

**PROTECTION OF THE BIODIVERSITY IN REGIONAL SPATIAL
PLANNING PROCESSES: A comparison between South Africa and Finland
- A summary of the most important aspects of MSc. Thesis**

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Summary of MSc. Thesis
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Keywords: protection of the biodiversity, regional planning, landuse planning.

Abstract

Protection of the biological diversity has become an important aspect of the land use planning process. This research compares the protection of the biodiversity in Finland and in South Africa in the regional planning proposals. The selection process for valuable nature areas to the provincial plan in North West Province, South Africa, is compared with three regional plans in Finland: Kanta-Häme, South Ostrobothnia and Northern Ostrobothnia. This thesis discusses mostly of the criteria used in the North West Province, South Africa and therefore no recommendations to improve the protection of bio-diversity in Finland are given. The valuable nature areas in North West provincial plan are mostly based on the North West Province Biodiversity Site Inventory and Database Development (2003) that has been prepared during the provincial planning process. In Finland the protected areas are mostly based on national investigations.

TABLE OF CONTENTS

TABLE OF CONTENTS.....	1
1. INTRODUCTION.....	2
1.1 The aim of the research	4
1.2 Protection of the bio-diversity in Finland	4
1.2.1 International agreements and national legislation	4
1.2.2 National goals for the protection of nature	5
1.2.3 National action plan for Bio-diversity in Finland 1997-2005.....	5
1.2.4 National Conservation programmes and the Natura 2000 network in Finland	5
1.2.5 Finland's Land Use and Building Act and National Land Use Guidelines	8
1.3 Protection of the bio-diversity in South Africa.....	11
1.3.1 National goals for protection of the bio-diversity in South Africa	11
1.3.2 The establishment of the conservation areas in the North West Province	12
1.3.3 The North West Province Biodiversity Site Inventory and Database Development	12
1.3.4 Key legislation and organisations in the North West Province	14
2. MATERIALS AND METHODS	16
2.1 Study area and the frames for the study	16
2.2 Materials	19
2.3 Research methods.....	19
3. RESULTS	20
3.1 Valuable nature areas of three regional plans in Finland.....	20
3.1.1 Regional plan of Kanta-Häme.....	20
3.1.2 Regional plan of South Ostrobothnia	21
3.1.3 Regional plan of Northern Ostrobothnia	21
3.1.4 Summary	22
3.2 Valuable nature areas in the North West Provincial Plan.....	23
3.3 Comparison of the valuable nature areas selection in Finland and South Africa	25
4. DISCUSSION	28
4.1 Protection of the biodiversity in regional planning procedures in Finland.....	28
4.2 Comparison of Finnish regional plans and the North West provincial plan.....	29
REFERENSES of the original Thesis.....	31

1. INTRODUCTION

Protection of the biological diversity has become an important aspect of the land use planning process. At the United Nations Conference of Environment and Development in Rio de Janeiro in 1992 more than 150 Governments adopted an agreement for sustainable development. Among these agreements was the Convention on Biological Diversity, which addresses the need for protection of the bio-diversity. Bio-diversity can be defined in three levels. It includes variation of different ecosystems and biological communities, variation of different species and variation of different genes within species (Primack 1993). In land use planning the most important levels of bio-diversity are ecosystem and landscape levels. Landscape level of bio-diversity presents the diversity of environmental types formed by ground features, vegetation and land use of that region. Bio-diversity is complex totality and different plans and projects can have a great influence on it. All sites are not similar and some areas are more sensitive than others. Sufficient nature investigations are needed in order to get the best results in land use planning processes. Decision makers need to notice also the reliability of the information (Söderman 2003). The reliability of the data depends on the level of verification (Roux 2005).

Moreover, there has been growing interest in the selection process of conservation areas. According to Margules and Pressey (2000) conservation reserves should be representative samples of the biodiversity of each region. The threats for the persistence of biodiversity need to be handled, because the reserves should separate the biodiversity from those harmful processes also in the future. It is useful to use two different perspectives in estimating how well the nature reserve represents the nature of the specific area. Firstly, why the area is selected *i.e.* which criteria are used. Secondly, whether the reserve network includes all ecosystems and vegetation types. Heikkinen et al. (1999) argue that while different criteria can be used, the main interest is to identify how well the reserve network protects the natural species, vital populations and ecosystems dynamics and the structural bio-diversity.

Some key theories and concepts related to this theme are minimum viable population, effective population size, metapopulation dynamic-theory, island-theory and the sink-source-theory. From these theories it is possible to develop some recommendations for

conservation. For example, the size of the area, border areas and connections to other similar habitats are important for the conservation areas. These recommendations, however should not be taken literally (Heikkinen et al. 1999; Newman 2000).

Traditionally the conservation areas have been selected on the basis of the size of the area, the species diversity, the species rarity and the threats of that area. Nowadays attention is paid to the whole conservation reserve network, and the new reserves should complement the existing reserve network. Different kinds of complementary-based methods have been developed to that purpose. The main aim of complementary-based methods is to identify network of reserves that maximise the representation of regional bio-diversity at the minimum cost. Furthermore, the sufficient representation of regional diversity and the issues that are critical for the long-term persistence of bio-diversity should be considered (Heikkinen et al. 1999 ; Virolainen 1999).

In land use planning the social and economical aspects need to be estimated together with the biological values. This needs a lot of co-operation among different professionals. The overall goal is to create sustainable society where people like to live in and the bio-diversity is protected for the future generations.

1.1 The aim of the research

The main purpose of this thesis is to compare the protection of the bio-diversity through spatial planning proposals in the North West Province, South Africa and in Finland. This comparison is actual, because Finnish and South African Governments financed together a project; *Support to Environment and Sustainable Development in the North West Province* to improve sustainable development and environmental planning in the North West Province. As a part of the project the North West provincial plan is in preparation at present. The selection process of valuable nature areas to the provincial plan in North West Province is compared with three regional plans in Finland: Kanta-Häme, South Ostrobothnia and Northern Ostrobothnia. This thesis discusses mostly of the criteria used in the North West Province, South Africa, and therefore no recommendations to improve the protection of bio-diversity in Finland are given.

Moreover this thesis was interested in the valuable nature areas and distribution of species in North West Province. This part was researched closely using the geographical information system (GIS) and statistical analysis. The statistical analysis and GIS-research are not included in this published report of the thesis.

1.2 Protection of the bio-diversity in Finland

1.2.1 International agreements and national legislation

There are important international agreements concerning the protection of bio-diversity in Finland. These international agreements consist of the International convention of biological diversity (1992), International convention on world heritage sites (UNESCO), the European Union Bird and Habitats Directives, Bern convention (29/1986) which has reference to the protection of the wild flora and fauna and their habitats in Europe and the International Ramsar convention (3-4/1976) that deals with the protection of the internationally important bird rich wetlands (Anonymous 2002 a).

The keystone legislation related to protection of bio-diversity in Finland consist of the Nature Conservation Act (1096/1996, changed 492/1997 and 371/1999), the Land Use

and Building Act (132/1999), the Forest Act (1093/1996), the Environmental Protection Act (86/2000), the Water Act (changed 88/2000), the Land Extraction Act (132/1999).

1.2.2 National goals for the protection of nature

The keystone goals for the protection of the nature in Finland are said in the Nature Conservation Act 1§:

- 1 To preserve the diversity of nature in Finland
- 2 To foster scenic values
- 3 To support the sustainable use of natural resources
- 4 To increase nature awareness and interest
- 5 To promote nature study

Targets for land use planning in Finland are defined in the Finland's national land use guidelines Issued by the Council of State (discussed later in paragraph 1.2.5.).

1.2.3 National action plan for Bio-diversity in Finland 1997-2005

The National action plan for Bio-diversity is designed for year 1997-2005 by National Commission for Biological Diversity appointed by the Ministry of the Environment. The purpose for the action plan is to meet the obligations decided in the Convention on Biological Diversity in Rio de Janeiro 1992. It is also based on the regulations of EU nature conservation directives. The main goal of the national action plan is to ensure national biological diversity. The biological diversity includes various floral and faunal species, natural habitats and ecosystems and also genetically important cultivated cereals and domesticated species in Finland (Kangas et al 1997).

1.2.4 National Conservation programmes and the Natura 2000 network in Finland

In Finland the main habitats of threatened species are forests. Especially herb-rich forests and old-growth natural forest are the main habitats for 43% of the nearly 1700

threatened species in Finland. One fifth of threatened species occur in cultural habitats (traditional agriculture biotopes *e.g.* semi natural grasslands, wooded pastures and meadows, ditches, cultivated land). Other important habitats are shores, rocky habitats, wetland habitats, mires and alpine habitats (Anonymous 2003d).

The network of conservation areas has been developed starting from 1970. A noticeable amount of habitats, species and communities are protected by various nature conservation programmes affirmed by the Council of State. The programmes have been developed gradually. The main purposes of the programmes have been to establish a versatile network of conservation areas and to unify the establishment of new protected areas around the country. The best available practices have been used to select the most valuable and representative sites to the programmes. The programmes cover state-owned and private land. The network of conservation areas include sites established to protect the general features of nature such as national parks, strict nature reserves and wilderness areas, and areas founded to protect specific ecosystems such as old-growth forest, herb-rich forest, mires and bird-rich wetlands. There have also been other criteria to select areas. Sites have been selected for example on the basis of cultural or scenic values, according to specific species appearance and remote or unproductive land (Salminen 1993; Anonymous 2003d).

In some conservation programmes the potential sites have been given positive or negative scores using various criteria. Used criteria have been for example species richness, size of the site, natural state of the site, scenic values or habitat degradation. The total value of the area has been counted summarising the scores of different criteria and sites have been ranked according to that total value. (Virolainen 1999). However, the selection process has been done by professionals in the field and the scoring method has been one tool for them. As mentioned above, the most valuable and representative sites, which have been created, developed and improved over decades have been selected to the conservation programmes.

The surface-area of the protected areas is higher in northern parts of Finland, because the only possibility to establish large protection areas was to create them on state-owned land (Salminen 1993). The state has also bought and changed private-owned land and private protection areas have been established. Moreover, landowners get some

compensation, if they establish private protection areas. Majority of the habitats of threatened species exist in southern parts of Finland. These areas are mostly built-up, thus establishing large protection areas is not possible. For that reason the small, but diverse sites are valuable in Southern-Finland (Kaipainen 1993).

The national conservation programme of national parks and strict nature reserves was established in 1978 and improved in years 1980, 1985 and 1988. The protected areas make the base of conservation areas network. National parks are open for public and represent widely the Finnish nature. The other conservation programmes complete the network. Valuable mire areas are protected by mire conservation programme (established in 1971, improved in 1981). National conservation programme of bird wetlands (established in 1982) include lush lakes and shores. These habitats have high diversity of birds and vegetation. The purpose of conservation programme of herb-rich forest (established in 1989) is to ensure the typical species of herb-rich forest around the country. Species diversity in forests is highest in herb-rich forests. The conservation programme of shores protection was established in 1990 to protect valuable shores and archipelago and prevent species to become threatened in those habitat types. The national conservation programme of old-growth natural forests (established in 1993, improved in 1996) is founded to protect the old forests and numerous species dependent on decayed wood. The national programme of the ridge protection differ from the other programmes, because it is carried out according to the Land Extraction Act and conservation areas are not established according to that programme. Other programmes are carried out according to the Nature Conservation Act (Salminen 1993, Anonymous 2003d).

The proposed areas to European Union Natura 2000 network include numerous amounts of sites covered by protection programmes and other existing conservation areas. The purpose of Natura 2000 network is to protect bio-diversity in European Union. The network consists of bird protection areas according to the EU Bird Directive and conservation areas of specific habitats and natural species according to the EU Habitat Directive (Anonymous 2003d).

Moreover, wilderness areas, rapids, surface waters that are in need of special protection and valuable rocky biotopes are protected in order to ensure the bio-diversity. The

Nature Conservation Act contains valuable habitats and the Forest Act comprises important living environments. These small areas are also protected. Valuable increase to the protection of the bio-diversity comes from the protected forest by The Finnish Forest and Park Service and Finnish Forest Research Institute. Also the state-owned camping sites and recreation areas contribute the protection of bio-diversity (Salminen 1993 ; Anonymous 2003d).

The selected areas for the conservation programme have been transferred to provincial plans in addition to proposed areas to Natura 2000 network and other important areas of the province. The other important areas have been selected primarily on the basis of ecological, biological or cultural values (Anonymous 2002c, 2003a, 2003b).

1.2.5 Finland's Land Use and Building Act and National Land Use Guidelines

The Land Use and Building Act (132/1999) came into force in the beginning of year 2000. The Section 28 defines requirements for the regional plans. When the regional planning in accordance with the new Land Use and Building Act started, the old regional plans in accordance with the old Building Act had been in force in every county (Anonymous 2001 ; Anonymous 2002 b).

The goal of Finland's Land use and Building Act (132 / 1999) is to create conditions for viable environment to live in and to promote ecologically, economically, socially and culturally sustainable development. Principles of land use and urban structure and important areas to develop the county are indicated in the regional plans. National land use guidelines are part of land use planning system in accordance with the Land Use and Building Act. These guidelines direct the regional planning and from the regional plans these guidelines are transferred into more detailed plans like master plans, town plans and shore plans. Plans in upper planning level need to be noticed in more specific plans (Söderman 2003).

According to the national land use guidelines areas including to the conservation programmes and decisions are to be indicated in the regional plans. Moreover, the aim of the national land use guidelines is to improve the preservation of natural values

which are not covered by national conservation programmes. There is highlighted that the preservation of bio-diversity should be included into all sectors of land use planning (Anonymous 2001; Anonymous 2002 b).

There are two kinds of national land use guidelines. The general guidelines outline the general principles concerning the land use planning. The special guidelines, on the other hand are obligatory. Below is shown the guidelines related to the protection of the biodiversity (Anonymous 2001; Anonymous 2002 b).

According to the general guidelines:

- Diversity of valuable and sensitive areas needs to be promoted.
- Ecological corridors between protected areas should be promoted. Corridors can be for example road crossing areas or subways for the animals.
- Natural and cultural tourism should be promoted without endangering nature conservation.

According to the special guidelines:

- The protection of nationally important natural and cultural heritage needs to be ensured by land use planning processes.
- The obligations of international conventions concerning the natural and cultural heritage need to be observed.
- The Council of State decisions need to be followed.
- The national inventories concerning the natural and cultural heritage need to be taken into account as background information of the land use planning.
- Nationally remarkable landscape areas and built up cultural heritage areas as well as important archaeological sites need to be assigned in the regional plans.
- Ecologically and recreationally important consistent areas need to be noticed and avoided splitting up in entities.
- Preservation of valuable shore areas and surface waters which are in need of special protection should be promoted.
- Good and consistent fields and forest should not be split into other types of land use.

As stated in the national land use guidelines the most important areas called “Areal entities of outstanding interest as natural and cultural sites” are the Archipelago Sea, the land-rise coast, the Lapland fell area and the Vuoksi waterways. These areas are important because they represent Finland’s national features and are also internationally unique areas (Anonymous 2001; Anonymous 2002 b).

In the regional plans needs to be indicated the regionally important nature values. Below is shown the criteria to help recognize these areas (Anonymous 2002 a):

- Sites of threatened, near threatened, specially protected or rare species according to the Nature Conservation Act
- Sites of valuable habitats mentioned in the Nature Conservation Act
- Naturalness of the area or possibility to restore the area
- Bio-geographical representativeness of the site
- Diversity of habitats and species in the area
- The importance of habitat types to the species
- The importance of site to the ecological network

1.3 Protection of the bio-diversity in South Africa

1.3.1 National goals for protection of the bio-diversity in South Africa

South Africa approved to keep the obligations of International Convention on Biodiversity (Rio De Janeiro 1992). To meet these obligations the White Paper on Biodiversity and the National Environmental Management Act were promulgated (Anonymous 2000).

National bio-diversity strategy in South-Africa is under construction now. The Global Environment Facility, through the United Nations Development Programme, has provided funding to develop the South Africa's National Biodiversity Strategy and Action Plan (NBSAP). Department of Environmental Affairs and Tourism (DEAT) has the overall responsibility for project implementation. The NBSAP is based on orders given in the new National Environmental Management: Biodiversity Act (2004). That legal status is important for the implementation of the plan. National Biodiversity Strategy and Action Plan will be one of the key tools for biodiversity management and protection in South Africa. The aim for NBSAP is to make the biodiversity related goals to be true by prioritised plans (Anonymous 2004 b).

The NBSAP will include strategies for the conservation of biodiversity, sustainable use of natural resources and fair sharing of benefits derived from the use of genetic resources. All levels of biodiversity are taken into account. It also include economic sectors that are depended on biodiversity such as tourism and fishery. Experiences from other countries are used and lot of work will be done to ensure the implementation of NBSAP (Anonymous 2004 b).

In some parts of South Africa there is already regional bio-diversity strategies and action plans to protect the bio-diversity. For example Cape Action Plan for the Environment (CAPE) project was established to preserve the globally unique Cape Floral kingdom and its associated marine and coastal environments. The CAPE project resulted bio-diversity strategy and the project has also successfully concentrated on

implementing the strategy and action plan. The Global Environment Facility carried the cost of the project and the World Wildlife Fund for Nature South Africa (WWF-SA) arranged it in partnership with government, communities and the private sector (Anonymous 2000).

1.3.2 The establishment of the conservation areas in the North West Province

The social and economical values of the area and the protection of the bio-diversity are the main criteria for selecting new areas for protection in North West Province. The existing nature reserves have been established in rural areas without pressure of other alternative use (Nel 2003). Most of the nature reserves in South Africa were (pre 1994) proclaimed on land that was given to the conservation department from other departments. Very few provincial nature reserves were proclaimed for their biodiversity or other conservation biology principles (Roux 2005).

The land ownerships present problems for establishing new protected areas. Land and particularly rare habitats in North West Province are mostly privately owned. According to the North West Province bio-diversity site inventory and database development report (2003) the conservation establishment has been more concerned with the big five parks (*i.e.* parks with elephants, rhinoceros, lions, buffalos and leopards for tourist attraction) than the habitat and ecosystem conservation (Anonymous 2003 c).

1.3.3 The North West Province Biodiversity Site Inventory and Database Development

The valuable nature areas needed to define in North West Province for the spatial plan. The North West Province ordered the Bio-diversity site inventory & database development from a private consultant. There was no database for species distribution within North West Province and therefore they concentrated on collation, classification and extrapolation of existing data (Anonymous 2003 c). Valuable nature areas were selected in the Spatial Plan according to the bio-diversity site inventory.

The diversity of species and ecosystems were seen highly important in bio-diversity site inventory. Reserve systems that represent land system diversity are likely to be representative of bio-diversity. As a result the areas which should be prioritised in terms of conserving bio-diversity were named: high and medium-high areas (hyper-diversity), important habitat types identified and areas with vast number of species with high conservation status. As a conclusion a map of critically important areas were produced (Anonymous 2003 c).

Hence, two different kind of bio-diversity maps were produced: average bio-diversity in the province and the hyper-diversity in the province. The hyper-diversity map is more useful for land use planning, because it combines all taxonomic groups and represents the highest rank within a habitat type. The ranking of bio-diversity was calculated according to the amount of species per grid / habitat code. Thus, the main used criterion is the distribution of species. The average bio-diversity map for the province was derived from the sum of all taxa rankings within a particular grid. Total hyper-diversity was calculated by combining all taxa (like average bio-diversity), but the highest ranking of any taxon represents the total ranking of particular grid or habitat type. For example if a particular habitat would contain high bio-diversity for avifauna and low bio-diversity for all other taxa, that habitat would represent a high hyper-diversity but a low average bio-diversity. For spatial planning purpose the hyper-diversity should be used, because then species diversity within a taxon would not be overlooked (Anonymous 2003 c).

The most important habitat types from 44 terrestrial habitat types and 3 aquatic habitat types were identified. Criteria for classification them and giving them high conservation priority was: uniqueness, importance or sensitiveness for conservation purposes. Grassland habitat types have the largest percentage transformed due to urban development, mining or agriculture. Some of them also include species with high conservation status (Anonymous 2003 c).

Sensitive species within the province for each taxon were identified. Each species sensitivity rating has been calculated from specific categories. These categories were: red data, endemism, extent of distribution, rarity, intolerance / sensitivity and indigenous. A pairwise matrix method was used in determining the importance of the

categories. After a scoring procedure species have obtained high, medium or low sensitivity / conservation status. An output map of sensitive species distribution was derived (Anonymous 2003 c).

1.3.4 Key legislation and organisations in the North West Province

Support to Environment and Sustainable Development in North West Province, South Africa is a Finnish – South African co-operation project operating on a provincial level trying to integrate all the organs related to the protection of the bio-diversity in the province even though the project office is located in the department of Agriculture, Conservation, Environment and Tourism in Mafikeng (Koivisto 2004).

Organisations related to the protection of the bio-diversity in North West Province (Koivisto 2004):

North West Provincial Government

- Department of Agriculture, Conservation, Environment and Tourism (DACET)
 - North West Parks and Tourism Board, Mafikeng
- Department of Developmental Local Government and Housing (DDLGH)

Organisations related to the protection of the biodiversity in national level (Koivisto 2004):

South African Government

- Department of Environmental Affairs and Tourism
 - National bio-diversity institute (before National Botanical Institute)
- South African National Parks (www.parks-sa.co.za)

The North West Parks and Tourism Board is responsible for two national parks, three game reserves, one recreation site and one heritage site within the North West Province. The Board is responsible to manage reserves cost-effectively and to protect wildlife resources (Anonymous 2004 b).

The National Biodiversity Institute is focused on conservation and sustainable use of plants. The institute has records of 25 000 plant species. In its three research centres and eight botanical gardens exist 10 000 different plant species (Anonymous 2004 b).

South African National Parks manages 20 national parks around the country. The most important responsibilities are development of tourism, conservation and local communities (Anonymous 2004 b).

Key legislation related on the protection of the bio-diversity in South Africa (Anonymous 2004 b):

- National Parks Act (57 of 1976)
- Environment Conservation Act (73 of 1998)
- National Environmental Management Act (107 of 1998)
- National Heritage Resources Act (25 of 1999)
- National Water Act (63 of 1998)
- National Environmental Management: Biodiversity Act (2004)
- National Environmental Management: Protected Areas Act (2004)

2. MATERIALS AND METHODS

2.1 Study area and the frames for the study

This study is part of the Environmental Support Programme financed together with Finnish and South African government. *Support to Environment and Sustainable Development in the North West Province (ESDNWP)* project was established to improve sustainable development and environmental planning. The project will contribute to the North West 2010 Provincial Development Framework and Zoning Plan. The bio-diversity site inventory and database development project relates to the Provincial Spatial Development Framework and Zoning Plan objective. The biodiversity site inventory is a source of information for spatial planners. The valuable nature areas were selected in the Spatial Plan according to a bio-diversity site inventory.

The criteria used in the bio-diversity site inventory to select valuable nature areas is compared to the criteria used in three regional spatial development frameworks in Finland: Kanta-Häme, South Ostrobothnia and Northern Ostrobothnia. The research discusses the land use planning in a bio-diversity-centred view. For that reason the traditional landscapes are the only cultural sites that are covered by this research. The sustainable use of natural recourses is not discussed in this research.

The study areas are the North West province in South Africa and the Kanta-Häme, the South Ostrobothnia and the Northern Ostrobothnia counties in Finland. Geographical locations of these two countries and their counties and the province can be seen from figures 1, 2 and 3. The area of North West Province is larger than all the three Finnish counties together and that applies also to the populations in the areas (Table 1).

Table 1. Area and Population of the North West Province in South Africa and Finnish counties.

County / Province	Area (km ²)	Population
North West Province	116 320	3 355 000
South Ostrobothnia County	13 459	194 542
Northern Ostrobothnia County	35 300	268 000
Kanta-Häme County	6 400	165 307

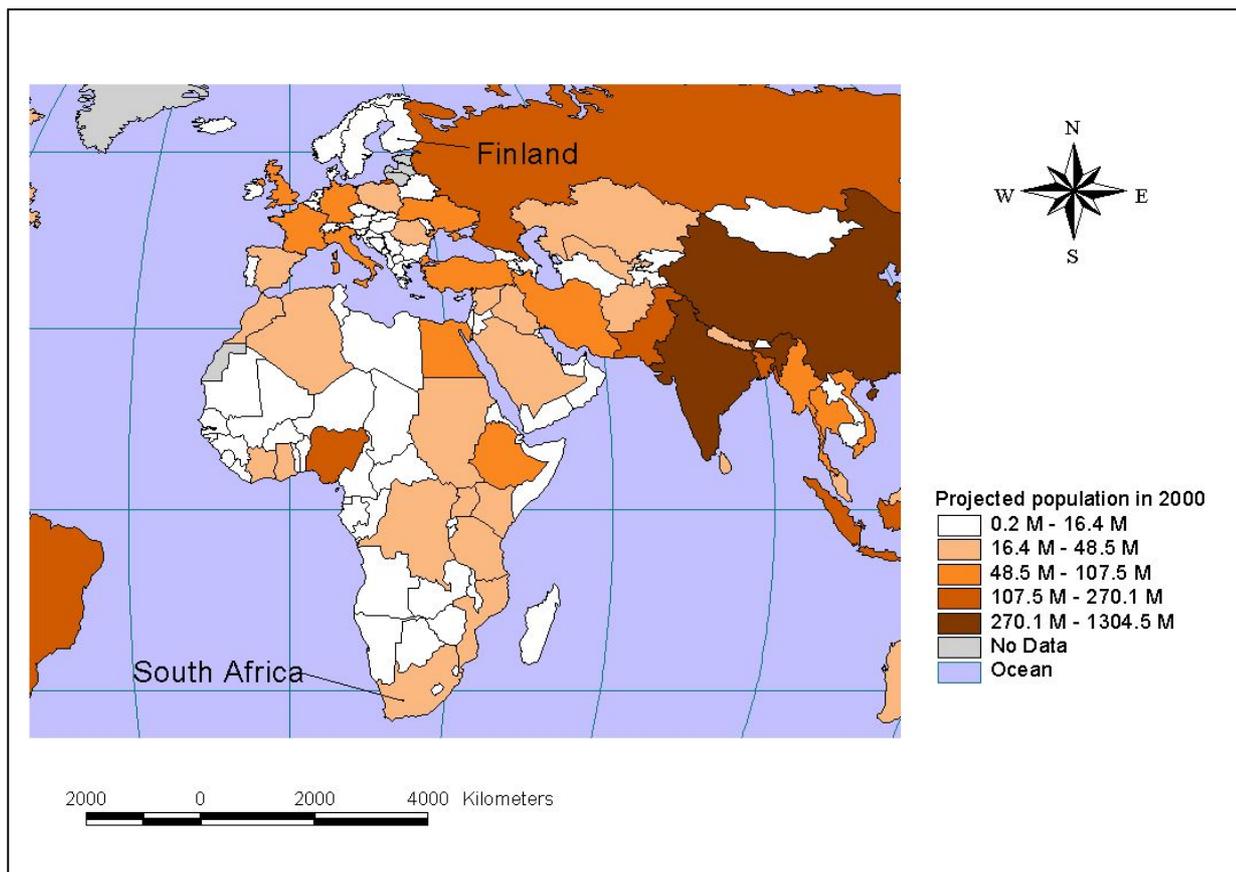


Figure 1. Geographical locations of Finland and South Africa. The map has been produced by Arc View Gis 3.2 program in GIS-laboratory in the University of Jyväskylä.

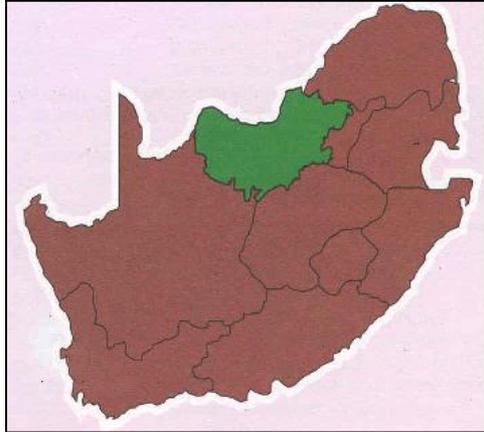


Figure 2. Geographical location of North West Province in South Africa. (Anonymous 2002 d)

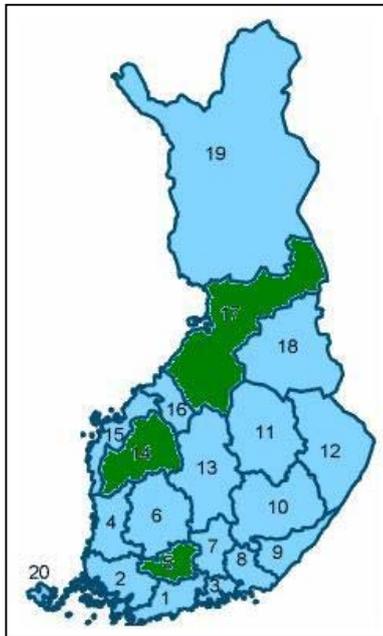


Figure 3. Geographical location of Kanta-Häme (number 5), South Ostrobothnia (number 14) and Northern Ostrobothnia (number 17) counties in Finland. (Anonymous 2004 c)

2.2 Materials

The material of three Finnish regional plans were from the regional councils of Häme, South Ostrobothnia and Northern Ostrobothnia. The material consisted mostly of maps and reports of proposed regional plans. North West Spatial Development Framework and Zoning Plan Proposals consisted also of maps and a report.

Information of the criteria used in selecting valuable nature areas in Finland were gathered from national conservation programmes and other publications. The North West Biodiversity Site inventory and database development provided that same information.

2.3 Research methods

The regional plans were compared by the reports and maps of regional plan proposals. More information were gathered from planners in Finland by e-mail. Some of the written documents were collected during the field work to South Africa in April 2003. During that time was also the final presentation of the Bio-diversity site inventory in Mafikeng and some informal interviews were done. Information were also gathered by interviewing Ms. Päivi Halinen and Ms. Katriina Koivisto from Central-Finland regional environmental centre.

3. RESULTS

3.1 Valuable nature areas of three regional plans in Finland

3.1.1 Regional plan of Kanta-Häme

The network of conservation areas is quite similar to the old regional plan. There are some new bird protection areas and one joined protected area for landscape and birds. New sites are also the valuable habitats mentioned in the Nature Conservation Act, valuable traditional agricultural biotopes, valuable rocky biotopes and moraine formations and road crossings over the highway.

The regional plan includes the areas of national conservation programmes and proposed areas to the Natura 2000 network. Other protected areas have been transferred from the old regional plan and these areas are based on earlier investigations. National investigations of surface waters needing special protection have been noticed. Finnish important bird areas (FINIBA) have been included to the regional plan. There are over 10 sites out of the national conservation programme of bird wetlands.

Traditional landscapes are mostly traditional agriculture biotopes. Juniper meadows, wooded pastures and landscapes made by horse management indicate the regional features. These areas are based on regional publication (Kanta-Hämeen perinnemaisemat, 2000, päivitetty 2003).

The valuable habitats mentioned in the Nature Conservation Act are woods rich in valuable broad-leaved deciduous species, hazel woods and common alder woods. These areas are investigated by environmental centre and based on their decisions. The conservation of ridges and valuable rocky biotopes are based on national investigations and provincial investigations (koko luontotyypin kattava käyttöselvitys). The protection of nature diversity, valuable habitats and species is based on national investigations for the national conservation programmes and other investigations made by the Häme regional council, municipalities, the Häme Regional Environmental Centre, the Finnish Environment Institute (SYKE) and the Geological Research Centre. There are three road crossings mainly for the elks.

3.1.2 Regional plan of South Ostrobothnia

The key areas for protection of the bio-diversity in South Ostrobothnia are proposed areas to Natura 2000 network, areas including in national conservation programmes, surface waters needing special protection and important areas for natural diversity.

Bird protection areas and landscape areas transferred from the old regional plan have been marked on the map with separate symbols. FINIBA areas have been marked with own symbol even if they are included in other areas such as the conservation areas and landscape areas. There are three surface waters (rivers) that need special protection according to national investigation.

Important areas for natural diversity are wide nature areas in Suupohja and Järvisoutu regions. These areas are diverse in their mire types and flora and fauna species. These areas are also important to the nature tourism. The Suupohja region is also important for ecological corridors. Even if there are no ecological corridors on the map, the corridors are going to be promoted. According to national investigation of traditional landscapes (1992-1996) there are 17 provincially and 135 regionally valuable traditional biotope sites within the province (Teräväinen 2003). There are no traditional biotopes on the regional plan, but the traditional built environments are mostly included into valuable areas for preservation of the cultural landscapes (Saartenoja 2004; Teräväinen 2004).

3.1.3 Regional plan of Northern Ostrobothnia

The land-rise coast belongs to the “Areal entities of outstanding interest as natural and cultural sites” according to national land use guidelines. Other valuable nature sites are mires, ridges, old-growth forests and bird wetlands. Fens and the best bird wetlands are the most representative in the country.

In addition to the national conservation programmes, five new mire protection areas have been added. These areas are based on provincial investigations during the planning process. The ecological corridors have been indicated.

Important areas for the nature diversity are valuable threatened species (flora) areas and Finnish important bird areas (FINIBA) outside of the national conservation programmes. The valuable areas for threatened species are transferred from the old regional plan. Also the important streams for threatened species and valuable rivers are included. The valuable ridge areas are based on national conservation programme and national investigations.

Nationally and provincially valuable traditional landscapes are included into the plan according to two provincial publications (Pohjois Pohjanmaan perinnemaisemat, 1997) and (Keski-Pohjanmaan perinnebiotoopit, 1999). These sites express the traditional source of livelihood, ensure bio-diversity and are important in scenic views. Nationally valuable rocky biotopes are included in the plan according to publication (Suomen ympäristökeskus: Luonnon ja maisemansuojelun kannalta arvokkaat kallioalueet Pohjois-Pohjanmaalla, 2001).

Nature tourism and recreation have been promoted by indicating large areas including valuable nature sites to the versatile areas. The nature values and protection goals must not be risked. These areas are based on provincial publication (Pohjois-Pohjanmaan arvokkaiden luontokohteiden hoidon ja käytön priorisointi, Pohjois-Pohjanmaan liitto, Metsähallitus ja Pohjois-Pohjanmaan ympäristökeskus, 2002).

3.1.4 Summary

All the Finnish regional plans included proposed areas to the Natura 2000 network, national conservation programme areas, valuable habitats according to Nature Conservation Act Valuable surface waters needing special protection, valuable ridges and moraine formations and nationally important bird areas (FINIBA).

In addition to the areas mentioned above regional plans include nationally and regionally valuable nature and culture sites. Recreation areas can complete the conservation network. Parts of protected areas, which are outside of the national programmes, have been transferred from old regional plans. For example five areas in

provincial plans of Kanta-Häme and South Ostrobothnia have been transferred from old regional plans of the counties.

Even though the ordinance of the Ministry of Environment (31.3.2000) is followed in all three plans, the use of plan symbols differ slightly between the plans. All plans seem to contribute the biodiversity related goals for land use planning that have been given in Finland's national Land Use Guidelines. The first notable difference between plans is that ecological corridors have not been indicated on the regional plan of South Ostrobothnia , but it is said in planning report that corridors are going to be promoted. Also the traditional landscapes are lacking from the regional plan of South Ostrobothnia. However most of the traditional built environments are included in valuable culture landscape areas. Third difference is that in the regional plan of North Ostrobothnia exist 5 new protected areas according to the investigations made during the spatial planning process.

3.2 Valuable nature areas in the North West Provincial Plan

The first draft of North West Spatial Development Framework and zoning plan proposals were commented by Finnish authorities and experts in December 2003. The zoning plan proposal include formal protected areas, proposed protected areas, conservancies, cultural heritage sites, dolomite aquifers, ridges (degree of slope > 5 %), rivers, wetlands, dams & pans, centre of endemism and areas of high bio-diversity. These sites are mostly based on Bio-diversity Site Inventory and Database development (2003) produced by a consultative company.

There are thirty-nine formally protected areas within the province. These areas are protected by law and include existing national parks and reserves managed by North West Parks and Tourism Board and nature reserves managed by municipalities and also the Magaliesberg (Anonymous 2004 a).

The areas that will be protected in the future are indicated also in the map. Expansion of the Kgalagadi-Molopo Transfrontier Park and National highveld Park (west of the

Potchefstroom) are in planning stage. Also a corridor between Pilannesberg and Madikwe Heritage Park is in planning phase. Conservancies include privately owned game reserves, ranches, farms and camps. There are rural, urban, township and industrial conservancies. Some of these areas are registered (Anonymous 2004 a).

Cultural and heritage sites include “archaeological sites, graves, forts, rock art sites, battlefields, conservation – worthy buildings as well as monuments, memorials and natural sites”(Anonymous 2004 a).

Critically important areas are mentioned. Wetland areas, which include rivers, streams, wetlands and pans, are one of the most endangered areas in South Africa. The Ramsar site (Barberspan Nature Reserve) is the only officially protected wetland site. Second critically important areas are dolomite eyes. These eyes are located underground and formed due to dissolution of dolomite. Dolomite eyes have unique species and they store large amounts of groundwater. Molopo, Marico, Malmani, Mooi, Schoonspruit and Harts Rivers are highly sensitive and should be legally protected. Thirdly hills and ridges are also critically important habitats from a conservation point of view. In these areas there is high diversity of flora species and habitats for sensitive species. All Mountain Bushveld habitat types (9/9), five of Kalahari Savanna Types (5/14), three Bushveld habitat types (3/9) and one Grassland habitat type (1/9) contain mountains, hills and ridges (Anonymous 2004 a).

Areas of high diversity include the critically important areas that have been defined in the North West province biodiversity site inventory and database development (2003). These areas are high and medium-high hyper-diversity areas, important habitat types and areas with remarkable number of species with high conservation status (Anonymous 2004 a).

Almost half (40%) of the Griqualand West Centre of Endemism (GWC) is located within North West Province. This area includes high percentage of plant species restricted only to that area (Anonymous 2004 a).

3.3 Comparison of the valuable nature areas selection in Finland and South Africa

The situations to make inventories and to prioritise and select the valuable nature areas in regional planning processes were different in Finland and South Africa. Also the whole planning process differs between these two countries (appendix 5 and 6). Protection of the biodiversity in Finland is based on conservation programmes which have been developed and improved during decades. Protected areas are mostly based on national investigations. The background that presents these areas as protected sites derives from selecting the most important and representative areas to provincial plans. The protected areas in old regional plans, Land use and Building Act and national land use guidelines facilitate the planning proposals. At present there are only a few provincial plans in South Africa and the whole provincial planning process is quite new. In the North West Province the valuable nature areas in the provincial plan are mostly based on the Bio-diversity Site Inventory (2003). Figures 4 and 5 show the different situations in Finland and South Africa.

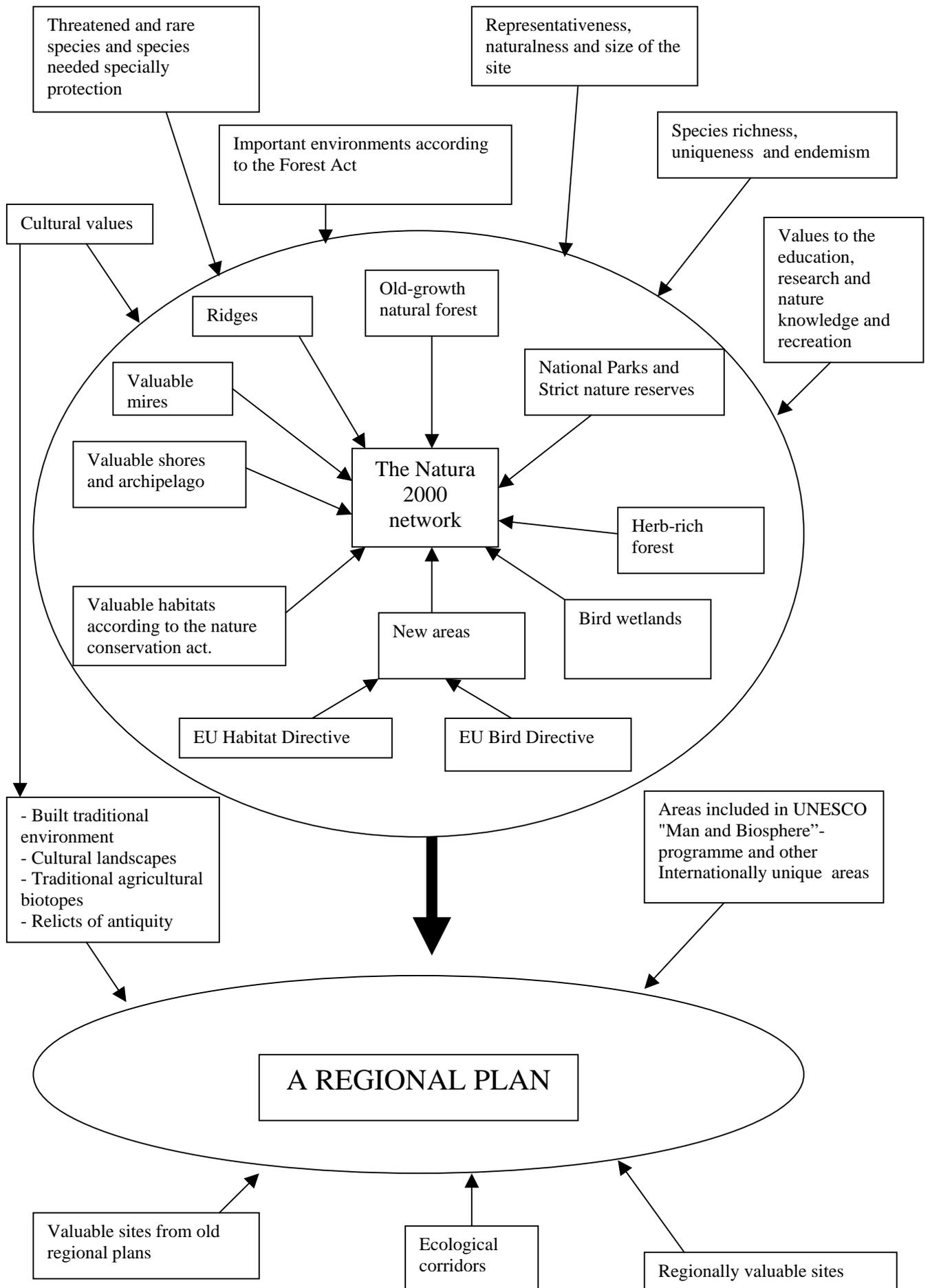


Figure 4. Selection of valuable nature areas to the regional plans in Finland.

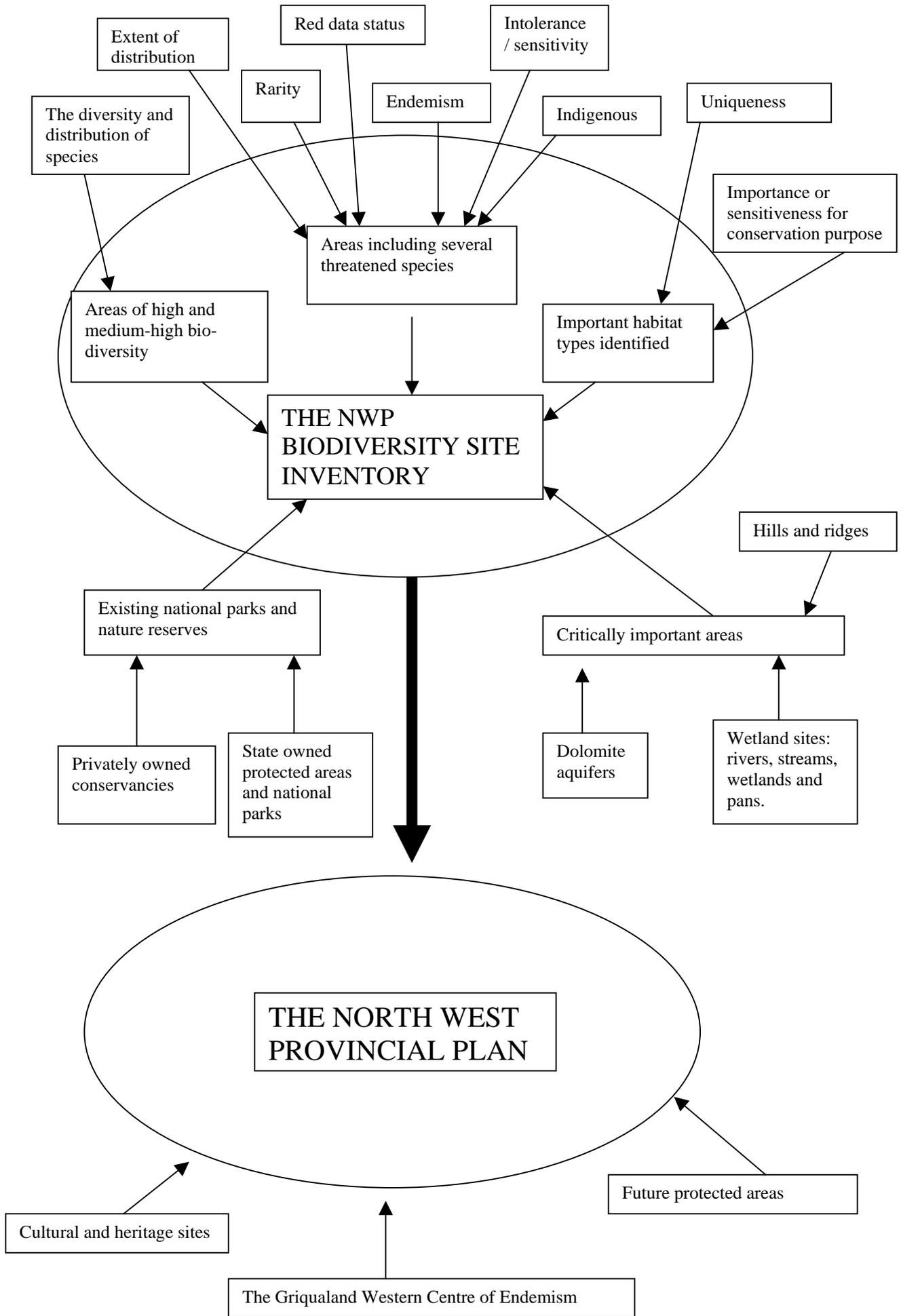


Figure 5. Selection of valuable nature areas to the North West provincial plan in South Africa.

4. DISCUSSION

A noticeable work was done to produce the bio-diversity site inventory in a relatively short period of time in North West Province. According to Halinen (2005) uniform methods to gather the information of species and habitats are needed. In Finland the information of species is in more accurate level than in the North West Biodiversity Site Inventory and database development (Halinen 2005). According to Hermien Roux (2005) the North West Provincial plan is not a competent example of conservation planning in South Africa. The other conservation plans in other provinces (Gauteng, KwaZulu Natal) are on a finer scale (a lot smaller than 1:50 000 level), as they include corridors and buffer zones and also programmes running to update and verify the data used in the plans. The North West Province Biodiversity inventory has problems regarding the reliability (not enough ground truthing, extrapolation at a coarse level, surrogate selection and criteria) and does not include enough current information on rarity and population dynamics. The NW inventory is a great start towards biodiversity conservation, but it needs to be refined and updated (Roux 2005).

Information gathered to the North West Province Bio-diversity Site Inventory and Database development (2003) were systematically transferred into North West Province zoning plan. Only the Taung Tuff Schrubveld habitat area was not proposed to be protected in North West Spatial Development Framework and Zoning Plan Proposals first draft (2004) even though it was classified as highly-important for protection the bio-diversity in the North West Province Biodiversity site inventory. However, the status of the area has been changed after that.

4.1 Protection of the biodiversity in regional planning procedures in Finland

The selection process of valuable nature areas in the Finnish regional plans is quite uniform in all three provincial plans: Kanta-Häme, South Ostrobothnia and Northern Ostrobothnia. Valuable areas are selected mostly based on national investigations. Söderman (2003) clarified the nature investigations as a part of planning process, environmental impact assessment process and Natura 2000-assessments. Also according to Söderman nature investigations as a part of the regional planning process

are mostly based on earlier investigations and results are presented in a general level. The goal for the nature investigations are to find the nationally and regionally valuable nature areas and ecological networks and to estimate the impact of the regional plan to these features. In a more detailed planning process the nature investigations are usually more accurate and include field investigations. The features of the area and the level of planning process have a great influence on the need and accuracy of nature investigations (Söderman 2003).

4.2 Comparison of Finnish regional plans and the North West provincial plan

The whole regional planning process differs between these two countries. In Finland the processes was easier to arrange, as there is a lot of earlier experience of it. The whole provincial planning process is quite new in the South Africa and in the North West Province the planning process has been led by private consultants. Therefore the implementation needs a lot of effort from the province. In Finland the Regional Environmental Centres supervise and promote the implementation of regional plans. That kind of authority would be needed also in South Africa to supervise and promote the information of provincial plan to transfer into municipal level planning (Halinen 2005).

The timetable of making inventories, prioritising and selecting areas have been quite different in these regional planning procedures. In South Africa the North West Province Bio-diversity site inventory and the whole provincial planning proposal have been done very rapidly. It did not take more than two years all together. In Finland the provincial planning procedures take about four years and it is based on readymade national investigations.

Some differences can be found from the maps of Finnish regional plans and the North West Province provincial plan. The proposed protected areas are indicated in the map in the North West provincial plan. In Finland these areas are not marked separately on the regional plans, but these areas are included in protected areas. On the other hand, the nationally valuable nature areas are not indicated separately in North West Provincial zoning plan, but other protected areas may include these areas. Also the traditional

landscapes differ between countries, which makes the comparison difficult. In Finland the traditional landscapes represent the features of early sources of livelihood. These traditional landscapes are usually divided into traditional agricultural biotopes (fields, meadows, grasslands, ditches, cultivated land etc.) and built traditional landscapes (buildings, roadsides, parks, yards, gardens etc.). The traditional agricultural biotopes are important habitats to protect the bio-diversity, because in these habitats live a whole range of special flora, fauna and fungi species (Teräväinen 2003, Halinen 2004). In South Africa the cultural and heritage sites seem to include mostly built traditional landscapes such as worthy buildings and memorial sites but also some natural sites.

However, some similarities can be found from all these plans in Finland and South Africa. The existing nature reserves and national parks are included in all plans. The critically important areas are defined in the North West Province Biodiversity Site Inventory and Database development (2003). These areas include the most important habitat types, areas with high diversity of species and areas important for sensitive species. In Finland the National Conservation programmes, proposed areas to Natura 2000 network and valuable habitats according to Conservation Act, cover these areas. These areas cover also the areas of endemism. Aquatic habitats needing special protection are identified and protected in South Africa and in Finland. Ecological corridors will be promoted according to land use planning in all plans.

Evaluation of nationally valuable nature areas differs in South Africa and Finland. The systematic biodiversity planning process has been developed in Finland and is needed also in South Africa (Halinen 2005). The South Africa's National Biodiversity Strategy and Action Plan will be an important tool for protecting the bio-diversity in South Africa. The legal status of that strategy makes it a strong tool to transfer different goals related to the protection of the bio-diversity into controlled action.

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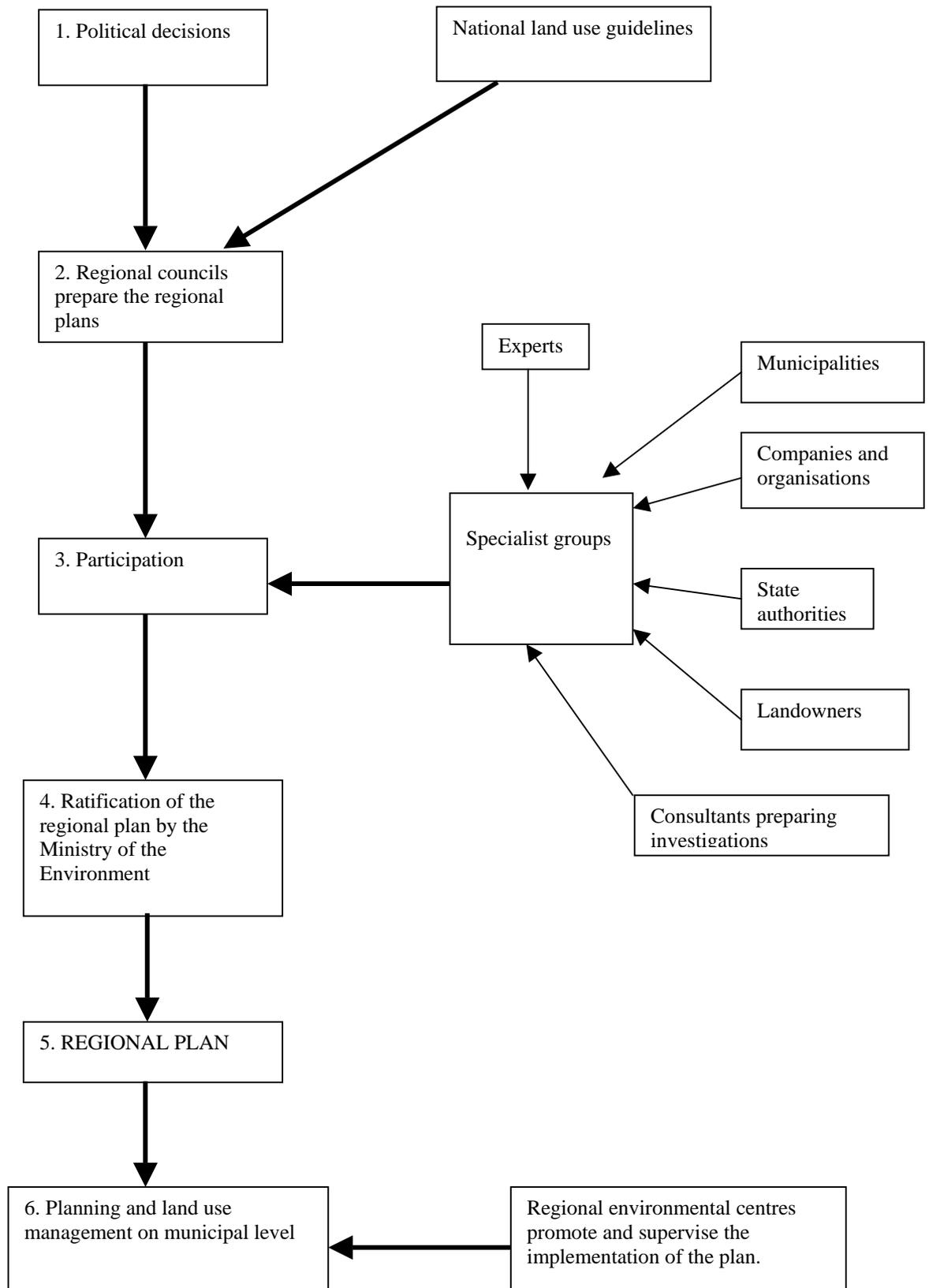
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REGIONAL PLANNING IN THE NORTH WEST PROVINCE, SOUTH AFRICA

