Chapter 8
The forest

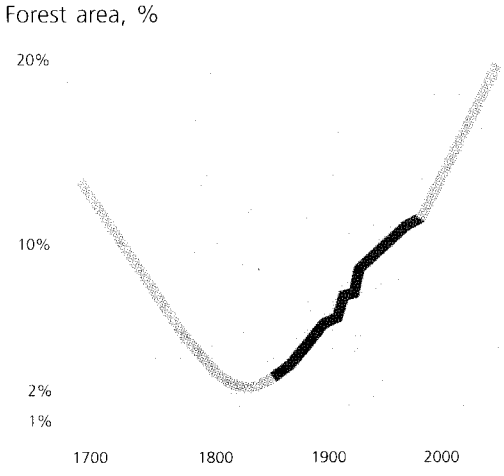


Fig. 8.1 Growth of forest area
Forests covered only about 2% of the country at the start of the 1800s. The area of our forests has grown by a factor of 5 since then. At the same time, forest management has changed

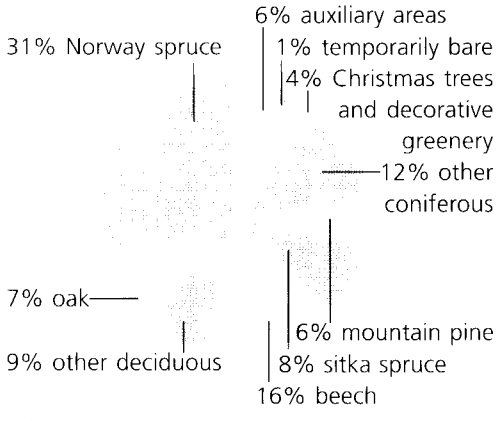


Fig. 8.2.
Utilisation of forest areas, 1990. (Source: Danish Bureau of Statistics, 1992.)

From virgin forest to planted forest

The greater part of Denmark was covered by virgin forest for a period after the last ice age. Then came the clearing of land for farming, which started about 6,000 years ago, and the resulting increase in the population led to the decline of the country's forest area.

By the start of the 1800s, the area of our forests had been reduced to just a few per cent of the country's total area. The forest was protected, and this trend reversed, by a number of ordinances, especially the *Forest Reserve Order* of 1805; see Fig. 8.1.

Since then, public and private *re-afforestation* have contributed to increasing Denmark's total forest area to 417,000 ha, or about 10% of the country's total area. The virgin forest is utterly lost today and natural forest, i.e. self-sown forest of Danish trees and bushes, constitutes less than 1% of the country's area.

Apart from the 417,000 ha of wooded forest areas, there is an estimated 100,000 ha of unwooded areas in, or in immediate proximity to, forests (lakes, bogs, meadows, heaths, etc.). These unwooded areas are usually counted in the *forest area*, for which reason the latter is normally quoted as being approximately 12% of the country's area. About a third of the forested area is publicly owned. The major part is managed by the Ministry of Environment and Energy. The remainder is privately owned.

Status of our forests

For reasons of production, forest plantations from the mid-1700s were largely

composed of non-native species, especially of conifers. Two-thirds of our wooded forest areas consist of conifers today; see Fig. 8.2.

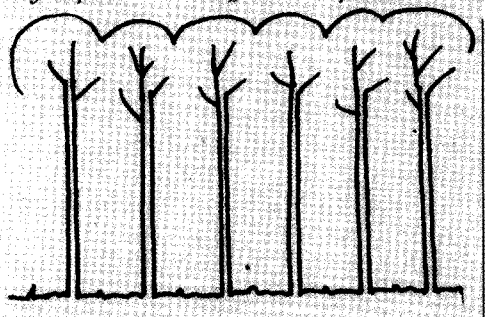
The *form of forestry* (Box 8.3) was changed with such instruments as the Forest Reserve Order into primarily monocultural, intensive high forest. Many light, open areas of grazing forest, hay meadows, small fields, etc., were gradually planted. Extensive drainage and afforestation were also carried out on bogs

Box 8.3

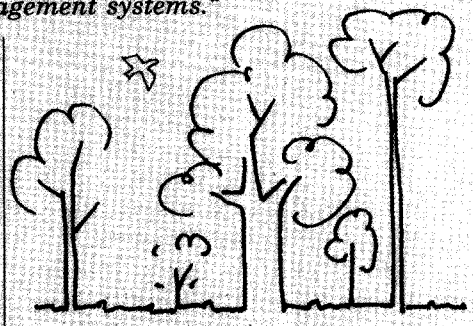
Ancient forest management systems

Intensively managed high forest is the habitat of many plant and animal species. These are, however, only some of the species that could occur in forests, if only other forms of management had been implemented. The biodiversity of a forest is, thus, highly dependent on its form of operation.

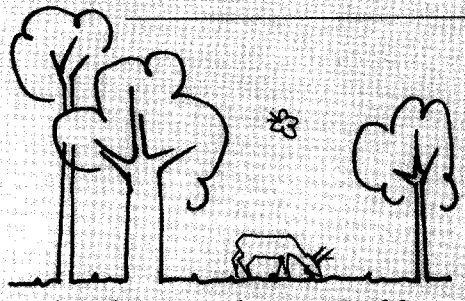
One of the elements of the Strategy for Natural Forests and Other Forest Types of High Conservation Value in Denmark is, therefore, the designation of forest areas for selective felling, as grazing forest and as coppice forest, generally referred to as „ancient forest management systems."



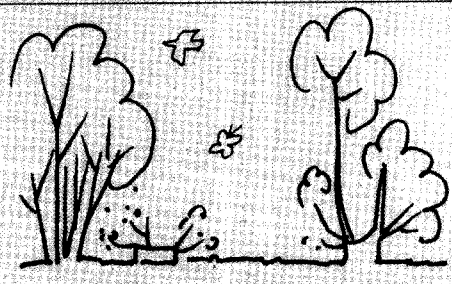
***High-forest-based forestry** is typically characterised by having only a single level of trees of the same species, age and height.*



***Selective felling** is high-forest-based forestry, but with tree species of all ages. This gives greater variation and, therefore, more habitats for plants and animals.*



***Grazing forest** is characterised by the fact that grazing animals create a lighter, more open forest, which increases the light and open and it increases the survival potential of heliotropic and thermotropic species.*



***Coppice forest** is rejuvenated through logging/pollarding subsequent to regular harvesting. This type of forest is survival potential of heliotropic and thermotropic plants and animals.*

and small lakes.

Where the boundaries between forest and fields had previously been loose, and the forests often had the character of commons, the change in operation resulted in sharply-drawn boundaries that followed straight lines. This brought about a diminution in the extent of the ecologically important boundary and transition zones between forest and open countryside.

One result of such manifestations as intensified operation is that, *as an ecosystem, the forest* has been fundamentally altered and, therefore, that occurrences of a large number of habitats have been drastically reduced. Not least impacted are the light, open habitats.

Box 8.4

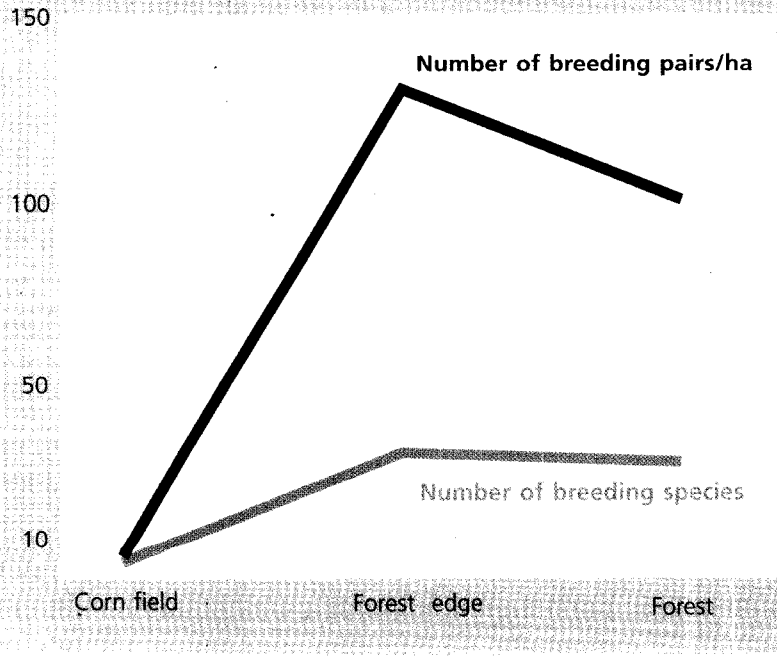
Forest edge

Forest edge is an important Danish nature type. It contains a large number of original Danish tree and bush species.

The edges of our forests are also the sites of rich herbaceous vegetation and the habitats of many animals.

For these reasons, the edges of forests are protected by the provisions of the Forest Act, which also makes it possible to obtain support for laying out new forest edges.

Forest edges also contain a great variety, for instance, of breeding birds, from the standpoints of population density and number of species. This great diversity is due to a border effect and to the great variation of habitats in forest edges. The greatest diversity can be found in old deciduous forest edges, where up to 22 breeding pairs/ha have been found in Denmark. (Source: S. Brøgger-Jensen, in Fodgaard, 1994.)



Modern operating methods have meant a decline in the number of old, dead or dying trees. Dead wood is vital as a habitat for a number of birds, bats, insects, fungi, etc.

The changes that have occurred have meant that many of the original *species* of our mature forests have become rare or extinct. According to the Ministry of Environment and Energy's Red Data Book of rare and endangered species (see Chapter 10), intensified forestry is the greatest single threat to these species. Over a third of the Red Data Book's total of 3,176 species is thus considered to be endangered, not least because of intensified forestry. Conversely, it is precisely in natural forests and virgin forests that we can conserve the greatest number of plant and animal species/ha.

There will always be a reduction in the genetic variation of all species that suffer drastic cuts in their numbers and in the areas over which they range. Similarly, there has been a loss of biodiversity from the standpoint of the *genetic resources* of silvian organisms. This problem is most clearly manifested in our natural forest trees. The original native species and locally adapted strains have been pushed back by alien strains. Together with our strategy for conserving genetic resources, this problem is discussed in more detail in Chapter 11.

Current protection performance

Legislation

The Forest Act, the Nature Protection Act and the Act on Hunting and Wildlife Management state general goals for promoting the conservation of biodiversity.

The Forest Act ensures that forest reserves are kept under forest cover. The Ministry of Environment and Energy estimates that about 90% of Denmark's forest areas are „fredskovspligtige," i.e. must be wooded in perpetuity.

The Forest Act also contains rules governing other types of habitat. Thus, lakes, watercourses, bogs, uncultivated dry meadows, coastal meadows, coastal reed beds and heaths that are in forest reserves must not be cultivated, drained, planted or otherwise altered, regardless of their size. Moreover, the Forest Act contains rules on the preservation of oak coppices and of forest edges consisting of deciduous trees and bushes. The Nature Protection Act rules that govern the protection of certain nature types, etc., also

Suserup Forest, Mid-Zealand, one of Northern Europe's best forests that bears the stamp of the virgin forest.

apply to areas that satisfy the conditions for protection and that are located in forests.

Pursuant to the Forest Act, special weight shall be attached in publicly-owned forests to considerations of scenic, nature-historical, culture-historical and environmental protection, together with consideration for open-air activities.

The Nature Protection Act makes it possible to protect or purchase forested areas that contain natural assets in particular need of protection.

Subsidies for nature improvement in private forests

The Forest Act sanctions subsidies that benefit deciduous forests in private forestry. The deciduous forest subsidy scheme makes it possible to grant subsidies for promoting the cultivation of deciduous trees and for laying out new forest edges, with their native deciduous trees and bushes. Subsidies can also be granted for the preservation of old trees. For 1995, DKK 19 million has been reserved for grants under the deciduous forest subsidy scheme.

The Forest Act also makes it possible for the State to support the management of private forests of particular natural interest. This scheme is aimed primarily at such forest types as untouched forest and coppice forest, which private forest owners would perhaps not otherwise maintain for economic reasons. For 1995, DKK 10 million has been reserved for grants under this scheme.

Pursuant to the Structural Development Act, private owners can also obtain subsidies for satisfactory multi-faceted forestry.

Area of forests to be doubled

The explanatory statements of such acts as the Nature Protection Act (former Nature Management Act) and Forest Act, as well as the Government's report on forestry policy, state the goal of doubling Denmark's forest area, from the present 12% to about 25%, over the coming 80 to 100 years.

This expansion of our forest area is to be implemented through the afforestation of agricultural land. It is assumed that half of the job will be done privately and the remainder by public instances. A significant part of this public afforestation will be carried out close to urban areas, in recreational forests that have a high proportion of native deciduous trees and bushes. Natural overgrowth will also be permitted to a certain extent.

Since forest expansion will take place on agricultural land it will benefit biodiversity, without this taking place at the expense of the diversity of other nature types.

Strategy for Sustainable Forestry

In 1993, the Minister of the Environment appointed an interministerial committee of government officials, which was assigned the task of drafting a consolidated Danish forestry policy in the spirit of the Rio Conference. The result of this was the report entitled *Strategy for Sustainable Forest Management*, of 1994. With this strategy Denmark has, as one of the first countries in the world, established a set of criteria for the concept of sustainable forestry. At the highest level, these criteria are classified into the *utilisation* of forests, the *protection* of forests and *socio-economic aspects* relating to forests.

The strategy asserts that, where the Forest Declaration of the Rio Conference is concerned, it is the responsibility of the national authorities to adopt the necessary acts and goals and, possibly, to encourage forest owners through subsidy schemes. The development over a period of forests in general is more important than the instantaneous situation of a particular stand. The primary goal is that all areas in forests be managed with the greatest possible degree of diversity, which means that trees shall be produced and that consideration shall also be gi-

ven to biodiversity, open-air activities, scenic values, etc.

Strategy for Natural Forests and Other Forest Types of High Conservation Value in Denmark

The Minister of the Environment presented the *Strategy for Natural Forests and Other Forest Types of High Conservation Value in Denmark* in 1992 (which was published in 1994, as an illustrated book with English and Danish text). The primary purpose of this strategy is to conserve the biodiversity that is linked to the forests. It applies to publicly and privately owned forests. The horizon of the strategy is 2040, with interim goals by 2000. It is a continuation of the conservation work of recent decades, the amendment of the Forest Act and the plans for doubling the total forest area within a tree generation.

Some of the goals have already been attained, as the following have already been implemented in *State forests*:

- safeguarding of natural forests;
- safeguarding of all oak coppices, coppice forests and forests similar to virgin forests;
- designating of 65 cohesive areas of between 25 and 1,000 ha, in which the forest shall either remain untouched or be operated under „old forms of operation".

During 1993-1994, a total of over 9,000 ha of the Ministry of Environment and Energy's areas were designated for old forms of operation or as destined to become untouched forest. This corresponds to 8% of the wooded area of the State forest. 3,500 ha shall remain untouched, whereas 5,700 shall be operated under old forms of operation. During 1994, the designation procedure has taken place in public consultation and the responses have been embodied into the final document. The designation of natural forest areas has meant that the goals for 2000 have almost been attained.

The Forest Act's management scheme, conservation orders and public acquisitions are the primary tools for attaining the Natural Forest Strategy's goals on *private property*.

A strategy for conserving the *genetic resources of trees and bushes* is described in more detail in Chapter 11.

Project „Green Forestry"

In 1994, the Government decided to support the multi-faceted operation of State forests. This was a consequence of the Strategy for Sustainable Forestry and of the Government's forestry policy report.

This support will be given, for instance, through the *„Green Forestry" project*, the tangible measures of which include:

- nature restoration and management, such as the restoration of wetlands and clearing for heaths;
- conversion of conifer plantations/ stands to deciduous forest, including the admixture of deciduous trees in coniferous cultures;
- underplanting of coniferous trees with deciduous trees;
- increasing forest variation by planting deciduous trees and bushes in small groups;
- establishing additional inner and outer deciduous fringes, with a high content of native species;
- increasing the importance of non-chemical clearing methods in newly-planted forests;
- implementing costly elements in the Natural Forest Strategy;
- implementing courses on sustainable forestry for employees in State forests.

Recording of key biotopes

The Ministry of Environment and Energy has started a project for the computerised recording of plant and animal habitats especially worthy of protection in State forests *(key biotopes)*. The system is expected to be debugged and run-in in conjunction with the regular revision of

the management plans of the State forest districts. It will be continuously updated thereafter. Registration is intended to make it easier to give consideration to key biotopes in the planning and implementation of forest operation in all areas of the state forests.

Trends

Forest cultivation systems intended for clear cutting followed by replanting are often used in forestry. To some extent, these cultivation systems are now on the way to being replaced by more nature-oriented methods, in which are used stands that age at differing rates, several types of tree in the same area and, to the extent possible, natural rejuvenation through self-sowing.

As has already been mentioned, the use of coniferous trees is extremely widespread. This has proved to be inappropriate in certain areas, as significant problems of health and stability have been ascertained in many places in coniferous forests growing on low-nutrient soils. For this reason, the State's coniferous plantations are slowly being reorganised into more stable and varied plantation systems, and consideration is also being given to the question of whether the introduction of similar reorganisation can be hastened in private plantations.

Soil preparation, fertilisation and use of pesticides

Forestry is a gentle way of using soil; the soil is normally only prepared either once in the course of a stand's life (i.e. at intervals of 50 to 150 years) or never. The use of fertilisers and pesticides is very limited, in comparison, for instance, with conventional agriculture, and the leaching of nutrients from forest soil is negligible.

Fertilisation and spraying are used primarily in connection with the cultivation of Christmas trees and decorative greenery. Work is in progress on the development of mechanical and biological clearing methods for the production of Christmas trees and decorative greenery, as replacements for weed spraying.

Forthcoming efforts

Expressing Ministry of Environment and Energy's strategies and projects

The *Strategy for Sustainable Forest Management* enumerates a large number of points in our forthcoming efforts. These points are intended to ensure that all 18 criteria for sustainable forest management are met.

Project Green Forestry will continue provisionally during 1995, as a tangible expression of the strategy.

Generally, more natural forestry methods will be used in State forests in the future, for instance, through the planting of more deciduous trees and bushes in coniferous forests and through the use of stands that age at differing rates, the planting of varieties of tree species in a

given area and, as far as possible, natural rejuvenation through self-sowing.

The *Strategy for Natural Forests and Other Forest Types of High Conservation Value in Denmark* specifies interim goals for the year 2000 and a final goal for 2040. The designation of natural forests in State areas has meant that the strategy's overall interim goals for 2000 have almost been attained already. The Natural Forest Strategy will be reviewed in the year 2000, at which time its tangible expression will also be reported.

The registration of *key biotopes in State forests* should be carried out continuously, in step with the drafting of operating plans for the individual state forest districts.

Afforestation

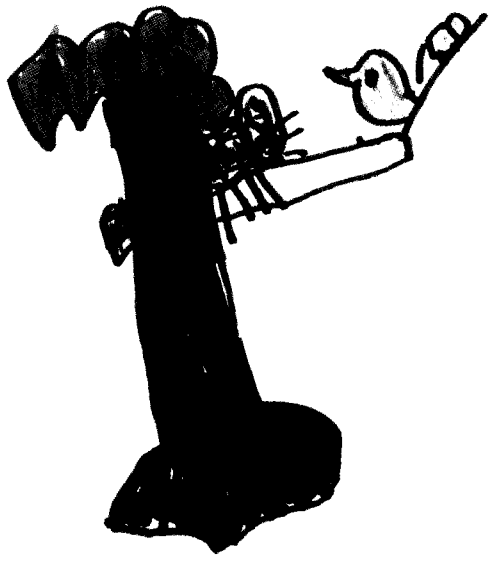
The expansion of our forest areas shall continue in conformity with our goal of doubling the total forest area during the course of the coming 80 to 100 years. A short-term goal is to increase the total forest area from about 500,000 ha at present to 650,000 ha over the next 30 years. To a limited extent, this expansion shall occur through natural overgrowth.

Reduction of pesticide consumption

The development of mechanical clearing methods for the production of Christmas trees and decorative greenery shall be continued, with a view to reducing the consumption of pesticides currently used for this purpose.

Forest Act management scheme

As of 1995, the forest management scheme will be extended to an annual DKK 10 million. At the same time, the scheme will also be split in two. The general management part will continue to concern large and small projects, which are usually of limited duration, and small areas containing untouched forest. The other part deals primarily with subsidies for the designation of areas of over 10 ha for development as untouched forests, i.e. forests in which no form of intervention takes place. Moreover, intervention for management purposes during the transition to untouched forest, and associated areas under other forms of operation that can improve the total value of the area, can also be included.



Target areas

Natural Forest Strategy
Before 2000

- Safeguarding an *untouched forest area* of at least 5,000 ha, of which 1,500 ha are in private forests.
- Ensuring the application of old forms of operation on at least 4,000 ha.
- Starting target-oriented research, e.g. for the benefit of the preservation of our forests' biodiversity, and acquiring more fundamental scientific knowledge of silvian ecosystems, their dynamics and sequence of development.
- Propagating information (on natural forests, untouched forests and old forms of management) on a broad front to forest owners, forest users and visitors to forests.

Before 2040

- Ensuring the presence of natural forests, untouched forests and old forms of operation on at least 40,000 ha, which corresponds to about 10% of Denmark's present total forest area.
- Designating areas in which natural overgrowth can contribute to extending such areas with natural forest.
- Establishing better spreading opportunities for endangered plant and animal species.

Other areas

- Expressing the goals of the Strategy for Sustainable Forest Management.
- Conserving 3 to 5 trees/ha up to the greatest possible age, their subsequent death and natural decay, when rejuvenating deciduous forests of Danish tree species in State forest areas.
- Extending the total forest area in conformity with the goal of doubling our forested area over the coming 80 to 100 years and, in this context, working to increase the total forested area from the present 500,000 ha to 650,000 ha during the next 30 years. In State forests, afforestation shall take place on the basis of forest locality planning.
- Directing public afforestation to recreational forests, with a high percentage of deciduous trees and close to urban areas, to forests that have a protective effect on the water table and surface water and to forests that can function as ecological *stepping stones*.
- Implementing more natural silviculture methods in State-owned forests, e.g. by using stands that age at differing rates, greater numbers of tree species in a given area and, as far as possible, natural rejuvenation through self-sowing.
- Continuous recording of key biotopes in State forests in conjunction with periodic forest management planning.

Chapter 9
Urban areas

Status of towns as habitats of wild plants and animals

Urban areas contain diverse plants and animals that have been able to adapt themselves to the special conditions prevailing in man-made environments.

The biodiversity of urban areas is important in many ways. The cities and towns are *everyday nature* for most of the Danish population, as about 85% live in urban areas. A block of single-family houses can contain innumerable potential sites for wild plant and animal life, which is concentrated in only a modest area in comparison with corresponding conditions outside the town.

Thus, there are species in our urban areas that are more or less peculiar to

Box 9.1

Conditions of life of wild plants and animals in urban areas

The walls of buildings in urban areas have become the habitats of a number of wild plant species that are adapted to a dry, low-nutrient, calciferous environment. Lichens are spreading, in part because of concrete substrates, where new species are appearing and old, familiar species are returning after a 25-year period of high air pollution, which began at the start of the 1960s.

Studies conducted in the 1970s, of lichen flora on roadside trees in Copenhagen, show that the large foliose species in particular have declined dramatically in the course of just a few years. The main cause of this has been air pollution. Measures for reducing the emission of pollutants into the atmosphere have reduced the level of air pollution, for which reason certain lichens have already reappeared.

In the mid-1980s, the Århus local press published a request from the Danish Botanical Society for information on occurrences of an orchid, the broad-leaved helleborine. This resulted in about 50 responses on finds in gardens, and even between the paving stones of Århus' well-wooded suburbs.

Several species of wild animal have moved into urban areas as they have grown accustomed to the proximity of man and his activities. They have established permanent populations and many of them, such as the fox, use the town as a larder.

The swift, black redstart and particoloured bat represent species that were originally adapted to cliffs and mountainous areas. They have found breeding grounds in the tall buildings of urban areas.

The meal beetle needs warmth and is widespread in Denmark today. It is often found in human dwellings, outhouses, chicken runs and dovecotes. Its larva, the meal worm, thrives in places where corn or flour are stored. The grub also occurs in sparrow nests, where it lives on the birds' droppings.

the urban landscape because of its special climate, variegated topography, the differing conditions for life and the often abundant supply of food; see Box 9.1.

Urban ecology

The concept of *urban ecology* was introduced at the end of the 1970s. Urban ecology considers the activities and physical structure of towns from an ecological, holistic angle. The goal is to create more natural, environmentally-oriented urban areas, where there is reduced consumption of polluting substances, energy and water. It is hoped to attain this through the local use and recycling of resources, and by *safeguarding and improving* the conditions for wild plants and animals; see Box 9.2.

The Ministry of Environment and Energy's urban ecology committee, appointed in 1993, has subsequently redefined the concept as follows: *„Urban ecology" denotes a special effort on behalf of the environment which, taking its point of departure in the environmental condition of a particular area and in the participation of the local inhabitants, attempts to promote holistic approaches to problems associated with the area's consumption of*

Box 9.2

Initiatives for safeguarding and improving the conditions of wild plants and animals in urban areas

Nature-oriented *and balanced arrangement, design and care of such public sites as parks, cemeteries and rainwater basins. This can be attained by including „wild corners", where fallen leaves, branches and tree trunks are left to lie and where unwanted trees are not felled, or by conserving old nesting trees.*

Promoting *ecological park techniques; see Box 9.3.*

Reducing *the consumption of pesticides to only the most necessary level and replacing weed-killers by sowing nurse crops and spreading wood chips.*

Preserving *and cleaning bogs, lakes, dams, ditches and other ponds.*

Re-opening *piped watercourses and re-establishing their green zones.*

Safeguarding *and improving the propagation passages of wild plants and animals in and to and from the town, e.g. by integrating the ecological corridors of the open countryside, in the form of ditches, hedgerows and watercourses, when planning new urban areas.*

Choosing *trees and bushes of native origin, or which are characteristic of the vicinity, and a mixture of Danish herbs when planting and sowing.*

Reducing *the need for the clearing of wild plants from ditches to only the most necessary, and preventing the location of heaps of sand, gravel, brushwood, etc., adjacent to ditches.*

Setting up *various types of nesting box, specific to animal species, as a replacement for the lack of breeding and living space for these creatures in modern buildings.*

These initiatives can be included as a phase in the urban planning of green spaces, as part of teaching programmes and nature presentations or as independent „grass-roots" initiatives.
(Source: Ministry of the Environment 1991c.)

resources, loading on the environment and nature content.

Thus, consideration for the wild plant and animal life found in towns is crucial to the concept of urban ecology.

Threats to urban nature

One of the most serious threats to urban wild plant and animal life is the destruction of habitats that has occurred in conjunction with increasing urbanisation. The piping of watercourses, intensification of park operation and management of green spaces, accompanied by the increasing consumption of spraying agents and the asphalting and suchlike of large areas in association with urban development, are all factors that limit the opportunities for the survival of wild plants and animals.

Another threat is the increasingly intensive use of green spaces and resting areas for building projects, roads, etc. This interrupts the propagation passages of wild plants and animals.

Increasing air pollution was responsible for the gradual impairment of the conditions for wild plants and animals that occurred throughout the 1960s and 1970s. However, a goal-oriented effort that started in the mid-1980s reduced air pollution, for instance, by reducing the sulphur content of heating oil and through conversion to natural gas.

Current protection performance

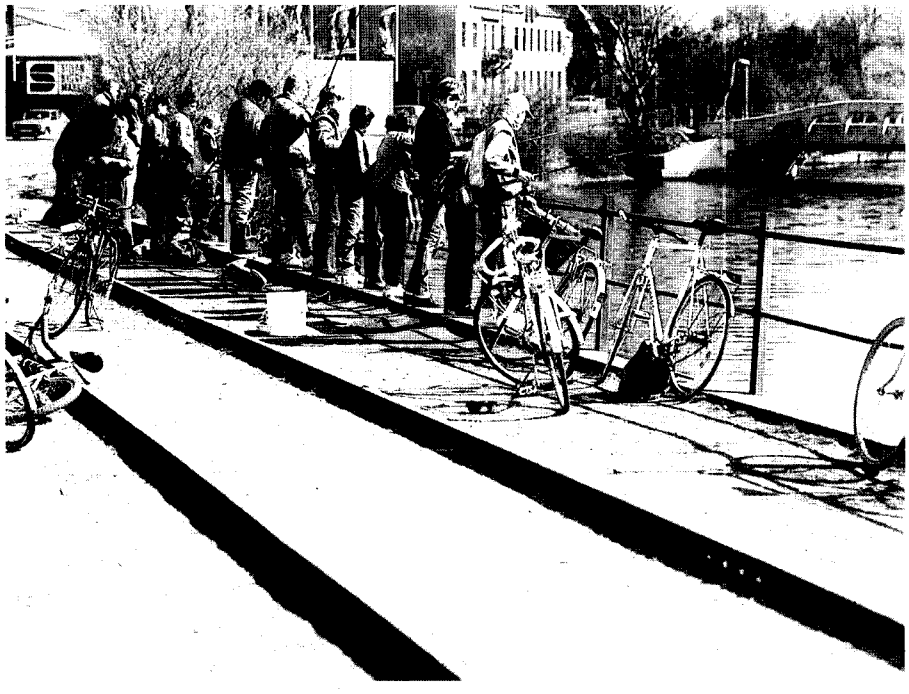
The Nature Protection Act's conservation scheme for a number of nature types is mentioned in Chapters 4 to 8; see Fig. 7.7. In urban zones, its protection provisions apply to their full extent to watercourses that are designated as protected and to lakes, bogs and suchlike, whereas they apply only to agricultural changes in the status of heaths, salt marshes, swamps and coastal meadows, humid permanent grassland and uncultivated dry meadows. Stone and earth dikes in urban areas are not covered by the conservation scheme.

Thus, most of the habitats of wild plant and animal life in urban areas are only protected to a lesser degree, as compared to the situation in the countryside. If we are to provide for urban biodiversity, a number of initiatives are needed in the fields of planning and information.

The Urban Ecology Committee of the Ministry of Environment and Energy issued a report entitled Recommendations on Urban Ecology in 1994. Of its tangible recommendations relevant to nature, the report proposed that the programme for natural guidelines in urban areas be continued and extended and that nature restoration projects be carried out within the boundaries of urban areas. Finally, it proposed that the Ministry of Environment and Energy give guidance on integrating consideration for plant and animal life into our management of urban areas.

Parliament has adopted the Green Fund Act as a result of this report. This fund makes it possible to finance a wide range of initiatives for promoting a „green" life style, which also includes urban ecology. The Ministry of Environment and Energy has appointed a board to make decisions on applications for funding.

The theme of the Ministry of the Environment's 1991 annual nature monitoring meeting was *„Nature in urban areas"*, as was the title of the subsequent yearbook. The book deals with such subjects



as elementary conditions of life, the development of habitats for wild plant and animal life, nature-oriented urban planning and the management of green spaces in urban areas; see Box 9.2.

In 1992, the project group *Ecology of Major Nordic Urban Areas*, which is subordinate to the Nordic Council of Ministers, held a symposium on nature in urban areas. Central subjects were, for instance, potential for specific action, ecological processes, the perception of nature in urban areas and urban ecology in the Nordic countries. The symposium issued a report in 1994.

The project *„Better Urban Environment"* was started in mid-1993 as one of the Ministry of the Environment's exemplary projects. For the purpose of conserving biodiversity, overall goals were set in the project for safeguarding varied habitats for the wild plants and animals in these urban areas.

Urban-Ecological Opportunities and Social Perspectives in the Planning and Management of Green Space is the title of a project started in 1994 by the Danish Forest and Landscape Research Centre and the Danish Building Research Institute. The aim of the project is to establish a theoretical basis on which to develop practical methods and strategies for a changeover to urban-ecological planning and the management of green spaces, including measures for the benefit of biodiversity.

Forthcoming efforts

Planning and management

Together with their habitats, the wild plants and animals of our urban areas are an often unappreciated part of our nature. They should be given more consideration as an integrated part of the urban environment and, as such, included in local planning.

The Ministry of Environment and Energy will follow up the nature-related parts of Recommendations on Urban Ecology, for instance, through the distribu-

tion of nature management resources and through increasing the advice given to the districts.

Local urban planning and management of green spaces in towns is of great significance in safeguarding and improving the conditions for wild plants and animals. Thus, urban planning needs an understanding of the significance of conserving established green spaces, of expanding them and increasing the variety of their natural content, and of their importance as the habitats of wild plants and animals. At the same time, we must also ensure a well-structured *green infrastructure*, as is the case in the countryside. This can be done by establishing propagation passages between the urban areas and their neighbouring nature areas, as well as fauna passages at exposed points.

Our green spaces should be managed with the greatest possible consideration for the wild plants and animals that live in them. The development of rational, environmentally-oriented methods, *ecological park techniques*, is thus one of the requisites for richer plant and animal life; see Box 9.3.

Safeguarding and improving conditions of life

This is a matter of conserving and restoring *natural processes* in urban areas in order to *safeguard and improve the conditions of life* of wild plants and animals. There is great potential in restoring such nature types as bogs, lakes, watercourses and their green surroundings and in establishing more green space between blocks of dwellings and in back yards (a development that is already in progress). Useful effort can be expended on establishing germination areas, watering places, nesting places, shelter and propagation passages for wild plants and animals.

The suitability of urban green space as a habitat for wild animals is known with less certainty. Studies of this will therefore be vital to safeguarding and conserving the conditions of life of urban animals. Large gardens, cemeteries and, to some extent, parks are probably the places in Denmark that have the highest botanical diversity, which consists of old culture herbs, perennials and fruit trees, as well as wild herbs. Gardens, especially, are however the habitats of a number of non-native species.

Box 9.3

Ecological park techniques

In ecological park techniques, the management of green spaces is differentiated at the nature, park and garden levels. In turn, this means that:

- *lawns are cut more or less extensively at varying intervals;*
- *areas are laid out as flowery meadows by sowing mixed Danish herbs;*
- *the handling and composting of park and garden refuse is carried out locally;*
- *plants are sown on façades and green roofs are established;*
- *wetlands and grassy fields are reestablished for local draining of rainwater;*
- *green plantations are reestablished along roads and around industrial installations, to improve air quality.*

Environmental improvements
The quality of the air should be improved still further. This can be attained by continuing to reduce emissions into the atmosphere, by planting more trees and by rerouting traffic that contributes to the loading.

The use of road salt imposes a load on urban trees and other plants along the roads. The leaves of roadside trees wither earlier in many cases, their crowns are thinner and branch systems poorer, in comparison with forest trees. We should therefore promote the development of other methods of safeguarding traffic in hard winters.

Local Agenda 21 groups
In common with 177 other countries, Denmark has acceded to the action programme of the Rio Conference 1992, Agenda 21. This means that local authorities shall have started some form of cooperation with their local inhabitants and reached agreement on a *local-area Agenda 21* by not later than 1996. The Ministry of Environment and Energy and the National Association of Local Authorities in Denmark have taken the initiative of starting this process.

Agenda 21 concerns sustainability on the local and global levels - an overall framework for specific action plans in the area of the environment and for broad treatment of environmental problems in general. The conserving and reinforcing of biodiversity will therefore be a significant topic for our local Agenda 21 groups.