

How can forest game management contribute to nature conservation?



In many parts of Western Europe, the financial output from forestry operations alone has shown a steady decline in recent times.

Surprisingly, this development has not caused lower incomes on forest estates - on the contrary, it seems that a new set of owners are buying up these estates because they have other, mainly recreational interests among which shooting and hunting are important. Using examples from Denmark, this paper will examine how shooting and the associated game management can go hand in hand with nature conservation and possibly a sound economy.

SHOOTING AS A SOURCE OF INCOME

In Denmark, shooting and the letting of shooting rights is a major source of income to many forest estates. Shooting rights are vested in land ownership and it is estimated that as much as 90 - 95 % of the forest lands are shot over. Depending on the region of the country, the main species are red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), fallow deer (*Dama dama*) and to a smaller extent sika deer (*Cervus Nippon*), geese or game birds such as pheasants (*Phasianus colchicus*) and mallards (*Anas platyrhynchos*). Within the frame of the Wildlife Management Act, land owners can dictate the terms of a shooting lease or practise the shooting themselves. The most common form of shooting lease is when the hunters lease the land for a number of years, maximum 30 years. Prices of shooting leases vary considerably but are generally fixed on the basis of the following parameters:

1. Presence of game. Obviously, the number and quality of the game present on the grounds, or in some cases the likelihood of finding certain species is an important parameter. Even in cases where not very much game is present from the start, but the layout of the woods seems promising, a good price can be fetched.

2. Size and situation of the land. The size of the area is important: The ideal situation is when the area is big enough to allow for a whole day's shooting and still leave parts of the forest undisturbed. Neighbouring land is another important factor.

Having a big game reserve or well managed shoot as a neighbour is often considered much more of an advantage than several small pieces of land with their own individual group of hunters. Also, areas close to major cities in some cases fetch higher prices than more remote areas.

3. Restrictions on shooting. There may be restrictions on the number of shooting days, number of game that can be shot or game birds that can be released. The restrictions may be mentioned in the lease agreement, e.g. the number of shooting days or number of hunters may be restricted, or special rights of other groups such as riders, runners or mountain bike riders may be taken into consideration. Restrictions may also be imposed by the authorities, for instance if new wildlife reserves are being created. The number of deer allowed on the land may also be restricted, if deer are perceived as a threat to the natural regeneration of forest. Recently, with the latest turn towards a more sustainable forestry in Denmark, this discussion has become a major issue and feelings are often very strong on both sides with hunters wanting more deer and foresters wanting less. Similar discussions are taking place in other European countries.

Also restrictions on land use due to nature conservation legislation occur and in some cases lead to conflicts of interest; for example, a desire to clear a valuable forest marsh in order to create a flight pond. Furthermore, extended rights of access to other groups can in some cases lead to giving up shooting over parts of the land due to security considerations.

Amenity value. Not just the number of game is important. Equally important are values such as beautiful scenery and the chance to enjoy game. Access rights for other groups can also have an impact on the amenity value. This problem is psychological. When a hunter has paid a substantial amount of money to enjoy shooting he does not like to have outsiders studying him all the time, especially if they do not approve of shooting.

WHAT DOES GAME WANT?

Basically, most game species require food, cover, shelter and peace. To cater for the wide range of game species variation is often the key word, since their requirements vary both in time and space as well as from species to species. In the following section, two very popular and common game species are described as an example.

Roe deer. Much of the increase in the Danish popula-

tion of roe deer is ascribed to better food availability in the wintertime: The population has more than doubled over the last 10-year period mainly due to more winter-grown cereals and more deciduous forest.

Roe deer find their food on agricultural fields next to the woods during summer. In May when the crops are tall and offer good cover, fawns are hidden in the fields or in neighbouring shelterbelts. After harvest the animals tend to rely more on a few herbs or field beets, and they start moving more into the woods where they browse on buds and shoots of the young trees. Through most of the winter the animals continue to eat a mixture of buds, shoots and agricultural crops. In February roots of anemone (mainly *Anemone nemorosa*) become an important food item, and they are eaten all through spring.

Where herbicides or fertilizers are used or spruce stands introduced the anemones are often killed, and recolonisation may take several decades. Grasses are only eaten in early spring when the animals seem to seek out the fresh green sprouts of mainly tussocky grasses.

Pheasants. Pheasants are quite versatile when searching for food. They spend winter time in the edges of woods where they feed on grasses, berries, roots and seeds from various herbs or wheat and barley fed to them. In February and March the cocks move out into the very edge of the woods and sur-

rounding field margins to establish their territories and attract the hens. During March and April the hens move out from the woods to find their nesting places. When the eggs hatch in May and June the hens try to find places rich in insects, which the chicks need to survive during their first three weeks. As the chicks get older they gradually change their diet to include more and more vegetarian matter. But even so both the adult and the young birds feed on insects as long as they can find them.

The most attractive woods to pheasants are small and “warm” woods. A dense layer of shrubs and bushes to keep the wind out and a variety of tree species dominated by species that allow light to penetrate to the lower layers are important. Small groups of conifers where they can roost and find shelter are also quite attractive to pheasants. Old trees left to fall down and decompose contribute to a richer insect fauna. To make large forests more attractive to pheasants, they need to be quite open and include inner edges with a composition of trees and shrubs very similar to the outer edge. Open clearings, wetlands and rides with a width of 30 meters or more will also enhance the “pheasant holding capacity” during winter.

Other bird species. Research into other bird species has also clearly shown that a varied forest including areas with a well-developed layer of shrubs and bushes will hold a greater number and variety of birds.

The presence of game is an important aesthetic asset adding to the general property value. (Photo : Nepenthes/ Christian Jensen).



Damage to tree seedlings by deer may be avoided by planting young trees in tubes. (Photo : Thomas Holst Christensen).



Stands of trees left to follow a natural succession not only supply more insects but also offer better opportunities for rare birds nesting in hollow trees.

Shy species. Relatively impenetrable stands can provide the necessary peace that is the requirement of some of the more shy game species such as sika and red deer as well as many birds of prey. The shelter capacity of forest stands also has much to do with species composition, age and time of year. A young stand of beech for example will provide excellent cover even during winter for a few years, but then it will become more open and thus offer no shelter and cover at any time of year. More or less the same can be said about large monoculture conifers at a close spacing, although they tend to offer cover for a longer period. Mixed stands on the other hand will often provide a more constant cover to game, especially if they include groups of conifers.

MAKING ENDS MEET AND PEACE PREVAIL

The trick is now to combine some of the considerations mentioned above in order to have a forest where the owner can make ends meet, plenty of game will live, and with more room for natural processes and vulnerable ecotypes.

Continuous Cover Forestry. In terms of economy, political correctness and nature conservation, continuous cover forestry with a high proportion of indigenous species is generally accepted as being the future. The major problem is that a change from

monoculture to continuous cover forestry is not brought about overnight. One problem which is nearly always mentioned is that in order to rely on natural regeneration, the browsing by deer has to be reduced.

The most common solution to this is to shoot a major part of the animals or to fence the area. Fencing can be rather expensive and is often not looked upon as an agreeable measure in close to nature forestry. Shooting most of the deer on the other hand, can also be a very time consuming task, which - depending on the level - may have negative consequences for the economic return from shooting.

Damage to trees and saplings by deer varies greatly, depending on not only the number of deer but also to a great extent on the forest composition and thus the availability of food. In old shady stands of conifers and beech with little or no under storey, only limited areas are available for the animals to feed on. In this situation, the demand for food may be filled by a combination of **1**) reducing the deer population and **2**) opening of the canopy through thinning a substantial area of closed forest, to allow for more seedlings to germinate.

Other solutions include the temporary use of fencing around areas newly planted with a species composition that will allow a multi-storey stand to develop over time. In forests with large clear-cut or storm-damaged areas, planting of groups of trees as future sources of seed combined with leaving parts of the area to natural colonisation will enable game to feed on parts of the area as well if it is not totally fenced off. Another solution can be the use of nurse trees or preculture as described below.

Forest Edges. Conditions in the forest edges may be improved by greatly reducing the number of shade offering species such as beech (*Fagus sylvatica*) and spruce (*Abies* and *Picea* spp.) and leaving species like ash (*Fraxinus excelsior*), birch (*Betula* spp.), pine (*Pinus* spp.), larch (*Larix* spp.) and lime (*Tilia* spp.), and thereby encouraging a more varied ground cover. A forest edge with a high value for game should preferably be 30-50 meters wide and include small openings in the canopy and even a wide track with grassy edges that are continuously mown to increase the fodder value. In narrow shaped or small forests it is obvious that edges this wide cannot be established everywhere. Priority should then be given to south and east facing edges to benefit game.

In cases where it is desired either to create a new forest edge or expand an existing edge, one should consider leaving considerable room for natural colonisation by only planting groups of bushes and a few trees with wide spaces in between. To prevent deer from eating the new plants, nurse plants such as birch, honeysuckle (*Lonicera xylosteum*) and common alder (*Alnus glutinosa*) can be used. An alternative is planting or sowing a preliminary cover of birch (*Betula* spp.) or willow (*Salix* spp.) Willows for example can be planted as cuttings and kept low through mowing (or simply from browsing) to create a kind of browsing crop for deer, an excellent cover crop for

pheasants and a good crop for many insects. Danish experiments have shown that some provenances are more popular with game than others. Once the preliminary cover and browsing species have been established, other species can be introduced at a lower risk of being browsed. Other methods of avoiding damage to young plants include tubes and repellents.

The fact that less traditional forest products are produced in the edge zone does not necessarily mean that the edge zone is not valuable in terms of production: Danish research claims that the tree production capacity of many Danish forests can be improved 30-50% by reducing wind and draught. Secondly, a well-developed edge can improve the market value of the forest and the revenue from shooting.

Veteran trees. Veteran trees, i.e. old trees left to fall and decompose, is another component that is generally perceived as a non-productive measure that is allowed in remote inaccessible corners or where they are supported by a grant scheme. Nevertheless, such trees contribute to the species diversity that will help support game birds, especially by being host to a great number of insects. For various reasons - including fear of excess nutrient production and run off into water ecosystems - the opinion against releasing of reared game birds is mounting and a 'fashion trend' is now seen towards shooting of wild birds. In this

context, veteran trees can certainly have a role to play in game management. They will form a natural component of the forest edge.

Meadows and wetlands. Other components important to amenity value, nature conservation and game are meadows, bogs, mires and wetlands. They provide the variation that will help sustain wildlife and offer the visitor a pleasant experience. In relation to shooting they also provide the open spaces that offer the right scenery for driven pheasants or trophy hunting of deer. If carefully planned they are also a nice way of guiding visitors by describing hiking routes that will take people past them leaving other parts of the forest relatively undisturbed. Curving edges and shading of the trails with bushes and trees around open areas can sometimes make people less visible to game, whereby they cause less disturbance. At the same time these habitats offer better opportunities for game to find food, especially if managed properly by grazing or cutting.

Game pockets. In a forest with a variety of recreational activity, it is a good idea to designate special areas as "Game Pockets". These are parts of the forest where game will be left relatively undisturbed and in which deer especially can seek refuge when they are disturbed by hunters, runners, hikers or any other activity. Experience gained from Denmark shows that such game pockets should:

- be evenly distributed in the forest

*Semi-natural meadows benefit not only the game, but are also key habitats of numerous other species.
(Photo : Thomas Holst Christensen).*



- have a size of at least 1 ha
- be set no further than 1000 meters apart and in a way that there will only be traffic on no more than two sides of the game pocket
- have a vegetation that offers good cover

Key habitats such as old growth woodland and old coppice stands (hazel, willow, oak etc.) can very well be part of or constitute game pockets. They are normally quite dense and thus not very easy to walk or run in and they offer a nice variety of food items most of the year.

Coppice stands can also be used as drives when shooting driven pheasants. Management of such stands will normally include coppicing at certain intervals. This can include “half-cutting” parts of the stems in an area or a row in a way that will allow the stem to fall but at the same time leave contact

between the root system and the top. This way the cut branches will keep sprouting and they will form little thickets for game birds to hide in and at the same time prevent draughty conditions in the undergrowth.

The general idea of the suggestions presented in this paper is that an open mind to multiple use of various forest structures can often help promote certain interests, rather than trying to enforce them through legislation or propaganda ●

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