SOME FACTS ABOUT GRAZING ANIMALS AND THE PUBLIC

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In March 2000 a young boy was bitten in the head by a horse in the nature reserve De Kleine Weerd (province of Limburg). This incident prompted Stichting Ark to set up a working party on Grazing Animals and the Public with representatives from all the major nature conservation organisations in the Netherlands. The working party decided to carry out a quick scan of incidents in grazed nature areas with unrestricted public access. The results are summarised in box 1. Subsequently, the Ministry of Agriculture, Nature Management and Fisheries commissioned Alterra to make a more in-depth analysis of the dangers to the public. The purpose of the study was to arrive at an accurate risk assessment and recommendations for management (box 2).

Both the quick scan and Alterra's analysis showed that, currently, visitors are not at undue risk in areas populated by large grazing animals. There are only a few dozen verified cases in which physical injury occurred as a result of confrontation with a large grazing animal. Professional medical assistance was required in ten cases, some of which involved site managers. Compared to the roughly thirty million visitors to these areas since the introduction of grazing animals, the figures are very low, especially when they are compared with the other risks of visits to nature or of other situations involving large herbivores. The potential danger in many 'exciting' wilderness attractions abroad are often much greater. Dutch nature also harbours another more lethal threat: ticks carrying Lyme's disease, which infects thousands of people each year. The number of hospitalisations for Lyme's disease has risen strongly in recent years, to 850 in 1998. And equestrian sports annually account for five deaths and 75,000 injuries, of which nearly half require medical treatment.

It is not our intention to belittle incidents with wild grazing animals. But putting things into perspective can help site managers to respond effectively to the public's reactions when incidents with large grazing animals do occur. At the same time, ways must be found of further restricting the danger to the public. As 'owner' of the animals, site managers are by law the primary accountable party in the case of inci-

Most incidents seem to occur on sites containing horses. this probably has to do with the public's liking for feeding and stroking the animals and the horses' tendency to bite.

Box 1: summary of the quick scan

1. The quick scan covered 140 grazed nature areas with unrestricted access, which together are estimated to have had more than 30 million visitors since grazers were first introduced in the areas (a period of fifteen to twenty years, at the most).
2. Confrontations between visitors and grazing animals resulted in physical injury in a few dozen (controlled) cases. In ten cases, professional medical treatment (general practitioner, hospital) was required. The remaining injuries varied from sprains to bruises, most commonly from being bitten by a horse or butted by a cow.
3. The incidence of confrontation is not greater in small areas compared to large areas. However, the larger the area, the lower the number of incidents per unit of surface area.
4. There is a relatively higher incidence in areas populated by horses. The higher risk in areas grazed by horses might be due to their greater appeal to people, who then try to stroke or feed them, as well as biting being a part of horses' natural behaviour.
5. There is a relatively higher incidence in areas where animals are frequently fed and/or stroked. This relationship is less marked where dogs are not kept on a lead.
6. According to site managers, feeding horses is the most common cause of accidents, as well as approaching herds too closely.
7. Nearly all incidents resulted from careless action by a visitor. There are no known cases in which animals turned on visitors. Begging for food or a bull defending his herd should not be classed as aggressive behaviour.
8. The data reveals no link between these incidents and the presence of warning signs.
9. One road accident was reported from grazed nature areas which are cleaved by a public road. Damage to paintwork by horses did occur more often.

Box 2: recommendations for site managers

Information

1. Careless actions by visitors are the greatest risk factor and should be brought to their attention by site managers
   through effective information; managers themselves should also reconsider their behaviour towards large grazing
   animals.
2. Visitor information should stress visitors' behaviour. Instead of being afraid of grazing animals, or wanting to get too close to them, visitors must learn to develop a certain alertness. This also applies to other potential dangers in nature areas (walking on rough terrain, tick bites, falling branches, etc.).
3. It is necessary to provide specific information for a responsible realisation of social trends such as rambling in nature areas and allowing natural processes to take their course. Such trends are in fact incorporated in Government policy, therefore additional government funding should be available to provide this type of information.
4. Site managers must agree on an action plan for serious incidents.
5. There must be a uniform set of public information or warning signs (e.g. keep 25 meters between you and grazing animals, do not feed the animals).

Incident registration

6. Nature organisations and local managers should record all incidents, so that an accurate picture can be obtained of the real number of accidents. A form has already been developed for this purpose. The register should be centrally maintained and figures should be published each year in professional journals for nature managers.

Research

7. Incident registration alone is not enough to gain a better understanding of problems concerning large grazing animals and the public. Many (minor) incidents are not recorded, nor is negative behaviour by grazing animals or visitors which did not lead to an incident.
   Fundamental ethological research should explore the differences in risks in large nature areas and other, often smaller areas. Site managers could jointly fund applied research into matters such as: how can characteristic behaviours of grazing animals be modified (selection), what adaptations of terrain would be necessary/possible, how could herd management be adapted, how could visitors change their behaviour?
8. The legal scope for enforcing bans on feeding or stroking grazing animals should be explored.

Rare livestock breeds and nature policy

Many traditional Dutch livestock breeds are at risk of dying out because they cannot compete with today's ultra-productive breeds (primarily the case with cattle and sheep in modern agriculture). This trend is disturbing, since these old breeds too possess unique characteristics which can help to maintain biological diversity. It is important these breeds be preserved.

Old livestock breeds are hardy and well adapted to the Dutch climate nearly all of their names are associated with a very specific Dutch region). This makes them extremely well suited to year-round grazing as instruments of landscape and nature management. The significant role of sheep in heathlands management is well known. Dutch landrace goats make a useful contribution in the fields by cleaning up the remains of woody crops. Since horses, cattle, sheep and goats all graze differently, a diversity of flora and fauna can arise on large landscapes if they are grazed simultaneously by a variety of animals. Native horse breeds such as the Groningen horse and Dutch draught horse also have uses in these rural landscapes. They are better suited for use on some compaction-prone soils than heavy machines and are gentle and easy-going by nature.

Rare breeds	Number of females	Number of males	Status
Gelderland horse	700	9	Treatened
Groningen horse	160	12	Treatened
Friesian red-and-white cattle	65	13	Critical
Dutch Belted cattle	900	20	Treatened
Deep Red cattle	65	5	Critical
Groningen Whiteheaded cattle	1000	15	Vulnerable
Mergelland sheep	1500	175	Vulnerable
Kempen heath sheep	1750	75	Vulnerable
Veluwe heath shheep	1600	80	Vulnerable
Drenthe heath sheep	840	75	Threatened
Schoonebeeker sheep	600	60	Threatened
Dutch landrace goat	1060	140	Vulnerable

Numbers of female and males of rare livestock breeds in 1998, showing status.

The Rare Domestic Breeds Foundation (Stichting Zeldzame Huisdierrassen) works to draw public attention to the issues around old agricultural breeds. The foundation provides informative presentations, advice and information. It also promotes the interests of breeders.

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dents. Confrontations between visitors and large grazing animals are increasing, not only because the number of grazed areas is on the rise, but because recreational intensity in the areas is increasing too. This is in fact the objective of Dutch government policy, which calls for more nature areas with public access. This policy can count on continued success in the future provided essential information reaches a wider public.

he primary cause of incidents is that visitors do not see large herbivores as wild animals. Many cattle have a staid air about them that seems to induce droll behaviour on the part of some visitors, and the horses seem no different than domestic horses at riding stables. The 'average' city dweller is hardly aware of the animals' natural behaviour and enormous strength. Natural behaviour such as defending young or defending the herd against intruders (e.g. riding horses) or potential predators (such as dogs) may easily result in injury. Similarly, a panic reaction by an individual animal or the fleeing of an entire herd are also potentially dangerous situations. Humans are vulnerable in the proximity of animals weighing hundreds of kilograms. The greatest problem is visitors feeding and stroking large grazing animals. Especially horses tend to become a nuisance, and will also bother visitors who do not approach them. In this context, one should also consider the consequences of the new law which compels site managers to provide supplementary fodder to animals in certain situations. Supplementary fodder should be provided without generating a Pavlov effect (human = food).

Visitor information should be clear and univocal for all nature areas. It is probably not enough to only provide information on special boards at the entrance to areas. Other means of communication should be exploited, such as field trips, place mats in local restaurants, and so on. Public information to support Government policy might also play an important role. It is essential that information focuses on the wonderful opportunities that are to be had in unrestricted areas provided visitors follow a few rules about dealing with animals.
Ideally, information should be based on the latest data. By recording all incidents, it is easier to establish what really happened. Applied research into the physical design of nature areas and grazing management might also yield useful solutions.

Stichting Ark has made a folder that site managers can hand out to visitors. The folder contains guidelines about dealing with grazing herds. Information about the folder can be obtained from stark@knoware.nl.

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COMMUNICATION AND GRAZING AT NATUURMONUMENTEN

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Meeting dangerous-looking cattle on your daily walk in the woods. Fences where before there were none. And the endearing sight of cows suckling their calves. When Natuurmonumenten, the Netherlands Society for Nature and Environment, and the National Forest Service decided to introduce grazing animals in Berkenheuvel woods for management reasons, they did not want to catch people unawares. So they decided to include visitors and residents bordering the nature area in the planning process.

Berkenheuvel is a woodland within the Drents-Friese Wold National Park. Integral grazing is set to become a key component of site management here in the future. The area is managed by Natuurmonumenten and the National Forest Service. In 1998, cattle fences were put up around a part of the site. First, however, the two organisations felt that neighboring residents and visitors should be well informed of the necessity of grazing management, the background of grazing and practical aspects. They also wanted to give people a say about where the fences should run, where access points should be made and what access should be like in general. The organisations also felt they had a duty to educate people about how to deal with the animals.

The primary target group consisted of people living next to the woodland and residents of the nearby village of Diever. They are regular visitors to the area. Many people walked their dogs there, and not everyone was in the habit of keeping their pets on a lead. Other important target groups were chariot drivers, businesses in the recreation sector and public bodies.

A strategic communications process was set up for site managers and site visitors. Mutual respect, trust and openness were key concepts in the process. As a result of the process, individuals' concerns could in many cases be allayed and a number of changes were made to the grazing project. Implementation of the project was not delayed and the process only had a minimal added cost.

Visitors have to be informed about how to behave around large herbivores . . .

Both organisations are enthusiastic about the communications process and will use it again in future management strategies for the park. The process has created a steady basis for communication between site managers and users. Users feel that their input is taken seriously and has tangible results.

Two-way communication about grazing is not unique to Berkenheuvel. Natuurmonumenten has also followed this strategy successfully in other nature areas. With the presence of large herbivores in nature areas, site managers are approached almost every day by mem-

. . . and that carcasses are a part of the natural process. Excursion wagon Oostvaardersplassen (Staatsbosbeheer).

bers of the public, the media, other nature managers and students with questions and requests for more information. Site managers provide this information in the field or in visitors' centers, but also organize excursions and answer letters. Initially, the public's feelings about these animals were mixed. Most agreed that it was a wonderful sight, but many people were concerned about their personal safety when walking in the area, about the animals' health and the effects of grazing on the vegetation.

Besides creating greater understanding and support for grazing management, and stressing that it is in the best interests of nature, site managers in the 1990s also learned to deal with and anticipate the public's needs. This new dimension of communication is a result of the much greater emancipation of the individual in society today. Increasingly members, recreational visitors and people who live near nature areas are actively consulted by Natuurmonumenten in forums, sounding board groups, contact committees and bilateral user consultations. Sometimes serious negotiation situations arise, but the net result is always greater mutual understanding among the users and a better understanding of the dilemmas faced by site managers and supervisors. In other words, more two-way communication. It has made our organisation more open. People can see that Natuurmonumenten is made up by real people who are readily approachable. This new situation also forces us to explore the limits of our visions on nature management. What is acceptable, what isn't? Sometimes access to nature areas is improved or areas are redesigned, for example grazing fences may be moved. Two-way communication has increased users' input and involvement in specific nature areas and in nature conservation in general. In fact, we now have a management vision developed in consultation with users!

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MAKE WAY FOR THE EUROPEAN ECOLOGICAL NETWORK

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Never before in Europe have we seen such numbers of threatened species or natural areas disappearing at such speed. The time has come to reverse this trend. This means that we must now start work on areas of a scale and quality that meet the requirements of viable, mature populations of large mammals.

In the terrestrial ecosystems of our climate zone the composition and structure of our vegetation and landscape have largely been determined by the effects of large herbivores, through stripping of vegetation, trampling, and the deposition of dung. Because of their effect on the biodiversity of our ecosystems these herbivores are called key species. Predators such as lynx and wolf dampen fluctuations in herd numbers and control the use of sites, which is why predators must also have a place in species-rich, natural ecosystems. Traditionally many communities kept large herbivores in semi-natural areas for economic reasons. Today the integration of ecological and socio-economic objectives is one of the major challenges for any site manager.

Space requirements

Populations of large mammals can only survive naturally in places that meet their requirements with respect to food, water, shelter and reproduction. Living conditions in such places may vary: food availability changes with the turning of the seasons. Large herbivores may meet these changed conditions by seeking inferior plants to feed on, by drawing on their reserves, lowering their energy needs or by migrating to places with better food supplies or a milder climate. Natural population densities will therefore fluctuate. The local extinction of populations or part of populations and their rehabilitation by means of colonisation is part of a natural population's life. Extinction however means the loss of genetic variation within the species.
Large mammals of the Temperate Zone need large areas that meet their requirements. The extent of the area needed depends on the area's quality in terms of the animals' requirements. This is illustrated in the table giving the home range of individual animals in poor and high quality areas. Obviously the extent of the area increases as the number of animals goes up.

The present habitat of red deer in north-western Europe

The present distribution of red deer in north-western Europe is a good example of the problems that affect large-scale habitats. The same is largely true for wild boar, wisent, fallow deer and their natural predators. Red deer are found all over Europe except in the far north of Scandinavia and Russia. The largest specimens live in central Europe. The subspecies on the edges of the distribution area are smaller. The habitat of the last, more or less free-ranging populations in Belgium and Germany are seriously threatened because of fragmentation of nature areas. The further you move from east to west in Europe the more large mammals' natural migratory behaviour is curtailed. In the Netherlands red deer are tolerated in the Veluwe and Oostvaardersplassen nature reserves. Wedged between urban agglomerations and trunk roads the Veluwe habitat is of marginal quality, an ecological island, as it were (see 'Ecologische Verkenning Veluwe' and the memorandum 'Veluwe 2010'). The memorandums 'Nederland 2030' and 'Groene ruimte op de kaart' indicate that this, on a larger scale, is something that threatens the entire country. The growth of large urban conglomerates and the infrastructure that goes with it are increasingly clogging up the national borders both at home and abroad.

Genetic deterioration

The sika deer introduced in Ireland causes major problems as it is cross

Tentative outline of north-western European ecological network for large herbivores and their predators. 1. Lüneberger heide, 2. Harz, 3. Thüringer Wald, 4. Rothaargebirge, 5. Taunus, 6. Eifel, 7. Pfälzer Wald, 8. Nord-Schwarzwald, 9. Hautes Fagnes, 10. Belgian/Luxemburg Ardennes, 11. Veluwe (and west of it: Oostvaardersplassen/Horsterwold, 12. South Eifel, Hunsrück, 13. Westerwald, 14. Vosges, Doubs and northern Jura (Geert Groot Bruinderink)

Red deer on the look out for the European Ecological Network so they can exchange genetic material.

breeding with the native subspecies of red deer in the British Isles. In the Netherlands native subspecies of deer do not exist, deer were introduced from all kinds of places. The combination of such introductions and the prolonged pressure by humans to select the smaller specimens for breeding has caused the extinction of native subspecies in large parts of Europe. What we are left with are semi-domesticated species in isolated areas, with few opportunities to disperse, colonise suitable habitats and exchange genetic material. An increasing number of populations will not be able to survive. More than half of the seven subspecies left in Europe is threatened with extinction. Red deer can no longer cope with sudden, major changes in their environment, ecologically, they are stretched to their limits.

Building a Pan-European Ecological Network

The only way to call a halt to the developments outlined above is to safeguard and extend suitable habitats. The 1990 Nature Policy Plan of the Netherlands was a first step in that direction. It centred on the realisation of a 700,000 ha national ecological network. The memorandum Nature for People, People for Nature, which was published 10 years later, once more emphasised the need for such a network. Belgium, France and Germany have similar so-called Green Networks. These plans however sadly lack provisions for mammal migration and internationalisation of nature conservation. Nor has the realisation of these plans really got off f the ground. In the Netherlands this may have to do with the fact that three different ministries have their say over land use and that for every nature management decision a consensus is needed.

The Council of Europe aims for the realisation of a Pan-European Ecological Network (Pan-European as it is to cover the whole of Europe not just the European Union). This network should consist of core areas, ecological corridors for migration, dispersion, and the exchange of genetic material and buffer zones surrounding the corridors and core areas. The European Union's policy plan is called Natura 2000. The Council and the Union have joined efforts to work towards a coherent network of nature areas. On the basis of the above and current insights we can roughly indicate where red deer and other wild ungulates should have their habitats in a north-western European ecological network.

In the Netherlands the Oostvaardersplassen, Utrechtse Heuvelrug and Veluwe nature reserves should be joined together and new habitats created in the provinces of Groningen, Drenthe, Overijssel, Gelderland, Noord Brabant and Limburg. In part, these reserves should be situated along the rivers but also cover the areas beyond. In Germany, Belgium and France the Green Networks and the Pan-European ecological network can be taken as a basis. The distances between the home ranges of large mammals are so great that the corridors between them should also be suitable as habitats, which is why they should be some 5-10 km wide, depending on the distance to be bridged.

Integration with agriculture

The opportunities to extend the habitats for large grazing animals look more favourable than ever now that both in eastern and western Europe farmland and military grounds are being given

Table. Home range of male animals (ha) in quality areas of high density and poor areas of low density and the maximum distance migrated (km)
* No data available.

Species	Quality home range	Poor home range	Migrated distance
Roe deer	5	100	60
Fallow dear	50	750	90
Wisent	100	1 500	*
Wild boar	100	15 000	300
Red deer	500	20 000	120
Elk	600	2 600	110
Bear	5 000	50	*
Wolf	7 000	126 000	900
Lynx	20 000	75 000	100

over to nature development. As agricultural crops are generally of better quality than the foodstuffs ungulates find in their natural surroundings. Hence large herbivores are likely to cause problems for farmers. In the Netherlands crops have suffered damage by geese, wild boars, red deer and badgers. We have learned that individual reimbursement of farmers for the damage caused by these animals, which increasingly come under a protection regime, does not lead to the integration of agriculture and nature management. The answer rather seems to lie with collective, long-term tolerance agreements with groups of farmers in combination with sufficient opportunities for others to prevent damage by chasing or shooting the animals, as currently happens with wild geese. Integration can also be fostered by farmers diversifying into eco-tourism. The time has come for a thorough study into the possibilities and impossibilities of the integration of 'large mammal nature' and agriculture.

Conclusion

The highest gains from investments in nature can eventually be obtained from areas whose ecosystems are potentially complete. That is, from areas of a scale and quality that meet the requirements of sustainable large mammal populations. If we really want to make room for complete ecosystems with large ungulates and their predators, and provide for migration, dispersion and the preservation of genetic variation we must think of areas covering many tens of thousands of hectares. The efforts to recreate the effects of the original mammalian fauna in smaller areas would cost relatively more both in terms of money and energy.

The ecological isolation of large mammals in the Veluwe as well as the Netherlands as a whole can only be lifted by the creation of a north-western European ecological network. This applies to what is left of the populations of red deer, but equally to those of wild boar, moose, wisent, fallow deer, lynx, wolf and bear. The land required to realise this makes the large-scale integration of agriculture and nature management of paramount importance.

The European bison: capable of tackling conifers on the Veluwe that other herbivores leave standing?

Lynx

Over the past twenty-five years experts have repeatedly urged for the introduction of lynx and wisent in the Veluwe nature reserve. The main reasons for the re-introduction of lynx are the increased chances of the species' long term survival in Europe and the establishment of a species that is of great ecological significance. The presence of a natural predator affects the way ungulates use an area and is believed to facilitate more natural woodland management in areas where production and nature management are integrated. Lynxes do not regulate ungulate populations but may have a stabilising effect. They may influence a population's structure by selective hunting.

Eurasian lynxes are found in large parts of Scandinavia, the Balkans, the Carpathians, Russia and Poland. They also occur, as a result of re-introduction or spontaneous settlement, in Germany, Italy, Switzerland and France. Footprints are regularly found in the Ardennes and the Limburgs Natuurhistorisch Genootschap claims the lynx also occurs in the Netherlands, in the provinces of Limburg and Noord Brabant. The realisation of an international ecological network will increase the chance of lynxes spontaneously colonising the Veluwe nature reserve.

European bison (wisent)

Some twenty years ago cattle and horses were introduced in the woods and heathlands of the Veluwe nature reserve to prevent grass invasion and realise mosaics of open spaces and woodlands. This second objective was not achieved as the cattle and horses in the area did not touch the coniferous trees growing there. A study into the role that wisents could play here is seriously being considered. The wisent cannot migrate from Poland to our country unaided and makes heavy demands on the scale of its habitat.

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