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ISWIMAN
**Integrated Sustainable
Wildlife Management**
Principles, Criteria and Indicators
for Hunting, Forestry, Agriculture, Recreation



Annex 2
PCI-Set for the Interface
FOREST MANAGEMENT
and Wild Animals / Wildlife
Habitats /Hunting
Full and Abbreviated Version



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Preliminary Remarks and Instructions for Use

The present Set of Principles, Criteria and Indicators (PCI) refers to the interfaces of sustainable forestry and sustainable hunting (focused on the Wienerwald Biosphere Reserve as a case study), creating a basis for self-assessment both for forestry (the forest manager) and property (the property owner). These two aspects were combined under one set of criteria mainly because, in the Wienerwald Biosphere Reserve, forestry is mostly closely linked with property (as opposed to the systems of timber utilisation permits or forest management permits, for example, as common in e.g. Eastern Europe, North and South America).

The Assessment Set is for self-evaluation by forest managers and forest owners and is designed to allow for an examination of sustainability of forest management activities with a view to the lasting conservation of domestic wildlife species and their habitats as well as a sustainable practice of hunting. This is necessary because wild animals, the quality of their habitats and thus also the sustainability of hunting are greatly influenced by forest management. Interactions between forestry and the practice of hunting may entail synergies with regard to various aspects, but also unwitting negative impacts on land use needs of the other groups.

In terms of assessment, the present Set considers possible impacts of forest managers and forest owners upon hunting, on the sustainable conservation of wildlife populations rich in species, and on wildlife habitats. For the assessment of possible impacts of other interests (hunting, agriculture as well as leisure and recreation management) on the sustainable conservation of wild animals, wildlife habitats and hunting, separate Sets with relevant Principles, Criteria and Indicators have been developed.

Note for owners of small forests: As a rule, owners of small forests are members of hunting co-operatives. Contracts (lease contracts, etc.) are commonly not concluded by the individual owner of a small forest but by his or her representatives in the hunting co-operative. The unit of assessment is thus, as a rule, not the individual forest owner but the hunting ground or a hunting management community. Thus, the assessment of sustainability ought to be made by the land owner's representatives responsible for the relevant hunting ground. Forest owners are, however, free to examine their own attitude regarding the sustainability criteria assessed in this framework. This may be of particular interest if their position is not fully reflected within the hunting co-operative.

For the Busy Reader

1. **Direct entry** with point scores accompanying the indicators (framed) for Ecology, Economy, and Socio-Cultural Aspects.
2. **Explanations** to be read only when needed.
3. **Simple Evaluation:** *Prepare an A4- format sheet of paper with three double columns (for ecological, economic and socio-cultural aspects).* Read the *maximum point scores* of the indicators evaluated and enter them underneath each other on the left; on the right, enter the score you assign to your respective territory (scores should range from the maximum to the minimum given in the assessment framework). Finally, add the scores across the six columns and express the sum of the scores you assigned in terms of the percentage of the sum of the relevant maximum values (separately for ecological, economic and socio-cultural aspects). If you achieve 76-100 % of the sum of maximum point scores for an assessment aspect, your sustainability evaluation is “very good” for this aspect; in case of 51-75 % “good,” 25-50 % “intermediate,” 0-24 % “bad,” and in case of negative scores “very bad.”
4. **Extensive User Information** for applying the PCI Framework as well as for a full evaluation of the self-assessment is given in the final report on the study.
5. **Quick Assessment:** A short version of the PCI Framework enables a limited assessment of sustainability. The numbers of the indicators foreseen for this purpose (most important indicators) are underlined and highlighted in grey (e.g. **Indicator 1**).

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Definition of Terms

- The term **forest manager** refers to a person responsible for the planning and carrying out of forestry-related measures. As a rule, the term includes the skilled personnel responsible for forest management (forester, head of a forest division), forest owner or manager of forest enterprises.
- The term **game** refers to those wild animal species (furred game and feathered) which are subject to hunting laws, including species with no open season. Unless indicated otherwise, the terms **game** and **wild animals** are used in the same sense. Conversely, the term wild animal species refers to those wild animal species that are (or were) “hunnable” as “game,” or otherwise influenced by hunting (e.g. on account of hunting laws, regulations, and hunting practise).
- The term **threatened** refers to those wild animal species whose long-term survival within their natural range is endangered to varying degrees, or questioned. As a rule, these are species threatened with regional extinction, are declining continuously, are particularly rare, or have temporarily disappeared and are now returning, and are thus often classified as “protected species” under the nature conservation laws. The degree to which a species is threatened results, as a rule, from various risk factors that interact to varying degrees, and which, when combined, influence the conservation status of the species. If these factors occur, they are to be interpreted as warning signals suggesting that the respective species may be threatened. These risk factors are first and foremost: low population size; continuously declining populations (continuously decreasing number of populations and/or individuals of a species); small or decreasing range (contraction of distribution area); specialised habitat requirements of a species; habitat loss, habitat fragmentation, deterioration of habitat quality (low or decreasing availability of habitats); direct adverse human influence (e.g. on account of excessive hunting, excessive use, persecution, etc.) pressure by invasive, non-native species (e.g. Zulka et al., 2001; Primack, 1998). In varying combinations and with differing emphasis, most of the factors mentioned account for status of threatened species on red lists as well as their classification as protected species in accordance with nature conservation laws. The degree of endangerment that indicates, so to speak, the probability of survival or risk of extinction of a species in a certain area, is categorised through Red Listing processes. IUCN Red List categories include “extinct” and “extinct in the wild”, followed by categories of “critically endangered,” “endangered,” “vulnerable”, within which a species is considered threatened with extinction, and the pre-warning level of “near-threatened” (e.g. Zulka et al., 2001; IUCN, 1994, 1999). If a wild animal species is listed on a relevant red list – e.g. the Red List of Threatened Animals in Austria (Zulka, 2005) and Red Lists of the Federal Provinces – and classified into one of the above categories of endangerment, the respective species is to be considered a threatened species in the sense of this study¹. Equally, species protected by Austrian nature protection and conservation laws (species protection regulations), EU community laws (Bird Protection Directive, Flora-Fauna-Habitats Directive) and international species protection agreements (e.g. the Convention on the Conservation of European Wildlife and Natural Habitats – Bern Convention; Convention on the Conservation of Migratory Species of Wild Animals – Bonn Convention) are considered to be threatened species in this document.

¹ http://www.umweltbundesamt.at/umweltschutz/naturschutz/artenschutz/oasis/oasis_abfrage gives access to an Internet databank compiled by the Federal Environment Agency – Austria that allows queries as to the endangerment classification of individual species on different red lists. With regard to species relevant in terms of hunting, regularly updated information relevant in terms of hunting laws (hunting and closed seasons) on the basis of the hunting laws of the Austrian Federal Provinces is made available.

- The term **sensitive** refers to those wildlife animal species to which one or more of the above endangerment factors apply, even if the respective species has not (yet) been red-listed as “threatened” or “near threatened.” In particular those wildlife species are to be considered sensitive which, on account of specific (population-) biological features such as specialised habitat requirements (including size and quality of habitat), low reproduction potential, low dispersal capacity, are particularly sensitive vis-à-vis additional endangerment factors such as excessive hunting pressure, decreasing distribution, strongly increasing predation and competitive pressure from other species, or rapid changes of environmental conditions. In a hunting context, however, also native huntable game species are to be classified as sensitive if hunting them sustainably cannot be considered guaranteed in a certain area on account of their unfavourable conservation status or unfavourable trends in the respective species and/or its habitat. These species may often only be taken in small numbers or demand particular consideration on the part of hunters.
- The term **person permitted to hunt** or **owner of a hunt** refers, for the purpose of this study, to the owner or tenant(s) of hunting rights. Additionally there are those who hunt by permission of land owner/game tenant and owners of stalking districts.
- The term **person owning the right to hunt** refers in Austria to the land owner.
- The term **tenant** refers to the tenant of a proprietor’s or co-operative hunt (person permitted to hunt).
- The term **lessor** refers to the owner or representative of the owner of a proprietor’s or co-operative hunt.
- **Potential natural wildlife species inventory** is to be understood as the spectrum of wildlife species representing the currently achievable optimum circumstances in terms of biodiversity and near-natural conditions, taking into account the irreversible changes that have occurred in the course of the development of the cultural landscape as well as the existing economic and socio-cultural impacts on wildlife habitats that cannot be influenced by hunting. The “potential natural wildlife species inventory” is thus the range of wildlife species possible under the current habitat conditions, which pertain to the native spectrum of species (autochthonous, typical for the region) of the respective geographic region. „Native wildlife species“ are, in the sense of the potential natural wildlife species inventory:
 - those species that have outlasted the latest Ice Age or have immigrated thereafter and before and/or without human intervention²;
 - recolonising species that used to be native in a certain area whose populations temporarily ceased to exist and which now are returning to their original ranges, either without human intervention (immigration of species, e.g. elk/moose (*Alces alces*), brown bear (*Ursus arctos*), wolf (*Canis lupus*), otter (*Lutra lutra*)), or through re-introduction into their original habitats (e.g. Alpine ibex (*Capra ibex*) and Alpine marmot (*Marmota marmota*) within their original ranges of distribution);
 - native species that have disappeared on account of human influence (eradication, habitat changes).

As far as today’s cultural landscape basically still has habitat potential for the species mentioned, these species are to be considered part of the potential natural wildlife species inventory.

This is not to be confused with “**new residents**” (**alien species, neobiota**), which have arrived at a certain territory (in this case, Austria) later than 1492 through direct or indirect

² So-called primary native or indigenous species

human influence. With regard to Austria, these are, among huntable wildlife species, e.g. fallow deer, Sika deer, moufflon, wild rabbit, racoon dog, racoon, nutria and wild turkey. These species are *not* considered part of the potential natural wildlife species inventory. Those animal species that had become established under human influence in pre- and early history up to the end of the Middle Ages (1492) (such as, probably, the brown rat) are not relevant for hunting in Austria and thus need not to be considered for the purpose of this study.

- **Hunting management plan (hunting plan)** is to be understood as the planning ahead of any hunting-related activities, in particular in terms of time, area, and personnel. It comprises the goals and measures of hunting management for the respective hunting area and serves the purpose of providing long-term orientation for the hunting practice. Key components are e.g. to ensure that hunting accords with the needs of other land users, to take into account the optimum time and area for hunting the relevant game, and to give consideration to rare, non-hunted species. A hunting plan may exist in thought or in writing; with regard to sustainable hunting practice, however, a written hunting plan is preferable.
- **Hunting bag plan** (as a part of the hunting management plan) is a list of the numbers of each species (sex, age classes) planned to be shot or trapped (hunting bag planned before the hunting season starts).
- **Off-take list** (as a part of the hunting management plan) is a list of the numbers of each species (sex, age classes) really shot/trapped/killed by traffic accidents/ found dead by other reasons (hunting bag documented when the hunting season closes).
- **Culturally unacceptable game impact** is to be understood in this context primarily in terms of the ecologically unacceptable (harmful) influence of game on vegetation. The impact of game on vegetation comprises food intake (grazing, browsing, bark peeling) as well as rubbing to remove velvet from antlers and territorial tearing or gnawing. The concept of “culture” differs from economic considerations. Culture refers from an overall societal perspective to, in the case of forests, the functions beyond that of timber production, including shelter, leisure and recreation for people, but also to the provision of ecological value from other vegetation (e.g. orchid meadows rich in biodiversity). This is the fundamental view represented by the competent authorities on the basis of the respective (Austrian) legislation. The lack of some important natural enemies of our herbivorous wild animals as well as anthropogenic influences on our wildlife habitats (most of all land use) accounts for the fact that they are mostly not near-natural environments. This influences local densities and distribution patterns of wild animals, in particular ungulates, which damage vegetation beyond tolerable limits.
- **Wildlife habitat** is defined as the “living space” or “site” (the habitat) of wild species populations and/or individuals of a wild species. The habitat needs of the wild animals concerned define the area of wildlife habitat they require. The wildlife habitat must meet key habitat functions (food, cover and reproduction area). Environmental factors (such as noise, temperature, light, climate, soil, etc.) must neither exceed nor fall short of the species-specific limit of tolerance of the wild animals. The wildlife habitat may consist of several separate habitat sectors.
- **Migration and Dispersal** are movements of animals. Migration is the repeated movement of animal populations leading to seasonal changes of place and entails a change of range of a species. As well as seasonal habitat change (e.g. passing from summer to winter habitat in red deer) there may also be migration to breed. Dispersal is the lasting movement of individuals away from a natal area or subsequent point of settlement, and is often omnidirectional unless constrained in particular directions by topography . It plays a significant role in terms of the necessary gene flow within and among populations of a species, and thus in terms of the preservation of the species, its distribution, the

colonisation or re-colonisation of habitats. In the absence of regular genetic exchange via such "gene flow corridors," the risk of species and populations becoming regionally extinct will increase.

- Landscape sectors in which migration or dispersal primarily happens are termed **migration axes (routes)**.
- **Wildlife corridors** are bottlenecks within a migration axis or the habitat of wildlife species caused by barriers or an unfavourable environment. A salient characteristic of a corridor is its favourable structure compared to the surrounding environment, allowing for a link between separate habitat sections.
- The term **constricted corridor** is used to describe a constriction of a wildlife corridor or wildlife route on account of natural or anthropogenic barriers to a minimum width without any possibility of bypassing it locally, i.e. wildlife species are forced to adhere to the corridor as a consequence of specific topographic conditions (forest corridors, steep slopes, canyons, water courses, etc.) or artificial obstacles (fences, road barriers, walls, settlements, etc.) which create local bottlenecks.
- **ÖPUL** is the "Austrian Agri-Environmental Programme." The initials refer to the promotion of agriculture that is appropriate to the environment, extensive and favourable for nature. The programme is supported through the European Agricultural Fund for Rural Development as well as the Rural Development Programme of Austria. Along with ÖPUL, there are other publicly subsidised **agri-environmental measures** pursuing similar goals (e.g. the Ecopoint Programme).
- **Use** is to be understood in the comprehensive sense of the IUCN Policy Statement on the Sustainable Use of Wild Living Resources (IUCN, 2000); it includes all forms of consumptive and non-consumptive use of natural resources. Sustainable hunting and/or sustainable hunting-related use includes hunting certain animal species without the animals that are killed having to be used in a consumptive way (e.g. red fox (*Vulpes vulpes*), if its population increases on account of anti-rabies vaccination and thus endangers the population of other species).
- **Farmer** refers to persons responsible for the planning and carrying out of agricultural measures on agricultural plots of land. As a rule, they are managers/cultivators or owners of agricultural land or managers of an agricultural enterprise.
- **Leisure and Recreation management** covers persons active and organisations representing groups of people that benefit from the recreational use of the Wienerwald Biosphere Reserve. It also includes as stakeholders the officials and decision-makers responsible for the planning, regulation and control of leisure and recreational activities. This group of actors includes the Biosphere Reserve management, municipalities, regional managing bodies, tourism federations and associations, alpine associations, sports associations and other representatives of some other recreational interests (horse riders, mountain bikers, hikers, etc.), land owners and representatives of relevant authorities.

Assessment Set for Integrated, Sustainable Wildlife Management

Part: FOREST MANAGEMENT

Principles, Criteria and Indicator scoring

1 ECOLOGY

1.1 Principle: The preservation and improvement of wildlife habitats is an aim of forest management

1.1.1 Criterion: Forest management relates to wild animals and hunting

1.1.1.1 **Indicator 1**: Obligation of hunting tenants and long-term hunting customers to draw up species-specific hunting bag plans and structured off-take lists

Explanation: The existence of hunting bag plans and off-take lists (as part of hunting management plan, see Definition of Terms) records that hunting-related interventions in wildlife populations are planned and also documented (for orientation and future planning). Owing to the fact that in the Provinces of Vienna and Lower Austria, hunting bag plans are subject to authorisation by the relevant authorities, we can assume that the authorities will prevent the over-hunting of a wildlife species as well as see to it that hunting is harmonised with the interest of other land users. Hunting bag plans and off-take lists are, however, not only of advantage with regard to the wildlife species for which they are prescribed by the authorities, but also with regard to other – in particular threatened and sensitive – wildlife species as well as with regard to species that need to be reduced. It is important that off-take lists are drawn up in a species-specific manner, i.e. avoiding inexact collective designations (subsuming by groups of species such as ducks, geese, weasels, polecats, etc.). Equally, it is important to structure hunting bag plans by sex and age class (if distinguishable in the field) as well as off-take lists by individual species, date, sex and age class (if distinguishable) and the hunting site (or, in case of driven hunting, the territory) in order to be able to compare the planned (aspired) hunting bag with the actual hunting results as well as for a temporal and, if applicable, spatial allocation, in particular with a view to other modes of land use.

By motivating the hunting tenants and/or customers to draw up structured hunting bag plans and off-take lists also for those wildlife species for which it is not prescribed by the authorities, the forest owner entitled to hunt can contribute greatly to the planning and documentation of a sustainable use of wildlife habitats in terms of hunting. Obligatory criteria to this effect may, for example, be stated in the lease or hunting contract. Such obligations are particularly desirable for hunting customers with long-term contracts (≥ 1 year).

Indication and score:	<p>4 Hunting tenants and longer-term hunting customers are obliged to draw up hunting bag plans and off-take lists not only for the species for which the authorities prescribe such plans/lists, but also for managing any other wildlife species hunted, as well as off-take lists structured by sex and age class (if distinguishable), date and site of the taking.</p> <p>2 Hunting tenants and longer-term hunting customers are obliged to draw up hunting bag plans and off-take lists not only for the species for which the authorities prescribe such plans/lists, but also for managing one or some of the other wildlife species hunted, as well as off-take lists structured by sex and age class, date and site of the taking.</p> <p>1 Hunting tenants and longer-term hunting customers are obliged to draw up hunting bag plans and off-take lists not only for the species for which the authorities prescribe such plans/lists, but also for one or some of the other wildlife species hunted; a structuring of off-take lists, however, is not foreseen.</p> <p>-2 Hunting tenants and longer-term hunting customers are not obliged to draw up hunting bag plans or structured off-take lists beyond those demanded by the authorities.</p>
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1.1.1.2 **Indicator 2: Definition of hunting bag requirements of wildlife species that need to be reduced, for which no hunting bag plans are prescribed by the authorities (e.g. wild boar, non-native species)**

Explanation: Planning of the hunting bag is potentially one of the most effective control instruments of forest management. If handled adequately, establishing hunting bag plans enables flexible response to wildlife population changes and results of forest observation systems, by increasing or lowering hunting bag figures. Hunting bag plans are, so to speak, the hunting-related link allowing for a coupling of the vegetation state, wildlife population regulation, and aspects of nature protection and conservation. They serve both the conservation of wildlife populations through sustainable use for hunting and the avoidance of game impacts unacceptable in terms of regional culture. In order for hunting bag plans to exert this controlling function in practice, it is essential that they are realistic and accomplishable. To establish an obligatory minimum or maximum number to be bagged, depending on the wildlife species and social class, is very much in line with this practical requirement. In particular with regard to wild boar, establishing a minimum bag serves this purpose (e.g. with a certain number depending on the current population status and increase, or, at least, in a more general manner, "as many as in the previous year" or „more than in the previous year.“) This also applies to forest districts if the wild boar living there also roam adjoining agricultural lands.

Along with the hunting bag plans generally prescribed by the authorities, the present Indicator refers in particular to additional hunting bag requirements on the part of the forest owner entitled to hunt for wildlife species with a (locally and temporarily limited) need of control. In the Wienerwald, wild boar are a wildlife species that need to be reduced in terms of regional culture. Currently, however, neither the hunting laws of Lower Austria nor those of Vienna establish obligatory hunting bag plans for this cloven-hoofed species. This is why minimum hunting bag requirements or annual hunting bag targets which hunting tenants or

hunters by permission of land owner/game tenant are contractually obliged to meet (in writing or orally), may greatly support the regulation of wildlife populations in the interest of regional culture. Along with wild boar, this may be meaningful also for various neozotes (e.g. racoon, racoon dog, American mink). Forest owners and managers may, in addition, contribute greatly to meeting hunting bag plans and requirements by creating adequate hunting possibilities and investing sensibly in the infrastructure of hunting territories.

The above mentioned target requirements are particularly desirable for hunting customers with long-term contracts (≥ 1 year).

Indication and score:	2	Contractual regulations between the forest owner entitled to hunt and the hunting tenants and/or longer-term hunting customers oblige hunters to aim at meeting minimum hunting bag requirements for wildlife species which need to be reduced.
	-2	Contractual regulations between the forest owner entitled to hunt and the hunting tenants and/or longer-term hunting customers do not contain any obligations to this effect.

Remark for owners of small forests: see Preliminary Remarks (p.2)

1.1.1.3 **Indicator 3: Inspection of hunting bags**

Explanation: The inspection of the shot game on the part of the person entitled to hunt (or a confidant) ought to be a consistent feature for wildlife species with prescribed minimum hunting bag requirements. This may be done in various ways (e.g. presentation for inspection of shot red deer and red deer calves after gralloching), but should, in any case, allow an unequivocal inspection of bags.

Indication and score:	2	All bags of wildlife species for which there is a minimum requirement prescribed by the authorities, as well as possibly other hunting bag requirements agreed upon, are <i>consistently</i> inspected.
	0	Bags of wildlife species for which there is a minimum requirement prescribed by the authorities, as well as possibly other hunting bag requirements agreed upon, are inspected <i>randomly or regarding individual species only</i> .
	-2	Bags of wildlife species for which there is a minimum requirement prescribed by the authorities, as well as possibly other hunting bag requirements agreed upon, are <i>not</i> inspected.

Remark for owners of small forests: see Preliminary Remarks (p.2)

1.1.1.4 **Indicator 4: Existence of a strategy to harmonise forestry measures with hunting**

Explanation: Forest management measures have a defining impact upon wildlife habitats. This Indicator, however, is not able to verify the effects of this impact but only to illustrate

how much the forest management strategies take into consideration hunting-related categories in the wildlife habitats. Communication of persons involved in forest management with hunters is also assessed. In terms of documentation, the harmonisation of forestry measures with wild animals and hunting by way of a respective strategy in the forest management plan is noted. A designation of habitat protection zones, nature zones, etc. may be advantageous in this attempt.

Indication and score:	2	A strategy to harmonise forest management measures with hunting is contained in the management plan.
	-1	The management plan does not contain a strategy to harmonise forest management measures with hunting.

Remark for owners of small forests: see Preliminary Remarks (p.2)

1.1.2 Criterion: Giving consideration to the influence of game on vegetation

Explanation: This criterion and the subsequent indicators are meant to allow an assessment of negative impacts of game on forests (and other forms of vegetation), while they do not question the value of forests as a wildlife habitat. Wild animals are unaware of limits and borders, so measures of forest management in one's own operation may have a major influence on how game impacts vegetation of the neighbouring operation. This criterion should not be evaluated without involving the authorities' forest management service.

1.1.2.1 Indicator 5: Existence of exclosures to monitor game impact on forest regeneration

Explanation: A proven method to objectively assess positive or negative game impacts on vegetation is to install and regularly observe control pairs of browsing control plots, i.e. small fenced-in plots entirely free of browsing and comparable areas in the surroundings that are not fenced in (e.g. 6 x 6 m each) for comparison of the game impact on the vegetation development. If the spot is adequately chosen, it is possible to determine the influence of current browsing on the composition of the vegetation (forest regeneration, permanent vegetation in agricultural areas, such as headlands). It is important to note that the vegetation growing without any game influence within the fence should not be regarded as the natural state, but is taken simply as a comparative area to determine game impact. It allows an objective check of whether this influence results in an increase or reduction in the diversity of vegetation, or none of the above.

Austria-wide forest surveys and biotope mapping in agricultural areas also provide good data on the current vegetation of many parts of Austria – at least with regard to forest vegetation – for comparison of the status quo with a target status.

The existence of certain indicator plants in the ground vegetation gives reliable clues as to the state of the biotope. An indication of a balanced relationship between game (in particular cloven-hoofed game and hares (*Lepus europaeus*)) and food supply is the existence of rare plants preferred for browsing, while the lack of such plants, in combination with the dominant appearance of certain (spiny/thorny/bitter/poisonous) plants resistant to browsing is characteristic of excessive game populations. A list of relevant indicator plants can be drawn up specifically for the respective wildlife habitat concerned. Permanent monitoring of game impacts on forest vegetation provides an important basis of information both for hunting and non-hunting forest owners (in their role as lessors of a hunt) to enable structuring of the hunting strategy and plan to the current vegetation status. It gives forest owners and managers a way to examine existing game impacts and optimise forest management measures in order to reduce the susceptibility of forests to game damage.

Indication and score:	3	Control fences to monitor game influence on the vegetation are at a density above one fence per 100 hectares of forest.
	2	Control fences to monitor game influence on the vegetation exist above a density of one fence per 200 hectares.
	1	Control fences to monitor game influence on the vegetation are at a density of up to one fence per 200 hectares.
	0	There are no control fences to monitor game influence on the vegetation.

1.1.2.2 **Indicator 6: Using the results of objective forest monitoring systems to estimate game impacts on forests**

Explanation: Forest monitoring suited for the area of assessment, such as observation transects, spot checks, exclosures, expert examinations of areas, stand surveys provide – regardless of whether they are carried out by an authority or a forestry operation – important guidance for forest managers and hunters, helping them to determine the impact of cloven-hoofed game on vegetation at browsing levels. Indirectly, these monitoring systems may also be consulted to verify the influence of forestry and hunting-related measures on both vegetation and cloven-hoofed game, and give clues as to how to optimise forestry and hunting-related measures.

Forest monitoring systems should provide traceable and objective results to be included in the planning of forest management and hunting. This Indicator is also applicable if no such systems have been established in the immediate area of a hunting ground, because from the results of monitoring systems at the levels of operations or regional level, basic conclusions can be drawn as to the situation of game impact within one's own hunting ground. Even if there is no current damage, regular objective monitoring is necessary.

Indication and score:	2	A recognised, objective forest monitoring system exists and is used for planning and optimising measures of forest management.
	-2	A recognised, objective forest monitoring system does not exist.
	-4	A recognised, objective forest monitoring system exists but is not used for planning and optimising measures of forest management.

1.1.2.3 **Indicator 7: Preventing game impacts which are unacceptable in terms of regional culture**

Explanation: Regional culture is here defined as comprising nature conservation in general and thus also conservation of native animal species; it also includes hunting and fishing rights, agriculture, Alpine farming and forestry, as well as the right of access to farmland and forests. We speak of game impact unacceptable in terms of regional culture in particular if important functions of the forest, in which there is a public interest (for shelter, well-being, recreation, use, habitat for animals and plants) are jeopardised. As a rule, damage to the forest ecosystem has a negative impact on these functions, which is particularly serious if the role as shelter (protection against avalanches, rockfall, erosion, etc.) is affected. Damage to ecologically valuable meadows and grasslands, such as wild boar may cause by large-scale rooting, may also be relevant in terms of regional culture.

Game impact unacceptable in terms of regional culture is to be understood in this context primarily in terms of the ecologically unacceptable (harmful) influence of game on vegetation. The impact of game on vegetation comprises food intake (grazing, browsing, bark peeling) as well as rubbing to remove velvet from antlers. The concept of “culture” differs from economic considerations. Culture refers from an overall societal perspective to, in the case of forests, the functions beyond that of timber production, including shelter, leisure and recreation for people, but also to the provision of ecological value from other vegetation (e.g. orchid meadows rich in biodiversity). This is the fundamental view represented by the competent authorities on the basis of the relevant (Austrian) legislation.

The lack of some important natural predators of our herbivorous wild animals as well as anthropogenic influences on our wildlife habitats (most of all land use) accounts for the fact that they are, seen from a larger perspective, mostly not near-natural environments. This influences local densities and distribution patterns of wild animals, in particular ungulates, which damage vegetation beyond tolerable limits.

Such impact unacceptable in terms of regional culture may also be caused by forest management. Forest management itself, on account of its objectives, its spatial and temporal patterns and its nature and intensity, can influence the susceptibility of a forest to damage by game and thus also the risk and extent of game impact relevant in terms of regional culture.

The way forests are managed (mode of operation, forest regeneration processes, selection of tree species, cultivation, construction of forest roads, etc.) quantitatively and qualitatively controls to a considerable extent the availability of food for game, as well as habitat factors unrelated to food, such as living space and cover (protection against climate influences and disturbance).

The susceptibility of a forest to game damage tends to be greater when there is little food in habitats that animals choose for reasons unrelated to food availability (living space, cover). Natural forest regeneration, for example, with its concept of forest rejuvenation often through a high density of saplings, provides large-scale, spatially and seasonally balanced availability of food while at the same not providing a great settling incentive. Mostly this results in a significantly lower susceptibility to game damage than clear-cutting (clear-felling) with artificial forest regeneration (afforestation). As opposed to exclusively coniferous forests, deciduous forests and mixed woodlands are characterised by soil vegetation of greater density and richness in species, which can mitigate bottlenecks in food supply and counteract game damage. The same effect is observed when rapidly growing browsing woods are tolerated and/or encouraged in some places. In addition, fruiting deciduous trees (beech and acorn mast) and recently fallen leaves improve the quality of feeding in autumn. Forest management that encourages open canopies, such as by tending thickets and pole stands, can improve the feeding situation while at the same time reducing cover (in case of unsuitable climate impacts, predators), thus entailing a more advantageous relationship of settlement incentive and food availability and reducing the forest's susceptibility to game damage. Adequate forest management measures that should be carried out in close co-ordination with hunting-related measures may both increase the carrying capacity of forest biotopes for wildlife populations and reduce the risk of game damage. This allows greater game densities, with lower susceptibility to damage, and results in an increase of forest and hunting-related usability.

The extent of game impacts unacceptable in terms of regional culture can mainly be ascertained via objective measurements of game damage (monitoring system, notified game damage, etc.) as well as via control fences (exclosure systems).

Indication and score:	<p>1 There is <i>no (on less than 3 % of the forest area)</i> game damage to the forest co-induced by forestry-related measures and intolerable in terms of regional culture.</p> <p>–1 There is a <i>minor extent (on up to 15 % of the forest area)</i> of game damage to the forest co-induced by forestry-related measures and intolerable in terms of regional culture.</p> <p>–3 There is a <i>significant extent (on more than 15 % to up to 35 % of the forest area)</i> of game damage to the forest co-induced by forestry-related measures and intolerable in terms of regional culture.</p> <p>–4 There is a <i>massive extent</i> of impairment of the forest ecosystem on account of game damage co-induced by forestry-related measures and intolerable in terms of regional culture (<i>more than 35 % of the forest area</i>)</p>
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1.1.3 Criterion: Preservation and creation of linking biotopes

1.1.3.1 Indicator 8: Registration and mapping of important migration routes, wildlife corridors and other essential wildlife routes

Explanation: Knowing about locations, course and use of important regional, supra-regional or cross-country axes of game movement (including those of large predators such as bear (*Ursus arctos*), lynx (*Lynx lynx*) or wolf (*Canis lupus*)) is a prerequisite for being able to establish measures for preserving or reinstalling links between habitats, as well as including migration routes into spatially relevant planning. In particular with regard to transport planning, especially of large-scale or high-capacity transport, it is important to take into account the mobility needs of wild animals as early as possible in order to be able to include them in the route and location planning process, as well as to estimate the need for “green bridges” (routes across railways, motorways, etc.) and artificial game routes in good time. It is mainly the choice of location as well as the right dimension that are decisive as to whether such artificial game routes are effective and accepted by the game. Reliable information on the course of significant long-range routes or historical routes as well as their use by the individual game species remain an indispensable basis of planning. Equally, expert knowledge on migration routes, corridors and other essential routes is a prerequisite for these routes to be entered into spatial plans, considered and treated as legally binding and kept free from construction.

Given their detailed knowledge of their hunting areas and their experience, hunters are on-site experts able to make valuable contributions to identifying migration routes, corridors and essential game routes. Even if no corridors and/or essential routes are found on a specific hunting ground, this is important information. Co-operation with wildlife biologists thus ought to be a major goal. Existing long-range, main and essential routes ought to be mapped as part of the hunting concept, and persons involved in planning activities as well as other land users ought to be informed when necessary. Communication with hunters as well as with owners and managers of neighbouring forest areas to this effect is of advantage.

Indication and score:	<p>2 Forest owners and managers actively contribute to defining important migration routes, wildlife corridors and other essential routes; if they exist, they are depicted in the forest management plan, and this information is made available to other land users</p> <p>0 Forest owners and managers do not actively contribute to defining important migration routes, wildlife corridors other essential routes.</p>
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1.1.3.2 **Indicator 9: Increasing the attractiveness of important migration routes, corridors and other essential routes**

Explanation: There is a wide range of possibilities of making important migration routes, corridors and other essential routes in forests more attractive. However, as a rule, they demand an active role or at least the consent of the forest/land owner:

- Preservation and management of forest areas that fulfil habitat-related and linking functions in connection with wildlife corridors in line with wildlife species' needs. Through measures of forest management aiming at an improvement of feeding/grazing as well as the availability of coverts and cover, structural diversity and forest edge density, the attractiveness of such forest areas to wild animal movements can be maintained and heightened. As movement routes shaped by forest structures are often locally reduced to narrow stretches (e.g. strips of forests within agricultural areas), it is important that they are sufficiently thick, thereby providing a visual shield and adequate weather protection near the ground.
- On open terrain, routes of movement, corridors and other essential routes can be made more attractive by planting guiding lines (hedges, riparian woods and woody plant communities, shelter belts/wind breaks, planted field and meadow boundaries, set-aside) providing cover and grazing opportunities which can be used by day and night. If wide open stretches are being crossed, their attractiveness may be increased by planting strips of woody communities (providing interim cover).
- Measures of biotope management can also increase the usability and acceptance of artificial game routes and "green bridges." Particularly for forest-bound animal species, it is of great advantage if artificial game routes are linked on both ends with forest structures. As a person entitled to hunt, the forest owner is able to work toward an effective prohibition of hunting within a minimum radius of approximately 200 m around artificial game routes.
- In addition, hunters can be supported in increasing the attractiveness of migration axes and corridors by planting strips of grazing land on agricultural land and installing watering places (wallows) and salt licks.

Any measures on the part of forest managers to increase the attractiveness of migration axes and corridors ought to be carried out in co-operation with nature protection and conservation organisations and/or the biosphere reserve management.

Indication and score:	<p>2 <i>Numerous</i> opportunities of making important migration routes, corridors and other essential routes more attractive have been realised.</p> <p>1 <i>Some</i> opportunities of making important migration routes, corridors and other essential routes more attractive have been realised, although there is room for improvement.</p> <p>-1 <i>No</i> opportunities of making important migration routes, corridors and other essential routes more attractive have been realised.</p> <p>-2 Fragmentation increases on account of forest management activities.</p> <p>x Not applicable, no score (There are no important migration routes, corridors and other essential routes within the unit of assessment.)</p>
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1.1.4 Criterion: Giving consideration to habitat quality and capacity

Explanation: Habitat capacity is, for the purpose of this study, defined as the capacity of a certain habitat to maintain a maximum number of wild animals of a population and/or a biotic community without major alterations in the composition of species and without damage to the habitat concerned (biotic biotope carrying capacity). It results on the one hand from the demands of game on its habitat and, on the other hand, from the availability of food and necessary habitat structures – e.g. cover, watering places, wallows, sleeping places, etc. Along with the nature and number of these biotope elements, their spatial distribution pattern is important. Habitat capacity is a dynamic quantity that may change over the course of time. If habitat capacity changes over the course of a year, we speak of “seasonal habitat capacity.”

1.1.4.1 **Indicator 10:** Active preservation and management of the wildlife habitat

Explanation: Forest management significantly controls habitat quality as well as both the biotic and economic biotope carrying capacity (unrelated to damage) for wild animals inhabiting forests. Any forestry-related intervention has a habitat-shaping effect and changes the habitat quality for wild animals. By the choice of the way a forest management enterprise is operated, in particular by measures such as selection of tree species and mode of forest rejuvenation, selective interventions such as tending of forest regeneration and thinning of thickets and pole stands, forestry management shapes significant habitat factors such as availability of coverts and cover, food/grazing, structural diversity or forest edge density. Measures of forestry may on the one hand contribute to minimising seasonal bottleneck situations in food availability for wild animals, but may also, on the other hand, induce such situations and/or aggravate naturally or anthropogenically induced bottleneck situations. The way a forest is managed also shapes the local spatial and temporal game distribution, local-temporal game behaviour, the potential wildlife species inventory and the overall possible game densities (without causing damage) (biotope carrying capacity). Even the susceptibility of a forest to game damage is closely related to the mode of forest management.

If wildlife habitat needs are targeted and taken into account in terms of forest management, forestry is able to combine active habitat management with sustainable use. By integrating game as a “site factor” into forest management planning and practice, the susceptibility to game damage as well as the extent of game damage may be reduced and even avoided. In addition, a forest management mode in line with wildlife needs may increase the biotope capacity and thus the game densities possible without causing damage, which, in turn, allows for a greater harvest of population increases through hunting as well as higher incomes for the forestry operation from hunting leases on account of the increased value of the hunting area. Thus, both in terms of forestry and hunting, the use of resources can be lastingly guaranteed.

Forest management has a broad variety of options to preserve and improve wildlife habitats, which are, for example:

- stronger emphasis on natural regeneration;
- improvement of feeding/grazing by fostering site-adapted mixed and deciduous forests with herbaceous layers rich in species, fruiting deciduous trees (beech and acorn mast) and freshly fallen leaves in autumn;
- fostering of rapidly growing and sprouting species for browsing;
- timely young growth cultivation and juvenile spacing;
- near-natural operational management rather than conventional age-class management with clear-felling;
- targeted forest management measures and consideration for fostering rare and threatened wildlife species such as hazel grouse (*Bonasa bonasia*), capercaillie (*Tetrao urogallus*) and black stork (*Ciconia nigra*).

Mainly for anthropogenic reasons, the suitability of our wildlife habitats for native wildlife species is limited to some extent. Both agri-environmental programmes such as ÖPUL, the Austrian Agri-Environmental Programme (to promote agricultural production methods compatible with the requirements of protection of the environment, de-intensified production and the preservation of natural habitats), as well as subsidising programmes by the provincial hunting associations and some nature protection and conservation associations, give hunters a multitude of opportunities for comprehensive biotope improvement, in particular for threatened and sensitive species. While measures of biotope improvement as a rule require the consent of the land owner, they mostly need the commitment and active involvement of hunters themselves.

In terms of assessment, it is important for improvement measures not to benefit exclusively species that are economically important or otherwise attractive to hunters. These measures ought to be directed in particular to covering habitat requirements of threatened, sensitive or less hunted native game species. Management measures for economically important species must not have a negative impact on threatened species such as may be caused, e.g., by baiting or feeding. Regional lists of current wildlife species, of the potential natural wildlife species inventory as well as of threatened wildlife species (e.g. on the basis of relevant Red Lists) and of protected species (according to nature protection and conservation laws, the Flora-Fauna-Habitats-Directive, Wild Birds Directive, etc.) may be valuable tools in this regard. Measures to improve and preserve wildlife habitats that benefit native game species as a rule also benefit non-huntable animal species.

Indication and score:	<p>4 Existing possibilities for improvement and preservation of wildlife habitats are exploited in the form of biotope care and management measures or preservation of intact biotopes; measures are geared mainly to the habitat needs of <i>threatened</i> native wild animals.</p> <p>2 Existing possibilities of improvement and preservation of wildlife habitats are exploited in the form of biotope care and management measures or preservation of intact biotopes; measures are geared to the habitat needs of native wildlife species.</p> <p>-2 No measures to improve and preserve wildlife habitats are taken; the wildlife habitat reflects considerable ecological deficits.</p> <p>-4 The habitat quality of wild animals is substantially impaired by counterproductive forestry-related measures.</p>
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1.1.4.2 Indicator 11: Giving consideration to habitats when planning forest development

Explanation: For some wildlife species, forest roads and logging trails may well be a small-scale enrichment in structural diversity of their habitat, in particular for roe deer, brown hare and grouse. On the other hand, if forest roads cut through sensitive areas such as game core areas, zones of rest and retreat, birthing and hatching areas, rutting and mating areas, feeding sites, etc., they may have considerably negative implications for wildlife behaviour and distribution and even cause wildlife to disperse and disturb the ecological functional cohesion of partial wildlife habitats (Reimoser & Hackländer, 2007). It should be borne in mind in this regard that new forest road constructions often entail opportunities of more intense recreational use – even, and in particular, off the tracks – which may turn them into “corridors of disturbance” with remarkably broad effects. As the network of development becomes more tightly knit, the remaining rest zones for wildlife become scarcer. Steep slopes may act as barriers and change the wildlife’s use of an area significantly. Especially broad forest roads used by lorries increase the length and density of inner forest edges. Inner forest edges often increase the attractiveness to wild animals to settle there. Particularly roe deer are strongly attracted by forest edge situations even if they do not provide additional grazing opportunities (Reimoser, 1986). Locally increased game densities can then often result in more game damage in the adjoining stands (Reimoser, 2001). Open road surfaces with good sight-lines may often be used by predators to increase their hunting success, which may result in a dangerously greater predator pressure upon the preferred species of prey. Limiting construction works as far as possible and choosing less disturbance-sensitive seasons can help to minimise disturbance caused by the particularly noise-intensive construction phase.

In order to minimise negative wildlife-ecological impacts and risks, development planning ought to take account of habitat needed by wildlife species that are important for hunting, and in particular by rare and threatened species; the ecological integrity of the wildlife habitat should not be impaired by forest road construction. Any new forest development should be exclusively in response to a demonstrable need. If a need is recognised, adequate forest and haulage-technology alternatives (e.g. overhead lines, multi-use paths, steep paths and roads) should be examined on the basis of wildlife-ecological habitat mapping. Routing innovations (including hauling across foreign land) should be tested for wildlife-ecological

impacts, and the solution most compatible with wildlife requirements should be chosen. Equally, for detailed planning (e.g. width of paths, gradient of slopes), time-scheduling and construction itself, it is important to observe wildlife-ecological criteria. Information by hunters may prove to be a precious resource with regard to the assessment of habitats and examination of alternatives, and ought to be accessed.

Indication and score:	<p>3 Ahead of construction, the need, development and routing alternatives, for new roads were examined <i>in every case</i> for possible wildlife impacts, and the solution most compatible with wildlife ecological needs was chosen.</p> <p>2 Ahead of construction, the need, development and routing alternatives for new roads were examined <i>in some cases</i> for possible wildlife impacts, and the solution most compatible with wildlife ecological needs was chosen <i>for the projects examined</i>.</p> <p>-2 <i>In no cases</i> were needs, possible development and routing alternatives for new roads examined for possible wildlife-ecological impacts ahead of construction.</p>
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1.2 Principle: Forest management should endeavour to preserve and improve the diversity of wildlife species by protection and use

1.2.1 Criterion: Forestry favours potentially natural forest vegetation

Explanation: By orienting itself towards potentially natural vegetation, and as far as possible to semi-natural forest stands with precious habitat resources, such as dead wood, forest management benefits habitats that favour natural wildlife species (e.g. Scherzinger, 2006).

1.2.1.1 Indicator 12: Knowledge and documentation of potentially natural forest types and tree species compositions

Explanation: Information on potentially natural forest communities and relevant tree species compositions, including its entry into planning documents (business plan, management concept, etc., with or without mapping), may also be provided on the supra-operational level, in particular by forest advisory services. Thus, this Indicator is also applicable by owners of small forests.

Indication and score:	<p>3 The potentially natural forest types and relevant tree species compositions have been identified and entered into planning documents; the current composition of tree species is recorded on a regular basis (at least every ten years).</p> <p>2 The potentially natural forest types and relevant tree species compositions have been identified, but not entered into the planning documents; the current composition of tree species is recorded on a regular basis (at least every ten years).</p> <p>–1 The current composition of tree species is recorded on a regular basis (at least every ten years); The potentially natural forest types and their relevant tree species compositions are not known.</p> <p>–3 The potentially natural forest types and relevant tree species compositions are not known; the current composition of tree species is not recorded on a regular basis (at least every ten years).</p>
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1.2.1.2 Indicator 13: Proportion of the forest area with potentially natural tree species composition and near-natural forest structure

Explanation: The preservation and improvement of the diversity of wildlife species in the sense of a complete potential natural wildlife inventory requires that adequate habitats are available for regionally native wildlife species. Wildlife habitats as close as possible to a near-natural state offer the best conditions for the establishment of as complete a potential natural wildlife species inventory as possible, including recolonising species and viable populations relevant for hunting. If forest management is oriented toward natural forest vegetation and near-nature forest structures and appearance, and chooses harvesting and haulage methods carefully to protect the soil and the woodland, it will make the greatest contribution to creating and preserving wildlife habitats likely to harbour potential natural wildlife inventories.

The availability to forest managers and/or land owners of a list of current and potentially natural tree species is a prerequisite for modelling forest management upon the principle of completeness of the potentially natural vegetation, and for aspiring and adhering to this principle. In order to make forests in the Biosphere Reserve inhabitable also for deadwood species, commercial forests should be managed in such a way as to allow a certain volume of dead wood along with the site-typical tree species (between 5 and 10 % of the living stock) (Sauberer et al., 2007).

The extent to which potentially natural tree species are represented ought to follow the geological situation, condition of the soil, exposure and altitude, etc. In the Wienerwald, given natural conditions, copper beech and oak trees will dominate along with a number of other deciduous tree species (at higher altitudes possible also larch, fir and spruce). Preserving tree stands appropriate to the site as well as promoting natural regeneration are aims of sustainability. Along with the gamut of species, however, the structure (matrix) of woodland is also significant for wildlife. This includes not only the age topography but also, and, no less significantly, site-typical deadwood volume. The average stock of an idealised beech stand (> 80 years of age) in the Biosphere Reserve is about 500 m³/ha. Apportioned to the “ideal beech” (diameter at breast height 50 cm), this volume corresponds to about 150 trees per ha, of which about 15 (5-10 %) should be available as standing or lying deadwood (Sauberer et al., 2007). In order for tree species lists to be updated, regular stock-taking is necessary

(forest inventory). By actively communicating with persons permitted to hunt (see prevention of game damage), the forest manager/land owner is able to make a significant contribution to a lasting preservation or development of site-typical forests.

Indication and score *:	<p>4 The composition of tree species corresponds to the potential natural forest community on a major part of the forest area (100 % to 80 %); the forest structure largely approaches the relevant potential natural forest type.</p> <p>2 The composition of tree species corresponds to the potential natural forest community on a major part of the forest area (100 % to 80 %); however, the forest structure clearly deviates from the relevant potential natural forest type.</p> <p>1 The composition of tree species corresponds to the potential natural forest community on a predominant part of the forest area (79 % to 50 %).</p> <p>–1 The composition of tree species corresponds to the potential natural forest community on a minor part of the forest area (49 % to 10 %).</p> <p>–4 The composition of tree species corresponds to the potential natural forest community on less than 10 % (9 % to 0 %) of the forest area.</p> <p>* <i>Forest types worthy of protection and preservation for considerations of ecology, nature conservation, history or aesthetics of a landscape, which have originated as a consequence of anthropogenic influence and do not correspond to the “natural” forest vegetation do not qualify for this evaluation (e.g. semi-open grazing forests).</i></p>
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1.2.1.3 **Indicator 14: Management for near-natural forest – operative goals, planning and practice**

Explanation: Important (ecological) principles for management of near-natural forest comprise, among others:

- Favouring natural vegetation, in particular selection of tree species with a view to site-adequate, native tree species of the potentially natural forest community
- Specific promotion of admixed tree species and rare native tree species
- natural regeneration
- Opting against large-scale clear-cutting (> 0,5 ha); encouraging site-specific, native flora and fauna rich in species
- Favouring near-nature forest stand structures (proportions of tree species, age distribution, topography) and forest appearance
- Maintaining forest-type-specific old and deadwood in its natural structure and distribution
- Timber harvest protecting the soil and woodland
- Cultivation of forest edges

Indication and score:	<p>4 Forest management favouring near-natural vegetation is a documented objective of a forest enterprise and/or the forest owner; the management plan contains implementation provisions <i>systematically</i> applied in practical forest management.</p> <p>2 Forest management favouring near-natural vegetation is a documented objective of a forest enterprise and/or the forest owner; the management plan contains implementation provisions – however, there are <i>deficiencies</i> regarding their application in practical forest management.</p> <p>1 Forest management favouring near-natural vegetation is a <i>documented objective</i> of a forest enterprise and/or the forest owner; however, there are <i>no concrete implementation provisions</i></p> <p>0 Forest management favouring near-natural vegetation is an objective of the forest enterprise and/or the forest owner; however, there is <i>no written documentation</i>.</p> <p>-2 Forest management favouring near-natural vegetation is <i>not an objective</i> of the forest enterprise and/or the forest owner, nor is it applied.</p>
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1.2.2 Criterion: Forest Management accommodates the habitat needs of wild animals

1.2.2.1 Indicator 15: Giving consideration to the habitat needs of threatened, sensitive and recolonising wildlife species

Explanation: Through silvicultural techniques, forest management can shape the habitats of wild animals. Along with the susceptibility to damage, habitat requisites important for threatened, sensitive and/or recolonising wild animals pertaining to the potential natural species inventory should also be taken into account. In this context, particular attention should go to maintaining or establishing rare habitat requisites (special sites). In the Wienerwald, this might be wetland habitats, old tree stands, deadwood, etc. By way of targeted silvicultural habitat management, forestry is able to contribute greatly to preserving and fostering threatened and/or recolonising native animal species. Forest road construction and wood haulage (in particular in terms of disturbance), too, should be handled with an awareness of threatened and/or sensitive species, on the basis of knowledge of the current and potential natural species inventory in one's own woodland as well as of the habitat needs of these species. If required, relevant information should be sought from persons permitted to hunt and/or wildlife ecologists. Consideration of these aspects is evidenced by documentation of measures in the forest management plan as well as records of measures actually implemented.

Indication and score:	<p>4 There is evidence that threatened, sensitive and/or recolonising wild animal species are encouraged through active forest management measures (e.g. development or preservation of habitats)</p> <p>–1 Threatened, sensitive and/or recolonising wild animal species are not taken into account in terms of forest management.</p> <p>–4 Forest management entails loss or impairment of habitats of threatened, sensitive and/or recolonising wild animal species.</p>
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1.2.2.2 **Indicator 16: Giving consideration to the reproductive biology and life-cycle of threatened and sensitive wild animal species**

Explanation: Forest management is rarely seen as a factor of disturbance, in particular by the forest manager him or herself. However, disturbance, and especially habitat-changing measures at times sensitive for wild animals, may have a strong impact on their behaviour. Partial habitats that were freely accessible only a few years ago may become difficult to reach on account of construction, settlement, new infrastructure, etc., or only be available in the form of relict areas. Forestry operations may result in additional barriers, sources of disturbance, and thus in disruption or stress for wild animals.

It is important to develop forests with forest roads or trails usable for forestry in a moderate and well-planned manner, taking into account in particular the consequent effects of tourism and disturbance for wild animals. Planning across forest ownerships may entail great advantages and minimise disturbing impacts. The spatial and temporal behaviour of wild animals, and even the potential wildlife species inventory may respond positively.

Concrete examples demonstrating that forestry heeds wild animals are the establishment of wildlife rest zones, cessation of interference in close proximity to nest sites or dens during the breeding season (to avoid hatching losses e.g. for owls, black storks, birds of prey, etc.), and, ideally, shifting forestry-related works in sensitive areas, e.g. in rutting and birthing zones to less critical seasons.

Such measures may minimise reproductive losses and thus benefit hunting later on. In case of wild animals not hunted, it will increase the aesthetic value while hunting. Paying heed to phases when wild animals are sensitive to disturbance as well as to the areas thus affected ought to be adequately documented in management plans. The emphasis here is on the threatened and sensitive wildlife species as reflected in the wildlife species inventory or on a separate list. If threatened and sensitive species do not (yet) occur in the unit of observation or the presence of such species is unknown, planning should consider how such species would be taken into account if they were to arrive in the relevant area.

Indication and score:	<p>4 Areas and times critical for threatened, sensitive wild animals <i>are taken into account</i> in terms of forest management by way of adequate planning.</p> <p>1 Areas and times critical for threatened, sensitive wild animals <i>are taken into account to some extent</i> in terms of forest management by way of adequate planning.</p> <p>–4 Areas and times critical for threatened, sensitive wild animals <i>are not taken into account</i> in terms of forest management by way of adequate planning.</p>
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1.2.2.3 **Indicator 17: Existence of far-reaching agreements regarding the sustainable management and development of wildlife habitats**

Explanation: Wild animals are unaware of human ownership boundaries. Habitat-shaping measures (construction of forest roads, larger-scale clear-felling, etc.) should thus be planned across forest, hunting and operational ownerships to best meet wild animals' habitat needs. This is mainly true for wide-ranging wildlife species such as red deer, wild boar, birds, etc. The smaller the units managed and developed, the more desirable are cross-territorial guidelines. If neighbourhood relationships are good, harmonisation may work informally by agreement. However, measures across operations ought to be documented in writing.

Indication and score:	<p>4 There are <i>written</i> agreements across hunting/forestry territories benefiting wide-ranging wildlife species (e.g. birds, red deer, wild boar, etc.), and these agreements are adhered to.</p> <p>2 There are management and development agreements across hunting/forestry territories benefiting wide-ranging wildlife species (e.g. birds, red deer, wild boar, etc.).</p> <p>1 There are no management and development agreements across hunting/forestry territories, even though the land owner/forest manager³ is acting in support of their establishment.</p> <p>–1 Management and development agreements across hunting/forestry territories do not exist, nor is anyone acting in support of their establishment.</p> <p>–2 Management and development agreements across hunting/forestry territories do not exist, nor is anyone acting in support of their establishment; the land owner/forest manager prevents a cross-operational strategy.</p>
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³ Der bewertete Grundeigentümer oder Forstwirt bzw. Forstbetrieb.

2 ECONOMY

2.1 Principle: Securing and/or improving the profitability of hunting is an objective of forest management

2.1.1 Criterion: Contributing to the profitability of hunting in the medium term

2.1.1.1 **Indicator 18:** Existence of a marketing strategy for hunting in the Biosphere Reserve

Explanation: For a contribution of hunting to the income of a forest operation/land owner, it is of critical importance whether he or she dedicates attention to the way hunting leases, hunts and bags, trophies, etc. are marketed. Proceeds from hunting leases and marketing of hunting may be optimised on the basis of a targeted marketing strategy vis a vis potential hunting tenants and customers. In this sense, the payback to the operational budget of hunting invitations (e.g. cultivating and establishing contacts with business partners), too, is to be understood as a marketing strategy. The marketing of game is assessed via the following Indicator and does not fall under the present Indicator.

The use of the Biosphere Reserve for marketing purposes also in the field of hunting management may be best achieved via a (future) quality brand (label/product definition) for "Hunting in a Biosphere Reserve;" however, the status of the Wienerwald region as a Biosphere Reserve may also be used for marketing independently. Both may contribute significantly to the success of a marketing strategy and, in addition, foster regional identity in the sense of the biosphere reserve concept.

Indication and score:	2	There is a marketing strategy for hunting as a source of income in addition to forest management.
	0	There is no marketing strategy for hunting as a source of income in addition to forest management.

2.1.1.2 **Indicator 19:** Marketing of regional game products

Explanation: The optimum marketing of game from the Wienerwald Biosphere Reserve and the products derived from game (from sustainable production) represents an economic potential.

Indication and score:	2	There is a recognised quality brand (label) for regional game products and their sale is supported by the forest manager, or the forest manager supports the creation of such a brand.
	-2	The marketing of regional game products is not supported.

2.1.2 Criterion: The value of hunting is preserved and/or improved by forest management

2.1.2.1 Indicator 20: Forestry measures to improve the market value of hunting

Explanation: Apart from the influence of the average regional market value, site-related factors such as proximity to cities or appealing landscape, the assumed or actually attainable market value of a hunt is mainly defined in terms of its richness in species, achievable game bags, the (average) quality of trophies and hunting accessibility (how can the hunting territory be reached, is it developed and accessible, how well-equipped is it?). All these factors can be positively as well as negatively influenced by forest management.

Serving the needs of hunting tenants and (paying) hunting guest particularly well, in the sense of “customer friendliness,” can help to raise the image and thus also the value of a hunt. Specific fostering of rare wildlife species, which subsequently enables bagging of uncommon trophies without jeopardising the relevant population, may be a means to increase the market value. Equally, a favourable infrastructure regarding hunting equipment and fixed installations (hunting lodges, stalking trails, hunting seats, hides and blinds, feeding, if required, etc.) is also a factor not to be ignored in terms of market value. It is worth noting that hunting-related measures on the part of the owner that contribute to increasing the market value may at the same time have negative impacts in terms of ecological requirements of sustainability – e.g. over-intensive game management resulting in unnaturally high game populations with impacts on the vegetation unacceptable in terms of regional culture.

Indication and score:	2	Forest management measures contribute significantly to a high market value of hunting.
	0	Forest management measures do not contribute noticeably to a high market value of hunting.
	-2	Forest management measures reduce the market value of hunting.

2.1.2.2 Indicator 21: Support of hunting ground installations and equipment

Explanation: Equipping hunting territories with installations such as grazing areas for game (grazing areas on agricultural land, grazing meadows, feeding spots, salt licks, deerstands/raised hides) is sometimes necessary and a factor determining the attractiveness and market value of a hunting territory. However, installations tend to require the consent of the land owner. By allowing the establishment of infrastructure on the hunting ground, land owners contribute at the same time to enhancing the market value of a hunt. By providing

construction material and/or workforce (e.g. for deerstands), building trails, etc., the owner can actively support the operation.

Indication and score:	2	The establishment and maintenance of hunting ground installations necessary to keep up an effective hunting operation is allowed and actively supported by the owner.
	-1	The establishment and maintenance of hunting ground installations necessary to keep up an effective hunting operation is made possible, but not actively supported.
	-2	The establishment and maintenance of hunting ground installations necessary to keep up an effective hunting operation is prevented.

2.2 Principle: Accommodating efficient game hunting is an objective of forest management

Explanation: Whether forest management allows scope to hunt wildlife is important in terms of avoiding game damage as well as for maintaining the value of hunting. Observing this principle thus serves both to secure and/or improve profits from hunting and to avoid game damage.

2.2.1 Criterion: Creating scope for hunting in forests

2.2.1.1 **Indicator 22:** Establishing an adequate number of hunting areas

Explanation: Hunting aisles and hunting areas are as a rule established by consent of the land owner. As establishing and maintaining these surfaces mostly demands interfering with the forest vegetation (felling of trees, regular cutting to keep areas open), it makes sense to harmonise such activities with forest management. Adequate scope for hunting contributes to regulation of wildlife populations and in turn may lower the hunting pressure and contribute to lessening game damage. However, particularly in a Biosphere Reserve, it is important for hunting areas to be newly established only to the extent necessary for efficient hunting in the sense of wildlife population regulation and meeting hunting requirements as well as maintaining the hunting value of a territory. Wherever possible, instead of hunting aisles, hunting should be based on logging and clear-felled areas arising from forestry-related use. This increased hunting efficiency “in the wake of forestry-related use” can be optimised by agreement between forest owners/ managers and hunters. Fewer available hunting areas may also partly be compensated by adapting hunting strategies and techniques.

The Indicator assesses whether the forest owner/manager provides sufficient hunting areas (specifically established hunting aisles and areas, areas arising from forestry use) compared to the amount of hunting area actually needed. In terms of an assessment of whether existing hunting areas are sufficient with regard to meeting requirements of the hunting bag plan, besides of the quantity (area and number), their spatial and temporal distribution must also to be taken into account.

Indication and score:	2	There are <i>sufficient</i> hunting areas in order to guarantee efficient hunting in the sense of meeting requirements of hunting bag plan.
	-2	Hunting areas in order to guarantee efficient hunting in the sense of meeting requirements of hunting bag plan are <i>not sufficient</i> .
	-3	There are <i>more</i> hunting areas than needed by hunters to guarantee efficient hunting in the sense of meeting requirements of hunting bag plan.

2.2.1.2 Indicator 23: Giving consideration to scope for hunting when choosing forest management methods

Explanation: The efficiency of hunting correlates to a great degree with the forest structure and forest management measures. If, for example, major parts of a forest area are dominated by dense tree stands with lack of tending (thickets, dense pole-stage woods, etc.), the visibility of game and scope for hunting are greatly limited. When a forestry operation decides upon the kind of forest management measures, their influence upon the conditions for hunting game should thus also be considered, in particular if poor hunting conditions make it more difficult to regulate game populations and meet hunting bag requirements, and/or lower the hunting value of a hunting ground.

Indication and score:	1	There is evidence that the creation and/or maintenance of scope for hunting is taken into account in terms of planning and implementing forest management measures.
	-1	The creation and/or maintenance of scope for hunting is not taken into account in terms of planning and implementing forest management measures.
	x	Not applicable, no score (assessment for core zones not possible as there is no forest management).

2.2.2 Criterion: Giving consideration to wildlife and scope for hunting in terms of space and time

2.2.2.1 Indicator 24: Giving consideration to wildlife in terms of space and time when it comes to forestry-related measures

Explanation: Several forestry-related measures such as logging, timber haulage, construction of paths, forest cultivation works, territorial inspection, etc., may often involve an undesired disturbance of game. This, again, may impair scope for hunting game and, by hindering hunting and/or disturbing game movements or grazing, increase or cause game damage. Along with activities of forest management, other activities by different users (e.g. people seeking recreation, hunters) may have a similar or even stronger effect upon wildlife

habitats. In terms of forestry, however, only the contribution of forestry-related measures to avoid disturbance of wildlife and rendering hunting more difficult should be assessed.

Forest management measures in wildlife habitats should thus pay as much attention as possible to hunting needs in terms of spatial and temporal planning. This refers, for example, to wildlife rest zones, important cover and feeding areas, areas of concentrated hunting and of game damage, supplementary feeding, times of planned driven hunting, the low-feeding season, main hunting seasons of wildlife species, etc. In order to avoid, or to reduce as far as possible, avoidable disturbance of game and game hunting, an exchange of information on a regular and timely basis (ahead of planned measures) is required. This may often also augment mutual benefits. If, for example, hunters are informed in time about planned afforestation and regeneration areas, these areas may be hunted on more intensively, and thus browsing may be reduced.

The evidence that the above factors are taken into account is provided by confirmation by the persons permitted to hunt as well as by relevant records in forest management documents.

Indication and score:	3	There is evidence that the planning and implementation of relevant forest management measures always takes hunting needs into account both in terms of space and time.
	0	There is evidence that the planning and implementation of relevant forest management measures occasionally takes hunting needs into account both in terms of space and time.
	-3	There is no evidence that the planning and implementation of relevant forest management measures take hunting needs into account both in terms of space and time.

2.3 Principle: Contributing to avoiding game damage is an objective of forest management

Explanation: Forest management measures have an important effect upon the risk of game damage to forest vegetation mainly in large, connected forest areas. If, however, the forest occurs only in the form of isolated woods, the effect upon the forest structure is greatly overlaid by agricultural and other measures outside the forest and thus weakened. When sivicultural options to minimise the forest's susceptibility to game damage have been employed to the full extent, existing forest/game problems can only be solved by effects of hunting and landscape planning. However, to create scope for hunting efficiently, support by forest management may be crucial – e.g. by building hunting trails, hunting aisles or clearing vegetation round hides. For information on controlling a forest's susceptibility to game damage, readers are referred to Reimoser et al. (2006).

2.3.1 Criterion: Forest management takes into account the forest's susceptibility to game damage

Explanation: There are various ways in which forest management may influence the susceptibility of vegetation to game damage. Susceptibility is as a rule low, if:

- food availability (feeding area) is high in relation to other reasons for game to settle an area (living space, shelter from weather or predators),
- the forest can be regenerated mainly or exclusively naturally (not by way of afforestation),
- the tree species targeted by forestry occur in high numbers,
- food availability in summer does not unnaturally exceed food availability in winter.

In terms of susceptibility of a forest to game damage, the ratio of food availability and other reasons for settlement is important. This ratio may be greatly impaired by non-natural silviculture. This generates what are called “ecological traps” (which encourage a wildlife density excessive for the respective biotope on account of optimised habitat factors unrelated to food, with minimised food availability). These ecological traps may provoke an unnaturally strong use of vegetation by the animals, and associated high damage levels. Near-natural forest management, in turn, allows as a rule for more stress resistant forests (an appropriate forestry-related carrying capacity for cloven-hoofed game).

Compared to forest management by clear-felling, near-natural management methods as a rule create more feeding opportunities relative to the attractiveness of the biotope that is unrelated to food availability, which greatly reduce the susceptibility to game damage of young forests and thus critically strengthen a forest’s stability vis-à-vis game damage. What is significant in this regard is the improved capacity and/or better utilisation of natural ecological mechanisms of regulation in the “forest – cloven-hoofed game” system, which helps to reduce time-intensive and costly interventions to avoid damage (including various measures of protection and regulation). However, the hunting of game is rendered more difficult in naturally regenerated forests that are more complex and demands an adaptation of hunting methods as well as construction of hunting aisles.

The forms of forest use least susceptible to game damage are mainly those with infrequent or absent clear-felling, where natural self-regeneration (i.e. no artificial afforestation) is achieved under the dispersed canopy of the old tree stands (after selective felling that leaves a reduced number of mature trees). This method results in less salient forest edges and, in most cases, a greater density of young trees.

2.3.1.1 **Indicator 25: Reduction of the susceptibility of forests to browsing damage**

Explanation: Unlike hunting, forestry is able to exert a direct influence upon a forest’s susceptibility to game damage. Silvicultural measures can greatly change the susceptibility of young forest stands to browsing. Forest regeneration after clear-cutting, for example, is characterised by low stem densities (from replanting) and mixed tree species are mostly rare. Natural rejuvenation under the crowns of old tree stands frequently results in a greater number of young trees. This naturally achieved “regeneration surplus” allows for a much larger number of trees to be browsed without preventing adequate regrowth, thus resulting in an overall increase in stress resistance of the biotope (forest-management-related carrying capacity for cloven-hoofed game). A sufficient number of healthy trees remain for the continued development of the stand. In case of management by clear-felling, very often, a small number of game suffices to cause considerable damage.

Factors increasing a forest’s susceptibility to browsing damage are, for example, small forest rejuvenation areas in forests where there are also few grazing opportunities (e.g. small clear-felled areas), as well as newly planted trees from nurseries with lack of alternative sources of food; factors reducing susceptibility to browsing damage are large forest regeneration areas, natural regeneration with high stem densities, large numbers of shrubs and bushes (mainly brambles), target tree species unattractive for browsing, rapid early growth of trees as well as early and intensive forest care (care when thinning).

The extent to which susceptibility to game damage is taken into account should be documented in the forest operation's management plan.

Indication and score:	<p>4 <i>There is evidence</i> that the forest management strategy and its practical implementation <i>optimally</i> reduce the susceptibility to browsing damage of regenerating forest.</p> <p>2 <i>There is evidence</i> that the forest management strategy and its practical implementation reduce the susceptibility to browsing damage of regenerating forest.</p> <p>0 The forest management strategy and its practical implementation reduce the susceptibility to browsing damage of regenerating forest <i>in some cases</i>.</p> <p>-4 The forest management strategy and its practical implementation <i>by no means</i> reduce the susceptibility to browsing damage of regenerating forest.</p>
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2.3.1.2 **Indicator 26: Giving consideration to the forest's susceptibility to bark peeling damage**

Explanation: This indicator is only applicable in forestry operations with forest stands potentially jeopardised by bark peeling. This mainly applies to forest areas harbouring game species prone to bark peeling – in case of the Wienerwald mostly red deer and European mouflon. In terms of tree species, both the coniferous species of spruce and fir as well as beech and most other deciduous species are often subject to bark peeling. Factors increasing the susceptibility of a forest to bark peeling are, e.g., pure spruce stands, single-layered pole woods and thickets, insufficient care when thinning, lack of food; factors reducing the susceptibility to bark peeling are tree species with thick bark (e.g. larch, pine, oak), free accessibility of other food sources than bark for game, silvicultural methods other than clear-felling, as well as early forest tending (thinning).

Indication and score:	<p>4 <i>There is evidence</i> that the forest management and its practical implementation <i>optimally</i> reduce the forest's susceptibility to bark peeling damage.</p> <p>2 <i>There is evidence</i> that the forest management and its practical implementation reduce the forest's susceptibility to bark peeling damage.</p> <p>0 The forest management and its practical implementation reduce the forest's susceptibility to bark peeling damage in some cases.</p> <p>-4 The forest management and its practical implementation <i>by no means</i> reduce the forest's susceptibility to bark peeling damage.</p> <p>x Not applicable, no score (no forest stands susceptible to bark peeling damage or no game species prone to bark peeling).</p>
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2.4 Principle: Forest management aims to benefit from synergies with hunting

Explanation: The use of possible synergies of forestry and hunting can contribute greatly to maintaining and improving the hunting value as well as to avoiding game damage. Observing this principle thus serves both to secure and/or improve profits from hunting and to avoid game damage.

2.4.1 Criterion: Forestry forms an economic unit with hunting

2.4.1.1 Indicator 27: Confirming a common policy

Explanation: A common economic policy between forestry and hunting consists in particular in harmonising measures, in order to improve the value of a hunt as well as prevent game damage. The fundamental prerequisite for forming an economic unit with hunting is regular contact and exchange of information with the hunting users and/or those who represent their interests. The forming of a unit with common economic policy will be confirmed by the hunters or those who represent their interests on the hunting territory.

Indication and score:	2	Hunting users of a wildlife habitat confirm an optimum common economic policy.
	1	Hunting users of a wildlife habitat confirm a common economic policy, but with room for improvement.
	0	Hunting users of a wildlife habitat do not confirm a common economic policy.
	-1	Hunting users of a wildlife habitat point to counterproductive forest management.

2.4.1.2 Indicator 28: Giving consideration to hunting in forest development

Explanation: A minimum extent of forest development by forest roads and logging trails is indispensable for forest care, timber harvest and haulage; near-natural forest management may often demand a comparatively higher detailed development (on account of temporary logging trails or aisles). From the point of view of hunting, forest roads may have positive and negative effects depending greatly on their routes, density, choice of construction periods, and mode of construction (particularly the gradient of steep slopes) as well as the kind, intensity and time of road use. In principle, forest roads make hunting grounds more readily accessible for hunters (enabling driving or walking into the territory). They also facilitate feeding and other measures of care, construction of hunting ground installations, hunting itself and transport of bagged game from the site. On the other hand, construction activities themselves as well as forest-management-related use of forest roads in newly developed forest areas can cause additional disturbance for game and the hunting operation. Especially in the Wienerwald, it should be noticed that opening up the forest for other visitors as a rule subsequently entail more intensive use for tourism purposes that go hand in hand with a disturbance of game, thus making hunting more difficult. Hunters mostly regard this as an inconvenience. The strongest disturbance for game may result from leisure and recreational users deviating from paths and corridors. The denser the network of paths, the greater the effect of disturbance of game over wide areas, with its concomitant impact on hunting. If intensively used paths have this strong impact of “corridors of disturbance” upon a hunting operation, this may impair the subjective leisure and recreational value of hunting and, subsequently, reduce the material value of a hunting ground.

Taking into account hunting-related demands in terms of forest planning is a necessary prerequisite for optimising positive effects of forest development for hunting and reducing negative effects as far as possible. Knowledge of the territory and experience should be put to best possible use to this effect. This is only possible on the basis of mutual exchange of information and agreement. In the interest of sustainable development in the Biosphere Reserve, operational forest development plans should be mutually adjusted on the level of the entire Biosphere Reserve region, involving the biosphere reserve management. Ultimately, minimising disturbance to game, improving scope for game-hunting and meeting hunting targets efficiently also benefit the forest owner on account of less game damage. In terms of documentation, consideration of hunting-related aspects is recorded in the form of a forest development plan geared to the needs of all interests.

Indication and score:	<p>4 There is a longer-term forest development strategy taking into account hunting-economic requirements at the level of the forestry operation; the strategy was drafted with hunters of the areas concerned as well as the biosphere reserve management and is harmonised across-operations as a biosphere-reserve-wide regional development strategy.</p> <p>2 There is a longer-term forest development strategy taking into account hunting-economic requirements at the level of the forestry operation; the strategy was drafted with hunters of the areas concerned as well as the biosphere reserve management.</p> <p>-2 Any longer-term forest development strategy does not take into account hunting-related requirements on the level of the forestry operation, or such a strategy does not exist.</p> <p>x Not applicable, no score (no further development envisaged, no assessment possible).</p>
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2.4.1.3 **Indicator 29: Existence of wildlife development strategy across hunting territories linked to leases and/or hunting contracts**

Explanation: This Indicator only applies to forestry operations administering more than one hunting ground. Management concepts across hunting grounds comprise, for example: planning of hunting, implementation of hunting (e.g. from high seats and driven hunts), feeding of game, marketing of game or hunting permits.

Indication and score:	<p>4 The forestry operation has game management strategy across hunting territories for <i>all major game species and in particular for sensitive or threatened wildlife species</i>; hunting tenants and hunters by permission of land owner/game tenant are bound by contract to implement the strategy.</p> <p>3 The forestry operation has game management strategy across hunting territories for the <i>major game species</i>; hunting tenants and hunters by permission of land owner/game tenant are bound by contract to implement the strategy.</p> <p>2 The forestry operation has game management strategy across hunting territories for <i>some (one) major game species</i>; hunting tenants and hunters by permission of land owner/game tenant are bound by contract to implement the strategy.</p> <p>0 The forestry operation has game management strategy across hunting territories; hunting tenants and hunters by permission of land owner/game tenant are <i>not bound by contract</i> to implement the strategy.</p> <p>-2 There is no game management strategy across hunting territories in the forestry operation.</p> <p>x Not applicable, no score (policy across hunting grounds is not possible, e.g. due to small-forest ownership).</p>
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2.4.1.4 **Indicator 30: Drafting of leases and hunting contracts to reflect criteria of sustainable hunting**

Explanation: The drafting of details of lease and hunting contracts provides a broad variety of opportunities to forest owners to create a framework of conditions with hunting customers on the basis of private law agreements that work in favour of sustainable game management. National laws provide the scope of action for individual contracts, so agreements laid down in the hunting lease or hunting contract must not contradict the valid hunting laws. However, provisions may be made beyond the laws that meet the intentions of hunting legislation and work further in favour of these intentions. Depending on the specific circumstances of leases and hunting contracts, the following aspects may, for example, influence the sustainability of hunting:

- Selection of hunting tenants and hunters by permission of land owner/game tenant: documented violations of provisions under hunting laws or of fundamental rules of fair and ethical hunting practice in the past as well as repeated failure to meet hunting bag requirements (by the authorities) may be reasons to decide against a hunting tenant or permitted hunter, or against an extension of a contract. In the interest of sustainability, a conscious selection of hunting tenants and permitted hunters able to fulfil the requirements of the respective hunting territory would be advisable.
- Term of hunting contracts: Under certain circumstances, the duration of hunting contracts may influence the sustainability of hunting ground management in various ways. Shorter contractual terms leave the owner an option to respond to unsatisfactory behaviour on the part of the

permitted hunters by making out new contracts with different partners, thus providing an incentive for adequate behaviour by holding out the perspective of a prolongation of the contract. Conversely, longer contractual terms may cause permitted hunters to feel more responsible for “their” territory, and allow for growing knowledge of the hunting ground as well as developing and implementing longer-term strategy for sustainable hunting.

- Numbers of stalkers and hunters by permission of land owner/game tenant:
A limitation of the number of stalking districts and permitted hunters may benefit sustainable hunting, partly because fewer hunters on a hunting territory create less hunting pressure and hunting-induced game disturbance, and partly because problems of harmonisation with and within hunting may be avoided.
- Obligation of the tenants to draft a hunting strategy or observe an existing one:
A compulsory hunting strategy ought to be directly coupled with a (cross-territorial) game management strategy drawn up by the land owner/forestry operation, for better planning at the level of the individual hunting territory.

Indication and score:	4	The opportunities of shaping contracts with hunting tenants and permitted hunters have been seized in the interest of sustainable hunting <i>to the greatest extent possible</i> .
	2	The opportunities of shaping contracts with hunting tenants and permitted hunters have been seized in the interest of sustainable hunting in individual cases.
	-2	No opportunities of shaping contracts with hunting tenants and permitted hunters have been seized.
	x	Not applicable, no score (there are no hunting tenants or permitted hunters).

2.4.1.5 Indicator 31: Setting hunting territory boundaries

Explanation: The division and size of a hunting territory may influence the opportunities for hunting to manage wildlife habitats sustainably. One way to create boundaries that serve the hunting-related interests of adjoining territories is with a distribution of forested and open areas among various hunting territories that is as balanced as possible. This may, among other effects, entail a more balanced distribution of responsibility for avoiding game damage and for favouring hunting practices that take susceptibility to game damage into consideration (damage to agriculture caused by wild boar in agriculturally-dominated open areas on the one hand, and browsing and bark peeling damage by other cloven-hoofed game species in forests on the other hand). If hunting territories are purely open land or purely forest, inefficient hunting of a damage-causing game species in one hunting territory may easily trigger increased game damage and thus higher compensation payments in another hunting territory. Also, a broader spectrum of landscape and vegetation structure on a hunting ground as a rule augments the variety of huntable game species, thus increasing the attractiveness of the respective hunting territory.

Small hunting territories may negatively influence sustainable hunting as several smaller hunting territories are tantamount to a greater number of hunters and greater hunting pressure.

Indicator 31 evaluates whether there is a balanced territorial subdivision in terms of distribution of forest and open areas and whether, in doing so, the influence of territory size on sustainability has been taken into account.

No less important is to use the various different zones in the Wienerwald Biosphere Reserve optimally in terms of suitability for hunting, maintenance of the value of hunting, prevention of game damage and other interests of hunting tenants when it comes to the subdivision of the hunting territory (this is of particular importance with regard to the distribution of core zones).

It should be borne in mind that changes in the subdivision of a hunting ground are impossible or very difficult to make during an administrative period for hunting and/or during the term of lease contracts. The uniform duration of a hunting period in Lower Austria and Vienna (nine years), makes adjustments in the designation of hunting territories easiest at the beginning of a new hunting period. Also, there is an option to “round off” hunting territories during current hunting periods for the purpose of achieving an area set-up that avoids obstacles for hunting interests (Lower Austria).

The extent to which forest owners can influence boundaries of hunting territories depends principally on the size of the land owned. If this means that no alternatives to the existing delimitation of hunting territories are available, the present Indicator cannot be assessed.

Indication and score:	4	There is evidence that the design and subdivision of hunting territories takes into account, the aims of the Biosphere Reserve, its zoning, prevention of game damage, and other hunting-related interests (e.g. distribution of forest, open land and wildlife species, game damage compensation payments)
	–4	In designating and subdividing hunting territories, the aims of the Biosphere Reserve, its zoning, prevention of game damage and other hunting-related interests (e.g. distribution of forest, open land and wildlife species, game damage compensation payments) have not been taken into account.
	x	Not applicable, no score (there is evidence that there are no alternatives to the current hunting territory boundary).

2.4.2 Criterion: Optimising planned changes in wildlife habitats

2.4.2.1 Indicator 32: Commitment of forest owners/managers to interdisciplinary wildlife-ecological spatial planning (WESP)

Explanation: Wildlife-ecological spatial planning is an instrument of integrated management of wildlife populations and habitats to re-establish a balance between the habitat needs of wild animals, the capacity of ecosystems for wildlife populations, and the various different user interests on the part of society (hunting, agriculture and forestry, tourism, general spatial planning). Along with the preservation of habitats of native wildlife species and guaranteeing their sustainable use, avoidance of user conflicts and unacceptable game-induced forest damage remain ulterior goals. WESP may be carried out on the basis of legal provisions, on a voluntary basis on the regional level, as well as on the basis of individual initiative on the part of the hunter. Integrating WESP into general spatial planning ought to be an objective.

In most cases, however, WESP has to be assisted as well as required by the parties involved. The effectiveness of WESP depends on whether the stakeholders concerned accept it and actively support its implementation. Along with hunting, this is particularly true

for persons involved in forestry and forest owners. Aspirations to this effect on the part of owners of a hunt and hunters in general should be documented.

Indication and score:	4	Wildlife-ecological spatial planning (WESP) exists, and the forest owner/manager actively supports its implementation.
	2	WESP does not exist, but the forest owner/manager supports its establishment.
	-1	WESP does not exist nor is there evidence that the forest owner/manager supports its establishment.
	-3	WESP exists, but the forest owner/manager does not actively support its implementation.

2.4.2.2 Indicator 33: Commitments of forest owners and managers in planning and projects with impacts on wildlife habitats

Explanation: On account of their expert knowledge of their forestry operation and/or forest area owned, persons involved in forestry should be called upon to contribute their territorial and wildlife-ecological expertise when plans and projects have a potential to impair wildlife habitats. This can contribute significantly to reducing or avoiding negative impacts on wildlife and on the economic and aesthetic value of hunting, and thus to preserving or optimising hunting as a source of income.

Road construction projects serve as an example in this context: Along with their barrier effects on wildlife ecology, they may also result in a dissection of hunting grounds, economic devaluation of separated parts of hunting territories, and a reduction of the recreational value of hunting. When it comes to building new roads, forest owners are concerned and may be an important source of information for assessing the impact of projects upon wildlife ecology. Citizen participation, as part of environmental impact assessments, provides further formalised opportunities to comment on projects and influence them to some extent. Legally established ecological compensation and mitigation measures to reduce negative impacts of projects provide another basis for considering hunting-related aspects (artificial game routes, ecological improvement of existing stands and planting measures, creation of substitute biotopes, etc.). Conservation-based forest restoration plans, forest development plans, larger-scale clearing/deforestation and afforestation, forest-pasture regulation projects, designation of industrial and commercial areas, restoration of natural water courses or nature protection and conservation projects are further examples for habitat-changing measures which give scope for involvement of persons with forest management responsibility and persons with the right to hunt, which makes sense in everyone's interest. Wildlife-ecological spatial planning (WESP) may be resorted to as an instrument to represent interests relating to hunting and wildlife ecology vis-à-vis other planners. In most cases, it will be necessary for forest managers to actively offer and/or call for co-operation, even if they as stakeholders do not have formal organisational status.

Indication and score:	2	There is evidence that forest owners and persons involved in forestry actively involve themselves in plans and projects relevant for wildlife and hunting in order to avoid negative impacts on wildlife habitats and hunting.
	-1	Forest owners and persons involved in forestry do not actively involve themselves in plans and projects relevant for wildlife and hunting
	x	Not applicable, no score (no habitat-changing plans and projects during the last three years).

3 SOCIO-CULTURAL ASPECTS

Explanation: The socio-cultural aspects we are looking at concern the relationship between land owners/forest managers and persons permitted to hunt as well as persons directly or indirectly concerned with the matters of hunting, wild animals and wildlife habitats (e.g. farmers, persons seeking recreation).

With regard to socio-cultural aspects, a definition of clearly measurable indicators, which is indispensable for tracing sustainability in forest management, is particularly difficult if not impossible. The quality of communication, for example, is hard to evaluate and to cast into clearly defined and examinable indicators. The indicators thus comprise only those socio-cultural aspects that are, at least to some extent, operationally recordable.

3.1 Principle: The hunter-related interests of the local population are given consideration by land owners/forest managers

3.1.1 Criterion: The land owner/forest manager actively supports a balanced regional approach by adequately involving local hunters

Explanation: As a consequence of the close ties of hunting to land, of hunting traditions and the (necessary) relation of hunting to the local environment and the local community, opportunities for local hunters to hunt in their own region are an important social and cultural aspect of hunting. The land owner, too, can significantly influence the extent to which local hunters are involved – e.g. by his or her decision to whom the hunting right is leased.

3.1.1.1 **Indicator 34:** Giving consideration to territory for local hunters

Explanation: A fair balance between the interests of land owners and local hunters not permitted to hunt is a necessary condition of socio-cultural sustainability. A balance of interests of this kind is also important for hunting to be locally accepted by the non-hunting population. In this context, the land owner and/or person entitled to vote in co-operative hunts, agricultural communities, etc. play a significant communicative role on account of their greater number, socio-cultural heterogeneity and thus representative character regarding the respective hunting territory. This Indicator is assessed on the basis of questioning the hunters concerned and recording the results.

Indication and score:	2	The land owner and/or forest manager takes into account the interest of local hunters.
	-2	The land owner and/or forest manager does not take into account the interest of local hunters.

3.1.1.2 Indicator 35: Giving adequate consideration to non-resident hunters

Explanation: Offering sufficient hunting possibilities to local hunters is to be considered a prime objective in terms of socio-cultural sustainability. We should also consider that meeting ecological requirements of sustainability needs a sound knowledge of the hunting territory and the local natural environment. Local residents have an advantage there.

Nevertheless, the needs of non-resident hunters (hunting guests, hunters without local hunting opportunities) ought to be considered adequately and in accordance with the local conditions and possibilities (e.g. depending on size of hunting ground and hunting bag plan), in order not to entirely preclude this group of people from practising hunting. Non-resident hunters are expected in this context to be willing to give thorough consideration to local conditions; it is recommended that local hunting experts give technical advice.

Indication and Score:	1	Non-resident hunters are adequately involved in the practice of hunting
	0	Non-resident hunters are not on principle precluded from hunting.
	-2	Non-resident hunters are on principle precluded from hunting, even though, for example, adequate hunting possibilities exist and there is demand; or non-resident hunters are over-represented vis-à-vis resident hunters.

3.2 Principle: Local people should be given preference in terms of hunting-related job opportunities

3.2.1 Criterion: Forest management/the landowner contributes to providing hunting-related jobs in the region

3.2.1.1 Indicator 36: Providing jobs in the field of hunting

Explanation: The amount of work to be done in the hunting areas of various different habitats varies widely, ranging from the feeding of game over more than half a year to merely establishing and maintaining infrastructure in the hunting territory, from guiding guest hunters and intensive hunting ground management and biotope care to the organisation of community hunts and the regular checking of traps. The scope of work depends, of course, on the size of the hunting territory. This creates opportunities to hire further hunting personnel, from full time to casual labour – apart from the obligation to hire professional hunters, for which legislation varies among the federal provinces. It is desirable in this regard to give preference to hiring locally, not least because local workers are well-acquainted with the surroundings.

Indication and score:	2	The land owner/forest manager makes full use of the opportunities to offer jobs in the field of hunting to the resident population.
	1	The land owner/forest manager makes use of the opportunities to offer jobs in the field of hunting to the resident population to some extent.
	-2	The land owner/forest manager does not make use of the opportunities to offer potential jobs in the field of hunting to the resident population.

3.3 Principle: Forest managers/landowners have a regular exchange of information with hunting-related interests, contribute to avoiding conflicts and help settle conflicts

Explanation: The acceptance of hunting-related activities among the population is desirable both on the local level and in terms of public opinion. Particularly when many population groups' understanding for hunting-related activities is dwindling, or hunting is rejected altogether, it is important to seek an interchange of opinions both for hunters and land owners/forest managers, and for hunting to be integrated in society in order to secure the future of hunting. This includes dealing with arguments of opponents of hunting. Acceptance and tolerance by all stakeholders involved is desirable; at least, there should be a readiness for open communication. As hunting is opening up toward society, opponents need to be open to arguments in favour of hunting too, thus taking the debate to a more factual level and defusing altercations. "Talking to each other" is, of course, to be seen as a two-way process; the readiness to participate in this process must come from both sides. The present Indicator, however, only evaluates the contribution of the forest manager/land owner.

3.3.1 Criterion: Contact, exchange of information, and avoiding and settling of conflicts with local stakeholders

Explanation: Taking into account the interests and opinions of hunters as well as of the local population in general is critical from a socio-cultural point of view, as arguments concerning practical forest management and land ownership may arise on the local level. This demands a fair balance of the various different interests, which includes all representatives of other relevant modes of use.

3.3.1.1 Indicator 37: Exchange of information with local hunting interests

Explanation: Whether hunting-related interests are integrated and taken into account on the local level may also be measured in terms of whether other land users, interest representatives and groups of society and/or their respective representatives are actively invited to participate in co-operation, co-ordination or at least in the flow of information to contribute to an acceptance of forest management activities by the society. This is not to be confused with co-determination in the sense of a formal right to vote. Rather, it is whole-

hearted participation in information flows and consultation (in this context, readers are referred to www.partizipation.at/anwendung.html (English version: Participation and Sustainable Development in Europe)). Moreover, co-determination in hunting management and other forms of land use regarding issues of land ownership is necessary in order to guarantee a balance of interests between persons permitted to hunt and other land users on the one hand, and land owners on the other.

Any form of involvement calls for regular communication among all persons concerned, persons interested in the issues, as well as the local population. Regular information exchange may often avoid disagreement, alleviate disagreement at an early stage, or at least settle altercations soon after they arise. Examples for group of actors interrelated with the intersection of forestry and hunting are: farmers, fish breeders, sport fishers, Alpine associations, tourism associations, nature protection and conservation organisations, representatives of municipal politics, road administration or project operators, but also owners of adjoining plots of land and neighbouring hunting territories. While mutual consultation may also be sought on an irregular basis and informally, well-established, organised and regular meetings provide a more adequate framework and reflect that forest managers openly and actively support a positive culture of debate. Organised instruments of opinion exchange and mutual consultation are, for example: communication fora, regular information and discussion events (e.g. among hunting communities) or even regular informal get-togethers.

Indication and score:	3	Forest managers/land owners <i>initiate</i> a regular exchange of information with groups of persons with an interest in hunting concerning measures of relevance to wildlife and hunting that affect both groups.
	1	Forest managers/land owners <i>participate in</i> a regular exchange of information with groups of persons with an interest in hunting concerning measures of relevance to wildlife and hunting.
	-2	There is no regular exchange of information with groups of persons with an interest in hunting concerning measures of relevance to wildlife and hunting.

3.3.1.2 **Indicator 38: Conflict management strategies**

Explanation: This Indicator does not intend to eliminate differences in opinion altogether. Sometimes, differing views, if they are expressed respectfully and on a factual basis, harbour potential for creative, innovative and efficient solutions. An indication of whether a conflict is dealt with in a solution-oriented, factual and respectful manner is whether an “escalation scale” is observed, i.e. by first seeking direct conversation (on the spot, for example, or in an informal setting); as a next stage, and as a next escalation grade, an impartial third person is involved to act as a moderator; and only as a last step will the matter be taken to court. Even in the case of conflicts between smaller groups on the one hand (e.g. hunters, forest managers, land owners) and larger groups on the other (e.g. persons seeking recreation such as mountain bikers, horse riders, etc.), this indicator may be applied by getting in touch with relevant stakeholders from the other side and raising the matter with them.

Indication and score:	<p>2 In coping with conflicts related to hunting, forest managers/land owners have, over the last three years, <i>always</i> sought the means with the least escalation potential (escalation step with the lowest possible escalation intensity, e.g. direct personal conversation ahead of conversation moderated by an impartial third person, ahead of taking the matter to court).</p> <p>–1 In coping with conflicts related to hunting, forest managers/land owners have, over the last three years, <i>not always</i> sought the means with the least escalation potential (escalation step with the lowest possible escalation intensity, e.g. direct personal conversation ahead of conversation moderated by an impartial third person, ahead of taking the matter to court).</p> <p>–2 In coping with conflicts related to hunting, forest managers/land owners have, over the last three years, <i>never</i> sought the means with the least escalation potential (escalation step with the lowest possible escalation intensity, e.g. direct personal conversation ahead of conversation moderated by an impartial third person, ahead of taking the matter to court).</p> <p>x Not applicable, no score (There has been no conflict over the last three years.)</p>
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3.3.1.3 Indicator 39: Training in public relations, communication and conflict management

Explanation: Public opinion of forestry is influenced by public relations work and the mode, intensity and quality of contacts of forest managers with other land users (e.g. hunters, farmers, etc.) and the public-at-large. Prejudices on either side may be eliminated by professional public relations work, communication, and adequate self-presentation of the players concerned. This calls for efforts on both sides; within the scope of the present assessment set, however, only the active commitment by forest managers can be evaluated. The efforts of forest managers to seek further education and training in this field is chosen as an indicator of the quality of public relations work, communication and conflict management between forest managers and other land users.

Examples of public relations activities: forest-education events or excursions, articles for local media, contributions to internal or external information brochures, web pages, etc.

Examples of contents in communication training seminars: assessment of the partner in conversation, development of self-assuredness and confidence of actions, patterns of speech, emphasis, modern and gripping arguments, intercultural dimensions, etc.

Examples of conflict management training: negotiations on compensation for game damage, supervisory functions, regulatory and inspection functions, executive functions, e.g. in the role of forest protection, hunting supervision or nature protection and conservation.

Examples of conflict management training: meaning of factual and relations level; self ascertainment rather than escape or attack behaviour; conversations that boil over – triggers and emergency braking techniques; minimising unnecessary hurting or upsetting; influence

of preconceptions on conflict behaviour; exploring interests behind rigid positions; “objective” truths and the question of who is right; causes of conflicts, signals of conflicts; meaning of opposition and resistance: What provokes/aggravates opposition, how can it be avoided/reduced, etc.

Indication and score:	3	Over the last five years, several activities of further education and training in public relations work, communication or conflict management were attended.
	1	Over the last five years, one activity of further education and training in public relations work, communication or conflict management was attended.
	-3	Over the last five years, no activities of further education and training in public relations work, communication or conflict management was attended.

3.4 Principle: The land owner/forest manager supports hunting that favours wild animals reproducing naturally in the wild

Explanation: The hunting of game in enclosures under conditions of intensive agricultural production is not defined as hunting here, and thus the present criteria evaluating the sustainability of hunting do not apply.

3.4.1 Criterion: No animals raised in breeding or other enclosures are made available for hunting

Explanation: In some hunting areas, game from (breeding) enclosures or aviaries is released before the hunt in order to achieve higher game bags during the year of the release. This is particularly common for pheasant (*Phasianus colchicus*), mallard (*Anas platyrhynchos*) and wild boar (*Sus scrofa*). Sometimes, the animals are even brought into close proximity of the hunting stands in single cages to be released within hunting range. There may even be “ordering” beforehand of the number to be bagged as well as the weight of the animals to be shot. Pheasants released that way and surviving the hunt have little chance of surviving in the wild later on. Both the selling of game from breeding or captivity for the purpose of hunting sports and the release of such animals for hunting should be rejected from a hunting-ethical perspective. Releases immediately before hunting for the purpose of increasing the game bag are not compatible with socio-cultural sustainability. Meeting this criterion thus requires that hunting be suspended for an adequate period of time after the release, and that it refrain from taking a majority of the released animals soon thereafter.

The hatching of eggs and raising of chicks from nests destroyed or threatened to be destroyed through mowing, followed by the release of these wild animals, does not fall under this criterion.

3.4.1.1 **Indicator 40: Not selling animals from enclosures or aviaries for the purpose of hunting**

Explanation: If land owners own game kept in enclosures/aviaries, these animals are not provided for the purpose of hunting.

Indication and score:	0	No animals raised in enclosures or aviaries are sold, or otherwise passed on, for the purpose of hunting.
	-4	Animals raised in enclosures or aviaries are sold, or otherwise passed on, for the purpose of hunting.
	x	Not applicable, no score (land owner does not raise animals in enclosures/aviaries).

3.4.1.2 **Indicator 41: Not releasing wild animals raised in enclosures or aviaries for the purpose of hunting**

Explanation: The land owner entitled to hunt may prohibit hunting wild animals raised in enclosures or aviaries, e.g. by way of concrete regulations to this effect in the hunting lease contract.

Indication and score:	0	The land owner prohibits the release of wild animals raised in enclosures or aviaries for the purpose of hunting.
	-4	The land owner does not prohibit the release of wild animals raised in enclosures or aviaries for the purpose of hunting.

3.5 **Principle: Forest managers are aware of the effects of their activity upon wild animals, their habitats and hunting**

3.5.1 **Criterion: Forest managers consciously deal with the effects of their activities on wildlife, habitats and hunting**

3.5.1.1 **Indicator 42: Improvement of knowledge about wildlife-ecological and hunting-related effects of forest management measures**

Explanation: Many actions taken or omissions made within the scope of forest management have a potential impact upon the balance of nature and ecosystems; this includes influencing wild animals, their habitats and, as a further consequence, the hunting of these animals. It is thus desirable for persons involved in forest management to deal consciously with the consequences of their actions, whether or not they are aware of these consequences, via interdisciplinary education and regularly update their knowledge in this regard. This can be documented in the form of any activity suited to contribute to high-quality knowledge transfer. Examples of compliance are: attendance at relevant educational and further training events

(lectures, expert meetings, discussion events, excursions, etc.), but also relevant literature and seeking information of direct or indirect wildlife-ecological relevance provided, e.g. by forestry operations, forest-management related educational and consulting institutions and organisations of nature protection and conservation; joint educational activities with groups of persons involved in hunting are also conceivable in this regard.

In applying this indicator, it should be borne in mind that education through sources of generally forest-ecological, silvicultural or nature and species-protection-related material may provide valuable help in dealing with ecological or hunting-related issues. Making use of such sources is positive in the assessment, provided there is a direct or indirect reference to wildlife ecology and hunting.

Indication and score:	2	Over the last three years, several education and further training activities with relevance to wildlife ecology and/or hunting (events, excursions, etc.) were attended.
	1	Over the last three years, one of the above education and further training activities was attended.
	-1	Over the last three years, none of the above education and further training activities was attended.