

Martin Forstner, Friedrich Reimoser, Wolfgang Lexer, Felix Heckl, Josef Hackl

Sustainable Hunting

Principles, Criteria and Indicators

Revised and extended edition



Sustainable Hunting

Principles, Criteria and Indicators

Revised and extended edition

Martin Forstner, Friedrich Reimoser
Wolfgang Lexer, Felix Heckl, Josef Hackl

Project co-ordination

DI Josef Hackl, Umweltbundesamt GmbH (Austrian Environment Agency), A-1090 Vienna, Spittelauer Lände 5

Univ.-Prof. Dr. DI Friedrich Reimoser, Research Institute of Wildlife Ecology, University of Veterinary Medicine Vienna, A-1160 Vienna, Savoyenstraße 1

Authors

DI Martin Forstner, WWN, Technical Consulting Bureau for Wildlife Ecology, Forest Management and Nature, A-3925 Arbesbach, Neustifterstraße 62

Univ.-Prof. DI Dr. Friedrich Reimoser, Research Institute of Wildlife Ecology, University of Veterinary Medicine Vienna, A-1160 Vienna, Savoyenstraße 1

DI Wolfgang Lexer, Ing. Felix Heckl, DI Josef Hackl, all: Umweltbundesamt GmbH (Austrian Environment Agency), A-1090 Vienna, Spittelauer Lände 5

Special contribution

Dr. Richard Zink, Research Institute of Wildlife Ecology, University of Veterinary Medicine Vienna, A-1160 Vienna, Savoyenstraße 1

Translation

Mag. Bettina Jakl-Dresel

Robin Sharp CB, Chair of European Sustainable Use Specialist Group of IUCN/SSC (editing)

Technical support in developing the sustainability assessment system

Fund for Environmental Studies – Tyrol (Förderungsverein für Umweltstudien, FUST-Tirol), Achenkirch, the Tyrol



Acknowledgments

The authors would like to thank all those who contributed to this report, in particular the participants in technical discussions, the persons responsible for the hunting and forestry operations where practical tests were carried out, the participants in the presentation at the Federal Ministry of Agriculture, Forestry, Environment and Water Management on 28/08/01, the participants in the practical application of the set of criteria and indicators as part of the revising process, the participants in the Revision Workshop as well as those who contributed their statements and suggestions regarding both editions.

We are particularly grateful to the Federal Ministry of Agriculture and Forestry, Environment and Water Management for its financial support of the first edition.

The German-language edition of this book has been published in 2006 by avBUCH, Österreichischer Agrarverlag, Druck- und Verlagsges.m.b.H. Nfg.KG, Sturzgasse 1A, A-1141 Wien (www.avbuch.at). The editors would like to thank the publishing company for the permission to use the original print layout.

For further information on publications of the Austrian Environment Agency, readers are referred to: www.umweltbundesamt.at

Title photos

Martin Forstner (left); Franz Kovacs (right)

Imprint

Owner and publisher: Umweltbundesamt GmbH
Spittelauer Lände 5, 1090 Vienna, Austria

© Umweltbundesamt GmbH, Vienna, 2006
All rights reserved
REP-0115
ISBN 3-85457-913-6

Preface

The first edition of “Criteria and Indicators of Sustainable Hunting” was published in 2001 (UMWELTBUNDESAMT, 2001: Monographs of the Austrian Environment Agency M-158; UMWELTBUNDESAMT, 2002: English translation M-163). In October 2002, the work results were also made available on the World Wide Web in the form of an interactive Internet platform (www.biodiv.at/chm/jagd). This platform allows a time-efficient and user-friendly electronic self-assessment and provides the opportunity to make comments and express criticism as well as other forms of user feedback.

Since it was first published, the concept of evaluating hunting as to its sustainability has received a significant response both in Austria and abroad. The Wild Species Resources Working Group of the European Sustainable Use Specialist Group (ESUSG-WISPER) of IUCN (The World Conservation Union) recently published non-binding “Guidelines on sustainable hunting in Europe” (IUCN ESUSG WISPER, 2006). The Austrian set of criteria and indicators served as a basis for this guidance document and contributed significantly to getting the international process started (IUCN, 2003). Both the broad interest and the response confirm that the Austrian assessment approach charted new terrain also on the international level. “Principles, Criteria and Indicators of Sustainable Hunting” has been designed from the outset as a learning, dynamic expert system open for future advancement, updating and adaptations. Particular emphasis was given to making the contents as user-friendly and practice-oriented as possible and at the same time as conclusive as possible regarding the sustainability of hunting. Experts and stakeholder representatives actively contributed to working out and further developing the set of principles, criteria and indicators.

The present study is considered to be a contribution to implementing the Convention on Biological Diversity (CBD, 1992). Its intention is particularly in conformity with the objectives of the Ecosystem Approach (CBD, 2000, 2004a) and the Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity (CBD, 2004b) – both central instruments for implementing the Convention. At the same time, it is intended to make a contribution to the implementation of significant national strategies for the conservation and sustainable use of biodiversity as well as for sustainable development. The Austrian Implementation Strategy for the CBD (FEDERAL MINISTRY OF ENVIRONMENT, YOUTH AND FAMILY AFFAIRS, 1998) formulates higher-ranking goals regarding hunting to the effect that all native wildlife animal populations and their habitats should be preserved over a prolonged period of time, and that the management of wildlife animal populations should take into account habitat conditions while at the same time improving the respective habitats. In 2002, the Austrian Federal Government adopted the Austrian Strategy for Sustainable Development. One of its key objectives is the preservation of the diversity of native animal and plant species, habitats and landscapes (FEDERAL MINISTRY OF AGRICULTURE, FORESTRY, ENVIRONMENT AND WATER MANAGEMENT, 2002).

Sustainable hunting may be considered a significant contribution to attaining these objectives.

Table of Contents

Preface.....	3
Summary.....	7
Zusammenfassung (German Summary).....	13
1 Introduction and Objectives.....	19
2 Design and Application of the Assessment Framework.....	23
2.1 Starting Kit for the Busy Reader.....	23
2.2 Range of Application and Frame of Reference.....	24
2.3 Systematic Structure of the Assessment Framework.....	28
2.4 Definition of Terms.....	31
3 Principles, Criteria and Sub-criteria with Indication and Assessment (Score).....	33
3.1 Ecology.....	33
3.1.1 Principle: The preservation and improvement of wildlife habitats is an objective of hunting.....	33
3.1.1.1 Criterion: Hunting and its interrelationship with other forms of land use.....	33
3.1.1.2 Criterion: Giving consideration to the influence of game on vegetation.....	37
3.1.1.3 Criterion: Preservation and fostering of linking biotopes.....	42
3.1.1.4 Criterion: Giving consideration to habitat capacity.....	45
3.1.2 Principle: The practice of hunting shall within its range ensure the preservation and improvement of the diversity of game species through protection and use.....	48
3.1.2.1 Criterion: Potential natural wildlife species inventory taking into account the current habitat situation (only for larger territorial units, e.g. a wildlife-ecologically homogeneous area).....	48
3.1.2.2 Criterion: Hunting is oriented according to the behaviour of wild animals.....	53
3.1.3 Principle: The natural genetic diversity of game species is preserved and fostered by means of an appropriate hunting practice.....	55
3.1.3.1 Criterion: There are no hunting-related limitations to the preservation and fostering of the natural genetic variability of wildlife species.....	55
3.1.3.2 Criterion: Native wildlife populations are not altered by the introduction of and blending with non-native wild animals.....	57
3.2 Economy.....	58
3.2.1 Principle: Securing and/or improving the profitability of hunting is an objective of hunting.....	59
3.2.1.1 Criterion: The profitability of hunting is secured over a medium term....	59
3.2.1.2 Criterion: The value of hunting is maintained and/or increased by the practice of hunting.....	62

3.2.2	Principle: Preserving and fostering the condition of game is an objective of hunting	63
3.2.2.1	Criterion: Average game weights	63
3.2.2.2	Criterion: Existence of a time- and area-specific hunting strategy	64
3.2.3	Principle: Preventing damage to agriculture and forestry is an objective of hunting	64
3.2.3.1	Criterion: Hunting is oriented according to the susceptibility of agricultural and forestry lands to game damage	64
3.2.4	Principle: Making use of synergies with other economic branches is an objective of hunting.....	65
3.2.4.1	Criterion: Hunting forms an economic unit with other anthropogenic forms of use	65
3.2.4.2	Criterion: Interdisciplinary optimising of planned changes in the wildlife habitat	66
3.3	Socio-cultural Aspects.....	68
3.3.1	Principle: The population's interest in using territory for hunting is taken into account.....	68
3.3.1.1	Criterion: By way of involving local hunters, hunting enjoys a balanced position within the local community but also takes into account the interests of non-resident hunters.....	68
3.3.2	Principle: Securing local jobs in the field of hunting is to be an objective	70
3.3.2.1	Criterion: Hunting contributes to securing jobs by creating employment.....	70
3.3.3	Principle: Hunting should find broad acceptance among the population.....	70
3.3.3.1	Criterion: Paying attention to the interests of the local population.....	71
3.3.3.2	Criterion: Hunting is connected with society-at-large	72
3.3.4	Principle: Hunting is oriented according to the well-being of game.....	73
3.3.4.1	Criterion: Hunting is practised with as little impairment to the natural behaviour of wildlife as possible	73
3.3.4.2	Criterion: Hunting is practised with as little pain for the animal as possible	74
3.3.5	Principle: Hunting targets wild animals reproducing naturally in the wild	75
3.3.5.1	Criterion: No animals raised in breeding or other enclosures are hunted	75
3.3.6	Principle: The way hunting traditions are dealt with is a characteristic of the socio-cultural sustainability of hunting	76
3.3.6.1	Criterion: Hunting traditions are cultivated and passed on to coming generations of hunters.....	77
3.3.6.2	Criterion: Traditional rules of hunting behaviour are being further developed and brought up to date	77
3.4	Synoptic Table.....	78
4	Evaluation Scheme.....	85
4.1	Evaluation – Type 1.....	85
4.2	Evaluation – Type 2.....	87

5	Description of the Hunting Ground – Basis for the Sustainability Test	90
5.1	Name, Geographical Position and Infrastructure of the Hunting Ground	90
5.2	Ownership and Legal Situation	91
5.3	Area and Biotope Description, Biological Diversity, Land Use	92
5.4	Management and Monitoring	93
5.5	Remarks	94
6	Development of the Assessment System	95
6.1	Organisational Procedure	95
6.2	Statements Relating to Practical Application	97
6.3	Dealing with Individual Arguments	97
6.4	Workshop	98
6.5	Publication of the Final Report	100
6.6	Interactive Platform on the Internet	101
6.7	Publication of an English Translation	101
6.8	Further Development and New Publication	101
6.9	Changes as Compared to the First Publication	103
6.10	Updating the Interactive Internet Platform	104
6.11	Summary of the Working Process	104
7	Outlook	106
8	Quoted Literature, further reading and Internet Links	108

Summary

Background

Hunting is one of the oldest ways for humans to use natural resources and as such has an influence on animal and plant species as well as on ecosystems. It may also be a potential source of conflict with other forms of use of natural resources (e. g. forestry, agriculture, and recreation). In this context, the issue of the sustainability of hunting arises. Oversimplified approaches often prevent objective views and hamper the settlement of disputes. Creating a basis of mutual understanding is of fundamental importance for communication. The question therefore is which aspects must invariably be considered to achieve a comprehensive, objective and solution-oriented discussion. In various other sectors of land use, the fundamentals of sustainable use have already been developed. In the field of hunting, however, there has been a lack of coherent approaches with regard to the definition and assessment of sustainable use. In line with similar processes in other economic sectors, this study presents principles, criteria and indicators of sustainable hunting, developed in a participatory way by involving a large number of interested parties. The assessment framework (then: “assessment set”) was first published in 2001 (UMWELTBUNDESAMT, 2001). Now, an extensively revised and advanced edition is available.

Establishing a set of principles, criteria and indicators (P, C, I) is a modern approach that allows treating the issue of hunting in an objective and transparent way by taking into account the three pillars of sustainability (ecology, economy and socio-cultural aspects). Sustainability means here that the use of natural resources is possible now in an equal way as it will be possible in the future (for future generations).

The system of sustainability assessment as presented here is solely concerned with the topic of hunting itself, always bearing in mind, however, that in the context of an overall sustainability concept, the consideration of other, external influences on hunting is of vital importance. Specific sustainability requirements for other sectors, however, will have to be established in those sectors themselves.

Particular attention has been given to coherence with international agreements and processes (CBD, IUCN, etc.).

Objective

The objective of the set of principles, criteria and indicators is to function as a supporting instrument for transparent, practice-oriented and time-efficient assessment of one’s own practice of hunting. Thereby, it should facilitate the analysis and ascertainment of individual strengths and weaknesses, as well as actions

to optimise sustainability. In order to allow for an application as broad as possible of the assessment framework by the parties concerned (hunters, hunting and wildlife managers), a user-friendly electronic self-assessment tool has been made available on the World Wide Web (www.biodiv.at/chm/jagd).

Procedure

Based on previous work, such as “Basics for Principles, Criteria and Indicators of Sustainable Hunting” (UMWELTBUNDESAMT, 1997), on international standards for environmental principles, criteria and indicators as well as on international conventions and initiatives, such as the CBD, 13 clear principles, 24 criteria, and 51 sub-criteria and indicators with scores have been defined. A process of participation that was gradually extended allowed a large circle of persons from all relevant stakeholder groups to express their views and contribute their own ideas and experience (topical discussions in smaller groups of experts, practical testings, discussions in larger groups, and consultation processes).

After publishing the first edition of the study and presenting the work results on the World Wide Web as well as a one-year monitoring phase, the criteria and indicators have now been further improved on the basis of user feedback and practical application on hunting grounds. As a result, a completely revised edition, agreed by a larger group of experts and stakeholders, has been produced.

Set of Principles, Criteria, Sub-criteria and Indicators of Sustainable Hunting

Range of application and frame of reference

This sustainability assessment is concerned with hunting activities and all those wildlife species that are subject to hunting laws (game animals). Other wildlife species in close interaction with wildlife species subject to hunting laws may also, indirectly, be included. Interfaces with land use sectors other than hunting are, although deliberately addressed, assessed only in terms of the influence hunting itself can have on them.

The primary unit to be used for assessing sustainable hunting with principles, criteria and indicators is the hunting management unit (hunting ground, “hunting ring”). However, assessment is basically also possible for larger areas, e. g. on a regional scale.

A concept of hunting, in written or mental form, is vital to sustainable hunting. A description of the assessment unit in question supports the assessment of the sustainability of hunting. It has to include details such as geographic location, ownership and legal circumstances, natural conditions as well as management and monitoring methods.

Based on the wildlife-ecological habitat types and the basic conditions to be found in Austria, the assessment framework is geared in particular to European countries where hunting ground systems (which tie the right to hunt to land ownership) prevail. The set of principles as well as the assessment methodology can be made standard practice. By modifying certain criteria and sub-criteria, the entire assessment framework can be adjusted to non-European circumstances and different hunting systems.

Table of Contents

Ecology

As far as ecological aspects are concerned, the guiding principles of the principles, criteria and indicators are the conservation and improvement of game habitats, game species diversity, and of the genetic diversity of game species.

For the planning and documentation of hunting activities, shooting plans and shooting lists (bag lists) are vital instruments in the regulation of game stocks and, if threatened or sensitive species are concerned, in species conservation. Such plans and lists, with detailed subdivisions, should be kept for each species. Compliance with official shooting specifications (target numbers for bags) is an important sustainability indicator, in particular for species with reduction requirements. The assessment also establishes whether, by pursuing a suitable strategy as part of the hunting concept, enough attention is paid to the harmonisation of hunting with other forms of land use (e. g. agriculture and forestry). A hunting strategy should take into account seasonal bottleneck situations in the food supply of wild animals.

It is of particular importance for ecological sustainability to take into account the impact of game on vegetation and to prevent game damage unacceptable in terms of ecosystem functioning and public interest (“regional culture”), especially with regard to the protective function of forests. Control fences and forest monitoring systems are considered to be useful instruments for monitoring browsing impacts, and the results should be used for planning hunting measures. Temporary natural fluctuations below average levels in the populations of abundant cloven-hoofed game species (ungulates) provide a natural opportunity for vegetation to recover from browsing pressure. Thus, such fluctuations should be tolerated in hunting.

The last few decades have seen an increase in habitat loss and habitat fragmentation, mainly due to an increase in agricultural landscapes which are poor in structural diversity and are crossed by major transportation infrastructure. It is therefore important for the assessment to establish whether all possibilities of hunting for improving biotope connectivity are exhausted, whether migration zones, forced wildlife passes and wildlife corridors are taken into account in hunting activities, and whether their location and routes are identified so that measures for linking up habitats are possible, especially if any structural changes are planned in wildlife habitats (e.g. transportation planning).

Furthermore, the varying habitat capacity for game populations has to be considered. If habitat conservation and improvement measures are taken, hunting can contribute to meeting the habitat requirements, especially of threatened native wild animals, in the best possible way. Increased competition and pressure from regionally abundant game species whose populations increase dramatically and threaten the viability of other rare native wildlife species, either directly or indirectly, can be counteracted by setting specific regulatory measures protecting the threatened species. The annual population growth rate of cloven-hoofed game can be used as an indicator of whether the density of game stocks fits habitat capacity.

It is of vital importance that hunting activities should be guided by the inventory of potentially natural game species (native species: present, returning and extinct species). This requires drawing up lists of currently existing and potentially natural game species, which is facilitated by a regular monitoring based on systematic observations and documentation. On the basis of this information, returning native species should be supported or at least tolerated, whereas favourable treatment of non-autochthonous species is not in line with the principles of ecologi-

cally sustainable hunting. The degree of consideration given to critical factors in the reproductive biology of sensitive species and to the undisturbed life-cycle of wildlife species by minimising the pressure from hunting shows whether hunting practices fit in with the life patterns of wild animals. The wide-ranging mobility of many wild animals should be taken into account in hunting guidelines which are to be applied across several hunting grounds.

The impact of hunting on the genetic diversity of game species is assessed by determining whether hunting is influenced by aims which relate to the aesthetics of trophies (forms of horns and antlers), and whether it is practised in a selective way according to certain natural characteristics of specific wild animals. Moreover, the introduction of non-autochthonous wild animals (species, sub-species and non-autochthonous breeds of wild animals) contributes to alterations of the natural gene pool and presents a threat to the native wildlife species diversity.

Economy

Securing a capability for producing returns and the profitability of hunting is one of the major objectives of economically sustainable hunting. Whether this objective is achieved is, for instance, indicated by the existence of a marketing strategy for game, shoots and bags, trophies and the amount of proceeds from game. For owners of hunts and for those granting hunting leases, the monetary expense/yield ratio of a hunting operation is important for the final balance, whereas for tenants and hunting customers the subjective immaterial benefit derived from hunting (nature experience, recreational value, etc.) is important, apart from the expense. Also, owners of hunts and those granting hunting leases are likely to consider hunting-related measures designed to increase the market value of a hunt, such as investments in installations and equipment on the hunting ground. The weight of game is a factor which determines the economic value of hunting and should therefore be documented in the long-term. A time and area-specific hunting strategy which includes documentation of shootings and their evaluation is crucial to the economic optimisation of hunting.

Taking into account the susceptibility of agricultural crops, forest stands and fisheries to damage by game is an important characteristic of economically sustainable hunting. This requires harmonising hunting activities with other land use sectors and their representatives (e. g. agriculture and forestry, tourism, transportation) on a regular and mutual basis. Positive synergies with other economic branches can be optimised by hunters who actively support wildlife ecological spatial planning (legally binding or voluntary on a regional scale) and its practical implementation. Also, involvement of hunters in projects and planning can help to prevent any negative effects of habitat changes before it is too late. Both forms of commitment are regarded as contributions to the sustainability of hunting.

Socio-cultural Aspects

With regard to socio-cultural aspects, the balancing of interests among the hunters themselves and the active involvement of landowners and other local user and interest groups are considered. Several indicators also refer to the relationship between hunters and non-hunters within society as a whole, to the well-being of wild animals as well as ethical and cultural aspects related to hunting.

The assessment focuses primarily on whether the hunting interests of the local population are taken into account. Hunters from outside, however, should as a rule not be excluded. Whether the interests of the non-hunting local population are considered can be seen from any disagreements documented by the local authority, or from whether there are any meetings to which local landowners, land users and their representatives are actively and regularly invited by the hunters to exchange views and information. Any contributions of hunting to securing local jobs are used as another indicator. The commitment of hunters to communicating with the non-hunting part of the population, as well as dealing actively with the broader public opinion on hunting-related issues, are seen as positive contributions to a sustained social acceptance of hunting.

Sustainable hunting must comply with the requirements of modern animal protection and the relevant hunting regulations must be observed. Hunting must be carried out in such a way as to ensure that as little pain as possible is caused to the hunted game, which can be achieved by appropriate and regular shooting exercises and by abandoning the use of poison. If the behaviour of huntable and non-huntable animals towards humans shows that they feel safe and undisturbed by hunting activities, which requires minimizing hunting pressure, this is an important indicator of the well-being of wild animals.

In socio-cultural terms, sustainable hunting is guided by the principle that only those wild animals are hunted which reproduce naturally within their environment. Thus the passing on or sale of game bred or kept for the sake of hunting, as well as the release of such game for hunting purposes should be rejected from the perspective of hunting ethics.

For an assessment of hunting traditions and how they are handled, it is important – apart from preserving the cultural heritage of hunting – that traditional rules of conduct are updated and regularly revised in the light of current knowledge.

Evaluation Scheme

In order to obtain transparent information on the sustainability of hunting, a differentiated evaluation scheme has been developed. Each sub-criterion has been allocated an indicator and valuation scheme of two to five grades (assessment questions) per sub-criterion (performance scales). The assessment is carried out by awarding points which relate to each grade of a sub-criterion. In this way the sub-criteria can be used as indicators showing to what extent sustainability requirements have been fulfilled in practice. The maximum range is between 4 to – 4 points per indicator.

Two different types of evaluation are provided:

- (i) In an aggregated type of evaluation, the total number of points is summed up separately for each of the three aspects of sustainability (ecology, economy, socio-cultural aspects), expressed as a percentage of the respective maximum number of points and allocated to one of the five evaluation categories (ranging from “very good” to “very bad”). This permits a concise presentation of the assessment results for each of the aspects of sustainability.
- (ii) In a second, synoptic presentation, the number of points reached for each indicator is shown as a graphical representation on a coloured “sustainability scale” (assessment profile of one management unit).

Both types of representation facilitate the quick identification of individual strengths and weaknesses in the practise of sustainable hunting.

Outlook

The methodical approach described here aims to provide the parties responsible for hunting with an instrument on site that can be used to assess, with adequate transparency, the sustainability of hunting within the reference unit. Although this cannot replace the development of additional large-scale monitoring systems for measuring the sustainability of hunting, the results of the user-oriented scheme presented here can be used in combination with the statistical results of monitoring systems.

Although initially geared to Austrian conditions, the assessment framework described here is designed in such a way as to allow Europe-wide application. Appropriate modifications should also make it adaptable to other specific regional conditions. The framework has been designed as a dynamic learning system which allows continuous refinement.

In future, the hunting-specific approach to sustainability as described here should be linked up with the sustainability requirements of other sectors of land use, and thereby gradually integrated into an overall cross-sectoral sustainability strategy.

Zusammenfassung (German Summary)

Hintergrund

Die Jagd, eine der ältesten Formen der menschlichen Nutzung natürlicher Ressourcen, beeinflusst Tier- und Pflanzenarten sowie Ökosysteme und birgt mitunter Konfliktpotenzial mit anderen Naturnutzern (z. B. der Forstwirtschaft, der Landwirtschaft, der Fischerei). In diesem Zusammenhang stellt sich die Frage der Nachhaltigkeit der Jagd. Zu stark vereinfachte Herangehensweisen sind dabei oftmals einer objektiven Betrachtung und Konfliktregelung hinderlich. Die Schaffung einer gemeinsamen Verständigungsbasis ist für die Kommunikation von tragender Bedeutung. Es stellt sich daher die Frage, welche Aspekte jedenfalls behandelt werden müssen, um eine umfassende, sachliche und lösungsorientierte Diskussion zum Thema Jagd zu ermöglichen. In verschiedenen anderen Landnutzungssektoren wurden bereits Grundlagen für eine nachhaltige Nutzung entwickelt. Für den Bereich der Jagd fehlten bislang systematische Ansätze zur Definition und Bewertung von Nachhaltigkeit. In Analogie zu Prozessen in anderen wirtschaftlichen Sektoren wird in der vorliegenden Arbeit eine Grundlage dafür in Form von partizipativ erarbeiteten Prinzipien, Kriterien und Indikatoren einer nachhaltigen Jagd vorgestellt. Das Bewertungsset wurde 2001 erstmals publiziert (UMWELTBUNDESAMT, 2001) und wird nun in einer stark überarbeiteten und weiterentwickelten Fassung vorgelegt. Die Auflösung in Prinzipien, Kriterien und Indikatoren (P, K, I) stellt einen zeitgemäßen Weg dar, sich der Jagd im Sinne der drei Säulen der Nachhaltigkeit (Ökologie, Ökonomie, sozio-kulturelle Aspekte) in weitgehend objektivierbarer und nachvollziehbarer Weise zu nähern. Nachhaltigkeit bedeutet hier, dass die Nutzung von natürlichen Ressourcen in gleichwertiger Weise sowohl jetzt als auch in Zukunft (für künftige Generationen) möglich ist.

Das vorgestellte System zur Nachhaltigkeitsüberprüfung befasst sich ausschließlich mit der Jagd selbst, wohl wissend, dass für eine Einbettung in ein Gesamtnachhaltigkeitskonzept die Berücksichtigung externer Einflüsse auf die Jagd von wesentlicher Bedeutung ist. Entsprechende Nachhaltigkeitsanforderungen sind jedoch in den betreffenden Sektoren selbst zu erarbeiten.

Besonderes Augenmerk wird auf die Stimmigkeit mit internationalen Abkommen und Prozessen (CBD, IUCN etc.) gelegt.

Ziel

Die Aufgabe des Kriterien- und Indikatorensets ist es, auf transparente, praxisgerechte und zeiteffiziente Weise die selbstständige Überprüfung der Nachhaltigkeit der eigenen Jagdausübung zu unterstützen. Dies soll die Feststellung individueller Stärken und Schwächen und die Ableitung von Maßnahmen zur Optimierung der Nachhaltigkeit erleichtern. Um eine möglichst breite Anwendung durch die Betroffenen zu ermöglichen, wurde eine benutzerfreundliche Möglichkeit zur Selbstbewertung im Internet verfügbar gemacht (www.biodiv.at/chm/jagd).

Vorgangsweise

Aufbauend auf Vorarbeiten – etwa den „*Grundlagen für Kriterien und Indikatoren einer nachhaltigen Jagd*“ (UMWELTBUNDESAMT, 1997), internationalen methodischen Standards für umweltrelevante Prinzipien, Kriterien und Indikatoren, internationalen Übereinkommen und Initiativen, wie der CBD sowie nationalen Umsetzungsstrategien – wurden 13 konkrete Prinzipien, 24 Kriterien und 51 Subkriterien (P, K, I) mit Indikation und Wertung definiert. Ein in mehreren Schritten ausgeweiteter Prozess der Partizipation erlaubte es einem großen Kreis von Personen aus allen betroffenen Interessengruppen, zu diesem Set Stellung zu nehmen und Ideen und eigenes Wissen einzubringen (Fachdiskussionen im kleineren Expertenkreis, Praxistests, Diskussionen in einem breiten Forum, Konsultationsprozess). Nach der Veröffentlichung der Erstfassung der Studie, der Präsentation der Arbeitsergebnisse im Internet und einer einjährigen Beobachtungsphase wurden die Kriterien und Indikatoren auf der Basis von Rückmeldungen der Anwender, von Praxisanwendungen in Jagdgebieten sowie unter erneuter Abstimmung mit einem erweiterten Kreis von Experten und Stakeholdern weiterentwickelt, verbessert und nun in einer überarbeiteten Fassung vorgelegt.

Das Set von Prinzipien, Kriterien, Subkriterien und Indikatoren einer nachhaltigen Jagd***Anwendungsbereich und Bezugsrahmen***

Die Nachhaltigkeitsbewertung bezieht sich auf die jagdliche Tätigkeit und auf die dem Jagdrecht unterliegenden wild lebenden Tierarten. Andere Tierarten, die mit jagdrechtlich relevanten Wildarten in enger ökologischer Wechselbeziehung stehen, können indirekt mit angesprochen sein. Schnittstellen zu nicht jagdlichen Nutzungssektoren werden zwar bewusst angesprochen, aber nur im Hinblick auf den jagdlichen Einflussbereich bewertet.

Die vorrangige Beurteilungseinheit für die Bewertung einer nachhaltigen Jagd mit Hilfe der P, K, I ist das Jagdgebiet oder die Hegegemeinschaft. Die Auswertung ist aber grundsätzlich auch für größere – z. B. regionale – Gebietseinheiten möglich. Ein schriftlich oder gedanklich vorliegendes Jagdkonzept bildet eine wesentliche Grundlage einer nachhaltigen Jagdausübung. Eine Beschreibung der jeweilig zu untersuchenden Beurteilungseinheit unterstützt die Prüfung der jagdlichen Nachhaltigkeit. Dazu gehören unter anderem die geographische Lage, Besitz- und Rechtsverhältnisse, die naturräumliche Situation sowie Management- und Monitoringmethoden.

Ausgehend von den österreichischen Wildlebensraumtypen und Rahmenbedingungen, ist das Bewertungsset besonders auf europäische Länder mit Revierjagdsystem abgestimmt. Das Set der Prinzipien und die Bewertungsmethodik sind ge-

nerell anwendbar. Durch Modifikation einzelner Kriterien und Indikatoren kann das gesamte Bewertungsset auch an nicht-europäische Verhältnisse und andere jagdrechtliche Ausgangssituationen angepasst werden.

Inhaltliche Gestaltung

Ökologischer Bereich

Im ökologischen Bereich orientieren sich die P, K, I an der Erhaltung und Verbesserung der Wildlebensräume, der Artenvielfalt des Wildes und der genetischen Vielfalt der Wildarten.

Abschusspläne und Abschusslisten für die bejagten Wildarten sind als zentrale Instrumente der Wildstandsregulierung und – bei gefährdeten und sensiblen Arten – der Arterhaltung zur Planung und Dokumentation des jagdlichen Handelns unerlässlich; sie sollten artenspezifisch geführt und genauer untergliedert sein. Die Erfüllung behördlicher Abschussvorgaben ist vor allem bei Wildarten mit Reduktionsbedarf ein wichtiger Nachhaltigkeitsindikator. Weiters wird bewertet, ob der Abstimmung mit anderen Landnutzungsformen (z. B. der Land- und Forstwirtschaft) durch eine geeignete Strategie als Teil des Jagdkonzeptes in ausreichender Form Beachtung geschenkt wird. Die Bejagungsstrategie sollte jahreszeitliche Engpasssituationen in der Nahrungsversorgung des Wildes berücksichtigen.

Von besonderer Bedeutung für die ökologische Nachhaltigkeit ist die Berücksichtigung des Wildeinflusses auf die Vegetation und die Vermeidung landeskulturell untragbarer Wildeinflüsse, insbesondere im Hinblick auf die Schutzwirkung des Waldes. Kontrollzäune und forstliche Beobachtungssysteme sind nützliche Instrumente zur Überwachung des Verbisses und sollten zur Bejagungsplanung herangezogen werden. Vorübergehende naturbedingte Bestandesschwankungen nach unten bei häufig vorkommenden Schalenwildarten ermöglichen eine natürliche vorübergehende Verbissentlastung der Vegetation und sollten daher jagdlich zugelassen werden.

Lebensraumverluste und die Zerschneidung von Wildlebensräumen haben in den letzten Jahrzehnten deutlich zugenommen, verantwortlich dafür sind insbesondere strukturarme Agrarlandschaften und hochrangige Verkehrsinfrastruktur. Für die Beurteilung ist daher bedeutend, ob die jagdlichen Möglichkeiten für Biotopvernetzungen ausgeschöpft, Migrationsachsen, Zwangswechsel und Wildkorridore bei der Bejagung berücksichtigt und deren Lage und Verlauf festgestellt werden, um Maßnahmen zur Lebensraumvernetzung zu ermöglichen, auch im Hinblick auf bauliche Eingriffe in den Wildlebensraum (z. B. Verkehrsplanungen). Zudem sollte die wechselnde Lebensraumkapazität für Wildpopulationen berücksichtigt werden. Durch Maßnahmen zur Biotoperhaltung und -verbesserung kann die Jagd dazu beitragen, die Lebensraumansprüche insbesondere gefährdeter heimischer Wildarten bestmöglich abzudecken. Verschärfter Konkurrenzdruck seitens regional häufiger Wildarten, die in ihrem Bestand stark zunehmen und dadurch andere seltene heimische Wildarten direkt oder indirekt in ihrem Fortbestand bedrohen, kann durch gezielte Regulation zu Gunsten der gefährdeten Arten jagdlich berücksichtigt werden. Die Höhe der jährlichen Zuwachsrate kann bei Schalenwild als ein Indikator dafür gelten, ob die Wilddichte der Lebensraumtragfähigkeit angepasst ist.

Zentrale Bedeutung wird der Orientierung der Bejagung am potenziell natürlichen Wildarteninventar (einheimische Arten: vorhandene, wiederkehrende und ausgerottete Arten) bemessen. Dies erfordert zunächst die Erstellung von Lis-

ten der aktuell vorkommenden und der potenziell natürlichen Wildarten, was ein regelmäßiges Monitoring auf der Grundlage systematischer Beobachtungen und Aufzeichnungen voraussetzt. Darauf basierend sollten wiederkehrende heimische Arten gefördert oder zumindest geduldet werden, während eine jagdliche Begünstigung von nicht autochthonen Arten nicht im Sinne einer ökologisch nachhaltigen Jagdausübung ist. Die Rücksichtnahme auf kritische Faktoren der Reproduktionsbiologie sensibler Arten sowie das Ermöglichen eines möglichst ungestörten Lebensrhythmus der Wildtiere durch Minimierung des Jagddrucks zeigt an, ob sich die Bejagung an der Lebensweise der Wildtiere orientiert. Die weiträumige Mobilität vieler Wildtiere sollte durch revierübergreifende Bejagungsrichtlinien berücksichtigt werden.

Der jagdliche Einfluss auf die genetische Vielfalt der Wildarten wird daran überprüft, ob die Bejagung an trophäenästhetischen Vorgaben ausgerichtet ist und ob sie selektiv nach bestimmten natürlichen Merkmalen einzelner Wildtiere erfolgt. Weiters trägt die Einbringung nicht autochthoner Wildtiere (Arten, Unterarten und Standortrassen) zu genetischer Verfälschung bei und gefährdet die heimische Wildartenvielfalt.

Ökonomischer Bereich

Die Sicherung der jagdwirtschaftlichen Ertragsfähigkeit und Rentabilität ist ein Hauptziel einer ökonomisch nachhaltigen Jagd. Das kann z. B. am Vorhandensein einer Vermarktungsstrategie für Wildbret, Abschüsse und Trophäen und an der Höhe der Wildbretterlöse abgelesen werden. Für Jagdeigentümer und Verpächter ist das Verhältnis zwischen monetären Aufwendungen und Erlösen des Jagdbetriebes ausschlaggebend für die wirtschaftliche Bilanz, während für Pächter und Jagdkunden neben den Kosten insbesondere der subjektive immaterielle Nutzen (Naturerleben, Erholungswert etc.) in die Bilanz eingeht. Ebenso werden bei Eigenjagdbesitzern und Verpächtern Maßnahmen zur Förderung des Marktwertes der Jagd bewertet, wie z. B. Investitionen in Reviereinrichtungen. Die Höhe der Wildbretgewichte ist mit ein jagdwertbestimmender Faktor und sollte deshalb langfristig dokumentiert werden. Ein zeitliches und räumliches Bejagungskonzept, einschließlich der Dokumentation von Abschüssen und deren Bewertung, ist entscheidend für die ökonomische Optimierung der Bejagung.

Die Orientierung der Jagdausübung an der Wildschadenanfälligkeit land-, forst- und fischereiwirtschaftlicher Kulturen ist ein wichtiges Merkmal einer ökonomisch nachhaltigen Jagd. Dies erfordert die regelmäßige, wechselseitige Abstimmung mit anderen Landnutzern bzw. deren Interessenvertretern (z. B. Land- und Forstwirtschaft, Tourismus, Verkehr). Positive Synergien mit anderen Wirtschaftszweigen können durch den Einsatz der Jägerschaft für eine (rechtsverbindliche oder freiwillig auf regionaler Ebene betriebene) wildökologische Raumplanung bzw. für deren praktische Umsetzung optimiert werden. Ebenso können durch das Engagement von Jägern bei Planungen und Projekten negative Auswirkungen von lebensraumverändernden Eingriffen rechtzeitig vermindert werden. Beides wird daher als Beitrag zur Nachhaltigkeit der Jagd bewertet.

Sozio-kultureller Bereich

Im sozio-kulturellen Bereich wird auf den Interessenausgleich innerhalb der Jagdausübungsberechtigten, auf die aktive Einbeziehung von Grundeigentümern und anderen örtlichen Nutzer- und Interessengruppen, auf die Beziehung zwi-

schen Jägern und Nicht-Jägern innerhalb der Gesellschaft, auf das Wohlergehen der Wildtiere sowie auf jagdethische und jagdkulturelle Aspekte eingegangen.

Hierbei wird vorrangig bewertet, ob die jagdlichen Nutzungsinteressen insbesondere der ortsansässigen Bevölkerung berücksichtigt werden, wobei aber auch auswärtige Jäger nicht grundsätzlich von der Jagdausübung ausgeschlossen werden sollten. Die Berücksichtigung der Interessen der nicht jagenden lokalen Bevölkerung wird daran gemessen, ob bei den örtlichen Behörden Unstimmigkeiten dokumentiert sind, und ob ortsansässige Grundeigentümer, Landnutzer und Interessensvertreter regelmäßig aktiv zum wechselseitigen Informationsaustausch eingeladen werden. Mögliche Beiträge der Jagd zur Ausschöpfung des lokalen Arbeitsplatzpotenzials fließen ebenfalls ein. Engagement der Jäger für Kommunikation mit der nicht jagenden Bevölkerung sowie die aktive Auseinandersetzung mit der breiteren öffentlichen Meinung zu jagdrelevanten Themen werden als positiver Beitrag zur nachhaltigen gesellschaftlichen Akzeptanz der Jagd gewertet.

Wesentlich für eine nachhaltige Jagd ist, dass diese den Anforderungen eines zeitgemäßen Tierschutzes entspricht und diesbezügliche jagdrechtliche Bestimmungen eingehalten werden. Die Jagdausübung muss mit den geringst möglichen Qualen für das Wildtier verbunden sein, wozu das regelmäßige Training der Schießfertigkeit und der Verzicht auf den Einsatz von Gift bei der Jagdausübung beitragen. Ein wichtiger Indikator für das Wohlbefinden der bejagten und der nicht bejagten Wildtiere ist deren Vertrautheit gegenüber dem Menschen, was eine Minimierung des Jagddrucks erfordert.

Eine sozio-kulturell nachhaltige Jagd orientiert sich an der Bejagung von Wildtieren, die sich in freier Wildbahn selbst fortpflanzen. Sowohl Weitergabe bzw. Verkauf von Wildtieren, die aus Züchtung oder Haltung zu jagdsportlichen Zwecken stammen, als auch die Freilassung solcher Tiere für die Abhaltung von Jagden sind daher aus jagdethischer Sicht abzulehnen.

Für die Beurteilung des Umgangs mit jagdlichen Traditionen sind neben der Pflege jagdkulturellen Brauchtums insbesondere die zeitgemäße Weiterentwicklung von traditionellen jagdlichen Verhaltensregeln und deren regelmäßige Überprüfung anhand des gültigen Wissensstandes maßgeblich.

Auswertungsschema

Um nachvollziehbare Hinweise für die Nachhaltigkeit der Jagd zu erhalten, wurde ein differenziertes Bewertungsschema entworfen. Jedem Sub-criterion ist ein Indikations- und Wertungsschema zugeordnet, das zwischen zwei und fünf Abstufungen (Bewertungsfragen) je Sub-criterion vorsieht. Die Wertung erfolgt durch die Vergabe von Punkten, die jeder Wertungsstufe eines Sub-criterions zugeordnet sind. Hierdurch dienen die Subkriterien als Indikatoren und zeigen an, inwieweit Nachhaltigkeitsanforderungen in der Praxis erfüllt sind. Das maximal mögliche Punktespektrum liegt zwischen 4 und -4 Punkten je Indikator.

Es sind zwei unterschiedliche Auswertungsvarianten vorgesehen:

- (i) In einem zusammenfassenden Auswertungstyp wird die erreichte Punktesumme getrennt nach den drei Nachhaltigkeitsbereichen (Ökologie, Ökonomie und sozio-kulturelle Aspekte) aufsummiert, in Prozent der jeweils möglichen Maximalpunktzahl berechnet und in eine von fünf Bewertungsklassen („sehr gut“ bis „sehr schlecht“) eingeordnet. Dadurch wird eine konzentrierte Darstellung der Bewertungsergebnisse nach den drei Nachhaltigkeitsbereichen möglich.

- (ii) In einer zweiten Überblicksdarstellung werden die erreichten Punktwerte aller Einzelindikatoren auf einer farbigen „Nachhaltigkeitsskala“ graphisch dargestellt.

Beide Darstellungsformen ermöglichen die rasche Identifikation von individuellen Stärken und Schwächen bei der Ausübung einer nachhaltigen Jagd.

Ausblick

Der hier gewählte methodische Ansatz zielt darauf ab, den Jagdverantwortlichen vor Ort ein Instrument in die Hand zu geben, mit dem auf transparente Weise geprüft werden kann, wie nachhaltig die Jagdausübung in der Bezugseinheit ist. Dies kann zwar nicht die Entwicklung zusätzlicher großräumiger Monitoringssysteme zur Messung der jagdlichen Nachhaltigkeit ersetzen. Die Ergebnisse aus dem vorliegenden anwenderorientierten Konzept können jedoch mit den statistischen Ergebnissen von Monitoringsystemen kombiniert werden.

Obwohl zunächst vor allem auf österreichische Verhältnisse abgestimmt, ist das vorliegende Bewertungsset dennoch derart gestaltet, dass es im Prinzip europaweit anwendbar ist. Durch entsprechende Modifikationen sollte es aber auch für andere spezifische Ausgangssituationen adaptierbar sein. Das Set ist als lernendes, dynamisches System konzipiert, das eine laufende Verfeinerung erlaubt.

Der vorliegende jagdspezifische Nachhaltigkeitsansatz sollte zukünftig mit Nachhaltigkeitskriterien anderer Landnutzungssektoren verknüpft und so sukzessive in eine sektorübergreifende Gesamtnachhaltigkeitsstrategie eingebunden werden.

1 Introduction and Objectives

By managing and taking wild animals, hunting has an impact on a certain share of natural resources. It has thus a direct influence on the genetic diversity of individual game species, the composition of game species, and the structure of game populations, as well as an indirect influence on non-hunttable animal species as well as plant species and soil. This influence may have effects upon ecosystems and, in some cases, has a potential for conflicting with the interests of other users of natural resources (e.g. forestry, agriculture, recreation). Wild animals, their occurrence and behaviour as well as suitability for hunting are often also strongly influenced by changes in land use, infrastructure (e.g. roads, railway lines, overhead wires or conduits), and tourism. While the present study takes into account, as far as possible, the manifold “non-hunting-related” factors of influence upon wildlife species, their habitats and huntability, which frequently strongly limit the possibilities for hunting to be sustainable, it does not directly assess and evaluate these factors. The study is concerned exclusively with hunting per se. Thus, the primary focus is on those wildlife species that, on account of the respective hunting laws, are subject to hunting, including game species with a year-round closed hunting season. Interactions with non-hunting-related sectors of land use as well as with species not subject to hunting laws are mentioned briefly, but evaluated only with regard to hunting-related activities. In the future, hunting, as a sector of sustainability dealt with in this study, has to be interlinked and harmonised with other sectors of sustainability (agriculture and forestry, tourism, etc.), in order to allow for an efficient, integrated sustainability strategy (“cross-sectoral sustainability strategy”) that also meets the requirements of nature conservation. Interlinking these sectors requires developing operational concepts for a cross-sector evaluation of the sustainability of using natural resources.

Towards the end of the 20th century, “sustainable development” became *the* path-breaking concept for environmental policy and resource management. The present study is intended to make a contribution to the implementation of the goals of comprehensive sustainable development as defined at UNCED (UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT) in Rio de Janeiro, 1992, and the follow-up processes such as MCPFE (MINISTERIAL CONFERENCE ON THE PROTECTION OF FORESTS IN EUROPE). Furthermore, the sustainable use of the components of biological diversity is one of the three declared objectives of the CBD (CONVENTION ON BIOLOGICAL DIVERSITY). This Convention mainly aims at the conservation of biological diversity of ecosystems, species and populations as well as their natural genetic variability, with the goal of achieving a balance between protection and sustainable use of biological diversity.

The intention of the study is in line with the 'IUCN Policy Statement on the Sustainable Use of Wild Living Resources' adopted at the World Congress of the World Conservation Union (IUCN) in Amman/Jordan (IUCN, 2000). The IUCN Policy Statement says that the use of wild living fauna and flora, provided it is sustainable, may also be defined as an instrument of nature conservation and may contribute to the preservation of biological diversity. This is also valid for hunting. The definition does not include those protected areas such as wilderness areas, national parks, etc., in which any consumptive use is by definition not admitted in the entire or in parts of the protected area. The study also intends to make fundamental contributions to implementing goals of the Convention on the Protection of the Alps (ALPINE CONVENTION, 1991), as contained, for example, in the Protocols on the Conservation of Nature and Landscape Management; Regional Planning and Sustainable Development; Mountain Forests; Tourism, as well as Transport.

The present study touches only marginally and indirectly upon concrete requirements of Austrian hunting law¹, even though general objectives of hunting laws are reflected in some principles. It does, however, address and refer to the meaning of such concepts as “good, fair and legal hunting practice”² and “hunting ethics” (cf. ZEILER, 1996).

The objective of this study is to concretise the concept of “sustainable hunting” with a set of principles, criteria and indicators,” thus making it operational. The meaning of the concept of “sustainable use” has changed over time and has come to comprise ecological, economic, and socio-cultural aspects, also described as the “three pillars” of sustainability, to be reflected in the structure of the set of principles, criteria and indicators (cf. below and Chapter 2.3)

Development may be described as sustainable if it meets the needs of the present without compromising the ability of future generations to meet their own needs (BRUNDTLAND & UNCED, 1988). In general terms, “sustainable use” of natural resources may be defined as a form and intensity of use that

- seeks a balance between protection and use;
- takes into account the limits of ecological carrying capacities and functioning of ecosystems;
- does not exceed the regenerative capacity of renewable biological resources;
- is socially just and balanced;
- allows the qualitatively and quantitatively equal use of resources both now and for future generations.

From an ecological point of view, sustainable use means in particular to prevent human action from exerting an irreversible impact on global material flows and from exceeding local limits of resilience of ecosystems. Sustainable use of natural resources has to give preference to maintaining the functioning capacity of an ecosystem in order to guarantee that all material and immaterial services of the natural environment are fulfilled on a lasting and even basis. Ecologically sus-

¹ In Austria, hunting is governed by laws of the individual Provinces.

² (Transl. comment:) The German term “Weidgerechtigkeit” (“good, fair and legal hunting practise”) describes a mode of hunting behaviour subject to changes in moral and ethical perspectives as well as in hunting techniques over the course of time. It relates to a practice of hunting in conformity with the general legal standards of hunting and has recently been expanded to comprise environmental considerations, dealing with natural resources, and behaviour vis-a-vis the ecosystem (HESPELER, 1990; LINDNER, 1979).

tainable hunting must not be limited to “harvesting” through hunting the maximum sustainable yield in terms of population growth. On the contrary, a variety of qualitative aspects ought to be taken into account. In particular, the diversity of species, populations and genetic variability but also of habitats and of the characteristics of natural scenery has to be preserved. Austria, too, has committed itself to integrating the recognised principles of ecological, social and economic sustainability into all fields of social and economic policy and all levels of decision making. (FEDERAL MINISTRY OF ENVIRONMENT, 1995; FEDERAL MINISTRY OF AGRICULTURE, FORESTRY, ENVIRONMENT AND WATER MANAGEMENT, 2002).

In accordance with the “three pillars” of sustainability, this study also intends to take into account the economic and socio-cultural components. A fundamental goal is to maintain, for example, the economic profitability of hunting while at the same time preventing potential damage caused by game management. It is also important for hunting to be in conformity with the objectives of the latest standards of animal protection. The contribution hunting makes to societal development as well as its readiness to assume responsibility are to be reflected in the cultural self-conception of hunting.

Criteria and indicator systems are modern assessment tools that allow an examination of the sustainability of various forms of use as well as of whether sustainability goals have been reached. Assessment approaches of this kind have been developed for application to various sectors of use, such as forestry, agriculture, or fishery. However, it has so far not been applied to the sector of hunting. Thus, in close cooperation with representatives of stakeholder groups concerned, a transparent and, as far as possible, objective assessment system has been developed, allowing hunters to self-examine the degree of sustainability of their own practice of hunting. The “Principles, Criteria and Indicators of Sustainable Hunting” have been designed as a voluntary tool to assist in self-assessment. They are meant to allow an individual to assess and to question their own practice of hunting.

We thus created, on the basis of the three pillars of sustainability – ecology, economy, and socio-cultural aspects – a hierarchically structured system of principles, criteria and sub-criteria that makes the guiding principle of sustainable hunting more concrete. The sub-criteria have been provided with a simple evaluation scheme. Thus, they assume the function of indicators with performance scales, i. e. of measuring parameters that allow for an evaluation as to whether hunting is practiced in accordance with the goals of sustainability. The assessment framework is to meet the following requirements:

- to allow examining the sustainability of one’s own hunting practice;
- to support the analysis of individual strengths and weaknesses;
- to facilitate the definition of action to optimise sustainability;
- to measure progress in implementing sustainability requirements (control of success);
- to allow monitoring of changes in levels of sustainability;
- to provide a basis for comparison with other hunting grounds.

The task of the assessment framework is thus to allow hunters to examine, on a voluntary basis, their own hunting practice and, if necessary, to provide assistance in making decisions in favour of a more sustainable future hunting practice. The study directs itself primarily to the individual hunters and their hunting behaviour. The definition of principles and criteria for sustainable hunting can, however, also provide suggestions for amendments of hunting law regulations that are in accor-

dance with the latest standards if developments within the society call for such adjustments and if doing so serves the purpose of sustainable use of resources.

It was our intention to create an instrument that contributes to the best possible integration of hunting practice into a comprehensive, sustainable use of natural resources. The numerous “outside” influences on wild animals, their habitats and hunting are not subject of this study.

The evaluation approach had to meet several fundamental methodological requirements: The framework was to be designed to be as conclusive as possible regarding sustainability, to meet scientific as well as technical hunting-related standards and at the same time be practical and time-efficient in its application. We wanted the evaluation process to be transparent and make the way evaluation results are produced comprehensible and verifiable. Another important goal was to make the framework applicable to various different local conditions and to take into account specific Austrian circumstances affecting an assessment of sustainability, which are due, for example, to the many small hunting grounds³, the partly very diverse ecological settings (from chamois hunting grounds in Western Austria to wild boar and small game hunting grounds in Eastern Austria), or the socio-cultural framework (e.g. the acceptance of hunting in rural areas as compared to more urban regions). The criteria and valuations are geared to the circumstances of Central European countries with hunting systems based on hunting grounds, while the methodological structure and the set of sustainability principles are also applicable to different circumstances. The criteria and indicators may also be adapted to other hunting-law systems and natural environments if the necessary modifications are made.

The unit of reference for the assessment is to be the hunting management unit, i. e. the hunting ground or the “hunting ring” (loose associations of hunting grounds). Consolidating assessment results based on management units in order to produce assessments of larger units should be possible. In doing so, it is important that the method of evaluation be uniform and consistent.

The main objective is to provide those responsible for the unit of reference with an instrument that allows for a transparent examination of the sustainability of their own hunting practice. This instrument is to foster a common understanding of the concept of sustainable hunting and to facilitate a demonstration of hunting sustainability – for the community of hunters, land owners, and persons outside this context.

³ The minimum size of a “proprietor’s hunt” is 115 hectares, while the habitats of red deer, for example, are much larger.

2 Design and Application of the Assessment Framework

2.1 Starting Kit for the Busy Reader

A concrete assessment may be made by selecting the most fitting evaluation option and giving scores under the sub-criteria (cf. Chapter 3, “Indication and Score” for each of the 51 sub-criteria). If readers/users decide to enter right here, they need to be aware of the content of the criterion to which the relevant sub-criterion is subordinated, as well as of the content of the governing principle before making an evaluation. Also, it ought to be clear to which aspect of sustainability the respective principle, criterion and/or sub-criterion belongs (ecological, economic or socio-cultural). This is the only way assessment questions under the sub-criteria can be correctly interpreted. Each of the structural levels (principle, criterion and sub-criterion) offers explanations that may frequently be significant for understanding the assessment questions and give additional information, if needed. For a synoptic table of all principles, criteria and indicators, readers are referred to Chapter 3.4.

The assessment framework presented here addresses itself to hunters and persons concerned with hunting, in particular to persons responsible for the hunting-related aspects of hunting management units. It serves the purpose of a voluntary examination of the sustainability of hunting through self-assessment. On the basis of a list of given assessment criteria, the degree of sustainability of one’s own hunting practice is to be determined, in order to identify its strengths and weaknesses and to derive assistance for decisions in favour of a more sustainable future hunting practice, if such decisions need to be made.

The assessment refers to hunting activities and wild animals subject to hunting law. Non-hunting-related sectors of use and other animal species in close interaction with wildlife species relevant in terms of hunting law are touched upon but are not immediate subjects of the assessment. The prevailing unit assessed is the hunting ground or a “hunting ring”⁴. In principle, however, the assessment is also applicable to larger – e.g. regional – territorial units. The period of assessment is the current or preceding calendar year. In some cases, longer periods of time are chosen. Ideally, the sustainability assessment ought to be based on a hunting concept existing in writing or in thought.

⁴ In Austria: A union of bordering hunting grounds and/or persons permitted to hunt (owners of a hunt) for the purpose of optimum hunting management.

For individual sub-criteria which, on account of specific local conditions, may not be applicable to all hunting grounds, an additional “neutral” option without score has been foreseen. If this option is chosen, the relevant sub-criterion will be dropped from the evaluation. For the calculation of the overall result, it has to be borne in mind that the overall total score achievable for each aspect of sustainability will be reduced by the highest possible score of the relevant sub-criterion. Chapter 5 contains a sample form to register key features of the hunting ground to be evaluated. Such area characterisation is of great significance to the examination of sustainability and its interpretation and, if possible, ought to precede the assessment. For motives of reader-friendliness, however, the chapter was relegated further towards the end of this document.

2.2 Range of Application and Frame of Reference

The guiding principle in developing the framework was the sustainability of hunting, subdivided into three aspects: an ecological, an economic and a socio-cultural one. In a wider sense, “sustainability” means here that the use of natural resources is possible both now and in the future (for future generations) with the quality of resources remaining the same.

What are the activities referred to? The assessment refers exclusively to hunting. This comprises all matters, modes of behaviour, actions and attitudes that can be immediately influenced by hunting and hunters. The manifold non-hunting-related influences exerted upon wild animals, their habitats and hunting possibilities by agriculture, forestry, tourism, transport, development of settlements, industries, and other forms of land use, which shape the conditions under which hunting takes place and often impose themselves on the influence and scope of hunting, are not subject of the sustainability examination. Interfaces with other, non-hunting-related sectors of use are being addressed, but evaluated only in terms of hunting-related impacts.

It ought to be mentioned here that it would be necessary to interlink the set of principles, criteria, sub-criteria, indicators and evaluation of hunting with respective sustainability concepts (partly yet to be developed) of other sectors (agriculture, forestry, tourism, transport, land development, spatial planning, etc.) in order to guarantee an efficient and effective implementation. For sustainability as an objective of a society, it is of key importance to integrate all sectoral sustainability approaches (guiding principles, guidelines, principles, criteria and indicators, etc.) into a cross-sectoral, overall sustainability strategy (cf. Chapter 7).

Who are the actors referred to? The assessment framework refers to hunters and persons concerned with hunting (including land owners/persons owning the right to hunt) The users to which the assessment framework is addressed are primarily the actors within the local assessment unit concerned (hunting ground, “hunting ring”) who are responsible for hunting (e.g. owners of a hunt, owners of a proprietor’s hunt, game tenant, land owner), not so much those hunters who hunt only for a short period of time in the area assessed or who do not have any decision-making capacity regarding sustainable hunting practice (e.g. guest hunters or hunters by permission of land owner/game tenant who pay per shooting). The persons responsible for hunting-related activities in the respective territory are responsible for ascertaining that the above-mentioned group of persons practice hunting in accordance with the criteria of sustainability.

Ecological Reference: The range of application of the assessment framework covers primarily those wild animal species (mammals, birds) that, on account of hunting laws, fall under the competency of hunting (furred game, winged game). This comprises species with shooting seasons, species with a year-round closed shooting season, as well as potential other species subject to hunting law. Unless otherwise indicated, the terms “game” and “wild animals” are used in this sense. However, in ecosystems, all components are directly or indirectly interlinked and interdependent. This is why even seemingly insignificant hunting measures may produce unforeseen effects in quite different parts of an ecosystem without the actors being always conscious of the interrelationships (cf. Fig.1). Thus, animal species not subject to hunting law (e.g. small mammals, insects, small birds, amphibians, reptiles, fish, domestic and domesticated animals) as well as plant species are also indirectly subject of this assessment framework, in so far as they are in close ecological interaction with species relevant in terms of hunting laws (predator-prey relationships, competition, etc.) or may otherwise be affected by hunting, e.g. through measures of biotope management or if mistaken for huntable wildlife species of great similarity.

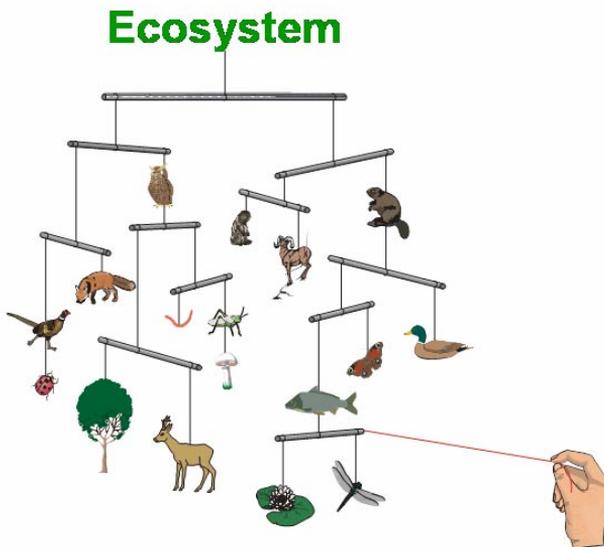


Fig. 1: In ecosystems, minor interventions in one place may have major impacts in other places, without the causing actors necessarily being conscious of this.

Time Reference: In terms of time, the assessment refers to the status quo. This is in most cases the current calendar year or, where necessary, the preceding calendar year. Some indicators may, however, require looking at a reference period further back; this can be deduced from the explanations and/or indications.

Spatial Reference: The hunting management unit (hunting ground, operation) or “hunting ring” (loose associations of hunting grounds) has been chosen as the local unit of reference for the assessment. In principle, a consolidation into larger assessment units is possible and makes sense. Thus, the assessment framework may be applied as an assessment tool across hunting areas and “hunting rings”, e.g. at the level of regions, federal provinces, or natural environments which are

ecologically homogenous from a wildlife perspective (valleys, landscapes, etc.) A wider view is of particular importance for large-scale, contiguous wildlife habitats, wide-ranging wildlife species such as red deer, wild boars and brown bear but also several bird species. Furthermore, the set of principles, criteria and indicators may be used as a monitoring instrument in order to be able to detect changes in the quality of sustainability over time and thus development trends.

Conditions for Application: An assessment of hunting requires a hunting concept, which is to be understood as the planning ahead of hunting activities. In most cases, there will be some kind of a hunting concept (often simply in the responsible persons' minds). In order to allow an assessment on the basis of the present indicators as well as in general for a long-term orientation of hunting practice, there ought to be a written hunting concept that gives clues as to goals and measures regarding the area assessed in terms of sustainable hunting. Drawing up such a hunting concept requires an awareness of factors and measures contained in the set of principles, criteria and indicators of the following Chapter. This, in turn, demands sufficient awareness of issues significant for sustainable hunting.

Limitations of Application: It cannot be ruled out that specific cases of application may occur in which requirements of hunting law make it difficult to fully meet certain examination criteria of the assessment framework. If it is demonstrated that demands of sustainability expressed under certain sub-criteria cannot be implemented on account of existing stipulations of hunting law, these sub-criteria cannot be assessed (cf. Sub-criterion 23, Chapter 3.1.3.1.1 and Sub-criterion 24, Chapter 3.1.3.1.2). This has to be made transparent and justified on grounds that are credible. It ought to be mentioned in this context that hunting legislation is, like any legal matter, dynamic, and that most hunting laws have not yet been examined as to their compatibility with sustainability criteria.

Individual sub-criteria may not be applicable in all hunting areas and/or not relevant in all cases. The assessment schemes for sub-criteria whose application demands certain conditions (described in greater detail in the explanatory text) have been provided with an additional possibility of valuation: "*x ... not applicable, no assessment.*" This option is to be chosen if the justification given in brackets applies. In that case, the respective sub-criterion is dropped from the assessment of the hunting area. At the same time, the score in points achievable within the respective aspect of sustainability (ecology, economy or socio-cultural aspect) is reduced by the maximum score in points achievable for the relevant sub-criterion; this has to be taken into account when calculating the assessment result in accordance with the Type 1 variety of evaluation (cf. Chapter 4.1)⁵. However, an assessment of the sub-criteria which are not-applicable and not-counted ought to be made at a higher level of reference (e.g. by summarising several hunting grounds).

Criterion 3.1.2.1., "Potential natural wildlife species inventory taking into account the current habitat situation (for larger territorial units, e.g. a wildlife-ecologically homogenous area)" serves as an example for the limited applicability at the level of an individual hunting ground described above. Sub-criterion 17, "Current and potential natural wildlife species list" (cf. Chapter 3.1.2.1.1) is to be assessed in any case. However, in order to draw up a potential natural wildlife species list, knowledge of regional conditions exceeding the boundaries of a hunting ground

⁵ The result calculation of the electronic self-assessment under www.biodiv.at/chm/jagd is programmed in a way that will automatically take this into account.

is necessary. Such knowledge will not in all cases be available on the hunting-ground level (even though in many cases, they are easily accessible). Thus, an assessment of the two following sub-criteria 18 (cf. Chapter 3.1.2.1.2) and 19 (cf. Chapter 3.1.2.1.3) will not be possible if the potential natural wildlife species inventory is not sufficiently known. In this case, the neutral valuation “x ... not applicable” is to be chosen, whereupon the respective sub-criterion is dropped from the assessment.

The economic aspect of sustainability is, with regard to certain issues, characterised by differing subjective views of the groups carrying out hunting-related activities – lessors/land owners and tenants/hunting customers. This is why individual sub-criteria may end up with differing and sometimes even opposed assessments. In order to avoid this, some sub-criteria are only to be applied by certain groups of persons: Sub-criterion 27, “*Cost/yield ratio*” (cf. Chapter 3.2.1.1.2) applies to lessors and owners, while Sub-criterion 28, “*Expense/subjective benefit ratio*” (cf. Chapter 3.2.1.1.3) applies to game tenants and hunting customers. For similar reasons, the application of Sub-criterion 30, “*Hunting-related measures to increase the market value*” (cf. Chapter 3.2.1.2.1) only makes sense for owners of a hunt and lessors (tenants and hunting customers will choose the “neutral” valuation of “*not applicable*” here).

Self-assessment: The assessment framework is based on the principle of voluntary self-examination. A certain amount of subjective discretion can thus, of course, not be avoided. This is also true for the separation of different influences regarding some sub-criteria. Sub-criterion 20 (cf. Chapter 3.1.2.2.1), “*Giving consideration to the undisturbed life-cycle of wild animals*”, may serve as an example here. Who, after all, wants to admit that he or she is a (sometimes quite significant) factor of disturbance to wild animals on account of hunting pressure that he or she has caused? A certain amount of readiness to question one’s own hunting behaviour and the ability to be self-critical are simply necessary preconditions regarding this assessment.

In assessing the individual sub-criteria, one should always be aware of the sectors to which the respective sub-criterion pertains (ecological, economic or socio-cultural sector) in order to avoid, for example, an intuitively “economically slanted” assessment of ecological sub-criteria, or vice versa.

Feeding: After intensive discussion of the matter, feeding was not included in the form of separate (sub)criteria, as feeding may have very diverse effects upon the indicators. Thus, the effects of feeding with regard to sustainability cannot be clearly defined. Depending on where and how it is carried out, feeding may reduce but also cause damage done by game (e.g. to forests). Where natural habitats – e.g. for red deer – are no longer available (human settlement), feeding may serve as a technical “remedy” for the lost habitat that would allow a sustainable use of this animal species. If feeding contributes to a better fulfillment of sustainability criteria, it is automatically entered positively into the sustainability assessment of a hunt. On the other hand, the existing sustainability criteria also sufficiently reflect negative aspects of feeding. Basically, the following applies when aiming at sustainability in hunting: To manage and preserve wildlife habitats in such a way as to make feeding wild animals (“technical remedy”) for the sake of preserving species and/or preventing damage done by game unnecessary.

2.3 Systematic Structure of the Assessment Framework

After principles for sustainable hunting were formulated in the three sectors of sustainability, the matching criteria and sub-criteria were defined. Eventually, every sub-criterion was allocated an indication and valuation scheme that allows for a concrete assessment of the criteria, principles and sectors via a system of scores in points. The wording of the set has been chosen so as to allow questioning of the sustainability of an individual's hunting activities, comparing it with other hunting grounds or larger hunting units, as well as presenting it comprehensibly to external observers.

A total of 13 principles, 24 criteria and 51 sub-criteria were defined (cf. also synoptic table, Chapter 3.4). The assessment framework has the hierarchical structure of a tree with branches which, starting from the level of sectors via principles and criteria to the sub-criteria, increasingly branches out downward. Within every sector, principles are concretised by way of a certain number of criteria, and these in turn through a certain number of sub-criteria (cf. also Fig. 1). Thus, the degree of sharpness of the contents and orientation toward taking action increases continuously from the top of the assessment pyramid toward the basis. The actual assessment is made on the lowest level, that of the sub-criteria. For the assessment of sustainability, a system of point scores has been proposed (cf. Chapter 4).

Levels of the Assessment Framework

- **Sectors of sustainable hunting:** There are various different angles from which to define sustainable hunting. The sectors for which the sustainability of hunting has been defined here are ecological (cf. Chapter 3.1), economic (cf. Chapter 3.2) and socio-cultural aspects (cf. Chapter 3.3). This corresponds also to the international standard of structuring sustainability. It ought to be borne in mind that the sectors are based on different approaches to and motives for practising sustainable hunting, which is why they may be mutually conflicting. One and the same action may thus have positive effects in terms of the ecological and negative effects in terms of the economic aspect. This, however, is reflected in the assessment and ought to be traceable on the basis of the assessment result. The analysis of the result thus allows an adequate interpretation of such controversial assessments.
- **Principles of sustainable hunting:** For each of these sectors, principles of sustainable hunting are determined. They describe overriding objectives which, as a whole, reflect an overall guiding image of sustainable hunting. Principles are found in the Framework under the 3-digit headlines. E.g.: Chapter 3.1.2, Principle, "*The hunting practice shall within its range ensure the preservation and improvement of the diversity of game species through protection and use.*" A total of 13 principles have been defined.
- **Criteria of sustainable hunting:** The principles are concretised by way of criteria. They describe key features of sustainable hunting in order to achieve a more detailed definition of the principles. Criteria are found in the Set under the 4-digit headlines. E.g.: Chapter 3.1.2.2, Criterion, "*Hunting is oriented according to the behaviour of wildlife species.*" A total of 24 criteria have been defined.

- **Sub-criteria of sustainable hunting:** The criteria are specified by way of sub-criteria. Sub-criteria are designed to concretise verifiable features of the criteria and be suitable for functioning as practical test statistics. They are found in the framework under the 5-digit headlines. In addition, they have been numbered consecutively. E.g.: Chapter 3.2.2.1, Sub-criterion 20, “*Giving consideration to the undisturbed life-cycle of wild animals.*” A total of 51 sub-criteria have been defined.
- **Indication and assessment of the sub-criteria:** The operational examination as to whether and in how far the sub-criteria are met in the practice of hunting as well as the respective assessment via a system of scores in points are made within the framework of an indication and assessment scheme determined for each sub-criterion. For this purpose, a minimum of two to a maximum of five assessment levels with allocated point scores for each level were given, with the maximum possible point score ranging from 4 to –4 points. The indication and assessment scheme make the sub-criteria quantifiable and give them the function of indicators, i.e. of substitute practical measurement or test statistics. These then reflect the deviation or concurrence of the current **status quo** with the potential **ideal status**.

In the following, Fig. 2 depicts the hierarchical structure of the assessment framework with a randomly chosen principle from the ecological sector.

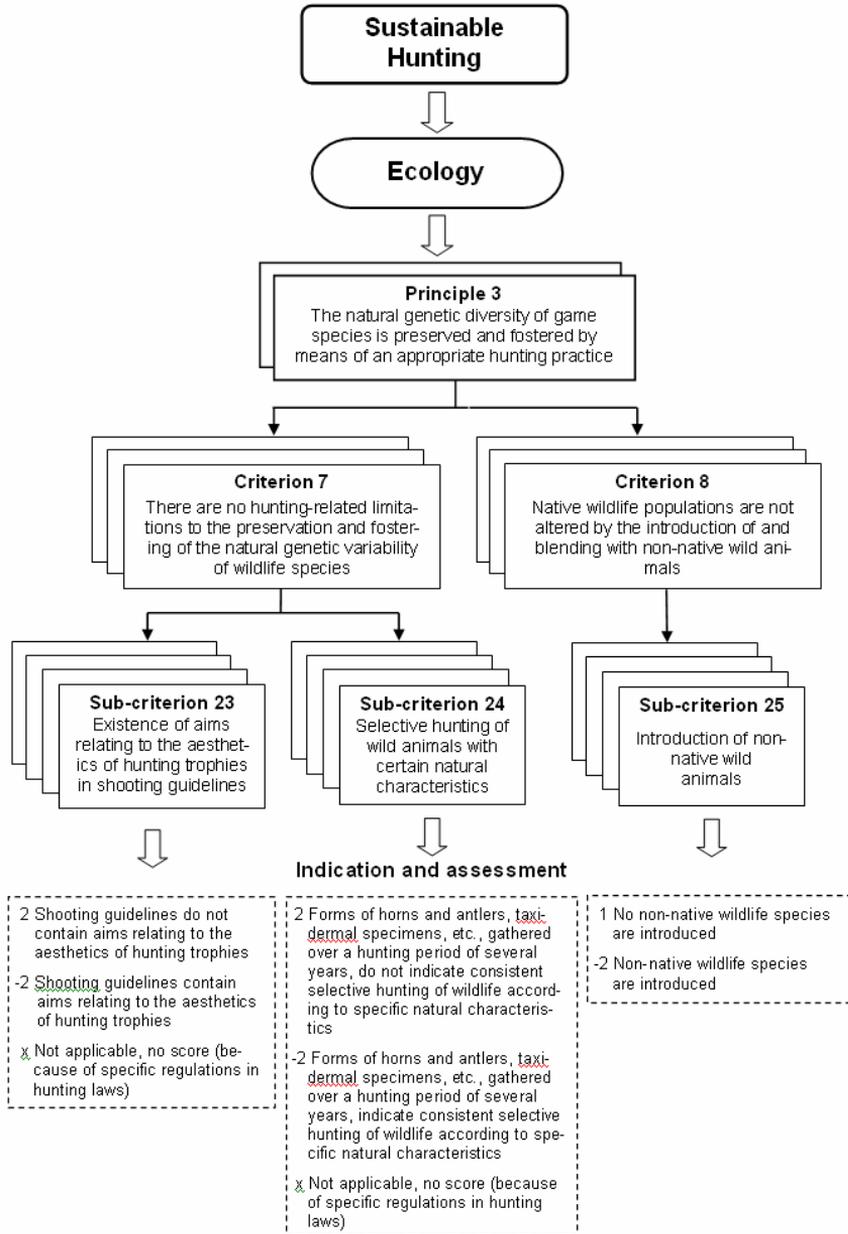


Fig. 2: Structure of the Assessment Framework (exemplary excerpt)

2.4 Definition of Terms

- The term **game** refers to those wild animal species (furred game and winged game) which are subject to hunting laws as amended, including species protected throughout the year. Unless indicated otherwise, the terms **game** and **wild animals** are used in the same sense.
- 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 to disappear or become extinct (regionally), are continuously decreasing, particularly rare, or have temporarily disappeared and are now returning, and are thus often as “protected species” under the special protection of nature conservation laws. The degree to which a species is threatened results, as a rule, from various factors that mostly interact to varying degrees, and which, when combined, influence the conservation status of a species. If these factors occur, they are to be interpreted as warning signals suggesting that the respective species may be threatened. These endangerment factors are first and foremost: low population size; continuously decreasing population development (continuously decreasing number of populations and/or individuals of a species); small or decreasing range (contraction of distribution area); high 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, targeted control, etc.) pressure by invasive, non-native species (cf. e.g. ZULKA et al., 2001; PRIMACK, 1998). In varying combinations and with differing emphasis, most of the factors mentioned form the basis of endangerment degrees of red lists of threatened species as well as of the 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 classified in scales, depending on the systematics of the various red lists. For most lists, these scales comprise the degrees “extinct or missing,” “threatened with extinction,” “highly threatened,” “threatened,” and the pre-warning level of “potentially threatened” (cf. 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 degrees of endangerment, the respective species is to be considered a threatened species in the sense of this study⁶. Equally, species protected in accordance with 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 to be considered threatened species.

⁶ http://www.umweltbundesamt.at/umweltschutz/naturschutz/artenschutz/oasis/oasis_abfrage gives access to an Internet databank compiled by the Environment Agency – Austria that allows queries as to the endangerment classification of individual species on different red lists. From 2006 onwards, information relevant in terms of hunting laws (shooting and closed seasons) on the basis of the hunting laws of the Austrian Federal Provinces will also be available there.

- The term **sensitive** refers to those wildlife animal species to which individual or several of the above endangerment factors apply, even if the respective species has not (yet) been red-listed as “threatened” or “potentially threatened.” In particular those wildlife species are to be considered sensitive which, on account of specific (population-)biological features such as high habitat demands (regarding 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, narrowing of area, strongly increasing predation and competitive pressure from other species, or rapid changes of environmental conditions. In a specific hunting-related sense, however, also autochthonous huntable game species are to be classified as sensitive whose sustainable usability in terms of hunting cannot be considered guaranteed in a certain area on account of their unfavourable conservation status or an unfavourable development of 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 hunting owner of a proprietor’s hunt or the tenant(s) of a proprietor’s or co-operative hunt. Apart from that, hunters by permission of land owner/game tenant and owners of stalking districts will be differentiated.
- The term **person** owning the right to hunt refers 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.
- **Hunting concept** 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 accord hunting with other land users, take into account the optimum time and area for hunting the relevant game, and give consideration to rare, not hunted species. A hunting concept may exist in thought or in writing; with regard to sustainable hunting practice, however, a written hunting concept is preferable.
- **Use:** 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 shooting certain animal species without the killed animals 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).

3 Principles, Criteria and Sub-criteria with Indication and Assessment (Score)

Please note: For a short synoptic table of the Assessment Framework readers are referred to Chapter 3.4.

3.1 Ecology

With regard to the sector of ecology, the principles, criteria and indications of sustainable hunting are directed towards the preservation and improvement of wildlife habitats, the diversity of wildlife species and the genetic diversity of wild animals. In terms of assessment, only the possibilities for the hunter to influence the situation are taken into account.

3.1.1 Principle: The preservation and improvement of wildlife habitats is an objective of hunting

Explanation: Hunting is understood comprehensively and does not refer exclusively to the shooting of game.

3.1.1.1 Criterion: Hunting and its interrelationship with other forms of land use

3.1.1.1.1 Sub-criterion 1: Existence of a shooting plan and shooting list

Explanation: The existence of a shooting plan and a shooting list (as part of the hunting concept) documents that influencing game populations by hunting is planned and (for the purpose of orientation regarding future planning) also documented. Owing to the fact that shooting plans are normally⁷ subject to permission of the authorities, it is to be assumed that the authorities also seek to prevent overhunting of individual game species as well as to harmonise hunting with other interests of land use. A hunting concept including a shooting list is, however, not only of advantage with regard to game species for which shooting plans and shooting lists are prescribed by the authorities but also with regard to other,

⁷ In most Austrian federal provinces

in particular threatened or sensitive (cf. definition of terms, Chapter 2.4) game species and for game species that need to be reduced (cf. Sub-criterion 3, Chapter 3.1.1.1.3). It is important that shooting lists be species-specific, i.e. inaccurate collective names (general classifications according to species groups, such as ducks, geese, weasels, polecats, etc.) are to be avoided.

Indication und Score:	
3	All shooting plans and shooting lists requested by the authorities exist, and respective concepts and shooting lists also exist for all other game species hunted.
2	All shooting plans and shooting lists requested by the authorities exist, and respective concepts and shooting lists also exist for another (some other) game species.
1	All shooting plants and shooting lists requested by the authorities exist.
-2	Shooting plans and/or shooting lists requested by the authorities are incomplete or deficient.

3.1.1.1.2. Sub-criterion 2: Structure of shooting plan and shooting list

Explanation: Breaking down the shooting plans by sex and age as well as by individual species, date, sex and age and, if applicable, the location of the shooting (and/or, in case of driven hunting, by territory) is of particular importance in order to be able to compare planned and actual shooting as well as to make evident the time and area of the shooting in particular with regard to other forms of land use.

Indication und Score:	
3	A subdivision of shooting plans and shooting lists by individual species, sex and age and, in addition, of shooting lists by date, is made for all game species hunted.
2	A subdivision of shooting plans and shooting lists by individual species, sex and age and of shooting lists also by date, is made for all game species for which shooting plans and lists are requested by the authorities and, in addition, for another (some other) game species.
0	A subdivision of shooting plans and shooting lists by individual species, sex and age and, in addition, for shooting lists by date, is made for all game species for which shooting plans and shooting lists are requested by the authorities.
-2	There is no or only a deficient subdivision of shooting plans and shooting lists by individual species, sex and age for game species for which shooting plans and shooting lists are requested by the authorities, and the subdivision of shooting lists by date is also deficient.

3.1.1.1.3. Sub-criterion 3: Meeting shooting requirements by the authorities for game species that need to be reduced

Explanation: The planning of shooting is potentially one of the most effective control instruments of game management. When done correctly, drawing up a shooting plan provides an opportunity to respond flexibly to changes in game population, as well as to results of forest observation systems by increasing or decreasing the number of shootings (cf. Sub-criterion 7, Chapter 3.1.1.2.2). Shooting plans are, so to speak, the link hunting establishes between the status of vegetation, the regulation of game populations, and aspects of nature protection and conservation. They serve both the preservation of game populations at levels usable for hunting in a sustainable way and the avoidance of game damage unacceptable in terms of regional culture. (cf. Sub-criterion 9, Chapter 3.1.1.2.4). In order for shooting plans to exercise this controlling function in practice, there is a need to draw up realistic shooting plans that are binding and can be complied with. The demand of a minimum or maximum number of shootings per game species and social class⁸ is very much in line with this practical requirement. Along with shooting plans requested by the authorities, this sub-criterion also refers to additional shooting demands by the authorities for game species with a reduction need (limited in terms of area and time), such as for wild boars (*Sus scrofa*), wild geese and great cormorants (*Phalacrocorax carbo*).

The subject of the assessment is the deviation of the target numbers and/or minimum or maximum numbers of shootings prescribed in the shooting plan and/or other shooting requirements made by the authorities for the respective game species from the actual number of shootings. If no minimum or maximum numbers of shootings are prescribed, slight deviations may be tolerated. This sub-criterion refers to game species which need reducing in numbers. The period of reference is the respective planning period of the planning of shooting.

Indication und Score:	
1	Shooting requirements made by the authorities were met with regard to all relevant game species within the period of reference.
-1	Shooting requirements made by the authorities were met for more than 50 % of the relevant game species within the period of reference.
-2	Shooting requirements made by the authorities were met for less than 50 % of the relevant game species within the period of reference.
-4	Shooting requirements made by the authorities were not met for any of the relevant game species within the period of reference.

⁸ For a number of game species, in particular ungulate game species, regulations on shooting seasons and shooting plans under Austrian hunting laws distinguish so called 'social classes', according to age class, sex, etc.

3.1.1.1.4. Sub-criterion 4: Existence of a strategy to harmonise hunting with other forms of land use

Explanation: Anthropogenic influences such as agriculture and forestry, tourism, road construction, housing, nature protection and conservation, etc., exert a lasting influence on wildlife habitats. In a study on criteria and indicators of sustainable hunting, however, the impact of these anthropogenic influences themselves cannot be verified. What can be done is to give consideration to the extent to which a hunting strategy takes into account anthropogenic influences in the wildlife habitat where hunting is practised. In this context, communication and mutual agreement between hunters and representatives of “other anthropogenic influences” are also to be evaluated. The harmonisation of hunting with other forms of land use through the existence of a specific strategy in the hunting concept is entered into the documentation. The legal designation of habitat protection areas, nature zones, etc. may be of advantage in this regard.

Indication und Score:

2	The hunting concept contains a strategy to harmonise hunting with other forms of land use.
0	The hunting concept does not contain a strategy to harmonise hunting with other forms of land use.

3.1.1.1.5. Sub-criterion 5: Giving consideration to seasonal bottleneck situations

Explanation: Bottleneck situations for wild animals are defined as shortages (mostly of food availability) over a limited period of time. These situations may be of anthropogenic origin (e.g. food shortage caused by full harvesting of agricultural lands in autumn, or limitations in food accessibility due to phases of intense recreational activities) or of natural origin (e.g. food shortage over the winter in high altitudes). Here, too, it is not the bottleneck situation itself that is to be evaluated, but the extent to which it is being taken into consideration by hunting (adjustment of shootings, habitat management activities). Such bottleneck situations are not considered in areas targeted, in the interest of regional culture or in the public interest, for intensified hunting of game species that cause damage.

Examples:

- Preventing the high autumn/winter mortality of brown hare (*Lepus europaeus*) in fully harvested agricultural lands bare of food and cover by way of early hunting in the autumn, as a result of which the remaining hare population remains in a better condition.
- Adjusting the stock of cloven-hoofed game in time in the relevant season to the low capacity of biotopes in winter, particularly of forests in hunting territories characterised by a mix of forest and agricultural land. If these annually returning capacity fluctuations, which vary among the individual hunting grounds, are captured by timely hunting before the capacity decreases, lasting damage to the permanent vegetation (forest, small woody plant communities, field edges, etc.) may be avoided and the remaining stock of game is able to survive the period of food shortage in a good condition.

Giving consideration to anthropogenic or natural bottleneck situations in terms of hunting ought to be reflected in an area and time-specific hunting strategy in the hunting concept. (The effects of this hunting strategy are evidenced later on by the winter condition of the remaining game stock and the state of the vegetation; whether it has actually been carried out can be checked by the shooting times given in the shooting lists).

Indication und Score:

2	Anthropogenic or natural bottleneck situations can be demonstrated to have been taken into account by way of an area and/or time-specific hunting strategy for the game species hunted.
-1	Anthropogenic or natural bottleneck situations are not taken into account in terms of hunting.
-2	Hunting aggravates anthropogenic or natural bottleneck situations.

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

Explanation: This criterion and the subsequent sub-criteria are meant to allow an assessment of negative game influence on forests (and other forms of vegetation), while they do not question forests as a wildlife habitat. Furthermore, in assessing negative game influence on vegetation, it is indispensable to look beyond the limits of individual hunting grounds, even if the hunting ground does not contain a forest with protective function, as wildlife is unaware of limits and borders. Hunting in one's own area, for example, may thus significantly influence the vegetation of the neighbouring hunting ground. For the assessment of this criterion, the forest authorities ought to be consulted.

3.1.1.2.1 Sub-criterion 6: Existence of control fences to monitor browsing

Explanation: A proven method to take into account game influence on vegetation in terms of hunting is to install browsing control fences (fenced-in browsing control plots). They allow comparison of a small, fenced-in plot of vegetation, entirely free of browsing, with the surrounding vegetation areas that are not fenced in. 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 boundary balks). It is important to note that the vegetation growing without any game influence within the fence is not to be regarded as the natural state, but is taken simply as a comparative area to determine game influence. 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 the agricultural area provide good data on the current vegetation of many Austrian areas as well as – at least with regard to forest vegetation – on the potential natural vegetation, which allows a comparison of the status quo with a target status.

The existence of certain indicator plants in the soil vegetation gives reliable clues as to the state of the biotope. An indication of a balanced relationship between game stock (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 oversized game populations. A list of relevant indicator plants can be drawn up specifically for the respective wildlife habitat. A shaping of the hunting strategy according to the potential natural plant societies ought to be a part of the hunting concept.

Indication und Score:	
3	Control fences to monitor browsing damage to vegetation exist above a density of one fence per 100 hectares of forest.
2	Control fences to monitor browsing damage to vegetation exist above a density of 0.5 fences per 100 hectares of forest (this equals more than one fence per 200 hectares).
1	Control fences to monitor browsing damage to vegetation exist at a density of up to 0.5 fences per 100 hectares of forest (this equals up to one fence per 200 hectares).
0	There are no control fences to monitor browsing damage to vegetation.
x	Not applicable, no score (e.g. The unit to be assessed does not contain forest areas.)

3.1.1.2.2. Sub-criterion 7: Giving consideration to the results of objective forest monitoring systems

Explanation: Forest monitoring systems such as tracts (control strips), spot checks, control fences, expert examinations of areas, stand surveys (full surveys) provide – regardless of whether they are carried out by an authority or a forestry operation – important guidance for the hunter, helping him or her to determine the influence of cloven-hoofed game on vegetation at muzzle height. Indirectly, these monitoring systems may also be consulted to verify the influence of hunting on cloven-hoofed game and vegetation and for clues as to how to optimise hunting.

Existing forest monitoring systems should thus always become a part of hunting management plans. This sub-criterion is also applicable if no such systems have been established in the immediate area of one's hunting ground, because from the results of monitoring systems at the levels of hunting/forestry operations or regional level, conclusions can be drawn as to the situation of game impact within one's own hunting ground.

Indication und Score:

2	Existing forest monitoring systems are consulted for planning and optimising hunting.
-2	Existing forest monitoring systems are not consulted for planning and optimising hunting.
x	Not applicable, no score (There are no forest monitoring systems.)

3.1.1.2.3. Sub-criterion 8: Giving consideration to the protective function of the forest

Explanation: In the field of ecology, it is the protective function among the functions of forests (protection, well-being and recreation) that is to be considered in terms of hunting. Apart from the protective function for the respective site (“site protection forests”⁹), this applies particularly to the protective function for humans and objects of the built environment. According to the AUSTRIAN FOREST ACT of 1975 as amended in 2002 (Federal Legal Gazette No. I 59/2002), “forests providing protection for humans and technological objects” are forests that protect humans, human settlements or installations or cultivated land in particular against elementary hazards or harmful environmental influence, and whose preservation requires specific treatment (§ 27 of the quoted legislation). In terms of hunting, this demands that the self-preservation and self-regeneration capacities of object-protecting forests must not be impaired by hunting-related activities. Impairments to the protective function of forests are, for example, (regionally) too high game population densities that cause ecologically detrimental alterations of the vegetation composition (species inventory, structure, texture). To identify forests whose major function is that of protecting objects, in Austria, for example, the following documents provide a basis: the Forest Development Plan (functional areas with protection as the priority function), the “areas with protective function” as defined under the Torrent and Avalanche Control as well as the Provincial Protection Forest Concepts. The competent Forest Authority may also provide support. Giving consideration to the protective function of forests ought to be included in the hunting concept. This sub-criterion is in principle also applicable if one’s own hunting territory does not include (object-)protecting forests, while, however, they do exist on neighbouring hunting grounds in the region (cf. explanations on criterion 3.1.1.2).

Indication und Score:

2	There is a hunting strategy to prevent impairment of the protective function of forest habitats on account of game damage.
-2	There is no hunting strategy to prevent impairment of the protective function of forest habitats on account of game damage.
x	Not applicable, no score (There is no protection forest within or near the area of the assessment unit.)

⁹ According to the AUSTRIAN FOREST ACT of 1975 as amended in 2002, these are forests protecting the respective forest site against erosion by the forces of wind, water, and gravity.

3.1.1.2.4. Sub-criterion 9: Preventing game damage unacceptable in terms of regional culture

Explanation: Regional culture is here defined as comprising the protection of nature in general and thus also the protection of native animal species; it also comprises, however, the guarantee of practising hunting and fishing, agriculture, Alpine farming and forestry, as well as the guarantee of the right of use of agricultural and forestry lands. We speak of game influence unacceptable in terms of regional culture in particular if important functions of the forest (protection, well-being, recreation, use) are jeopardised. As a rule, damage to the forest ecosystem has a negative impact on these functions, which is particularly serious if the protective function is affected. Damage to meadows and grasslands such as wild boars may cause by large-scale rooting in ecologically valuable meadows may also be relevant in terms of regional culture.

Game influence unacceptable in terms of regional culture is to be understood in this context primarily in terms of ecologically unacceptable (harmful) influence of game on vegetation. The influence of game on vegetation comprises food intake (grazing, browsing, bark peeling) as well as fraying of velvet and fraying and beating of antlers. The aspect of regional culture goes further than managerial economic considerations. The concept of “regional culture” refers in particular to the functions of forests beyond that of timber production (protection, well-being, recreation, biodiversity) from an overall societal perspective, but also to the function of providing habitats as well as the ecological value of other vegetation (orchid meadows rich in diversity, for example). This is the fundamental view represented by the competent authorities on the basis of the respective (Austrian) legislation.

The lack of some significant 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, seen from a larger perspective, mostly not near-natural environments. This allows local densities and distribution patterns of wild animals that provoke game influence on vegetation beyond the tolerable limits. Hunting, depending on where and when as well as how intensely it is practiced, has an impact on the extent of regionally relevant game influence and may also cause such influence itself.

The extent of game influence unacceptable in terms of regional culture can mainly be ascertained via objectively detectable game damage (monitoring system, notified game damage, etc.) as well as via control fences (cf. also Sub-criterion 6, Chapter 3.1.1.2.1) ermittelbar.

Indication und Score:

1	There is objectively no self-induced game impact due to hunting that is unacceptable in terms of regional culture.
-1	There is objectively a minor extent of self-induced game impact due to hunting (on up to 10 % of the forest area) that is unacceptable in terms of regional culture.
-3	There is objectively significant self-induced game impact due to hunting (on more than 10 % up to 30 % of the forest area) that is unacceptable in terms of regional culture.
-4	There is objectively massive impairment of the ecosystem on account of self-induced game impact due to hunting (on more than 30 % of the forest area) that is unacceptable in terms of regional culture.

3.1.1.2.5. Sub-criterion 10: Giving consideration to population fluctuations

Explanation: Under natural conditions largely free of anthropogenic influence, wildlife populations are subject to a certain amount of fluctuation attributable to climatic influence (losses during winter), food supply, and the presence of enemies. Constant population densities, in turn, are unnatural. This does not relate to population fluctuations attributable to anthropogenically induced habitat deficits. Population fluctuations in huntable game species can be traced back by reference to the annual game bag as well as, to a certain extent, by browsing damage to vegetation. Bearing in mind the game's strong influence on the ground vegetation, it makes sense, in particular for commonly occurring cloven-hoofed game, to make the extent to which hunting "accepts" and takes into account population fluctuations an indication of sustainable hunting.

A naturally-induced population decrease of the hunted game populations (e.g. on account of weather influence) is tantamount to a decrease of browsing of the preferred grazing plants. Under near-natural conditions (completeness of wildlife species inventory even for large predators), the reduced wildlife population is not "spared" by its natural enemies immediately after the population decrease, as it is frequently the case in traditional hunting, but further reduced or kept low until the reduced populations of preyed-upon animals have had an effect on the reproduction rate and presence of natural enemies. Thus, in most cases, the period of time during which the vegetation experiences relief from ecological game damage lasts significantly longer than if man quickly reacts to a population decrease by reducing shooting.

For the vegetation however, a longer opportunity for recreation (browsing break) results, for example, in an increase in trees and shrubs whose leading shoots are able to grow out of the browsing area, and thus in an increase of grazing vegetation, cover, and protection against weather conditions for the recovering game population. Improved natural grazing conditions may, as a consequence, allow higher shooting rates.

A fast and too strong reduction of shooting immediately after a transient, naturally-induced population decrease in frequent game species, however, results in disadvantages to the ecosystem (including the hunted game). Counter-balancing population fluctuations, in particular of cloven-hoofed game species, to a major extent is thus not in line with ecological sustainability.

Indication und Score:

2	Stronger natural downward population fluctuations over several years in common cloven-hoofed game species are admitted and/or made possible.
-2	Stronger natural downward population fluctuations over several years in common cloven-hoofed game species are prevented by hunting.

3.1.1.3 Criterion: Preservation and fostering of linking biotopes

3.1.1.3.1. Sub-criterion 11: Giving consideration to existing wildlife habitat fragmentation

Explanation: The fragmentation (dissection) of wildlife habitats through roads, railway lines, settlements and industrial zones as well as tourist establishments has a central influence on habitat quality. It may only be mitigated by hunting to some extent, by exerting as little hunting pressure as possible on important wildlife corridors, migration routes and obligatory passages¹⁰ between habitats and parts of habitats, or by making them more attractive. However, if this is practised consistently, it will make a significant contribution to a sustainable use of wildlife habitats. Existing wildlife habitat fragmentation may, however, also be aggravated by hunting-related measures, e.g. on account of increased hunting pressure in sensitive areas, fences built in order to prevent game from drifting to a neighbouring hunting ground, or large-scale enclosures on unfavourable sites. Owing to the fact that the effects of habitat dissection mostly transcend the local level as a result of the wide-ranging behaviour of many game species, the application of this sub-criterion may also make sense in hunting areas without infrastructural fragmentation.

¹⁰ Obligatory passage: Passages that game is forced to take as a result of specific conditions of the terrain (forest corridors, scarps, gorges, watercourses, etc.) or artificial obstacles (fences, high-capacity roads, walls, settlements, etc.); in other words, terrain-induced bottleneck situations.

Indication und Score:	
2	Hunting takes into account wildlife habitat fragmentation as far as possible.
1	Hunting takes into account wildlife habitat fragmentation, although there is room for improvement.
0	Hunting does not take into account wildlife habitat fragmentation.
-1	Parts of habitats particularly sensitive on account of fragmentation are preferred hunting areas.
-3	Hunting-related measures aggravate wildlife habitat fragmentation.
x	Not applicable, no score (There is no wildlife habitat fragmentation relevant in terms of the assessment unit.)

3.1.1.3.2. Sub-criterion 12: Registration and mapping of important migration routes, wildlife corridors and obligatory wildlife passages

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 of preserving or reinstalling the interlinking of 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” (passages across railways, motorways, etc.) and technical game passages in time. It is mainly the choice of location as well as the right dimension that are decisive as to whether such technical game passages are effective and accepted by the game. Reliable information on the course of significant long-range passages or historical passages as well as their use by the individual game species remain an indispensable basis of planning. Equally, qualified knowledge on migration routes, corridors and obligatory passages is a prerequisite for these passages 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 obligatory game passages. Even if no corridors and/or obligatory passages 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 obligatory passages 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 of neighbouring hunting grounds to this effect is absolutely necessary in order to be able to assess this sub-criterion.

Indication und Score:

2	Hunters actively contribute to registering important migration routes, wildlife corridors and obligatory passages; if they exist, they are mapped as part of the hunting concept, and this information is made available to other land users.
0	Hunters do not actively contribute to registering important migration routes, wildlife corridors and obligatory passages.

3.1.1.3.3. Sub-criterion 13: Increasing the attractiveness of important migration routes, corridors and obligatory passages

Explanation: There is a wide range of possibilities of making important migration routes, corridors and obligatory passages more attractive (in agreement with the land owners):

- On open terrain, routes of movement, corridors and obligatory passages 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, fallow lands) providing cover and grazing opportunities which can be resorted to also during the day. If wide open stretches are being crossed, their attractiveness may be increased by planting strips of woody communities (providing interim cover).
- Such measures of biotope management can also increase the usability and acceptance of technical game passages and “green bridges.” It is absolutely necessary that hunting be prohibited within a minimum radius of approximately 200 m around technical game passages.
- Greater attractiveness can also be achieved by planting strips of grazing land on agricultural land, and installing watering places (wallows) and salt licks.
- It makes sense in terms of hunting territory management to make use of agri-environmental programmes, such as the instruments described under the Austrian Agri-Environmental Programme (ÖPUL), as well as to co-operate with organisations for nature protection and conservation.

Indication und Score:

2	Numerous opportunities of making important migration routes, corridors and obligatory passages more attractive have been realised.
1	Some opportunities of making important migration routes, corridors and obligatory passages more attractive have been realised, although there is room for improvement.
-1	No opportunities of making important migration routes, corridors and obligatory passages more attractive have been realised.
-2	Fragmentation increases on account of hunting.
x	Not applicable, no score (There are no important migration routes, corridors and obligatory passages within the unit of assessment.)

3.1.1.4 Criterion: Giving consideration to habitat 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 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 significant. 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.”

3.1.1.4.1. Sub-criterion 14: Active preservation and management of the wildlife habitat

Explanation: Mainly for anthropogenic reasons, the suitability of our wildlife habitats for native wildlife species is limited to some extent. Seasonal partial habitats that a few years ago used to be freely accessible for our wildlife are now inaccessible, difficult to access or only relicts exist. Many of these limitations of habitat quantity and quality may be remedied or even fully removed by way of biotope care and management measures. 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, extensive 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 (cf. Definition of Terms, Chapter 2.4). 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 significant or otherwise attractive to hunters. These measures ought to be directed in particular to covering habitat requirements of threatened, sensitive or less hunted autochthonous game species. Management measures for economically significant species must not have a negative impact on threatened species such as may be caused, e.g., by baiting or feeding. Regional lists of currently existing 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 und Score:	
4	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 mainly to the habitat needs of <i>threatened</i> autochthonous wild animals.
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 mainly to the habitat needs of autochthonous wildlife species.
-2	No measures to improve and preserve wildlife habitats are taken; the wildlife habitat reflects considerable ecological deficits.
-4	The habitat needs of wild animals are substantially impaired by counterproductive hunting-related measures (e.g. excessive fostering or false control of individual species).

3.1.1.4.2. Sub-criterion 15: Giving consideration to increased competitive pressure upon threatened and sensitive animal species by strongly increasing game populations

Explanation: Some natural regulatory mechanisms for our wildlife, such as (some) large predators, but also diseases (e.g. rabies), no longer exist or presently have no regulatory effect on game populations. Without regulating the game populations via hunting, overpopulation would occur in most hunting areas of our cultural landscape, in particular of cloven-hoofed game, but also of fox and stone marten. These would then exert unnaturally high pressure upon their prey animals and/or grazing plants. This may lastingly change the diversity, frequency and distribution of both flora and fauna species on account of excessive use. A mode of hunting specific to the hunting territory, oriented according to the vegetation composition and diversity of wildlife species, which also takes into account varying seasonal habitat capacities, can largely avoid such negative impacts. Such regulation of regionally frequent, non-endangered wildlife species is particularly significant if the strong increase in their populations threatens the preservation of populations of endangered and sensitive native animal species (cf. Chapter 2.4). Taking into consideration habitat capacity in the hunting strategy (“hunting concept”) is an indicator of sustainable hunting practice.

A habitat-related example for the above are “Hochraine” (low field or meadow boundary walls, about 0.5 to 1 m in width, formed of gathered stones piled up over centuries and partly overgrown with vegetation) for lowland black grouse (*Tetrao tetrix*) populations. The permanent vegetation growing there is an important source of food for black grouse throughout the year. If this vegetation is subject to over-browsing on account of an excessive roe deer density (in some cases only seasonally), the one and two-year-old shoots of low bushes, important for fructification, are largely or entirely missing. In spring, the flowers significant for the reproduction rate of black grouse do not appear, nor do berries, which constitute

the main source of food in the summer. The protection against weather influence which low bushes offer the black grouse chicks is thus also significantly reduced. In many cases, over-browsing of this kind could be avoided by shooting cloven-hoofed game much earlier in the year.

Indication und Score:

2	Regionally frequent non-threatened game species with strongly increasing populations that directly or indirectly (habitat changes) threaten the continued existence of populations of threatened and sensitive autochthonous animal species are selectively regulated in favour of the threatened species (as proved by adequate hunting strategies in the hunting concept).
0	Regionally frequent non-threatened game species with strongly increasing populations that directly or indirectly (habitat changes) threaten the continued existence of threatened and sensitive autochthonous animal species are <i>not</i> selectively regulated in favour of the threatened species (<i>no</i> adequate hunting strategy in the hunting concept).
-2	The hunting strategy applied to regionally frequent not threatened game species with strongly increasing populations is counterproductive with regard to the preservation of threatened and sensitive animal species.

3.1.1.4.3. Sub-criterion 16: Annual growth rate in cloven-hoofed game

Explanation: This sub-criterion refers to ruminants. The term “growth rate” refers to the annual number of young animals per female animal. The annual growth rate is mainly determined by the quality of the habitat and the extent of interference through hunting. Whether or not the game density corresponds to the habitat can be determined, e.g. with regard to cloven-hoofed game, by game weights, browsing intensity, and the vegetation species inventory. These factors have both a direct and an indirect influence on the wildlife species inventory.

The density of the wildlife stock and the skimming off of its increase through hunting exert a significant influence – varying according to the game species – on the population’s growth rate. As a rule, we can assume that in case of high (in relation to habitat capacity) population densities of huntable ruminants, e.g. as a consequence of insufficient hunting take, the average rate of increase will decrease, while it will increase in case of intensive reduction. The extent of the usable increases per year can thus – provided the preservation of habitat quality is taken into account – give valuable clues as to the use of these increases for the purpose of hunting. If there is above-average food supply before the rutting season (period of heat), such as for example in mainly agriculturally dominated cultural landscapes or as a result of intensive feeding, the annual growth rate determined is no longer an indicator regarding the actual use of the increases for hunting purposes. In most cases, the average annual growth rate can be estimated with a satisfactory degree of accuracy.

An example to illustrate the above: In a roe deer (*Capreolus capreolus*) hunting territory with normal grazing conditions throughout the year, where food supply before pairing time is not above average, a roe deer stock adjusted to high habitat quality in terms of its population density, has a tendency to produce two fawns per adult doe every year. However, if the same hunting ground has an excessive roe deer population – taking biotope capacity as a measure – the tendency is more and more towards one fawn per adult doe, and two-year-old does not in fawn are more common.

Indication und Score:

1	Average growth rate on account of hunting
-1	Below-average growth rate on account of hunting

3.1.2 Principle: The practice of hunting shall within its range ensure the preservation and improvement of the diversity of game species through protection and use

Explanation: By game we understand those wildlife species that, in accordance with hunting laws, are subject to hunting. The study does not give specific consideration to other wildlife species (e.g. small mammals, insects, song-birds, amphibians, reptiles, fish) as well as micro-organisms that may interact with game.

3.1.2.1 Criterion: Potential natural wildlife species inventory taking into account the current habitat situation (only for larger territorial units, e.g. a wildlife-ecologically homogeneous area)

Explanation: “Potential natural wildlife species inventory” is to be understood as a spectrum of wildlife species representing the currently achievable optimum circumstances in terms of biodiversity and near-natural conditions (cf. also Sub-criterion 17, Chapter 3.1.2.1.1), 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 ecologically optimised range of wildlife species possible under the current habitat conditions and acceptable in terms of regional culture, which pertain to the native spectrum of species (autochthonous, typical for the region) of the geographic region concerned. “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 intervention¹¹;
- returning species that used to be native in a certain area whose populations temporarily ceased to exist and which now, without human intervention, are returning to their original ranges (remigration of species, e.g. elk / moose (*Alces alces*), brown bear (*Ursus arctos*), wolf (*Canis lupus*), otter (*Lutra lutra*)), or

¹¹ So-called primary native or indigenous species

which are re-introduced into their original habitats through direct human support (re-introduction, e.g. Alpine ibex (*Capra ibex*) and Alpine marmot (*Marmota marmota*) within their original ranges of distribution);

- originally 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 upon direct or indirect human influence¹² (cf. Sub-criterion 19, Chapter 3.1.2.1.3). 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 (LEBERSORGER & ZEILER, 2005). 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 in Austria in terms of hunting and thus need not to be considered for the purpose of this study. Pheasant (common pheasant, *Phasianus colchicus*) is dealt with specifically within this study (cf. Sub-criterion 19, Chapter 3.1.2.1.3).

By "wildlife species" we refer to those wildlife species that are or were "huntable" or, as "game," in other ways subject to hunting (e.g. to regulations under hunting laws, hunting practice).

3.1.2.1.1. Sub-criterion 17: Current and potential natural wildlife species list

Explanation: The existence of a list of current or potential natural wildlife species available to the party responsible for wildlife management is an indication that the completeness of the potential natural wildlife species inventory represents a guideline for hunting and is aspired to and/or maintained.

In order to be able to compare the existing wildlife species inventory with the inventory of potential natural wildlife species, it is necessary to draw up a regional list of the potential natural wildlife inventory. Bearing in mind the anthropogenic influence upon the cultural landscape (agriculture, forestry, settlements and housing, transport rail/road, tourism, etc), the current inhabitability of the meanwhile altered cultural landscape for the wildlife species originally present can be evaluated and thus a potential natural list of wildlife species prepared (cf. also Criterion 3.1.2.1). Wildlife-ecological spatial planning binding in terms of regional culture (cf. Sub-criterion 35, Chapter 3.2.4.2.1) may also provide an important basis for drawing up a list of potential natural wildlife species. Drawing up such a list is only envisaged and only makes sense for larger and fairly homogeneous territories in terms of the type of cultural landscape. Comparing the current with the potential natural wildlife species list allows conclusions as to the completeness of the potential natural species inventory achievable through hunting (in accordance with the given economic and socio-cultural environment), as well as an assessment of the impact of hunting on the species inventory.

¹² "New residents" among animals are also termed "neozoes."

Updating wildlife species lists requires regular monitoring, in particular of sensitive and returning wildlife species. Hunters are able to make an important contribution to this effect by way of systematic observing and record-keeping combined with their knowledge of local natural habitats.

Indication und Score:	
2	There is a current and a potential natural wildlife species list as well as systematic monitoring for the purpose of updating the lists.
1	There is a current and a potential natural wildlife species list but no systematic monitoring.
0	There is no current and no potential natural wildlife species list, although the hunter proves that he or she aims at drawing up such lists.
-1	There are no current and potential natural wildlife species lists, nor does the hunter aim at drawing up such lists

3.1.2.1.2. Sub-criterion 18: Dealing with returning species (in accordance with the potential natural wildlife species inventory)

Explanation: The term “returning species” refers to wildlife species native to a certain area whose populations temporarily ceased to exist and which, with or without human influence, are returning to inhabit their original habitats, whether by re-immigration (e.g. elk / moose (*Alces alces*), brown bear (*Ursus arctos*), wolf (*Canis lupus*), otter (*Lutra lutra*)), or by selective re-introduction (e.g. Alpine ibex (*Capra ibex*) and Alpine marmot (*Marmota marmota*) within their original ranges). The existence of certain wildlife species within a habitat gives clues as to anthropogenic impacts on the wildlife habitat, including hunting. Particularly threatened and sensitive wildlife species such as wood grouse (*Tetrao urogallus*), black grouse (*Tetrao tetrix*), grey partridge (*Perdix perdix*), lynx (*Lynx lynx*), brown bear (*Ursus arctos*), as well as certain birds of prey and owls, which are good bio-indicators of the wildlife ecological habitat quality and hunting impacts on it, ought to be mentioned in this context. It is for assessment not only whether these species are not impaired by hunting, but also whether predators whose populations have grown unnaturally large owing to the lack of natural enemies and/or epidemic control (e.g. that of fox as a consequence of anti-rabies vaccination), are hunted efficiently in favour of indicator species (red-listed species, a.o.). It is to be borne in mind in this context that “benefit” in the sense of optimising the potential wildlife species inventory may also be generated by certain returning native wildlife species’ displacing other less desired species. The extinction of the (non-autochthonous) musk rat (*Ondatra zibethica*) as a result of the renewed spreading of otter (*Lutra lutra*) serves as an example in this context.

Fostering a potential natural wildlife species through hunting ought to aim at creating conditions for populations with long-term viability of the respective species, in harmony with regional culture, without impairing the viability of other native species nor their long-term sustainable usability for hunting. Not only the existence of a species is of significance, but also the balance of frequencies among

species, which is to be measured in terms of their number of individuals (population size and abundance) as well as the time horizon of their presence (broken down by resident game, game passing through, and seasonally represented game species).

Indication und Score:	
2	All returning wildlife species (herbivores, carnivores, etc.) corresponding to the potential natural wildlife species inventory are fostered in order to allow viable populations.
1	All returning wildlife species (herbivores, carnivores, etc.) corresponding to the potential natural wildlife species inventory are tolerated, and sensitive species are fostered, in order to allow viable populations.
0	All returning wildlife species (herbivores, carnivores, etc.) corresponding to the potential natural wildlife species inventory are tolerated.
-2	Returning wildlife species (herbivores, carnivores, etc.) corresponding to the potential natural wildlife species inventory are not tolerated.
x	Not applicable, no score (Current and potential natural wildlife inventory is not fully known.)

3.1.2.1.3. Sub-criterion 19: Dealing with wildlife species not contained in the potential natural wildlife species inventory

Explanation: For various reasons, non-indigenous species (non-autochthonous species, alien to the region or fauna) may appear in habitats: by way of selective introduction, unintentional introduction, directly or indirectly (e.g. habitat change) anthropogenically induced immigration, escape from enclosures, preserves, or fur farms, etc. As compositions of species have, for natural or anthropogenic reasons, always been subject to change, a more exact definition is called for, as well as setting a time limit starting from which a newly appearing species may be defined as “non-indigenous” in the sense of the potential natural wildlife species inventory. “Neobiota in Österreich” (ESSL & RABITSCH, 2002), a study published by the Austrian Environment Agency, brings up to date the scientific debate regarding the situation in Europe: Non-indigenous species (“new residents,” “newcomers”) or neobiota are defined as species that have arrived in Austria later than 1492 upon direct or indirect human influence. 1492 marks the discovery of the American Continent by Christopher Columbus and thus stands for more intense foreign trade relations, resulting in a strong increase in the number of intentionally or unintentionally introduced species. This point of reference is also approximately the time of relatively reliable documentation of faunal changes. As nature itself is unaware of threshold values, drawing such a line is, of course, a matter of scientific agreement. The same definition also forms the basis of the Austrian Action Plan on Invasive Alien Species (FEDERAL MINISTRY OF AGRICULTURE, FORESTRY, ENVIRONMENT AND WATER MANAGEMENT, 2004). Those animal species that have become established under anthropogenic influence in pre- and early history

up to the end of the Middle Ages (1492) are not relevant in Austria in terms of hunting and thus need not to be considered for the purpose of this study.

For reasons of lack of adaptation, higher competitive potential, lack of natural enemies and introduction of diseases, non-autochthonous species often crowd out autochthonous species and, at the same time, have a lasting impact on the wildlife habitat, difficult to project at an earlier stage. Tolerating these species in terms of hunting or selectively fostering them is thus not in the interest of a potential natural flora and fauna species inventory which aspires to be as complete as possible. Documents of the treatment of non-autochthonous species are, for example, trophies (fur / racoon (*Procyon lotor*), horns / moufflon (*Ovis ammon musimon*), etc.) or, for that matter, measures of biotope management (e.g. feeding of moufflons). Some wildlife species were, more or less individually, introduced earlier than the above defined period, but, according to current knowledge, had not become established in the wild.¹³ Thus, for example, the common pheasant (*Phasianus colchicus*), whose origins are in Asia, became naturalised in Southern Europe as early as in Roman times, and was introduced in some Central and Western European regions as hunting game around 1000 a. D. (DVORAK et al., 1993). First references to its existence in Austria date back to the 15th and 16th centuries. It is assumed, however, that these were pheasantry specimens rather than free-living birds (GLUTZ v. BLOTZHEIM & BAUER, 1973). It was not until much later that the species became established in Austria as a consequence of strong fostering through hunting (management and care, regular new releases). Today, pheasants have free-breeding populations able to maintain themselves at least over intermediate periods of time in climatically favored low regions without external management (SCHUSTER 2005). According to the above definition, the common pheasant is to be classified as a non-indigenous “new resident” in Austria (LEBERSORGER & ZEILER, 2005). When this sub-criterion is applied, the way the pheasant is dealt with in terms of hunting ought to be evaluated in a differentiated and area-specific manner. In those Austrian wildlife habitats where its populations are able to survive on their own, the pheasant may be evaluated similarly to a potential natural wildlife species. In the sense of the present Criterion, in practice, attention should be given to abstaining from fostering pheasant through the practice of hunting in sensitive areas where undesired competition vis-à-vis threatened native species (e.g. vis-à-vis partridge (*Perdix perdix*) or, in some locations, black grouse (*Tetrao tetrix*) may occur. If wildlife-ecological expert opinions, etc., prove that such a situation of undesired competition with native species exists, pheasant ought not to be tolerated in the relevant areas. Where pheasant populations are not able to maintain themselves without measures of care and management or stocking, this species cannot be classified as potentially natural. Supplementing or increasing the stocks of pheasants for reasons of huntings and/or breeding and releasing pheasants for the purpose of more or less immediate shooting in hunting areas would have to be evaluated according to Sub-criterion 25 (cf. Chapter 3.1.3.2.1) and/or Principle 3.3.5. This is also true for any other wildlife species of similar status. The introduction of non-autochthonous sub-species or habitat-specific sub-species (site races) of an autochthonous wildlife species (e.g. Siberian roe deer or North-Caucasian roe deer; transfer of lowland red deer *Cervus elaphus* ssp. "Auhirsch"

¹³ In order for a species to be classified as established there has to be proof of at least three generations reproducing freely over a minimum period of 25 years.

to mountain regions) is to be evaluated according to Sub-criterion 25 (cf. Chapter 3.1.3.2.1). The way non-autochthonous wildlife species are to be dealt with is defined in the hunting concept and documented by written records of the measures taken.

Indication und Score:	
2	Only wildlife species contained in the potential natural wildlife species inventory are represented.
1	(A) wildlife species not contained in the potential natural wildlife species inventory (is) are represented, despite hunting-related counter-measures.
0	(A) wildlife species not contained in the potential natural wildlife species inventory (is) are represented and (is) are tolerated in terms of hunting, although not selectively fostered.
-1	(A) wildlife species not contained in the potential natural wildlife species inventory is (are) represented and is (are) tolerated in terms of hunting, although not selectively fostered, despite proven negative impacts on one or several native wildlife species.
-2	(A) wildlife species not contained in the potential natural wildlife species inventory (is) are represented and selectively fostered in terms of hunting.
x	Not applicable, no score (Current and potential natural wildlife species inventory is not fully known.)

3.1.2.2 Criterion: Hunting is oriented according to the behaviour of wild animals

3.1.2.2.1. Sub-criterion 20: Giving consideration to the undisturbed life cycle of wild animals

Explanation: Hunting is rarely regarded as a factor of disturbance, in particular by the hunter him- or herself. Hunting pressure, however, often has a strong impact on wildlife behaviour and thus indirectly upon its habitats. In cloven-hoofed game, for example, strong hunting pressure causes, among other factors, a reduced possibility of using open grazing areas (which in most cases are the best ones), which results in increased browsing damage of the forest vegetation providing cover. The selective fostering of an undisturbed life cycle for wildlife through hunting should be documented in the hunting concept. In small-game areas (hare, pheasant, etc.), such considerations might take effect e.g. by limiting hunting activities to a few days per hunting year.

Indication und Score:	
2	The undisturbed life cycle of wild animals is fostered on more than 90 % of the area by exerting as little hunting pressure as possible (e.g. interval hunting, short hunting periods).
1	The undisturbed life cycle of wild animals is guaranteed on a majority (> 50 %) of the area on account of low hunting pressure.
0	The undisturbed life cycle of wild animals is guaranteed only on parts (< 50 %) of the area on account of hunting pressure.
-2	The undisturbed life cycle of wild animals is not guaranteed on a majority (> 75 %) of the area on account of extremely high hunting pressure.

3.1.2.2.2. Sub-criterion 21: Giving consideration to the reproductive biology of threatened and sensitive game species

Explanation: The wrong moment for hunting an individual game species or certain individuals of one species may have an enormous impact on the reproduction of one game species (e.g. in the case of capercaillie (wood grouse, *Tetrao urogallus*): hunting of the alpha-cock before the hens' covering time.) If hunting takes into account sensitive stages of the reproductive periods of certain threatened and sensitive wildlife species, this is to be evaluated as a sustainable approach to hunting. The emphasis is here on threatened and sensitive game species as found in the game species inventory or on a separate list.

This does not refer to the pairing time of roe deer (*Capreolus capreolus*), red deer (*Cervus elaphus*), and chamois (*Rupicapra rupicapra*), though it does refer to the time of raising their young. Also to be taken into account is that the hunting of one species should not have a considerable impact on the reproductive periods of other species. Giving specific regard in terms of hunting to the sensitive factors of the reproductive biology of game species is documented in the hunting concept.

Indication und Score:	
2	Hunting takes into account the critical factors of the reproductive biology of sensitive game species by way of spatial and/or time planning.
1	Hunting takes into account the critical factors of the reproductive biology of sensitive game species to some extent by way of spatial and/or time planning.
-2	Hunting does not take into account the critical factors of the reproductive biology of sensitive game species.

3.1.2.2.3. Sub-criterion 22: Existence of hunting guidelines across hunting grounds

Explanation: Wildlife species are not aware of the boundaries of hunting territories. The hunting of wildlife has thus to be oriented according to the wildlife's use of its habitats, rather than area limits drawn by man. The use of habitats by game can be best responded to by hunting guidelines that transcend the limits of individual hunting grounds. This is mainly true for widely ranging game species such as red deer (*Cervus elaphus*), wild boars (*Sus scrofa*), and migratory bird species. The smaller the hunting ground, the more desirable are hunting guidelines across hunting grounds for all game species hunted. This objective can be fostered by forming hunting communities, but also, provided the relations with one's neighbours are good, on a less formal basis, simply by agreement. Both forms of a hunting strategy across hunting territories ought to be documented in writing.

Indication und Score:

4	There are written hunting guidelines across hunting grounds for widely ranging wildlife species, and there is proof that they are being observed (confirmation by all involved hunting grounds).
2	There are hunting guidelines across hunting grounds for widely ranging wildlife species (e.g. migratory bird species, red deer, wild boars, etc.)
1	There are no hunting guidelines across hunting grounds, even though the owner of the hunt ¹⁴ would support their existence.
-1	There are no hunting guidelines across hunting grounds, nor does the owner of the hunt support such guidelines.
-2	There are no hunting guidelines across hunting grounds, and the owner of the hunt prevents a hunting strategy across hunting grounds.

3.1.3 Principle: The natural genetic diversity of game species is preserved and fostered by means of an appropriate hunting practice

3.1.3.1 Criterion: There are no hunting-related limitations to the preservation and fostering of the natural genetic variability of wildlife species

3.1.3.1.1. Sub-criterion 23: Existence of aims relating to the aesthetics of hunting trophies in shooting guidelines

Explanation: The fostering of genetic diversity within a species can also be measured by the extent to which it is taken into account by hunting. Shooting guidelines for cloven-hoofed game are thus to be evaluated with an eye to whether they foster the diversity of forms of horns and antlers, whether they accept it, or whether they place importance on the aesthetic appearance of trophies.

¹⁴ The hunting owner of a proprietor's hunt or the tenant(s) of a proprietor's or co-operative hunt.

Indication und Score:	
2	Shooting guidelines do not contain aims relating to the aesthetics of hunting trophies.
-2	Shooting guidelines contain aims relating to the aesthetics of hunting trophies.
x	Not applicable, no score (Criterion cannot be applied on account of regulations under hunting law demanding e.g. that shooting follow criteria relating to the aesthetics of trophies.) ¹⁵

3.1.3.1.2. Sub-criterion 24: Selective hunting of wild animals with certain natural characteristics

Explanation: Characteristics of outward appearance, such as horns and antlers, as well as modes of behaviour, have (or used to have) various purposes. From a biological point of view, it is of importance whether, for example, the form of horns or antlers is used to deter enemies, to impress female members of the same species, to fight members of the same species, to uncover food in winter, etc., or whether it does not serve such a purpose.

Hunters have been fascinated by the aesthetic aspects of trophies for a long time. The notion of an ideal form of trophy mainly of roe deer (*Capreolus capreolus*), chamois (*Rupicapra rupicapra*), and red deer (*Cervus elaphus*), developed mainly in the second half of the 19th and the first half of the 20th century. With regard to red deer, antlers should be rich in points and wide, with regard to roe deer the ideal is a wide, richly-pearled six-pointer; chamois, too, should ideally have wide and high horns. Some forms of horns or antlers, which are not desirable in terms of aesthetic considerations, may, however, be of great advantage to their bearers from an ecological perspective. Narrow horns or antler beams, for example, are absolutely advantageous in a fight. A low number of points in roe deer and deer entails no disadvantage whatsoever for the bearer of the horns/antlers unless it is an expression of a bad overall constitution. Any form of selective hunting that may have genetic effects and thus entails a danger of reducing the genetic diversity of the game population ought to be avoided.

Another danger of “selective hunting of wildlife” exists for grouse species. In the spring hunt (wood grouse, *Tetrao urogallus*; black grouse, *Tetrao tetrix*), the so-called “fighters” are selectively shot on the display ground, with the justification that their aggressive behaviour disturbs mating. In actual fact, however, it is mostly the alpha cocks – the strongest cocks – that are the hens’ preferred mating partners. Particularly for capercaillies (wood grouse), the shooting of alpha cocks before hens are covered selectively prevents reproduction.

Whether the way hunting is practised is or is not selective in the sense above described is documented, for example, by existing trophies, taxidermal specimens, etc., gathered over a longer period of time, such as a hunting period.

¹⁵ Cf. also comment on hunting law in Chapter 2.2, section “Limitations of Application”

Indication und Score:

2	Forms of horns and antlers, taxidermal specimens, etc., gathered over a hunting period of several years, do not indicate consistent selective hunting of wildlife according to specific natural characteristics.
-2	Forms of horns and antlers, taxidermal specimens, etc., gathered over a hunting period of several years, indicate consistent selective hunting of wildlife according to specific natural characteristics.
x	Not applicable, no score (Criterion cannot be applied on account of regulations under hunting law demanding e.g. selective shooting.) ¹⁶

3.1.3.2 Criterion: Native wildlife populations are not altered by the introduction of and blending with non-native wild animals

3.1.3.2.1. Sub-criterion 25: Introduction of non-native wild animals

Explanation: “Non-native” (“non-autochthonous”) refers to those species, sub-species or habitat-specific sub-species (site races) that are or were not indigenous to a certain area (species alien to a region or fauna). This comprises all wildlife species not contained in the potential natural wildlife species inventory of a wildlife habitat (cf. Criterion 3.1.2.1). It refers in particular to wild animals of those species which, according to agreement among a majority of the relevant scientific community, arrived in Austria after 1492 – the year of reference marking the discovery of the American continent – upon direct or indirect anthropogenic influence (cf. ESSL & RABITSCH, 2002, 2005; FEDERAL MINISTRY OF AGRICULTURE, FORESTRY, ENVIRONMENT AND WATER MANAGEMENT, 2004; cf. also Explanations/Sub-criterion 19, Chapter 3.1.2.1.3). The present sub-criterion does not refer to the re-establishment of originally indigenous species of the potential natural wildlife species inventory that had become extinct for a certain period of time (cf. Sub-criterion 18, Chapter 3.1.2.1.2). The introduction of non-native wildlife occurs mainly in two ways:

1. Introduction (for the first time or stocking of population) of a non-autochthonous wildlife species (mouflon (*Ovis ammon musimon*), fallow deer (*Dama dama*), Sika deer (*Cervus nippon*), chukar partridge (*Alectoris chukar*), etc.)
2. Introduction of non-native sub-species or habitat-specific sub-species (site race) of an autochthonous wildlife species (e.g. Wapity, maral deer, Siberian or North-Caucasian roe deer in Central Europe; *Cervus elaphus* ssp. “Auhirsch” to mountain regions, etc.)

With regard to 1., it ought to be mentioned that populations of newly introduced, non-native species often surpass the populations of native species (at least in partial habitats) and at the same time frequently have a lasting influence on the wildlife habitat (game damage, transmission of new diseases and parasites), which is hard to assess before it has occurred.

¹⁶ Cf. also comment on hunting law in Chapter 2.2, section “Limitations of Application”

With regard to 2., it ought to be noted that particularly these introduced wildlife species demonstrate that in the history of wildlife development, sub-species or site races have developed that are specifically adapted to local climate and (seasonal) food conditions, which, as a result, pertain exactly to the habitat in which they have developed. Any blending of genetic material through hybridisation of sub-species causes an eventually irreversible genetic alteration and may entail the loss of locally native races and even of native species (e.g. on account of changed mating periods of winged game) (LEBERSORGER & ZEILER, 2005). Apart from the fact that the above-mentioned “grafting” attempts often fail (mainly because the number of individuals is too small), they entail a genetic alteration and may even cause pain, as native dams are unable to give birth to the oversized calves or fawns resulting from crossing with larger representatives of the species. Both forms of introduction of non-native wildlife species are thus to be avoided in the quest for sustainable preservation and fostering of (natural) genetic variability of our native wildlife, in particular in those regions of which negative effects are known (e.g. pheasants (*Phasianus colchicus*) in low-lying black grouse (*Tetrao tetrix*) regions).

Indication und Score:

1	No non-native wildlife species are introduced.
-2	Non-native wildlife species are introduced.

3.2 Economy

Explanation: For the purpose of this study, the economic sustainability of hunting is dealt with mainly from the perspective of the individual hunting operation and/or hunting area. Aspects transcending operational limits, i.e. macroeconomic aspects, are only included in so far as they can be immediately influenced by the individual hunting operations. An economic assessment of hunting may produce differing results, depending on whether the assessment is made a) from the perspective of the person “permitted to hunt” (game tenant or land owner, if he or she hunts personally in his or her own hunting territory) or b) from the perspective of the person “owning the right to hunt” (lessor of the hunt, land owner, owner of a proprietor’s hunt). Even though the assessment is basically made from the viewpoint of the person permitted to hunt (a), an assessment, particularly with regard to economic criteria and indicators, may also be interesting from the perspective of the person owning the right to hunt (b). If the sustainability assessment produces differing results for the two viewpoints in terms of individual economic indicators, the lower rating shall count. If the person permitted to hunt (a) and the person owning the right to hunt (b) are not identical, assessments from both points of view are to be made for those criteria that produce differing results. This applies in particular to criteria pertaining to the Principles 3.2.1 and 3.2.4.

3.2.1 Principle: Securing and/or improving the profitability of hunting is an objective of hunting

Explanation: The applicability and concrete assessment of some sub-criteria within this principle depend to a large extent on the individual point of view. For an economic assessment of hunting, a lessor and/or land owner will thus, for example, focus on other balance-sheet entries than a tenant or hunting customer. What for one group of actors becomes relevant as return or yield, the other group will charge as an expense. What is more, realistically, the result of economic balancing in a strictly monetary sense can rarely produce positive results for the tenant or hunting customer. For these groups of persons, it is as a rule much rather ideal values, such as the subjective recreational value of hunting, which are decisive as to whether the material costs are considered reasonable and justified, while the lessor will focus much more on a financially positive balance-sheet. In order to respond better to the differing subjective viewpoints of the two groups of hunting actors, Sub-criteria 27, 28 and 30 are to be evaluated only by certain groups of persons. Sub-criterion 27 (cf. Chapter 3.2.1.1.2) is foreseen for lessors and land owners, and assesses the material cost/yield ratio. Alternatively, Sub-criterion 28 (cf. Chapter 3.2.1.1.3) is meant to be evaluated by tenants and hunting customers (hunters by permission of land owner/game tenant who pay per shooting), and includes ideal aspects in the ratio of expenses and subjective benefit. Owners of a proprietor's hunt who hunt on their own hunting ground will rather use Sub-criterion 28 for their self-assessment. Sub-criterion 30 (cf. Chapter 3.2.1.2.1) evaluates hunting-related measures to foster the market-value of hunting and is, for similar reasons, mainly relevant for persons owning the right to hunt (lessors/land owners).

3.2.1.1 Criterion: The profitability of hunting is secured over a medium term

3.2.1.1.1. Sub-criterion 26: Existence of a marketing strategy

Explanation: For the yield of hunting it is of significance whether the owner of a hunt gives consideration to the form in which he or she will market game, shoots, bags, trophies, etc. – whether and in what form they are sold or used for the owner's own purposes, for example. Thus, if game is used for the owner's own purposes or informally passed on to relatives, this is also to be seen as part of a marketing strategy.

Indication und Score:

2	There is a marketing strategy for game, bag, trophies, etc.
0	There is no marketing strategy for game, bag, trophies, etc.

3.2.1.1.2. Sub-criterion 27: Cost/yield ratio (applies to lessors and owners)

Explanation: This sub-criterion is to be evaluated by lessors and/or owners of a hunting ground (land owners, non-hunting owners of a proprietor's hunt). From the point of view of the lessor, "cost/yield ratio" summarises all monetary expenses and yields of a hunting operation, including the expenses of time and work immediately in connection with the tenancy relationship. In this case, ideal aspects are not a category of assessment.

“Cost” refers to all expenses of money, material and time. This comprises e.g. additional expenses on account of game damage (game protection measures for cultivations, restoration of game damage), losses of agricultural or forestry returns on account of game damage, potential personnel costs, expenses for communication (with the tenant) and organisation (drafting of contracts, checking and control, etc.). Depending on the nature of the tenancy or shooting contract, costs for setting up and maintenance of installations on the hunting ground as well as infrastructure (e.g. paths), feeding costs, etc., may accrue.

“Yield” refers mainly to: returns from tenancy, shooting, compensation for game damage.

Indication und Score:	
2	The cost/yield balance of a hunting period is positive.
1	The cost/yield balance of a hunting period is even.
0	The cost/yield balance of a hunting period is slightly negative.
-1	The cost/yield balance of a hunting period is strongly negative.
x	Not applicable, no score (Applicant is not a lessor/land owner but tenant or hunting customer.) ¹⁷

3.2.1.1.3. Sub-criterion 28: Expense/subjective benefit ratio (applies to hunting tenants and hunting customers)

Explanation: This sub-criterion is to be evaluated by tenants of a hunting area or hunting customers (hunters by permission of land owner/game tenant who pay per shooting, stalking customers, etc.). Owners of a proprietor’s hunt who hunt on their own hunting ground will also use this sub-criterion rather than sub-criterion 27 (cf. Chapter 3.2.1.1.2) for their self-assessment.

From the perspective of game tenants and hunting customers, the cost/benefit ratio is produced by drawing the material and ideal balance of all inputs and gains (material aspects), and subjective benefits. In evaluating the subjective benefit, it is mainly the ideal gain (immaterial values) along with monetary returns that counts and is to be weighed off against the costs and expenses.

"Expenses" comprise costs for: tenancy and/or shooting license, taxes and fees, hunting permit, costs of feeding, installations on the hunting ground, compensation for game damage, personnel costs, if applicable, equipment, travel expenses, in some cases hunting time (e.g. to meet shooting requirements), organisation and communication (with the lessor), etc.

Material and immaterial “benefit” summarises: subjective recreational value (enjoying, nature experience, leisure time spent for hunting, etc.), game and proceeds from game, returns from selling shootings, image values, businesses concluded, etc.

¹⁷ In this case, the assessment under sub-criterion 28 applies (cf. Chapter 3.2.1.1.3).

As long as the sum of ideal gain and material yields outweighs the expenses of money, material and time, and subjective benefit is drawn from hunting, the balance is positive from the perspective of the tenant and/or hunting customer.

Indication und Score:	
2	The material and ideal expense/benefit balance of the hunting period is positive.
1	The material and ideal expense/benefit balance of the hunting period is even.
0	The material and ideal expense/benefit balance of the hunting period is slightly negative.
-1	The material and ideal expense/benefit balance of the hunting period is strongly negative.
x	Not applicable, no score (Applicant is not a hunting tenant/hunting customer but lessor/land owner.) ¹⁸

3.2.1.1.4. Sub-criterion 29: Marketing of game

Explanation: Despite high meat quality, the average proceeds from game are generally low. Experience has shown that proceeds from game can be increased far beyond the average regional prices by way of good marketing and special customer service. If game is used exclusively for the owner's own purposes, this sub-criterion does not apply.

Indication und Score:	
2	Proceeds from game are more than 15 % above average.
0	Average proceeds from game (+/- 15 %).
-1	Below-average proceeds from game (< -15 %).
x	Not applicable, no score (Game is exclusively used for hunters' own purposes.).

¹⁸ In this case, the assessment under sub-criterion 27 applies (cf. Chapter 3.2.1.1.2).

3.2.1.2 Criterion: The value of hunting is maintained and/or increased by the practice of hunting

3.2.1.2.1. Sub-criterion 30: Hunting-related measures to increase the market value

Explanation: The assessment of this sub-criterion makes sense in particular from the perspective of persons owning the right to hunt (land owner, lessor, owner of a proprietor's hunt).

Apart from the influence of the average local market value (site-related factors such as proximity to a city or an attractive countryside), the assumed or actually attainable market value of a hunt results mainly from its variety in game species, the bag achieved, the (average) strength of trophies and the territory's huntability (how can it be reached; how well is it developed and accessible; installations and equipment on the hunting ground). All these factors can be positively or negatively influenced by the management of the hunt, dependent on the size of the hunting ground. "Customer friendliness," – looking particularly well after hunting customers and (paying) guest hunters – for example, can raise the image and thus the value of a hunt. The selective fostering of less frequent game species, out of which bearers' population balance – may be a measure to raise the market value. Equally, a good infrastructure regarding installations and equipment on the hunting ground (hunting lodges, stalking trails, shooting boxes, hides and blinds, feedings, if required) is in most cases a relevant factor for a hunt's market value. It is worth noting that hunting-related measures 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 und Score:	
2	The market value of the hunt is very high on account of far-reaching hunting-related measures (> 30 % above the average of hunting grounds comparable in terms of locations.)
1	The market value of the hunt is slightly above the regional average (10 to 30 % above the average of hunting grounds comparable in terms of location) on account of individual hunting-related measures.
0	The market value of the hunt corresponds to the regional average (–10 % to +10 % above/below the average of hunting grounds comparable in terms of location); no hunting-related measures are taken for its maintenance and/or fostering.
–1	The market value of the hunt is below the regional average on account of counter-productive hunting management (> –10 % below the average of hunting grounds comparable in terms of location.)
x	Not applicable, no score (Applicant is not a lessor/land owner but a tenant/hunting customer.)

3.2.2 Principle: Preserving and fostering the condition of game is an objective of hunting

Explanation: The focus is on the condition of the overall population, not on that of individual animals.

3.2.2.1 Criterion: Average game weights

Explanation: Assessment of average weights under comparable hunting territory conditions as well as comparable seasons and game bags.

3.2.2.1.1. Sub-criterion 31: Continuous, long-term comparison of game weights

Explanation: An assessment of the maximum average game weights achievable can only be made by a retrospective comparison of game weights (cloven-hoofed game) over several decades. Such a comparison should be made on the basis of a long-term documentation of game weights by separate categories of sex, age groups, and shooting date.

A documentation of game weights makes sense: The higher the game weights, the better the constitution of wild animals and thus the trophies, hunting yield, etc. to be expected. Of course, habitat-related weight differences such as between lowland red deer *Cervus elaphus ssp.* “Auhirsch” and mountain red deer have to be taken into account.

Game weight may be influenced by the form of game management: If hunting is oriented (also) according to the (seasonal) food capacity of the wildlife habitat, the accessibility of food is not impaired by unnecessary hunting pressure, and natural regulators of wild animals (e.g. weather, natural enemies, etc.) are considered as natural factors, game weights will be and remain higher. However, feeding, for example, may also result in a reduction of average game weights as it enables very weak animals to survive the winter.

Indication und Score:

2	Game weights are documented exactly, allowing a long-term retrospective comparison of game weights, and this comparison is made.
1	Game weights are documented exactly; a retrospective comparison of game weights, however, is only possible in fragments.
0	A fragmentary documentation of game weights is made; however, a retrospective comparison of game weights is not possible.
-1	Game weights are not documented exactly, and thus, no retrospective comparison of game weights can be made.

3.2.2.2 Criterion: Existence of a time- and area-specific hunting strategy

3.2.2.2.1. Sub-criterion 32: Existence of an economically sound, time- and area-specific hunting strategy

Explanation: From an economic point of view, a hunting strategy for time- and area-specific hunting is important particularly with regard to the efficiency of hunting, game weights achieved, and the amount of potential feeding costs.

For the efficiency of hunting, it is important that the hunting strategy contain knowledge of the seasonal locations of a game species as well as the time when it can be best observed, thus minimising the time spent on hunting. One should see to it, however, that this is not counterproductive to planned periods of concentrated hunting.

The planning of time and area-specific hunting is documented in the hunting concept as an integral component of an economically sound hunting strategy. The timing of hunting should be given in shooting lists. The location of shootings should be traceable on a map of the hunting territory, separately for each hunting year, by marking every single shooting. In case of driven hunting (small game), the respective territories should be marked.

Indication und Score:	
2	A hunting strategy for time- and area-specific hunting exists for all game species hunted; shootings are continuously documented and evaluated as to whether the respective principle of sustainability is observed.
1	A hunting strategy for time and area-specific hunting exists for all game species hunted; however, the documentation and evaluation of shootings is deficient.
0	A hunting strategy for time and area-specific hunting exists only in fragments and not for all game species hunted; shootings are not evaluated, or only evaluated for animals bearing trophies.
-1	There is no hunting strategy for time and area-specific hunting; shootings are not evaluated.

3.2.3 Principle: Preventing damage to agriculture and forestry is an objective of hunting

3.2.3.1 Criterion: Hunting is oriented according to the susceptibility of agricultural and forestry lands to game damage

3.2.3.1.1. Sub-criterion 33: Giving consideration to susceptibility to game damage

Explanation: Game damage can be avoided by orienting hunting according to the susceptibility of agricultural and forest lands to game damage (cf. also Chapter 3.1.1.2). This should be documented in the hunting concept by means of a hunting strategy which takes into account foreseeable habitat-related influences on agricultural, forestry and fishery interests (e.g. concentrated hunting).

Indication und Score:

4	The hunting strategy and its practical implementation can be proved to give best possible attention to the susceptibility of agriculture and forestry lands to game damage.
2	The hunting strategy and its practical implementation can be proved to give attention to the susceptibility of agriculture and forestry lands to game damage.
0	The hunting strategy only sometimes pays attention to the susceptibility of agriculture and forestry lands to game damage or is only in some cases implemented in this way.
-2	The hunting strategy pays no attention whatsoever to the susceptibility of agriculture and forestry lands to game damage.

3.2.4 Principle: Making use of synergies with other economic branches is an objective of hunting

3.2.4.1 Criterion: Hunting forms an economic unit with other anthropogenic forms of use

Explanation: Hunting, together with other anthropogenic forms of use (agriculture and forestry, tourism, housing and industrial areas, transport infrastructure, etc.) puts its stamp on the habitats of our wild animals. The aim of any anthropogenic form of use is to get an actual benefit out of it. It is thus meaningful for hunting management to form an economic unit with other foreseeable anthropogenic forms of use in a wildlife habitat. There are various ways to achieve this, such as:

- By selective, concentrated hunting, forest regeneration measures planned by the forest owner can be carried out in the best possible way. In return, the forest owner can allow for time and area-related aspects of hunting foreseen in the hunting strategy in his or her forest management activities.
- In agricultural areas, leaving vegetated fallow lands can help the game to get over the winter. Considerate timing of mowing/cropping helps to avoid losses of young animals or clutches, nests and settings. In return, the hunter is able to minimise damage to agricultural lands by following a good hunting strategy.
- Harmonising hunting with regional tourism allows important concerns of both hunting and tourism to be addressed by way of co-ordination (cf. also Sub-criterion 35, Chapter 3.2.4.2.1).

3.2.4.1.1. Sub-criterion 34: Confirming a common policy

Explanation: A fundamental requirement for forming an economic unit with other foreseeable anthropogenic forms of use is regular contact and co-ordination with the other land users and/or the persons representing their interests. The forming of an economic unit is documented by way of a confirmation on the part of other land users in the hunting territory and/or those who represent their interests that a joint economic policy is being pursued.

Indication und Score:	
2	Other users of the wildlife habitat confirm an optimised common economic policy.
1	Other users of the wildlife habitat confirm an optimised common economic policy but point out possibilities for improvement.
0	There is no confirmation of a common economic policy by other users.
-1	Other users of the wildlife habitat point to hunting management as being counterproductive.

3.2.4.2 Criterion: Interdisciplinary optimising of planned changes in the wildlife habitat

Explanation: Most of the changes in our wildlife habitats with far-reaching impacts upon the area are not related to hunting (road and railway construction, settlements and housing development, tourism infrastructure, construction of power plants, etc.). With regard to many of these changes, considering wildlife-ecological aspects at an early stage of planning might minimise detrimental effects upon our wildlife habitats, or even avoid them altogether. Interdisciplinary spatial planning that looks upon wildlife ecology/hunting as an equal planning partner allows for optimising planned changes in the wildlife habitat.

3.2.4.2.1. Sub-criterion 35: Interdisciplinary wildlife-ecological spatial planning (WESP)

Explanation: Wildlife-ecological spatial planning is an instrument of integrative 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 offered as well as demanded by the hunters. Aspirations to this effect on the part of owners of a hunt and hunters in general ought to be documented.

Indication und Score:

4	Wildlife-ecological spatial planning (WESP) exists, and hunters actively support its implementation.
2	WESP does not exist, but hunters are proved to aim at establishing it.
-1	WESP does not exist, nor is there any indication that hunters aim at establishing it.
-3	WESP exists, but hunters do not actively support its implementation.

3.2.4.2.2. Sub-criterion 36: Commitment of hunters regarding habitat-changing plans and projects

Explanation: On account of their knowledge of the hunting ground, hunters, who are experts on the site, are called upon to contribute their territorial and wildlife-ecological expertise to plans and projects that have a potential of impairing wildlife habitats. This can contribute significantly to reducing or avoiding negative impacts on wildlife ecology as well as on the practical implementation of hunting, practical huntability and the economic and ideal value of hunting.

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, the local community of hunters is more often than not the prime source of information for assessing the impact of projects upon hunting and wildlife ecology (cf. also Sub-criterion 12, Chapter 3.1.1.3.2). Citizen participation processes as part of environmental impact assessments provide further formalised opportunities to comment on projects and influence them within certain limits. Legally established ecological compensation and mitigation measures to reduce negative impacts of projects provide another basis for considering hunting-related aspects (technical game passages, planting of vegetation structures, creation of substitute biotopes, etc.) Consolidations of properties in the course of agricultural planning, protective forest restoration plans, forest development plans, larger-scale clearing/deforestation and afforestation, forest-pasture regulation projects, designation of industrial and commercial areas, re-naturation of water courses or nature protection and conservation projects are further examples for habitat-changing measures allowing for an involvement of persons owning the right to hunt and persons permitted to hunt, which makes sense in everyone's interest. Wildlife-ecological spatial planning (WESP) (cf. Sub-criterion 35, Chapter 3.2.4.2.1) 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 hunters to actively offer and/or call for co-operation, even if they as stakeholders do not have formal party status.

Indication und Score:	
2	Hunters can be proved to actively get involved in plans and projects relevant for wildlife and hunting in order to avoid negative impacts on wildlife habitats and hunting.
0	Hunters do not actively get involved in plans and projects relevant for wildlife and hunting.
x	Not applicable, no score (no current or past habitat-changing plans and projects)

3.3 Socio-cultural Aspects

Explanation: The socio-cultural aspects we are looking at refer to the needs of persons who have a direct or indirect relationship to hunting (hunters, land owners and non-hunters), to the relationships of hunters with each other, as well as to relationships between hunters and non-hunters. They also refer to the needs (the well-being) of huntable wildlife.

With regard to socio-cultural aspects, the definition of clearly measurable indicators, which is indispensable for understanding and pursuing sustainability in hunting, is particularly difficult and sometimes even impossible. The pursuit and development of hunting traditions, for example, does not lend itself easily to an assessment within the narrow confines of clear-cut and verifiable indicators.

3.3.1 Principle: The population's interest in using territory for hunting is taken into account

3.3.1.1 Criterion: By way of involving local hunters, hunting enjoys a balanced position within the local community but also takes into account the interests of non-resident 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. At the same time – given adequate specific hunting ground conditions – even creating hunting possibilities for non-resident, incoming hunters, in particular from urban areas, may foster a lasting interest of the population in hunting.

3.3.1.1.1. Sub-criterion 37: Reconciling the interests of local hunters permitted to hunt and local hunters not permitted to hunt locally

Explanation: A fair balance between the interests of local hunters permitted to hunt and those of local hunters not permitted to hunt – including hunters by permission of land owner/game tenant – is a necessary condition of socio-culturally sustainable hunting. This reconciliation is of importance also with regard to the

local acceptance of hunting by members of the population not engaging in hunting activities. This sub-criterion is evaluated by way of questioning the hunters concerned. The results are being documented.

N.B.: Aspects relating to “co-operative hunts” and “agricultural communities” should be especially borne in mind.

Indication und Score:

3	An ideal balance of interests between local hunters permitted to hunt and local hunters not permitted to hunt locally is evident.
2	There is a balance of interests between local hunters permitted to hunt and local hunters not permitted to hunt locally.
1	Reconciliation of the interests of local hunters permitted to hunt and local hunters not permitted to hunt locally is only partly satisfactory.
-1	There is no reconciliation of interests between local hunters permitted to hunt and local hunters not permitted to hunt locally.

3.3.1.1.2. Sub-criterion 38: Adequate consideration is given 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 (cf. explanations on Chapter 3.3.1.1). We can also assume that meeting ecological requirements of sustainability suggests 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. size of hunting ground and shooting 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; in countries with hunting ground systems (which tie the right to hunt to land ownership), seeking technical advice from local hunting experts is recommended.

Indication und Score:

1	Non-resident hunters are allowed to hunt.
0	Non-resident hunters are not precluded from hunting on principle.
-1	Non-resident hunters are precluded from hunting on principle, even though there are enough hunting possibilities and there is demand.

3.3.2 Principle: Securing local jobs in the field of hunting is to be an objective

3.3.2.1 Criterion: Hunting contributes to securing jobs by creating employment

3.3.2.1.1. Sub-criterion 39: 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 trapping devices. The scope of work depends, of course, also 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 und Score:	
2	The owner of the hunt makes full use of the opportunities to secure local jobs.
1	The owner of the hunt provides jobs in the field of hunting but does not make full use of the opportunities to secure jobs locally.
0	The owner of the hunt does not offer potential hunting-related jobs.
-1	The hunting management practised is counterproductive to the local job situation.

3.3.3 Principle: Hunting should find broad acceptance among the population

Explanation: The acceptance of hunting among the population is desirable both on the local level and in terms of overall public opinion. Particularly in times when understanding of hunting is decreasing among a number of population groups or hunting is even rejected altogether, it is paramount for hunters to seek an exchange of opinions and be integrated in society in order to secure the future of hunting. This also includes dealing with the arguments of those who oppose hunting. Sectoral group thinking is often counterproductive to this objective. Acceptance and tolerance has to be developed by all parties involved and demands a readiness for open communication. If hunting opens itself towards the wider society, persons critical of hunting can be presented with arguments in favour of hunting; the discussion will be taken to a more factual level, and many an altercation will lose its sting. “Talking to each other” is, of course, to be seen as a two-way process – readiness has to be there on both sides. For the purpose of this study, however, only the contribution on the part of hunters can be evaluated.

3.3.3.1 Criterion: Paying attention to the interests of the local population

Explanation: From a socio-cultural point of view, giving due regard to the interests and opinions of the local population is of major importance, as it is the local level from which disagreement over the practice of hunting may arise. This calls for a fair balance of diverging interests that includes all non-hunting stakeholders (representatives of other forms of use). Hunting has to pay special attention to safeguarding justified interests on the part of land owners.

3.3.3.1.1. Sub-criterion 40: Documentation of disagreement at the local authority

Explanation: It is desirable for hunting to be practised with due regard to other social and economic spheres of interest affected by hunting. This applies in particular to co-operative hunts and hunting leases, where the game tenant hunts on property not his or her own. Whether or not this is the case, can be demonstrated by means of a documentation of disagreement at the local authority¹⁹.

Indication und Score:

2	Hunting is practised with due regard to other social and economic spheres; there is no evidence of disagreement with the local population.
-2	Hunting is not practised with due regard to the local population; there is evidence of disagreement at the local authority.

3.3.3.1.2. Sub-criterion 41: Active involvement and information of local stakeholder and land user groups not directly related to hunting

Explanation: Whether other land users, stakeholders and community groups and/or their representatives are actively involved in co-operation, co-ordination or even only in receiving information in order to contribute to the social acceptance of hunting-related measures indicates whether non-hunting related local interests are integrated and heeded. This is not to be confused with co-determination in the sense of a formal right to vote in purely hunting-related bodies. Moreover, it is necessary to give land owners a right to participate in decisions on hunting management questions in order to guarantee a balance of interests between land owners and persons permitted to hunt.

Any form of involvement requires regular communication between all parties and stakeholders concerned, e.g. land owners, persons permitted to hunt, all (potentially) concerned land users as well as the local population. Regular exchanges of information and arrangements can help to avoid a lot of disagreement early on or settle disputes as soon as they arise. Examples of groups of actors who closely interrelate with hunting are, along with land owners: foresters, farmers, fish breeders, sport fishers, Alpine and tourism associations, nature protection and conser-

¹⁹ Evidence of disagreement at local authorities can, for example, relate to violations of nature conservation or other laws, compensation payments for game damage, damage to property caused by hunters, hazards to other people's safety caused by hunting, escalation of arguments with other land users etc.

vation organisations, municipal political officials, road administrations or project operators but also owners of adjacent plots of land and neighboring hunting grounds. While oral arrangements may also be made on an irregular and informal basis, organised and regular meetings provide a better framework and indicate that hunters openly and actively support a positive climate of exchanges of opinion, giving rise to a favourable climate of debate. Organisational methods for an exchange of views and mutual arrangements are, for example: invitations to meetings of hunting bodies, enlarged gatherings of “hunting rings” (loose associations of hunting grounds), communication platforms, regular information and discussion events but also regular informal meetings or get-togethers.

Indication und Score:

2	Non-hunting local population groups are actively invited to a regular mutual exchange of information on measures relevant for wildlife and hunting.
1	Non-hunting local population groups are actively informed about hunting-related activities.
-1	Non-hunting local population groups are neither actively invited to a mutual exchange of information, nor actively informed.

3.3.3.2 Criterion: Hunting is connected with society-at-large

Explanation: The integration of hunters into society is a fundamental prerequisite for hunting activities to find broad acceptance and understanding. The relationship between hunters and overall society is, in terms of hunting policies, significant for the future framework within which hunting will take place.

3.3.3.2.1. Sub-criterion 42: Social commitment of hunters and regular communication with the non-hunting population

Explanation: The frequency, intensity and quality of social contacts and interchange of thoughts and views with the non-hunting population substantially influence the opinions hunters and non-hunters hold of each other. Prejudices on both sides may best be assuaged by way of regular communication. This requires an effort from both sides; the present assessment framework, however, only evaluates an active commitment on the part of the hunters. An adequate context and events designed to further this objective may clearly stimulate such communication. Indicators of how intensively hunters enter into contact with the society-at-large are, for example, the frequency of joint public or semi-public social events, such as Sr. Hubert’s Day celebrations, information booths at village festivals, game-marketing events, wildlife-training events, etc. Further indicators are active memberships of hunters in non-hunting related social bodies such as associations, political bodies, organisations, etc. Activities of this kind provide opportunities to make contributions to public understanding of hunting and foster the social integration of hunting.

Indication und Score:

1	Hunters involve themselves actively in social life and engage in regular communication with the non-hunting population (e.g. by way of joint events or active memberships in social bodies not related to hunting).
0	Hunters are actively engaged in society only to a minor extent or not at all; communication and interchange with the non-hunting population is rare.

3.3.3.2.2. Sub-criterion 43: Taking into account the opinion of the public at large

Explanation: Justified objective criticism of certain forms of hunting practice ought to be responded to by considering and discussing it. Changes within society may call for a re-consideration of some traditional hunting practices or thinking patterns. This does not refer to following short-lived fashions, but to an active examination of changed patterns and conditions of society which hunting cannot ignore. This may, for example, be documented by discussing the views of the broader public, represented e.g. by considering the point of view of important organisations, in gatherings of hunters or hunting circles and documented in the minutes of such meetings.

Indication und Score:

1	Publicly relevant points of view of society and/or representative organisations are shown to be given consideration.
0	Publicly relevant points of view of society and/or representative organisations are not given consideration.

3.3.4 Principle: Hunting is oriented according to the well-being of game

Explanation: Hunting ethics involves an awareness of the responsibilities of hunters vis-à-vis animals and nature in general. Ethical hunting practice gives central importance to the well-being of game.

3.3.4.1 Criterion: Hunting is practised with as little impairment to the natural behaviour of wildlife as possible**3.3.4.1.1. Sub-criterion 44: Habituated behaviour of wild animals**

Explanation: Wild animals are “habituated” when they display little shyness vis-à-vis humans. Species-specific differences are, however, to be borne in mind. The extent to which hunted and non-hunted wildlife is habituated to humans depends, among other factors, upon the hunting-related disturbance of the game: the lower the hunting pressure, the more habituated to humans the hunted and non-hunted wildlife. The disturbing effect of other forms of anthropogenic use is considerably influenced by the intensity of hunting pressure. For wildlife to be exposed to as lit-

the stress as possible in the areas of the wildlife habitat used by man, it is important that wildlife be as habituated to humans as possible. This is also true for the accessibility of important parts of habitats, such as good grazing areas on open terrain. “Habituated behaviour” does *not*, however, refer to behaviour no longer typical of wild animals as it may occur as a result of *excessive* habituation to humans (which may, for example, produce feeding-tame, but also aggressive animals). Habituated behaviour of wildlife does not by its nature lend itself to exact measurements for any species. However, observing and comparing the habituated behaviour of wildlife in different sectors of the hunting territory with varying hunting pressure produces species-specific standard values (such as escape distance) for the various game species which are capable of sound application.

Indication und Score:	
2	Human-habituated behaviour of hunted and non-hunted wild animals is species-specifically very high on account of minimum hunting pressure.
1	Human-habituated behaviour of hunted and non-hunted wild animals is species-specifically high on account of low hunting pressure, with a few local exceptions.
-1	Human-habituated behaviour of hunted and/or non-hunted wild animals is species-specifically low on account of high hunting pressure.
-2	Human-habituated behaviour of hunted and/or non-hunted wild animals is species-specifically very low on account of extremely high hunting pressure.

3.3.4.2 Criterion: Hunting is practised with as little pain for the animal as possible

Explanation: The practice of hunting is to involve as little pain for the animal as possible. Good shooting ability and correctly installed and regularly checked trapping devices prevent unnecessary pain for wildlife. Training in shooting as well as the best possible installation and checking of trapping devices are also moral obligations for the hunter, just as refraining from the use of poison in hunting.

3.3.4.2.1. Sub-criterion 45: Violations of legal provisions concerning animal protection

Explanation: It should be a central aim of hunting to cause the hunted wildlife animal no pain or as little pain as possible. Hunting in accordance with animal protection standards requires adherence to the relevant provisions of hunting law (orders and prohibitions for hunting, certain aspects of hunting ethics and “good, fair and legal hunting practice” regarding e.g. snares, springes and traps, use of ammunition, searching for wounded game, etc.)

Indication und Score:

0	There are no violations of legal provisions regarding animal protection.
-4	There are violations of legal provisions regarding animal protection.

3.3.4.2.2. Sub-criterion 46: Training in shooting**Indication und Score:**

2	Successful training in shooting is documented annually.
-2	Successful training in shooting is not documented annually.

3.3.4.2.3. Sub-criterion 47: Use of poison in hunting**Indication und Score:**

0	No poison is used as part of the hunting practice.
-4	Poison is used as part of the hunting practice.

3.3.5 Principle: Hunting targets wild animals reproducing naturally in the wild

The shooting 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. Hunting enclosures with conditions of extensive production can be subjected to the sustainability assessment (bearing in mind, however, that certain indicators are not applicable on account of the fencing).

3.3.5.1 Criterion: No animals raised in breeding or other enclosures are hunted

Explanation: In some hunting areas, game from (breeding) enclosures or aviaries is released before the hunt in order to achieve higher game bags already during the year of the release. This is particularly frequently the case with pheasant (*Phasianus colchicus*, “caged pheasant”), mallard (*Anas platyrhynchos*), wild boar (*Sus scrofa*), and, in some Western European countries, red-legged partridge (*Alectoris rufa*) (cf. also Sub-criterion 25, Chapter 3.1.3.2.1. Sometimes, the animals are even brought into close proximity of the shooting galleries in single cages to be released within the shooting range of the shooter. There is even a habit of “ordering” beforehand the number of the bag as well as – regarding wild boars – the weight of the animals to be shot. Moreover, pheasant and red-legged partridge 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 is to be rejected from a hunting-ethical point of view.

This criterion does not apply to the re-introduction or re-stocking of wild animals of autochthonous species if they are raised and released in accordance with species-specific needs and animal protection standards for the purpose of building up self-reproducing wildlife populations (e.g. ibex (*Capra ibex*), grouse (*Tetrao sp.*). Releases immediately before hunting for the purpose of increasing the game bag are, however, not compatible with the socio-cultural requirements of 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.

3.3.5.1.1. Sub-criterion 48: Selling of animals from enclosures or aviaries for the purpose of hunting

Indication und 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.

3.3.5.1.2. Sub-criterion 49: Release of animals from enclosures and aviaries for the purpose of hunting

Indication und Score:	
0	No animals raised in enclosures or aviaries are released for the purpose of hunting.
-4	Animals raised in enclosures or aviaries are released for the purpose of hunting.

3.3.6 Principle: The way hunting traditions are dealt with is a characteristic of the socio-cultural sustainability of hunting

Explanation: Dealing with hunting traditions comprises both the cultivation and further development of hunting-related customs and traditions and, on the other hand, unwritten rules of conduct which, as a whole, establish a sort of hunting code of conduct and shape the concept of “good, fair and legal hunting practice” (cf. footnote ²) and “hunting ethics.”

3.3.6.1 Criterion: Hunting traditions are cultivated and passed on to coming generations of hunters

Explanation: Hunting culture and traditions are an integral part of the way hunters and hunting understand themselves and of their identity, but also of rural areas per se. In order to preserve them, they have to be lived, practised, and stay abreast of changing times. A loss of traditions is often irreversible.

3.3.6.1.1. Sub-criterion 50: Maintaining hunting culture

Explanation: By “hunting culture,” we understand in this context all hunting-related customs and traditions manifesting themselves in cultural activities and forms of expression, including traditional events, music, art, literature, figures of speech, etc.

Indication und Score:	
1	There is evidence that cultural hunting traditions are cultivated on a regular basis.
-1	Cultural hunting traditions are not cultivated.

3.3.6.2 Criterion: Traditional rules of hunting behaviour are being further developed and brought up to date

Explanation: Rules and modes of hunting behaviour as well as norms of ethical hunting are subject to changing times and societies. Values change over time, and new scientific findings continuously broaden ecological knowledge of wildlife. This may call for questioning and, if necessary, adjusting traditional rules of hunting behaviour – in other words, the unwritten code of hunting ethics. Reverence for animals and nature demands in particular to subordinate concepts of hunting ethics and good and fair hunting practice that may no longer be in line with current ideas and findings to ecological requirements and criteria of animal and nature protection. Thus, for example, shooting wild animals exclusively for the aesthetics of their trophies (cf. Sub-criterion 23, Chapter 3.1.3.1.1) or generally not tolerating prey animals (cf. Sub-criterion 18, Chapter 3.1.2.1.2) are problematic positions from today’s point of view.

3.3.6.2.1. Sub-criterion 51: Examining modes of hunting behaviour by regularly updating knowledge

Explanation: For traditional concepts of hunting ethics and good, fair and legal hunting practice to be further developed, there has to be a regular assessment and integration of recent scientific findings and research results of wildlife-biology and hunting science relevant for practical hunting. While science needs to make increased efforts to pass on information to the parties involved in practical hunting, hunters themselves should actively *seek* such information. The responsibility of the hunter vis-à-vis the wild animals entrusted to him or her demands that the best available knowledge be translated into hunting practice.

High qualifications in terms of wildlife ecology, hunting economy and hunting ethics are also particularly significant for hunting officials. In their capacity as elected representatives of the community of hunters, they have major responsibilities: They exert considerable influence in determining how hunting is practiced within their range of competency and are, to a certain extent, able to influence hunting legislation. At the same time, they shape the public image of hunters, both with regard to everyday hunting practice as well as at events and in the media. Moreover, they are role models for their own community.

Regular education and further training of all persons practising hunting by way of activities contributing to high-quality knowledge transfer are thus desirable, e.g. regular attendance at training and further education events (lectures, technical meetings of hunters, discussions, excursions, etc.), but also technical literature.

Indication und Score:	
2	Several activities of training and further education (events, excursions) were undertaken over the past three years.
0	One of the educational activities described above was carried out over the past three years.
-1	None of the educational activities described above was carried out over the past three years.

3.4 Synoptic Table

The following table provides a synoptic view of the three sectors, 13 Principles, 24 Criteria and 51 Sub-criteria of the entire assessment framework. The structure of the table reflects the hierarchical structure of the assessment framework. Sectors, principles, criteria and sub-criteria are listed with the number of the respective chapter as well as the full designation as described in Chapters 3.1 to 3.3. In addition, the sub-criteria are numbered consecutively.

Certain sub-criteria not relevant in every case: their applicability depends on the specific situation in the assessment unit and their evaluation may be omitted provided there is adequate justification. These are listed in the column "Applicable with limits" and designated with "x".

For every sub-criterion, the maximum and minimum possible point score is given, as well as the highest and lowest (minus values) point score for the three sectors of sustainability. What is described here is the maximum possible spectrum of scores. Individual sub-criteria not applicable in all situations and by all groups of persons may also achieve a score-neutral assessment designated with "x". If this assessment is chosen, the respective sub-criteria will not be valued. Correspondingly, this reduces the highest and lowest score sum possible by the highest positive and lowest negative valuation of the sub-criteria which are not counted.

The basic assumption is that the principles developed are generally, i.e. internationally applicable, while the criteria, and in particular the sub-criteria, are geared mainly to Austrian situations, although they should be applicable to most other Central and Western European countries. Adapting them to other natural habitat and hunting law conditions is possible on the basis of respective modifications of the criteria and sub-criteria.

Table 1: Synoptic table of sectors, principles, criteria and sub-criteria of sustainable hunting:

PRINCIPLE		CRITERION		SUB-CRITERION		
No. of Chapter, Designation	No. of Chapter, Designation	No.	No. of Chapter, Designation	applicable w. limits	Spectrum of scores	
					max.	min.
3.1 Ecology					Score sum	
					53	-49
3.1.1 The preservation and improvement of wildlife habitats is an objective of hunting	3.1.1.1 Hunting and its interrelationship with other forms of land use	1	3.1.1.1.1 Existence of a shooting plan and shooting list		3	-2
		2	3.1.1.1.2 Structure of shooting plan and shooting list		3	-2
		3	3.1.1.1.3 Meeting shooting requirements by the authorities for wildlife species that need to be reduced		1	-4
		4	3.1.1.1.4 Existence of a strategy to harmonise hunting with other forms of land use		2	0
		5	3.1.1.1.5 Giving consideration to seasonal bottleneck situations		2	-2
	3.1.1.2 Giving consideration to the influence of game on vegetation	6	3.1.1.2.1 Existence of control fences to monitor browsing	X	3	0
		7	3.1.1.2.2 Giving consideration to the results of objective forest monitoring systems	X	2	-2
		8	3.1.1.2.3 Giving consideration to the protective function of the forest	X	2	-2
		9	3.1.1.2.4 Preventing game damage unacceptable in terms of regional culture		1	-4
		10	3.1.1.2.5 Giving consideration to population fluctuations		2	-2
	3.1.1.3 Preservation and fostering of linking biotopes	11	3.1.1.3.1 Giving consideration to existing wildlife habitat fragmentation	X	2	-3

PRINCIPLE	CRITERION	SUB-CRITERION				
No. of Chapter, Designation	No. of Chapter, Designation	No.	No. of Chapter, Designation	applicable w. limits	Spectrum of scores	
					max.	min.
3.1 Ecology					Score sum	
					53	-49
		12	3.1.1.3.2 Registration and mapping of important migration routes, wildlife corridors and obligatory wildlife passages		2	0
		13	3.1.1.3.3 Increasing the attractiveness of important migration routes, corridors and obligatory passages	X	2	-2
		14	3.1.1.4.1 Active preservation and management of the wildlife habitat		4	-4
	3.1.1.4 Giving consideration to habitat capacity	15	3.1.1.4.2 Giving consideration to increased competitive pressure upon threatened and sensitive animal species by strongly increasing game populations		2	-2
		16	3.1.1.4.3 Annual growth rate in cloven-hoofed game		1	-1
	3.1.2 The practice of hunting shall within its range ensure the preservation and improvement of the diversity of game species through protection and use	3.1.2.1 Potential natural wildlife species inventory taking into account the current habitat situation (applies only to larger territorial units, e.g. an ecologically homogeneous wildlife area)	17	3.1.2.1.1 Current and potential natural wildlife species list		2
18			3.1.2.1.2 Dealing with returning species (in accordance with the potential natural wildlife species inventory)	X	2	-2
19			3.1.2.1.3 Dealing with wildlife species not contained in the potential natural wildlife species inventory	X	2	-2
3.1.2.2 Hunting is oriented according to the behaviour of wild animals		20	3.1.2.2.1 Giving consideration to the undisturbed life cycle of wild animals		2	-2
		21	3.1.2.2.2 Giving consideration to the reproductive biology of threatened and sensitive game species		2	-2

PRINCIPLE	CRITERION	SUB-CRITERION		applicable w. limits	Spectrum of scores	
No. of Chapter, Designation	No. of Chapter, Designation	No.	No. of Chapter, Designation		max.	min.
3.1 Ecology					Score sum	
					53	-49
		22	3.1.2.2.3 Existence of hunting guidelines across hunting grounds		4	-2
3.1.3 The natural genetic diversity of game species is preserved and fostered by means of an appropriate hunting practice	3.1.3.1 There are no hunting-related limitations to the preservation and fostering of the natural genetic variability of wildlife species	23	3.1.3.1.1 Existence of aims relating to the aesthetics of hunting trophies in shooting guidelines	X	2	-2
		24	3.1.3.1.2 Selective hunting of wild animals with certain natural characteristics	X	2	-2
	3.1.3.2 Native wildlife populations are not altered by the introduction of and blending with non-native wild animals	25	3.1.3.2.1 Introduction of non-native wild animals		1	-2
3.2 Economy					Score sum	
					26	-12
3.2.1 Securing and/or improving the profitability of hunting is an objective of hunting	3.2.1.1 The profitability of hunting is secured over a medium term	26	3.2.1.1.1 Existence of a marketing strategy		2	0
		27	3.2.1.1.2 Cost/yield ratio (applies to lessors and owners)	X	2	-1
		28	3.2.1.1.3 Expense/subjective benefit ratio (applies to hunting tenants and hunting customers)	X	2	-1
		29	3.2.1.1.4 Marketing of game	X	2	-1

PRINCIPLE	CRITERION	SUB-CRITERION				
No. of Chapter, Designation	No. of Chapter, Designation	No.	No. of Chapter, Designation	applicable w. limits	Spectrum of scores	
					max.	min.
3.2 Economy					Score sum	
					26	-12
	3.2.1.2 The value of hunting is maintained and/or increased by the practice of hunting	30	3.2.1.2.1 Hunting-related measures to increase the market value	X	2	-1
3.2.2 Preserving and fostering the condition of game is an objective of hunting	3.2.2.1 Average game weights	31	3.2.2.1.1 Continuous, long-term comparison of game weights		2	-1
	3.2.2.2 Existence of a time- and area-specific hunting strategy	32	3.2.2.2.1 Existence of an economically sound, time- and area-specific hunting strategy		2	-1
3.2.3 Preventing damage to agriculture and forestry is an objective of hunting	3.2.3.1 Hunting is oriented according to the susceptibility of agricultural and forestry lands to game damage	33	3.2.3.1.1 Giving consideration to susceptibility to game damage		4	-2
3.2.4 Making use of synergies with other economic branches is an objective of hunting	3.2.4.1 Hunting forms an economic unit with other anthropogenic forms of use	34	3.2.4.1.1 Confirming a common policy		2	-1
	3.2.4.2 Interdisciplinary optimising of planned changes in the wildlife habitat	35	3.2.4.2.1 Interdisciplinary wildlife-ecological spatial planning (WESP)		4	-3
		36	3.2.4.2.2 Commitment of hunters regarding habitat-changing plans and projects	X	2	0

PRINCIPLE							CRITERION		SUB-CRITERION		
No. of Chapter, Designation	No. of Chapter, Designation	No.	No. of Chapter, Designation	applicable w. limits	Spectrum of scores		Score sum	19	-28		
					max.	min.					
3.3							Socio-cultural Aspects				
3.3.1 The population's interest in using territory for hunting is taken into account	3.3.1.1 By way of involving local hunters, hunting enjoys a balanced position within the local community but also takes into account the interests of non-resident hunters	37	3.3.1.1.1 Reconciling the interests of local hunters permitted to hunt and local hunters not permitted to hunt locally								
		38	3.3.1.1.2 Adequate consideration is given to non-resident hunters								
	3.3.2.1 Hunting contributes to securing jobs by creating employment	39	3.3.2.1.1 Providing jobs in the field of hunting		2			-1			
3.3.3 Hunting should find broad acceptance among the population	3.3.3.1 Paying attention to the interests of the local population	40	3.3.3.1.1 Documentation of disagreement at the local authority		2			-2			
		41	3.3.3.1.2 Active involvement and information of local stakeholder and land user groups not directly related to hunting		2			-1			
	3.3.3.2 Hunting is connected with society at large	42	3.3.3.2.1 Social commitment of hunters and regular communication with the non-hunting population		1			0			
		43	3.3.3.2.2 Taking into account the opinion of the public at large		1			0			

PRINCIPLE		CRITERION		SUB-CRITERION		
No. of Chapter, Designation	No. of Chapter, Designation	No.	No. of Chapter, Designation	applicable w. limits	Spectrum of scores	
					max.	min.
3.3					Score sum	
Socio-cultural Aspects					19	-28
3.3.4 Hunting is oriented according to the well-being of game	3.3.4.1 Hunting is practised with as little impairment to the natural behaviour of wildlife as possible	44	3.3.4.1.1 Habituated behaviour of wild animals		2	-2
	3.3.4.2 Hunting is practised with as little pain for the animal as possible	45	3.3.4.2.1 Violations of legal provisions concerning animal protection		0	-4
		46	3.3.4.2.2 Training in shooting		2	-2
		47	3.3.4.2.3 Use of poison in hunting		0	-4
	3.3.5.1 No animals raised in breeding or other enclosures are hunted	48	3.3.5.1.1 Selling of animals from enclosures or aviaries for the purpose of hunting		0	-4
		49	3.3.5.1.2 Release of animals from enclosures and aviaries for the purpose of hunting		0	-4
	3.3.6.1 Hunting traditions are cultivated and passed on to coming generations of hunters	50	3.3.6.1.1 Maintaining hunting culture		1	-1
	3.3.6.2 Traditional rules of hunting behaviour are being further developed and brought up to date	51	3.3.6.2.1 Examining modes of hunting behaviour by regularly updating knowledge		2	-1

x ... applicable with limits and/or not relevant for all situations; valuation may be omitted provided there is adequate justification (cf. Explanations in Chapter 2.2)

4 Evaluation Scheme

The assessment framework consists of 3 sectors of sustainability, 13 principles, 24 criteria and 51 sub-criteria. Scores are given at the level of the sub-criteria.

The scheme foresees two different possibilities of evaluation. Both types of evaluation are based on the score values given within the framework of the indication and score scheme. By choosing the adequate assessment level (score), each indicator is assigned a certain number of points. The maximum possible range is between 4 and –4 points per indicator. If it is evident that principles of sustainability are violated, minus values are assigned (–1 to –4); otherwise, scores range between 0 and 4. Making evident the points score attributed to the individual assessment levels of each indicator allows for a transparent assessment process and results which can be reconstructed at any time. This also facilitates interpreting the result as well as working out measures to optimise sustainability.

Point limits (minimum requirements) or ‘knockout’ (KO) criteria (cf. Chapter 6.4) can be determined for individual principles, criteria or sub-criteria.

The two differentiated evaluation types display both well-balanced situations and deficiencies in the respective sectors of sustainability. Depending on regional conditions, deficiencies and the conclusions thus drawn (e.g. for protective forests, etc.) may vary.

The decision not to apply more or less complicated assessment algorithms makes the evaluation scheme more transparent and easier to handle.

Via the interactive Internet platform “Criteria and Indicators of Sustainable Hunting” (www.biodiv.at/chm/jagd), electronic self-assessment can be carried out online. At the end of the assessment, the result is automatically calculated and supplied to the person doing the assessment without any data being centrally stored or transmitted. Following are the two automatically generated types of evaluation.

4.1 Evaluation – Type 1

This evaluation version calculates results separately for each of the three groups of aspects of sustainability (ecology, economy, and socio-cultural aspects). The score sums attained are added within each sector and converted into percentage values of the possible maximum point score. The resulting percentage value is attributed to one of five assessment categories. These categories range from “very good” (76 % to 100 %), “good” (51 % to 75 %), “intermediate” (25 % to 50 %), “bad” (0 % to 24 %) to “very bad” (less than 0 %). The purpose of the five assessment categories is to facilitate an evaluation of current hunting practices and future direction.

The two colour graphs below demonstrate how the evaluation result according to Type 1 may be graphically represented. Figure 3 displays the basic visualisation scheme. Figure 4 is an example of a fictitious evaluation to further illustrate the above.

Ecology	1 very good	2 good	3 average	4 bad	5 very bad	max. point score	min. score
	sustainable			not sustainable			
	76 % to 100 %	51 % to 75 %	25 % to 50 %	0 to 24 %	negative value	53	-49
Ecology	1 very good	2 good	3 average	4 bad	5 very bad	max. point score	min. point score
	sustainable			not sustainable			
	76 % to 100 %	51 % to 75 %	25 % to 50 %	0 to 24 %	negative value	26	-12
Socio-cultural aspects	1 very good	2 good	3 average	4 bad	5 very bad	max. point score	min. point score
	Sustainable			not sustainable			
	76 % to 100 %	51 % to 75 %	25 % to 50 %	0 to 24 %	negative value	19	-28

Fig. 3: Evaluation scheme – type 1

Ecology	1 very good	2 good	3 average	4 bad	5 very bad	max. point score	min. point score
	sustainable			not sustainable			
		64 % (34 points)				53	-49
Economy	1 very good	2 good	3 average	4 bad	5 very bad	max. point score	min. point score
	sustainable			not sustainable			
				23 % (6 points)		26	-12
Socio-cultural aspects	1 very good	2 good	3 average	4 bad	5 very bad	max. point score	min. point score
	Sustainable			not sustainable			
			47 % (9 points)			19	-28

Fig. 4: Evaluation scheme – Type 1, fictitious evaluation example

The evaluation results of all three groups of aspects of sustainability are not summed. Doing so would reduce the informative value and conclusiveness, and would flatten the evaluation result. A separate evaluation for each group of aspects of sustainability facilitates the analysis of strength and weaknesses.

Moreover, if a low score in points is achieved for the ecological aspects, while at the same time, the score in the two other groups of aspects is high, one should bear in mind that the persons involved in hunting might refrain from a stronger economic orientation of the hunt for reasons that go beyond mere economic considerations (high subjective value of hunting activities, improvement of the ecological and socio-cultural sustainability of hunting). In such a case, economic sustainability, evaluated in terms of the selected objective criteria, may be low on the rating scale or not exist at all. This, however, is not to be interpreted as an argument against hunting itself, as long as the hunting operation or the hunter are able to afford the expenses. The authors would also like to add that in some hunting areas, the maximum points score cannot be reached on account of the fact that some sub-criteria are not applicable in that respective area. This would, for example, be the case in a hunting territory for small game consisting exclusively of agriculturally dominated open land, without a forest whose function is mainly one of protection – the indicator relating to protective forests can thus not be applied. Sub-criteria only applicable under certain local or regional conditions are supplemented by “point neutral” valuation options in Chapter 3, which should be chosen on the basis of adequate justification. Thus the respective sub-criterion is dropped and, as a consequence, the maximum achievable score reduced. If not all of the sub-criteria can be assessed, the overall maximum point score of the respective sustainability aspect has to be reduced by the maximum point score of the omitted sub-criteria. Thus, the maximum point score specific to the respective hunting ground and region can be calculated for the three groups of aspects of sustainability; the maximum score sums may thus vary. These individual specific maximum scores then serve as a basis for the calculation of the percentage values in the assessment table.

4.2 Evaluation – Type 2

In this evaluation version, the individual assessment results of all 51 sub-criteria are represented in terms of absolute point values in the form of a synoptic graph ("indicator performance profiles"). This indicator- by-indicator mode of representation allows identifying individual strengths and weaknesses in terms of sustainability in a detailed manner. Thus, problems and where to approach them to improve sustainability can be rapidly identified.

The white lines reflect the possible score span of the respective sub-criterion, i.e. the range within which individual assessments may be made. The green buttons symbolise the assessment made, in accordance with their position on the white score span lines, i.e. the individual point score. They thus demonstrate, so to speak, the degree of sustainability achieved on the “sustainability scale.” For better visibility and descriptive quality, the scale is coloured in progressive transitions from red (“not sustainable”) to green (“sustainable”). The idea was to make it more illustrative and allow a swift interpretation of the result.

Colour graph 5 demonstrates the principle of depicting results in accordance with Evaluation – Type 2 using a fictitious evaluation example.

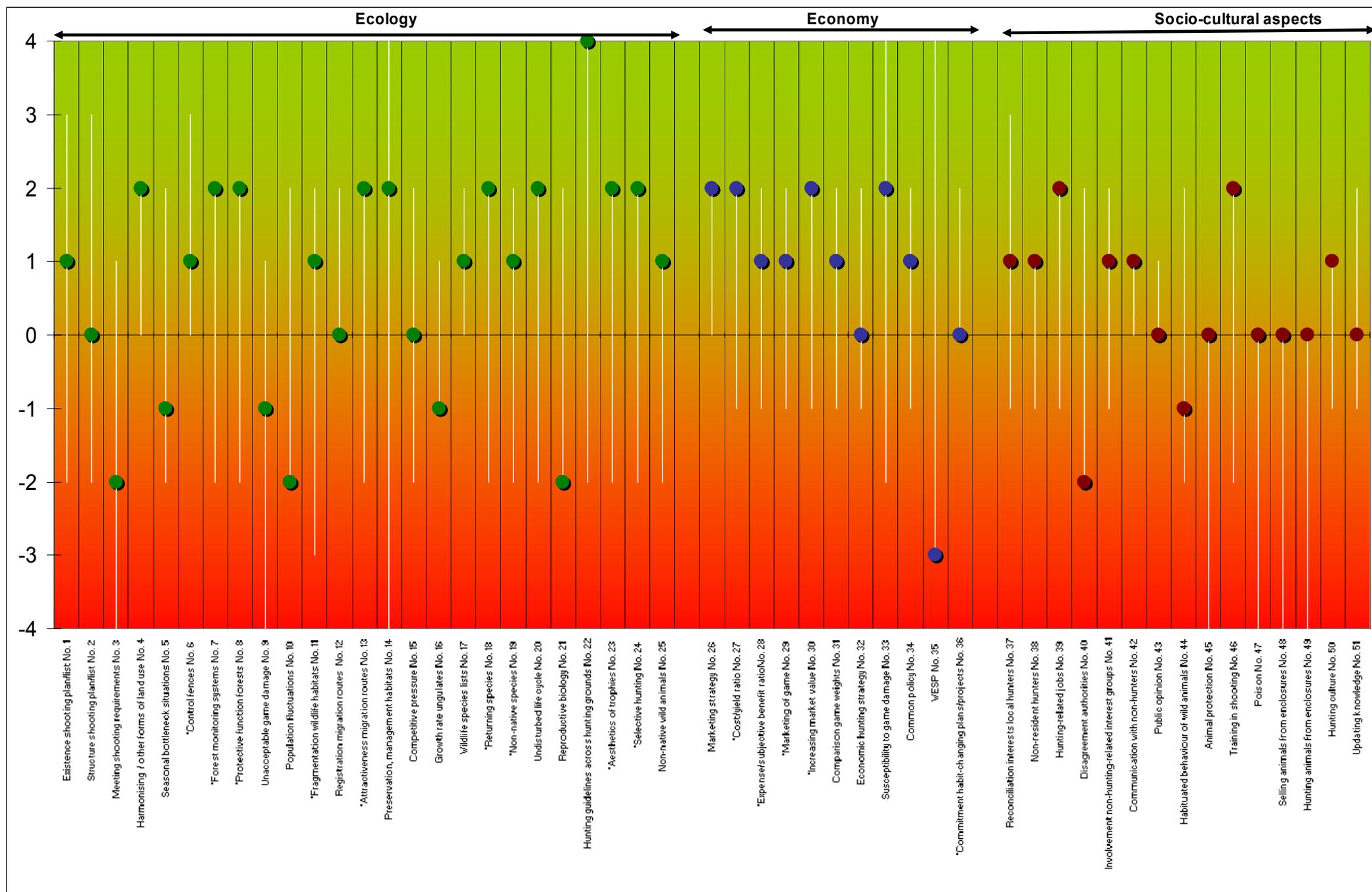


Fig. 5: Evaluation – Type 2, fictitious evaluation example

* ... applicable with limits and/or not relevant in all situations; valuation may be dropped on the basis of adequate justification (cf. explanations in Chapter 2.2)

5 Description of the Hunting Ground – Basis for the Sustainability Test

The description of the assessment unit provides an important basis for the sustainability test of hunting and its interpretation. It is therefore to be made with the greatest possible completeness and exactitude. It refers to the preceding calendar year.

Date of data entry

 (DMY)

5.1 Name, Geographical Position and Infrastructure of the Hunting Ground

Name of the hunting ground

Area size of the hunting ground

 (hectares)

Geographical position of the hunting ground

State:
Province (Land):
District:
Municipality:
Wildlife area, wildlife region:

Extent of passable roads (e.g. forest roads)low medium high **Red deer feeding**yes no **Winter fencing**yes no **5.2 Ownership and Legal Situation****Land owner**

First name:

Last name (Institution):

Street:

Postal code and City/Town:

Owner of hunting ground

First name:

Last name (Institution):

Street:

Postal code and City/Town:

Exercise of hunting rightsProprietor's hunt (property larger than 115 hectares): Community/co-operative hunt (sum of joint properties below 115 hectares on community level) Hunt leased: yes no **Areas to which special legal provisions apply**Percentage/developed area: (%)Percentage/traffic/transport area: (%)Percentage/area dedicated to hunting: (%)

Sustainable Hunting | Description of the Hunting Ground

Percentage/nature conservation area: (%)

Percentage/landscape protection area: (%)

Percentage/Natura 2000 area: (%)

Percentage-area: (%)

5.3 Area and Biotope Description, Biological Diversity, Land Use

Altitude above sea level of hunting ground

from (m) to (m)

Habitats

related to overall hunting ground (figures in %); food patches/cultivated deer pastures (percentage in hectares)

Percentage/forest: (%)

Percentage/protective forest: (%)

Percentage/high mountain chains without forest: (%)

Percentage/grass (pasture) land: (%)

Percentage/arable land: (%)

Food patches/cultivated deer pastures: (hectares)

Does the hunting ground contain stagnant waters (lakes, ponds)?

yes no

Does the hunting ground contain running waters (rivers, brooks) with wetland riparian vegetation (reeds, shrubs, strips of herbaceous riparian vegetation)?

yes no

Does the hunting ground contain riparian areas and riverside forests?

yes no

Main game species

(number shot/year)

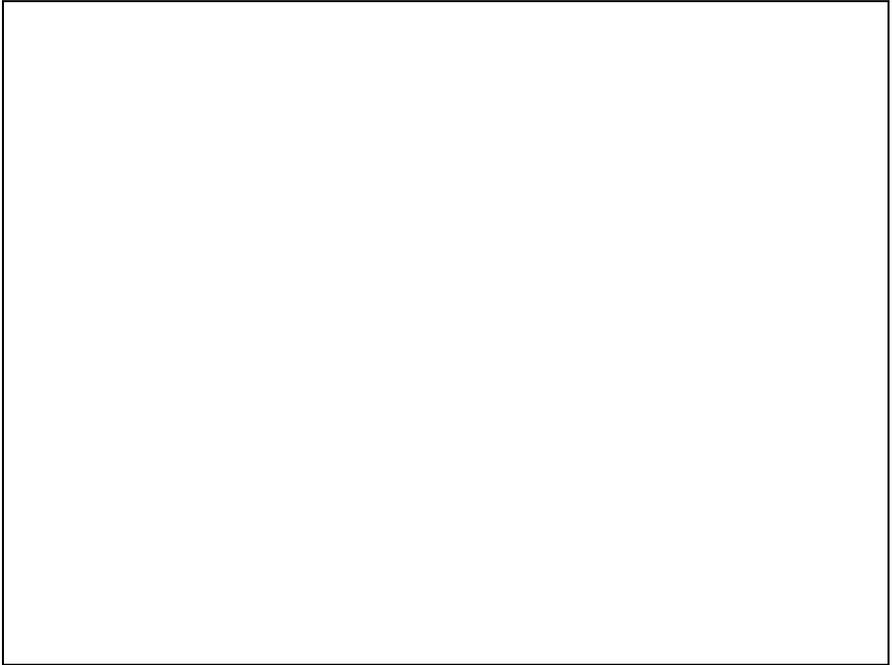
Rare animal species
 (name)
Habitat dissection/fragmentation (by roads, railways, etc.)
 low medium high
Tourism
 low medium high
5.4 Management and Monitoring**Is there a written management concept?**
 yes no
Measures to protect biological diversity

Biological diversity is understood as the variety of genetic differentiation within a species, the diversity of species, and the diversity of habitats.

Number of hunters
 overall professional hunters guest hunters
 hunters by permission of land owner/game tenant who pay per shooting
 persons permitted to hunt a few times by permission of land
 owner/game tenant others
List of land owner's/game tenant's regular notes
 (nature of notes)
List of other data used

e.g. on fauna and flora

5.5 Remarks

A large, empty rectangular box with a thin black border, intended for entering remarks or observations. The box is currently blank.

6 Development of the Assessment System

The “Criteria and Indicators of Sustainable Hunting” were developed in close cooperation with experts, practical hunters and representatives of various stakeholder and user groups of relevance to hunting. In order to make the gradually enlarged participatory process resulting in the assessment framework in its present form transparent and comprehensible, several significant steps of the working process will be briefly described in the following.

6.1 Organisational Procedure

In the process of devising the contents of the assessment framework, we took into consideration provisions on the sustainable use of natural resources as contained in international agreements, initiatives and processes (UNCED, 1992; CBD, 1992, 2000, 2004a, 2004b; MCPFE, 1990, 1993, 1998, 2003; IUCN, 2000; ALPINE CONVENTION, 1991, among others) as well as in national implementation strategies (FEDERAL MINISTRY OF ENVIRONMENT, 1995; FEDERAL MINISTRY OF ENVIRONMENT, YOUTH AND FAMILY AFFAIRS, 1998) (cf. also Chapter 1). In terms of methodology, international standards for the construction of criteria and indicator systems were used.

In particular, we were able to draw on concrete Austrian preparatory work. In the early stages of the project, for example, already existing workshop results were revised (UMWELTBUNDESAMT, 1997), in the process of which the existing set of criteria and indicators was examined as to completeness, supplemented and/or re-phrased, and the entire spectrum of sustainable hunting was assigned to three categories (ecology, economy and socio-cultural aspects) as well as divided into the three categories of principles, criteria, and sub-criteria.

Furthermore, a profile of requirements for the criteria and indicators to be defined was established, reflecting the various different Austrian wildlife habitats. This profile of requirements defines five characteristic types of wildlife habitats to which the set of principles, criteria, sub-criteria, indications and scores is to apply (see box below). These types of habitats also include existing bodies of water. On account of the broad spectrum of wildlife ecological habitat types represented in Austria, the assessment framework should be applicable in most Central and Western European countries with hunting-ground-based systems. By modifying individual criteria and sub-criteria, the framework can also be adapted to other natural habitat and hunting law conditions.

1. Riparian areas and their riverside forests
2. Lowland areas characterised by agriculture, industries and settlements
3. Alpine foothills and hilly areas characterised by agriculture and forestry
4. Mountain regions characterised mainly by forestry
5. High mountain chains

As a next stage, new principles, criteria, indicators, and sub-criteria were defined for the three aspects of sustainability, and the already existing criteria, indicators, and sub-criteria were integrated. The resulting new set was then once again examined as to completeness and conclusiveness and revised. Then, each sub-criterion was provided with an assessment scheme.

The complete set was submitted for review and first reactions to a circle of experts and representatives of stakeholder groups directly or indirectly concerned with hunting (game management, forestry, hunting science and wildlife biology, nature protection and conservation). In the autumn of 2000, this group of experts was invited to discuss the draft at the Environment Agency. This two-day meeting, at which each point of the entire set was thoroughly discussed, took place in a very constructive atmosphere.

The framework as well as comments sent in beforehand were projected on a screen. Disputed issues were settled by consensus and immediately digitally incorporated into the presentation, visible for all participants. Participants and their respective institutions (at that time) were:

- Prof. DI Alfred Fürst (Mayr-Melnhofsche Forstverwaltung Pfannberg, Steirischer Jagdschutzverein/Meyr-Melnhof Forest Management Pfannberg, Styrian Association for the Protection of Hunting)
- Norbert Gerstl (WWF)
- Dr. Peter Lebersorger (Zentralstelle Österreichischer Jagdverbände/Centre of Austrian Hunting Associations)
- Mag. Birgit Mair-Markart (Naturschutzbund/Austrian League for Nature Conservation)
- DI Hans Mattanovich (Landesjägermeister-Stellvertreter von Kärnten/Deputy Senior Representative of the Official Hunters' Association of the Province of Carinthia)
- DI Friedrich Prandl (Landesjägermeister des Burgenlands/Senior Representative of the Official Hunters' Association of the Province of Burgenland)
- Dr. Karoline Schmidt (wildlife biologist)
- Mag. Karl Sirowatka (Steirische Landesjägerschaft/Styrian Official Hunters' Association)
- DI Dr. Friedrich Völk (Institute of Wildlife Biology and Game Management of the University of Agricultural Sciences, Vienna; Österreichische Bundesforste AG/Austrian Federal Forests)
- DI Dr. Hubert Zeiler (Institute of Wildlife Biology and Game Management of the University of Agricultural Sciences).

6.2 Statements Relating to Practical Application

Following the round of discussion among experts, the entire framework was amended to take account of the results of the discussion. This preliminary final version was then sent for practical testing to those responsible for hunting matters in hunting units of varying size - hunting grounds, “hunting rings” (loose associations of hunting grounds), small and large-scale operations. The hunting grounds were selected in such a way as to comprise a broad spectrum of the hunting units and all types of wildlife habitats represented in Austria.

The reactions to the preliminary final version of the study were very helpful for this final report. The set proved to be suitable for practical application to the hunting units included within the framework of the test. The reactions also contained some requests for changes, which were integrated in the set where they were found to improve its suitability for practical application. None of these changes, however, fundamentally altered the substance and findings of the preliminary final version agreed with the experts.

The following persons and hunting units participated in the test of the practical relevance of the set:

- Ing. Martin Artner (Altzinger’sche Forstverwaltung/Altzinger Forest Administration)
- DI Josef Kerschbaummayr (Österreichische Bundesforste AG; Forstbetrieb Gmunden/Austrian Federal Forests; Gmunden Forestry Operation)
- Georg Krautgartner (Österreichische Bundesforste AG; Forstbetrieb Gußwerk/Austrian Federal Forests; Gußwerk Forestry Operation)
- L. Messner (Forschungsfonds für Umweltstudien/Research Fund for Environmental Studies, FUST-Achenkirch, the Tyrol)
- DI Hans Müller (Carinthian forest owner)
- DI Gottfried Pausch (Österreichische Bundesforste AG; Nationalpark-Forstverwaltung Eckartsau/Austrian Federal Forests/National Park Forest Administration Eckartsau)
- DI Dr. Dieter Stöhr (forestry expert, the Tyrol)
- Ing. Josef Zandl (Gutsverwaltung Fischhorn/Fischhorn Estate Management, Salzburg)

6.3 Dealing with Individual Arguments

The reactions which arrived after the practical test contained several suggestions and requests for changes. A considerable number of the suggestions related to subject areas that had already been discussed extensively among the group of experts. Concrete requests for changes were integrated in the framework where they improved its suitability for practical application. In one case, they referred to a change in the structuring of a principle (making two criteria out of one), and in a few cases, slight changes in the evaluation set of some sub-criteria were asked for. They brought about an improvement in clarity without changing the contents and substance of the sub-criteria.

6.4 Workshop

Following discussion among a restricted group of experts and the test of practical applicability, the study was summarised in a preliminary draft report. In order to present this draft report to a broader audience and to get their expert opinion, a workshop was held in the marble hall of the Austrian Federal Ministry of Agriculture and Forestry, Environment and Water Management on Stubenring, Vienna, on 28/08/2001.

A diverse group of specialists and potentially interested participants were invited and sent copies of the draft report. The workshop focussed on the following four key subjects:

1. Giving an outline of the existing situation (legal and societal framework conditions in the context of aspects of sustainability, international conventions and processes, etc.)
2. Presentation of the set of principles, criteria, and indicators as well as the evaluation scheme developed
3. Discussion of groups of issues: framework conditions, structure of the set, indication and score, evaluation and application, communication and implementation
4. Summary and conclusions

The discussion following the presentation was to the point and constructive. Suggestions, additional points, and requests for changes were to a great extent integrated into this final report.

Summary of the issues discussed

The discussion at the workshop focussed on five thematic areas. Statements in this context are presented here without comment:

- **Basic responses to the work accomplished**

The present study was commended in various ways, and it was noted that it addresses current problems as well as making a valuable contribution to a more objective approach. The opening up of the subject of hunting to everyone was considered positive. The present model will for the first time make it possible for hunting to put itself to the test. Its aim is to secure the involvement and personal responsibility of those who take part in hunting, rather than to lay down rules and regulations for every minute detail.

There was criticism of the lack of a political assessment of the model's application. In this context, a proposal was made to go beyond mere self-assessment and also consider an examination by independent testing systems.

- **Sustainability and Linking with other Sectors**

There was consensus among the participants that hunting should not be looked at in isolation when it comes to sustainability. Rather, the study should be integrated with other sectors of sustainability in an overall sustainability strategy. In particular, the impacts of tourism on hunting should be included.

On the one hand, there was a demand for sustainable hunting to allow sustainable forest management. On the other hand, the idea was expressed that the "forest" as wildlife habitat would be better placed in a context relevant to forestry.

In connection with the discussion as to whether “sustainable use” could only exist if there was actual consumptive use, the following statement was made: Certain wildlife species that jeopardise the population of other species (e.g. fox inoculated against rabies, whose population increases strongly), can be regulated without being used in the sense of consumption.

- **Assessment Unit**

At the Workshop, larger units of assessment than the individual hunting ground (115 hectares at minimum) were called for in order to measure the sustainability of hunting. On the one hand, the need to look beyond the limits of the hunting ground was recognised, even if the hunting ground does not contain a forest with a protective function. This is why a separation of assessment units on the supra-regional, regional, and provincial levels and the level of individual operations was being considered. On the other hand, the participants insisted that the individual hunting ground had to remain the unit of assessment. At any rate, however, the subject of “larger areas” ought to be dealt with in greater detail in the present study.

Finally, there was call for a list showing to which level of reference the respective principle, criterion or indicator should apply. However, exceptions ought to be possible, provided they can be accounted for. This request was met by adding information to this effect to the explanations.

- **Assessment**

Both when the principles, criteria, and indicators were worked out, and at the subsequent discussion among a smaller group of experts, as well as at the Workshop, the question as to whether the set should include so-called “KO” (knock-out) criteria, was intensively debated. KO criteria would be individual criteria which, upon their non-completion, would immediately render a hunting practice non-sustainable, i.e. a negative result regarding one such criterion would not be compensated by scoring particularly well regarding other criteria. The introduction of KO criteria was discussed mainly with a view to game damage to forest vegetation. It is difficult to respond to this issue with the principle that the person under whose responsibility the damage falls should pay for it. What, if game damage occurring on one’s own hunting ground, is, for example, due to wrong hunting practice in the neighbouring hunting ground? Or if, for example, game damage has been caused by forestry practices resulting in increased susceptibility to game damage? In the latter case, forest-related sustainability criteria would have to make this case a KO criterion, in order to allow sustainability also from that side. In the course of numerous discussions, the prevailing opinion was that an assessment using the above point system should render sufficient information for current hunting activities and make valuable suggestions for the future. As a result, the idea of introducing obligatory KO criteria was discarded for the time being.

Under special local or regional conditions and upon due justification, KO criteria or KO principles can, however, be specified in particular with regard to the ecological aspects. Individual sub-criteria, however, should not be used as KO criteria (with the exception of Sub-criterion 9, Chapter 3.1.1.2.4, “*Preventing game damage unacceptable in terms of regional culture*,” in case of massive impairment of the ecosystem due to hunting-related game influence brought about by the fault of the responsible person and of relevance in terms of regional culture.

We were further alerted to the fact that with regard to certain assessment units, certain aspects are not relevant, e.g. if the protective function of the forest is minimal or if the region does not contain forests. In this context, it was pointed out that the maximum possible point scores ought to be variable depending on the nature of the hunting ground (e.g. if there is no protective forest). Dropping individual sub-criteria not applicable under certain conditions would thus result in a reduction of the maximum point score. A concluding proposal was to evaluate the three groups of aspects (ecology, economy, socio-cultural aspects) separately by expressing the assessment result of each aspect in terms of percentage of the maximum point score to be gained, and to use the resulting percentage for classification (cf. Chapter 4.1).

- **Further Issues**

With reference to land owners, it was pointed out that a certain percentage of the hunting area should be defined as and made “game-friendly” (e.g. grazing areas for game).

The term “nature protection” was considered significant and should thus be mentioned under criteria and explanations. In order to come closer to finding a real solution to the “forest/game” conflict, the economic aspects of forestry would have to be taken into account.

It was suggested that the cultural aspect of hunting should be considered. In order for the individual hunt (one single hunter) to be continued, it might be listed as a cultural good under the socio-cultural aspects, thus documenting its value. The subject of “feeding”, in particular in red deer hunting grounds, was repeatedly discussed. In this context, the issues of “winter fences” and “use of medication” were brought up. A proposal was made to consider these topics under Criterion 3.1.1.4 “*Giving consideration to habitat capacity*,” as a feature of sustainable hunting. It was pointed out, however, that well-functioning examples for feeding and use of winter fences actually existed.

Another suggestion was to examine connections and/or inconsistencies regarding game weights and the admission of natural population dynamics (e.g. also overpopulation).

Furthermore, a framework of reference with respective reference values (“benchmarking”) was called for in order to be able to respond to questions as to “What is the final state of matters we are aiming at?” and “Are there possibilities to examine via monitoring whether we are reaching our goals?”.

Thus, all criteria should be examined to see whether they allow wildlife populations rich in species, genetically diverse, as close as possible to natural behaviour, and living in harmony with the ecosystem. Furthermore, the assessment framework ought to be examined as to its suitability for application to sustainable hunting of migrating species (e.g. ducks).

6.5 Publication of the Final Report

Following a revision in several stages of the concept and the draft version of the report allowing the incorporation of justified criticism and proposals for improvement, the final report was finished and the study was published under the title “Criteria and Indicators of Sustainable Hunting” (ENVIRONMENT AGENCY, 2001).

6.6 Interactive Platform on the Internet

The results of the working process plus additional background information were made available on the World Wide Web in October of 2002 in the form of an interactive Internet platform (www.biodiv.at/chm/jagd), thus making them widely accessible. The user-led Internet presentation allows particularly the target group of practical hunters to examine their hunting practice online, on their own and in a time-efficient manner via an electronic self-assessment form. The programming is designed so as to automatically generate evaluations and graphic representations of the result. In addition, the full original wording of the report can be downloaded in pdf-format. The motives behind the project as well as its progress are given, together with an explanation of the assessment methods it is based on. Moreover, the site offers further information on the subject of “hunting and sustainability” as well as a comprehensive service-section including a glossary of technical terms, selected literature and links.

Voluntary user response is registered via an electronic feedback form, in accordance with the conception of the assessment framework as a dynamic, learning expert system. Comments, remarks and suggestions thus conveyed serve as inputs for the further development of the assessment framework.

6.7 Publication of an English Translation

In order to make the results available to an international public and as a consequence of the strong international feedback, the study was translated into English with the financial support of the Fund for Environmental Studies Tyrol (Förderungsverein für Umweltstudien, FUST). The contents of the English version are identical with that of the German version. The translation was published on the World Wide Web as a Monograph of the Environment Agency, Vol. 163, as part of an English-language module of the Internet platform (www.biodiv.at/chm/jagd). It is currently only digitally available.

6.8 Further Development and New Publication

Following a year of test runs, the Criteria and Indicators of Sustainable Hunting were further developed, adjusted and improved on the basis of responses from practical hunting. Along with reactions received via the Internet and written and oral statements mostly referring to specific aspects, we based the revision process mainly on practical application in hunting areas in order to gain a critical evaluation of the entire assessment framework. Practical applications were made on the spot, in co-operation with the persons responsible for hunting, and jointly analysed in extensive in-depth expert interviews. As for the selection of hunting areas to be tested, the emphasis was on a broad geographical spread, in order to cover as wide a range as possible of the major Austrian types of wildlife habitats with various different main game species – from the forest-dominated cloven-hoof area to large predators and the typical open-terrain small game area. Furthermore, different forms of hunting ground organisation and ownership structures (proprietor’s hunt, co-operative hunt) were also represented.

Experience of and responses from hunting practice were evaluated, analysed and discussed among the team of authors, and have been incorporated in the revised version in cases where a potential for improvement, supplements or amendments was identified.

In the course of the consultation process, an extended circle of participants in the participatory working process of the first publication (experts and representatives of various different stakeholder groups related to hunting, cf. also Chapter 6.1) was invited to harmonise the draft of the revised version both in a Workshop and through written statements. After the draft was submitted for expert advice, proposals for amendments were discussed at the Workshop and directly integrated into the study. The result is the present final version, on which all participants in the Workshop agreed. Written suggestions and statements were carefully worked over and edited by the team of authors, taken into account as far as possible, and included in the discussion of the draft at the Workshop.

The contributions of all participants in the course of the harmonising process have contributed significantly to improving the practical relevance and user-orientation by including justified proposals for amendments and additions. Content-related aspects not sufficiently covered before, e.g. socio-cultural aspects, have now been given stronger emphasis, and aspects relating to small game were better integrated.

- Following is a detailed account of the revision process:
- Internet appearance and one-year test phase;
- Registration and evaluation of responses;
- Practical application in hunting areas and joint analysis with the persons responsible for hunting;
- Discussion, analysis and evaluation of all contributions among the team of authors;
- Drafting of the revised study;
- Sending out of the draft of the revised study to the active participants in the participatory working process of the first publication (cf. Chapter 6.1 to 6.4) and invitation to a Workshop as well as to comment in writing;
- Discussion of suggestions, requests for amendments and written statements in a Workshop: agreement on amendments and integration into the draft;
- Sending out of a protocol on the results;
- Final editing, conclusion of the final report of the revised version and new publication of the study.

We would like to thank the following hunting operations and persons for participating in the practical application:

- ÖBf (Österreichische Bundesforste) AG (Austrian Federal Forests) – Forstbetrieb Steyr (Steyr forestry operation), Oberösterreich:
Karl Gschliffner, Forstmeister-Stellvertreter (ÖBf-Forstbetrieb Steyr) (Deputy head of forestry field office, Austrian Federal Forests Operation, Steyr);
Franz Jocher, Revierförster (ÖBF-Forstbetrieb Steyr) (Head of forest division, Austrian Federal Forests Operation, Steyr);
Walter Wagner (ÖBf-Nationalparkverwaltung Reichraming und Bärenanwalt des WWF für Oberösterreich) (Austrian Federal Forests National Park Administration Reichraming and bear specialist of the WWF for Upper Austria)

- Forstfonds (Forest Fund) “Stand Montafon”, Vorarlberg: DI Hubert Malin, operations manager; in co-operation with a forester and a forest warden of the operation and a forest warden of the Province of Vorarlberg.
- Jagdgenossenschaft Wildendürnbach, Niederösterreich (Hunting Co-operative Wildendürnbach, Lower Austria): Bezirksjägermeister Gottfried Klinghofer (Senior Representative of the Official Hunters’ Association of the District of Mistelbach); Jagdleiter Herbert Fritz (leader of hunting parties, Wildendürnbach hunting area); Christian Stöger (member of the hunting co-operative of Wildendürnbach).

6.9 Changes as Compared to the First Publication

Besides some linguistic smoothening and adaptations, changes were mainly made with regard to the following aspects:

- The range of application was widened in order to cover the spectrum of sustainable hunting more precisely. Thus, newly defined principles, criteria and sub-criteria plus corresponding indication and valuation schemes were added to the assessment framework, including newly phrased explanatory notes and recommendations for practical application. The following elements were entirely newly defined:
 - two principles: Chapter 3.3.5, Chapter 3.3.6;
 - four criteria: Chapter 3.3.3.2, Chapter 3.3.5.1, Chapter 3.3.6.1 und Chapter 3.3.6.2;
 and
 - 13 sub-criteria: No. 3 (Chapter 3.1.1.1.3), No. 12 (Chapter 3.1.1.3.2), No. 28 (Chapter 3.2.1.1.3), No. 36 (Chapter 3.2.4.2.2), No. 38 (Chapter 3.3.1.1.2), No. 41 (Chapter 3.3.3.1.2), No. 42 (Chapter 3.3.3.2.1), No. 43 (Chapter 3.3.3.2.2), No. 47 (Chapter 3.3.4.2.3), No. 48 (Chapter 3.3.5.1.1), No. 49 (Chapter 3.3.5.1.2), No. 50 (Chapter 3.3.6.1.1) and No. 51 (Chapter 3.3.6.2.1).

The changes in content relate to all three aspects of sustainability. We were able to repair omissions particularly in relation to the socio-cultural aspects. The entire assessment framework now comprises 13 principles, 24 criteria and 51 sub-criteria plus corresponding indications.

- In order to improve the precision of assessment, several already existing principles, criteria and sub-criteria were defined more precisely from a practical point of view and rendered more specific in terms of contents and wording. This was achieved to some extent by supplementing or concretising explanations and recommendations for application. Also, several key concepts were specified to a greater degree.
- One sub-criterion, which has turned out to be of limited practical applicability, was dropped entirely.
- In some cases, the scaling of indicators was fine-tuned by re-adjusting valuations (point scores), the band-width of scales and the spreading of valuation schemes (changed number of valuation scales, changed maximum and minimum score per indicator).

- Indicators were made more easily verifiable.
- Optional sub-criteria were avoided; instead, there is now a valuation choice of “*not applicable*” for sub-criteria that may not apply under all circumstances. More detailed attention is given to the subjective, role-dependent points of view of various different groups of actors in hunting (most of all lessors/land owners and tenants/hunting customers); this is of particular significance to some sub-criteria under the economic aspects of sustainability.
- In order to make the revision process transparent and comprehensible, the technical report on the development of the assessment system (cf. Chapter 6) was brought up to date and now includes the various stages of the work undertaken since the first publication (cf. Chapters 6.6 to 6.11).
- Formally, the order of presentation of some principles (including the corresponding criteria and sub-criteria) was changed. Also, lay-out and visual adjustments were made: graphs as well as fictitious evaluation examples were added, and the synoptic table in Chapter 3.4 was re-designed for greater clarity.

6.10 Updating the Interactive Internet Platform

The entire interactive Internet platform "Criteria and Indicators of Sustainable Hunting" (www.biodiv.at/chm/jagd) on the World Wide Web is being brought up to date, and the electronic self-assessment tools on the website is being re-programmed in accordance with the results of the revising process.

6.11 Summary of the Working Process

Starting with a core team, the “Criteria and Indicators of Sustainable Hunting” were developed in a gradually expanding, broadly-designed participatory process. By integrating representatives and stakeholders of land user groups, economic branches and scientific disciplines relevant to wildlife and hunting (most of all wildlife management, forestry, agriculture, nature protection and conservation, hunting science, wildlife biology), a large circle of experts and persons concerned were able to actively make available their theoretical and practical knowledge and experience in the course of a bottom-up process, and to participate in defining criteria and indicators.

It turned out to be opportune to choose a broad, comprehensive and holistic approach, looking at the entire spectrum of sustainability in hunting, including economic and socio-cultural aspects.

In terms of revising the study for re-publication, we placed particular emphasis on making it even more suitable for practical application, responsive to practical requirements, and user-friendly. Feedback from practical hunting and practical application in the hunting areas thus provided the primary input for the modifications we made. A draft revised version by the team of authors was harmonised with experts and stakeholders, including written recommendations. The study was advanced mainly on the basis of a limited enlargement of the contents of the assessment framework, valuation adjustments (scores), specifications and additions both in terms of wording and substance.

Graph 6 (below) is a simplified pattern summarising the basic course of the project.

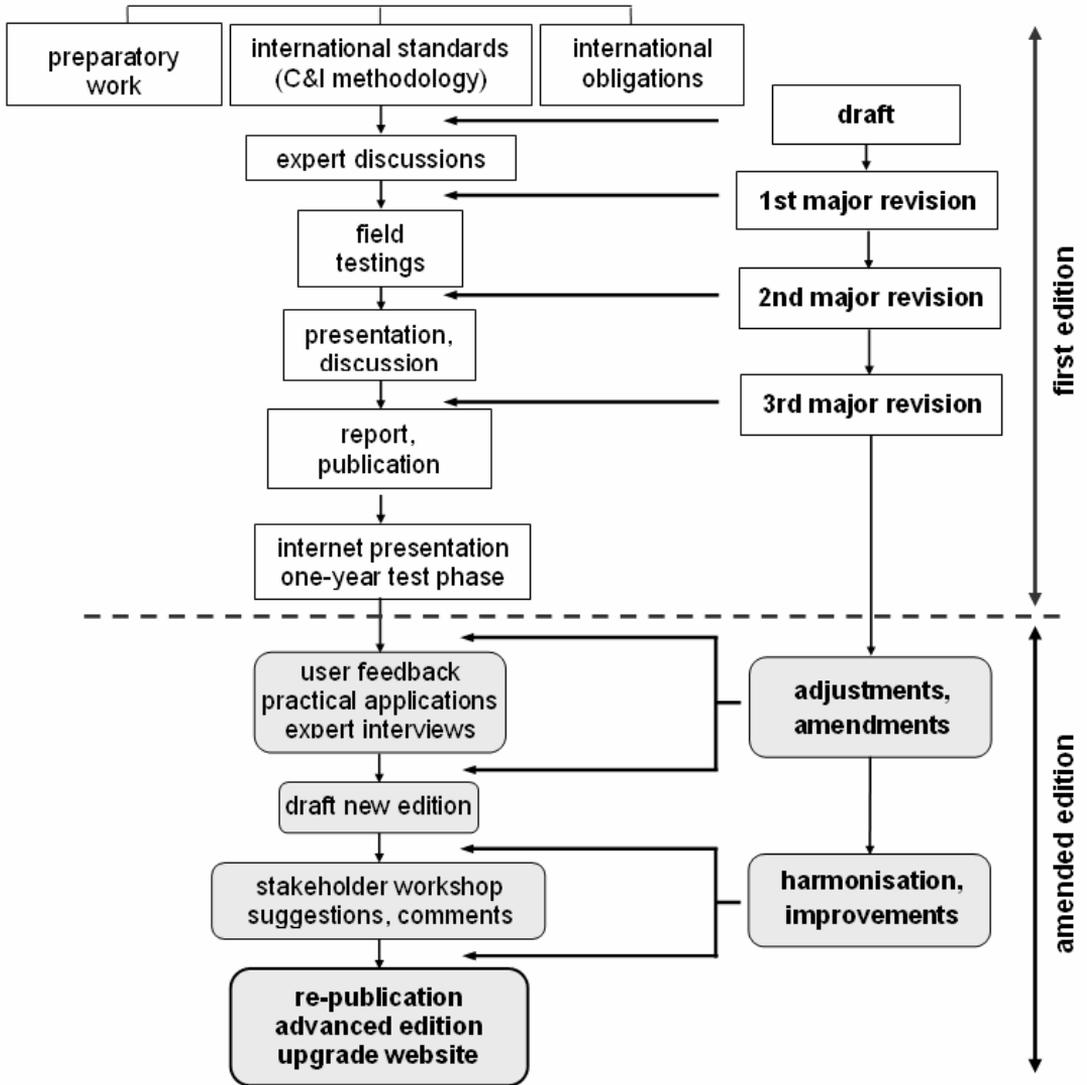


Fig. 6: Pattern of the course of development and advancement of the “Criteria and Indicators of Sustainable Hunting”

7 Outlook

The Principles, Criteria and Indicators for Sustainable Hunting continue to be available on the Internet for practical application. For this purpose, the existing Internet platform “Criteria and Indicators of Sustainable Hunting” (www.biodiv.at/chm/jagd) is being brought up to date and adjusted to the current status of the assessment framework by including modifications made in the course of its revisal. Commentaries and proposals for improvement will be collected for future adjustments in the interest of the dynamic concept of the set. In doing so, we aim at making it as practically applicable and conclusive as possible. At the same time, the present hunting-related aspect of sustainability is to be linked with sustainability criteria of other sectors (agriculture, forestry, tourism, transport, etc.) and successively integrated into a cross-sectoral, overall sustainability strategy. The primary goal at this point is to identify intersections relevant in terms of hunting and wildlife as well as an analysis of the extent to which non-hunting related sectors have to be integrated in order to guarantee the sustainability of hunting, just as sustainable hunting has to meet certain criteria relating to the sustainability of other sectors. The ultimate goal is to integrate hunting and wild animals into an overall concept of sustainable land use.

The main objective of the methodology chosen in this study to assess the sustainability of hunting is for locally concerned persons to feel directly addressed by the Framework of Principles, Criteria, and Indicators, and to address demands of sustainability by making use of this assessment tool on their own accord. This cannot replace the potential need for developing additional monitoring systems for a large-scale objective assessment of sustainable hunting “from outside.” What we should aim at is a combination of the assessment approach developed here and designed for the “user” (primarily hunters) with statistically interpretable monitoring methods for the development of wild animal species and their habitats (e.g. by way of a country-wide network of representative test areas.) This would allow recording the populations or population trends of huntable wildlife within an area of study and comparing them with supra-regional developments in order to take into account the respective findings in terms of future planning of shooting and hunting. Ideally, supra-regional checks ought to be carried out as part of an internationally agreed programme on a supra-regional level, depending on the wildlife species (e.g. populations; in case of migrating birds, at the flyway level.)

A further approach would be to examine hunting laws as to provisions relevant for the sustainability of hunting. If hunters are proved to violate such provisions, this ought to be automatically tantamount to non-completion of the sustainability criteria.

A further significant element to complete the chain of sustainability would be the future integration of guest hunters and hunting tourism. Put into practice, this might be achieved if hunting providers (e.g. offices offering hunting opportunities/events, etc.) design their arrangements in accordance with the criteria of sustainable hunting made available to them. In addition to the criteria for the hunting area chosen, sustainable hunting tourism also requires special assessment criteria for tourism-related aspects of sustainability, both in terms of ecological, economic and socio-cultural aspects (such as the mode of transport/travel to and from the location chosen, accommodation, behaviour in the target area, etc.). In this context, along with the behaviour of (national and foreign) hunting tourists in hunting areas, it would also be worth discussing the behaviour of domestic hunting tourists in foreign target areas.

8 Quoted Literature, further reading and Internet Links

ALPINE CONVENTION (1991): Convention on the Protection of the Alps
<http://www.convenzionedellealpi.org/index.htm>

AUSTRIAN FOREST ACT (2002): Österreichisches Forstgesetz 1975 in der Fassung 2002. BGBl. No. I 59/2002.
<http://bgbl.wzo.at/htmlausgabe.aspx?ID=7799&search=Forstgesetz>

BERN CONVENTION (1979): Convention on the Conservation of European Wildlife and Natural Habitats. Council of Europe.
<http://conventions.coe.int/Treaty/EN/Treaties/Html/104.htm>

BIRDS DIRECTIVE - COUNCIL DIRECTIVE OF APRIL 2 1979 ON THE CONSERVATION OF WILD BIRDS (79/409/EEC).
http://ec.europa.eu/environment/nature/nature_conservation/eu_nature_legislation/birds_directive/index_en.htm

BONN CONVENTION (1979): Convention on Migratory Species (CMS).
<http://www.cms.int>

BRUNDTLAND, G. H. & UNCED – United Nations Conference on Environment and Development (1988): Our common future. Oxford University Press, Oxford.

CBD – CONVENTION ON BIOLOGICAL DIVERSITY (1992).
<http://www.cbd.int/convention/default.shtml>

CBD – CONVENTION ON BIOLOGICAL DIVERSITY (2000): Decision V/6 of the Conference of the Parties to the CBD, 5th meeting, Nairobi, Kenya, May 2000: Ecosystem Approach. In: UNEP/CBD/COP/5/23 2004:

CBD – CONVENTION ON BIOLOGICAL DIVERSITY (2004a): Decision VII/11 of the Conference of the Parties to the CBD, 7th meeting, Kuala Lumpur, Malaysia, 9-20 February 2004: Ecosystem Approach – Annotations to the Rationales and Implementation Guidelines. In: UNEP/CBD/COP/7/21.

CBD – CONVENTION ON BIOLOGICAL DIVERSITY (2004b): Decision VII/12 of the Conference of the Parties to the CBD, 7th meeting, Kuala Lumpur, Malaysia, 9-20 February 2004: Sustainable Use – Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity. In: UNEP/CBD/COP/7/21.

CLEARING-HOUSE MECHANISM BIODIVERSITY – AUSTRIA:

<http://www.biodiv.at/chm>

CLEARING-HOUSE MECHANISM BIODIVERSITY – EUROPEAN COMMUNITY:

<http://biodiversity-chm.eea.eu.int>

DVORAK, M.; RANNER, A. & BERG, H. M. (1993): Atlas der Brutvögel Österreichs. Ergebnisse der Brutvogelkartierung 1981–1985 der Österreichischen Gesellschaft für Vogelkunde. Umweltbundesamt, Wien.

ESSL, F. & RABITSCH, W. (2002): Neobiota in Österreich. Umweltbundesamt, Wien.

ESSL, F. & RABITSCH, W. (2005): Neobiota in Österreich. In: *Aliens: Neobiota in Österreich. Grüne Reihe des Lebensministeriums* Bd. 15. Herausgegeben vom Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft. Böhlau, Wien. S. 28–47.

FEDERAL MINISTRY OF AGRICULTURE, FORESTRY, ENVIRONMENT AND WATER MANAGEMENT (2004): Austrian Action Plan on Invasive Alien Species. Vienna. www.biodiv.at/chm

FEDERAL MINISTRY OF AGRICULTURE, FORESTRY, ENVIRONMENT AND WATER MANAGEMENT (2002): The Austrian Strategy for Sustainable Development. Vienna.

FEDERAL MINISTRY OF ENVIRONMENT, YOUTH AND FAMILY AFFAIRS (1998): Austrian Implementation Strategy for the Convention on Biological Diversity. Vienna.

<http://www.biodiv.at/chm>

FEDERAL MINISTRY OF THE ENVIRONMENT (1995): National Environmental Plan. Vienna.

GLUTZ VON BLOTZHEIM, U. & BAUER, K. (1973): Handbuch der Vögel Mitteleuropas, Band 5: Galliformes und Gruiformes. Wiesbaden.

IUCN – THE WORLD CONSERVATION UNION (1994): IUCN Red List Categories. Prepared by the IUCN Species Survival Commission. As approved by the 40th meeting of the IUCN Council. IUCN, Gland, Switzerland. 22 p.

IUCN – THE WORLD CONSERVATION UNION (1999): IUCN Red List criteria review provisional report: Draft of the proposed changes and recommendations. Species 31/32. pp. 43–57.

IUCN – THE WORLD CONSERVATION UNION (2000): The IUCN Policy Statement on Sustainable Use of Wild Living Natural Resources adopted at the IUCN World Conservation Congress Amman, October 10, 2000.

http://www.iucn.org/themes/ssc/susg/docs/valeurs_annex2.pdf

IUCN – THE WORLD CONSERVATION UNION (2003): Austrian Government Issues Sustainable Hunting Principles. Meldung auf der Homepage der IUCN vom 7. September 2003.

<http://www.iucn.org/themes/ssc/susg/susgs/englishhuntingprinc.html>

IUCN-ESUG WISPER - THE WORLD CONSERVATION UNION, EUROPEAN SUSTAINABLE USE SPECIALIST GROUP, WILD SPECIES RESOURCES WORKING GROUP (2006): Guidelines on Sustainable Hunting in Europe. September 2006. http://www.iucn.org/themes/ssc/susg/docs/WISPERguidelines210906_1.pdf

LEBERSORGER, P. & ZEILER, H. (2005): Neobiota aus der Sicht der Jägerschaft. In: *Aliens: Neobiota in Österreich. Grüne Reihe des Lebensministeriums* Bd. 15. Herausgegeben vom Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft. Böhlau, Wien. S. 205–212.

LEXER, W.; REIMOSER, F.; HACKL, J.; HECKL, F. & FORSTNER, M. (2005): Criteria and Indicators of Sustainable Hunting – The Austrian Assessment Approach. In: *Wildlife Biology in Practice*, Vol. 1, No. 2 (2005). pp. 163–183.

MCPFE – MINISTERIAL CONFERENCE ON THE PROTECTION OF FORESTS IN EUROPE (1990): Decisions and Resolutions of the First Ministerial Conference on the Protection of Forests in Europe. December 1990, Strasbourg. <http://www.mcpfe.org>

MCPFE – MINISTERIAL CONFERENCE ON THE PROTECTION OF FORESTS IN EUROPE (1993): Decisions and Resolutions of the First Ministerial Conference on the Protection of Forests in Europe. 16–17 June 1992, Helsinki. <http://www.mcpfe.org>

MCPFE – MINISTERIAL CONFERENCE ON THE PROTECTION OF FORESTS IN EUROPE (1998): Decisions and Resolutions of the First Ministerial Conference on the Protection of Forests in Europe. June 1998, Lisbon. <http://www.mcpfe.org>

MCPFE – MINISTERIAL CONFERENCE ON THE PROTECTION OF FORESTS IN EUROPE (2003): Decisions and Resolutions of the First Ministerial Conference on the Protection of Forests in Europe. 28–30 April 2003, Vienna. <http://www.mcpfe.org>

PRIMACK, R. B. (1998): Essentials of conservation biology. 2nd edition. Sinauer, Sunderland. 660 p.

REIMOSER, F.; LEXER, W.; FORSTNER, M.; HACKL, J. & HECKL, F. (2003): Kriterien und Indikatoren einer nachhaltigen Jagd. In: *Zeitschrift für Jagdwissenschaft* 49 (2003). S. 275–287.

SCHUSTER, A. (2005): Ausgewählte Neozoen: Vögel. In: *Aliens: Neobiota in Österreich. Grüne Reihe des Lebensministeriums* Bd. 15. Herausgegeben vom Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft. Böhlau, Wien. S. 121–132.

UMWELTBUNDESAMT (1997): Jagd und Nachhaltigkeit – Workshopergebnisse. Tagungsbericht, Bd. 21. Umweltbundesamt, Wien. www.umweltbundesamt.at

UMWELTBUNDESAMT (2001): Forstner, M.; Reimoser, F.; Hackl, S. & Heckl, F.: Kriterien und Indikatoren einer nachhaltigen Jagd. Monographien, Bd. M-158. Umweltbundesamt, Wien. <http://www.biodiv.at/chm/jagd>

UMWELTBUNDESAMT (2002): Kriterien und Indikatoren einer nachhaltigen Jagd. Interactive Internet platform with electronic online self-assessment.

www.biodiv.at/chm/jagd

UMWELTBUNDESAMT (2003): Forstner, M.; Reimoser, F.; Hackl, S. & Heckl, F.: Criteria and Indicators of Sustainable Hunting. Monograph No. M-163. English Translation of Monograph No. M-158 (2001). Available only in digital format.

www.biodiv.at/chm/jagd

UNCED (1992a): Rio Declaration on Environment and Development. General Assembly of the United Nations, document A/CONF.151/26 (Vol. I).

<http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm>

UNCED (1992b): Agenda 21. Global Programme of Action for Sustainable Development.

<http://www.un.org/esa/sustdev/agenda21text.htm>

ZEILER, H. (1996): Jagd und Nachhaltigkeit. Monographien, Bd. M-73. Umweltbundesamt, Wien. www.umweltbundesamt.at

ZULKA, K. P. (2005): Rote Listen gefährdeter Tiere Österreichs: Säugetiere, Vögel, Heuschrecken, Wasserkäfer, Netzflügler, Schnabelfliegen, Tagfalter. Checkliste, Gefährdungsanalysen, Handlungsbedarf. Herausgegeben vom Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft. Böhlau Verlag, Wien.

ZULKA, K. P.; EDER, E.; HÖTTINGER, H. & WEIGAND, E. (2001): Grundlagen zur Fortschreibung der Roten Listen gefährdeter Tiere Österreichs. Monographien, Bd. M-135. Umweltbundesamt, Wien.

<http://www.umweltbundesamt.at/fileadmin/site/publikationen/M135.pdf>