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EUROPEAN CODE OF CONDUCT ON HUNTING AND IAS

FINAL DRAFT

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on behalf of the Bern Convention

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1. INTRODUCTION

Invasive alien species (IAS) have been identified as one the most important direct drivers of biodiversity loss and ecosystem service changes. Many international policy instruments, guidelines and technical tools have been developed to address the threat of IAS.

The Convention on Biological Diversity (CBD) at art. 8(h) calls for parties "as far as possible and as appropriate, (to) prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species". In 2002 the CBD Conference of the Parties adopted the *Guiding Principles on Invasive Alien Species* (Decision VI/23) as a basic policy response. The first CBD guiding principle state that prevention is generally far more cost-effective and environmentally desirable than measure taken after IAS introductions.

The Millennium Ecosystem Assessment (2005) highlighted the absence of an adequate regulation for several pathways of introductions and considered the adoption of measures to control major pathways as a fundamental goal to address the IAS threats to biodiversity (Goal 6).

A *European Strategy on Invasive Alien Species* was adopted in 2003 by the Bern Convention (Genovesi and Shine, 2004). The strategy identifies priorities and key actions in order to prevent or minimise adverse impact of IAS, and proposes measures required to recover species and natural habitats affected by IAS. Prevention measures are a priority of the strategy and one of the key actions is the pathways identification and management.

Europe, characterized by a territorial continuity, a high volume of trade, tourism and transport, and by a free trade regime, indeed requires a coordinated approach to IAS, also implemented at the supranational scale. Any European policy would require balancing regulatory and voluntary measures in order to address key pathways of IAS introduction into the region, such as pet trade, forestry, aquaculture, horticulture, etc. The European Commission is focusing on the regulatory aspects, and is drafting an EU legal tool on IAS, but it is also crucial to encourage responsible behaviours also through agreed standards, best-practice guidelines, or codes of conduct.

Voluntary codes of conduct and best practices are in fact considered as fundamental flexible "implementation" tools which could be scaled up with support from public bodies, industry federations, user groups and/or NGOs as appropriate, with the aim of ensuring responsible, proactive policies, and applying these in a coherent manner across Europe (Shine *et al*. 2010). On the other hand, the principle of self-regulation is considered to be more successful and effective than any other legally binding scheme.

For this reason the Bern Convention, with the technical support of the IUCN SSC Invasive Species Specialist Group, has started to develop a series of voluntary instruments (codes of conduct and guidelines) covering a number of industries, activities or contexts potentially responsible for the introduction of alien species (horticulture, hunting, pets industry, botanical gardens, zoological garden and aquaria, protected areas). The development of these instruments can play an important

role in building awareness among key societal sectors, and is fully in line with Aichi Target 9 of the Strategic Plan for biodiversity 2011–2020 (CBD-COP, Nagoya, 2010, Decision X/38): "by 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment", and with Target 5 of the EU Biodiversity strategy to 2020.

Hunting has, for centuries, been one of the most important pathways for the introduction of alien birds and mammals as quarry. In addition, escapes occurred using animal-aided hunting techniques (e.g. falconry, ferreting) caused a number of unintentional introductions of alien predators, with ecological and genetic consequences. Nevertheless, in the last decades, intentional introduction have became much less common, primarily as a consequence of an increase of natural populations of game species, but also because of a deep change in the regulatory framework and in hunters' approach to the wildlife management. However hunting still remains an "open gateway" for alien species, especially because of massive restocking of small game – including alien game species - annually carried out by hunter's associations as well as private landowners and public agencies, and illegal introductions of new alien species for hunting purposes, still occasionally reported in Europe.

In the case of hunting, the adoption of a voluntary code of conduct might contribute, at the same time, to increase awareness toward IAS in this important sector of the society, on the one hand reducing the risk of hunters causing new accidental or intentional introductions of IAS, and on the other hand to highlight the central role that hunters can play in contrasting IAS, for example by supporting surveillance, monitoring and mitigation of the impacts caused by invasive species.

The importance of this issue has already been acknowledged by hunters. In the recent *Manifesto for Biodiversity* (2010), European hunters, represented by the Federation of Associations for Hunting and Conservation of the European Union (FACE) and its Members, stated the necessity to identify, control and avoid the introduction of alien animal and plant species.

Such a need is also clearly expressed in the *European Charter on Hunting and Biodiversity*, established in collaboration between FACE and the International Council for Game and Wildlife Conservation (CIC), and adopted by the Bern Convention in 2007. The Charter is aimed at promoting principles and guidelines to ensure that hunting in Europe is practiced in a sustainable manner, while avoiding negative impacts on biodiversity. One principle of the Charter focuses on hunting and alien species (4th: "Maintain wild populations of indigenous species with adaptive gene pools") and provides some guidelines to regulators and managers.

The present document provides a background documentation, based on the most updated available information on hunting and invasive species, for developing a Code of Conduct on Hunting and Invasive Alien Species, that is presented in the second part of the document.

2. AIM AND SCOPE

The present Code of Conduct aims to provide a set of voluntary principles for hunters and hunting managers to be adopted in order to improve sustainability of hunting, avoiding negative impacts caused by the introduction and spread of invasive alien species for hunting purposes, and to strengthen the contribution of hunters to the management and conservation of biodiversity.

The Code takes into account the existing initiatives and relevant obligations and principles of the Directive 79/409/EEC (the Birds Directive), the Bern Convention and the Convention on Biological Diversity (CBD). Furthermore, the Charter is based on the Malawi and Addis Ababa Principles for a conservation of biodiversity through the sustainable use (hunting included) of its components.

This European Code of Conduct on Hunting and IAS is a contribution to the implementation of points (1) *Building awareness and support*, (5) *Prevention*, (6) *Early detection and rapid response* and (7) *Mitigation of impacts* of the European Strategy on Invasive Alien Species (Genovesi and Shine, 2004).

Furthermore, the Code represents a contribution of the hunters to the "2020 European Strategy on biodiversity" and to the Strategic Plan 2011-2020 of the CBD (http://www.cbd.int/cop/cop-10/doc/press/press-briefs-en.pdf).

Scope of this Code is to deepen some aspects of the issue "hunting and IAS" and to contribute to enhance what already stated mainly in the European Charter on Hunting and Biodiversity.

The Code uses the definitions agreed by (1) the Conference of the Parties to the Convention on Biological Diversity for the purposes of the CBD Guiding Principles, (2) the European Strategy on Invasive Alien Species adopted by the Bern Convention and (3) the international scientific community (see Box 1: Terminology).

TERMINOLOGY

- "**alien species**"[1] (syn. non-native, exotic) refers to a species, subspecies or lower taxon, introduced outside its natural distribution (past or present); includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce, as well as domestic forms and feral animals of domestic species (dogs, ferrets, etc.);
- "**invasive alien species**"[1] means an alien species whose introduction and/or spread threaten biological diversity;
- "**introduction**"[1] refers to the movement by human agency, indirect or direct, of an alien species outside of its natural range (past or present). This movement can be either within a country or between countries or areas beyond national jurisdiction;
- "**intentional introduction**"[1] refers to the deliberate movement and/or release by humans of an alien species outside its natural range;
- "**unintentional introduction**"[1] refers to all other introductions which are not intentional;
- "**ancient introduction**"[2,3] refers to introduction of alien species in ancient historic times (e.g. archeophytes, alien plants introduced before ca. 1500, both deliberately or accidentally, regardless of invasion status).
- "**re-stocking**"[5] is the movement of numbers of animals of a species with the intention of building up the number of individuals of that species in an original habitat;
- "**establishment**"[1] refers to the process of an alien species in a new habitat successfully producing viable offspring with the likelihood of continued survival;
- "**pathway**"[2] refers to the human activity that gives rise to an intentional or unintentional introduction;
- "**eradication**"[4] refers to the complete and permanent removal of all wild living populations of a species from a specific area by means of a time–limited campaign;
- "**containment**"[2] refers to the management of IAS to prevent (or retard) its spread to other areas, including rapid response to outbreaks.
- "**control**"[2] refers to the management of IAS to reduce density and abundance to keep its impact to an acceptable level in the long term.
- "**rapid response**"[2] means the prompt removal of an AS, before it becomes established or reaches a certain level of population and/or range expansion;
- "**surveillance**"[2] is an activity aimed at detecting, identifying and locating species new to a defined region; as such, surveillance is a pivotal element of an early warning and rapid response system;
- "**monitoring**"[2] is the systematic collection of data over time and space to track ecological changes or biological responses to implemented actions (e.g. eradication and control).

Sources: [1]CBD Decision VI/23; [2]COE European Strategy on Invasive Alien Species ; [3]Pysek et al., 2004. [4]Encyclopaedia of Biological Invasions. Eds Simberloff, D. and Rejmanek, M. University of California Press .[5]IUCN Position Statement on Traslocation of Living Organism, 1987.

3. BACKGROUND

3.1 Hunters and hunting in Europe

Hunting has always been an integrant part of the cultures and traditions of European rural society, with great differences from country to country. Reasons for hunting have changed through the centuries, passing from subsistence to recreational and management purposes.

At present, in Europe there are more than 7,300,000 hunters (data from FACE updated to 2010), with a density of about 1.3 hunters/km^2 and a mean of 1 hunter every 76 inhabitants, but with considerable regional and national differences.

Despite the recent launch of the ARTEMIS portal (European Hunting Bag Data Collection Programme), no comprehensive, and updated information on hunting bag are available. Whilst game bag statistics are available for most European countries, the data sources are disparate and not all are publicly available; data on harvest of lagomorphs are very fragmented, and only for hunted birds and ungulates are there more comprehensive information, although not collected with harmonized methods (Apollonio *et al*., 2010). Several alien species have great importance as game, for example in UK annual common pheasant *Phasianus colchicus* bag was estimated at 12 million (Tapper, 1999) and in France 13.5 million of wild rabbits *Oryctolagus cuniculus* were shot in 1975 and 3.2 million in 1999 (Letty *et al*., 2006).

Hunting is not only an important recreational activity but also a relevant socio-economic activity with direct and indirect benefits mainly on rural economies. In 1995 an annual productivity of about 10 billion euros and generates about 1 job for every 65 hunters in Europe (Pinet, 1995). More recent data estimate at least 120,000 jobs in hunting "industry" (PACE, Recommendation 1689, 2004: http://assembly.coe.int/Main.asp?link=/Documents/AdoptedText/ta04/EREC1689.htm). Hunting for pheasant in the UK alone generates annually over £ 300 million and sustains 26,550 jobs (Tapper, 1999).

3.2 Hunting as pathway of introduction of alien species

Hunting is generally considered one of the most common motivations for the introduction of mammals (in particular *Artiodactyla* and *Lagomorpha*) and birds (in particular *Galliformes* and *Anseriformes*) (Lever, 2005; Nentwig, 2003; Genovesi *et al*., 2012). Blackburn *et al*. (2009) has recently defined the game hunting as the primarily key reason for translocating birds.

To create new hunting opportunities, for meat or recreation, humans have introduced alien species as quarry for centuries. For instance, wild rabbit since the Middle Ages (Long, 2003); fallow deer *Dama dama* since 11th century (Philip Shirley, 1867 in McDonald & Burnham, 2010) and common pheasants since 15th century (Lever, 2005) were introduced as game species in many parts of Europe.

Analysis of data coming from DAISIE database showed that hunting has been the main pathway for deliberated introduction of birds (Kark et al., 2009); hunting has been at the origin of 25% of introduction of birds and 21% of mammals in Europe (Genovesi et al., 2009). Another recent review of European data pointed out "food/game" as a primary introduction pathways for birds (61 species) and mammals (31 species) (Hulme *et al*., 2008).

It must be stressed that the pathways of introduction have significantly changed in the last decades, and nowadays the intentional introduction of new alien game species is much more uncommon (see Box 2: Trend of introduction of alien species for hunting purposes). Several reasons explain this decreased importance: increased awareness of hunters on the problem of biological invasions, changes of national and international regulations, achievement of more sustainable hunting management principles, increase of natural populations of game species.

TREND OF INTRODUCTION OF ALIEN SPECIES FOR HUNTING PURPOSES IN EUROPE

Hunting has always been a fundamental pathway for deliberated introduction of alien birds and mammals with an evident increase in the second part of 19th century (Figure 1).

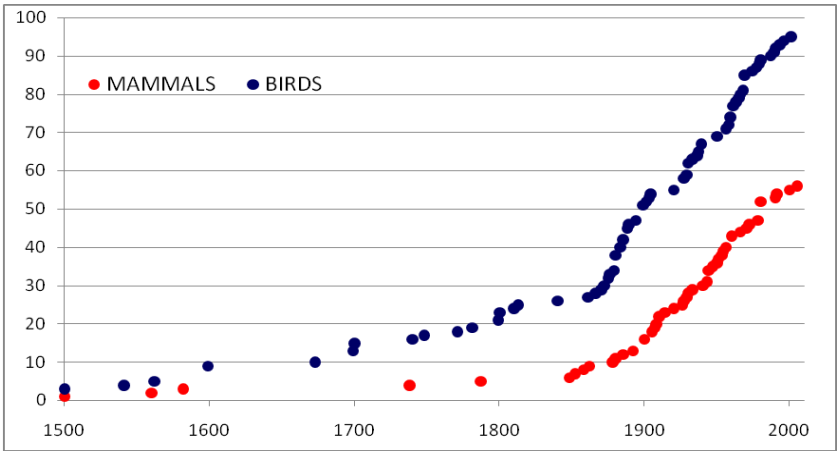

Fig. 1 – Trend of introductions of mammals and birds for hunting purposes: cumulative number of introduction events for hunting purposes occurred in Europe since 1500 (original analysis based on data from DAISIE European Invasive Alien Species Gateway; http://www.europe-aliens.org).

The number of intentional introductions of alien species due to hunting purposes is decreasing since the '80s and resulted to be very low during the last decades (Figure 2).

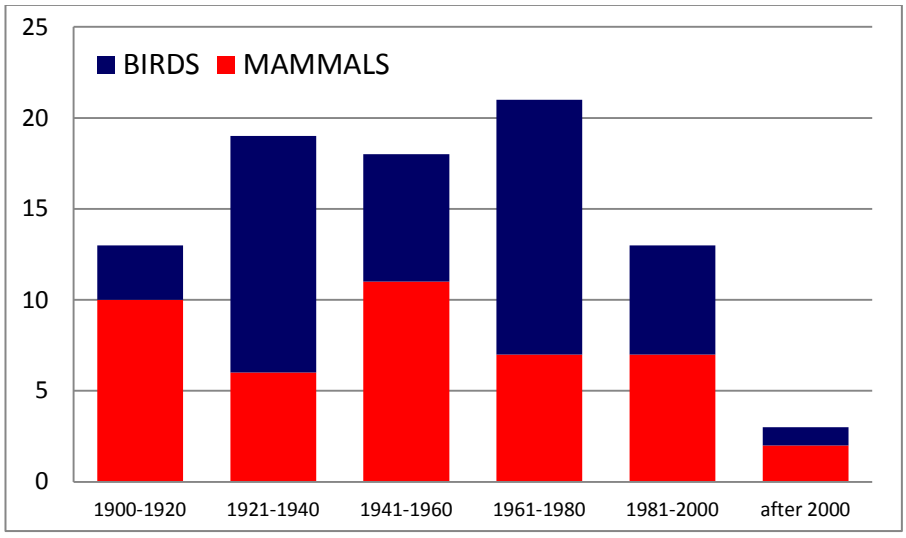

Fig. 2 – Trend of introductions of mammals and birds for hunting purposes: number of introduction events occurred in Europe since 1900 by 20 yrs periods (original analysis based on data from DAISIE European Invasive Alien Species Gateway; http://www.europe-aliens.org).

Pathways of introduction have significantly changed in the last decades. An analysis of the DAISIE database showed that in the last century introduction events for hunting purposes in Europe

decreased from 30% (1900-1920) to 10% (1980-2010) of the total number of known introductions (Figure 3).

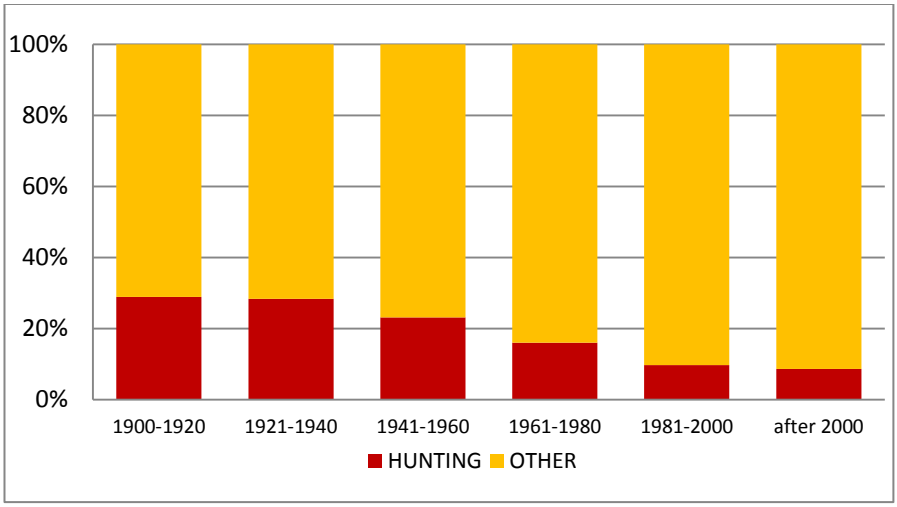

Fig. 3 – Change over time of the role of hunting as a pathway of introduction of alien mammals and birds: percentage of introduction events occurred in Europe since 1900 (data from DAISIE European Invasive Alien Species Gateway; http://www.europe-aliens.org).

At present, the most common introduction of non-native species for hunting is limited to the restocking of small game (mainly pheasants, wild rabbits, hares, partridges). Massive releases of often captive-reproduced game stocks (e.g. 20 million of pheasant are released annually in the UK, Tapper 1999; half a million wild rabbits are restocked annually in France, Letty *et al*., 2006; 100-150,000 chukar partridge *Alectoris chukar* are released annually in Cyprus, Hadjisterkotis, 1998) are made by hunter's associations and public agencies, sometimes by nature conservation funds. Furthermore, new illegal introductions of alien game species are still reported in different countries (e.g the recent cases of the cotton-tail rabbit *Sylvilagus floridanus* in Italy or the wild boar *Sus scrofa* introduced in Ireland, http://www.biodiversityireland.ie/wild-boar-in-ireland/).

In addition to the intentional releases of alien species for hunting purposes, it should also be mentioned the unintentional introductions (escapes) of species used in animal-aided hunting (e.g. falconry, ferreting).

Falconry is an ancient hunting technique defined as "*taking quarry in its natural state and habitat by means of trained birds of prey*" (http://www.i-a-f.org/new/). Falconry, stated as Living Human Heritage by UNESCO in 2010 (http://www.unesco.org/culture/ich/en/RL/00442), is diffuse throughout Europe and often is practised by means of non-native birds of prey many of which are hybrids which may hybridise with the native birds. Several thousands captive bred raptor hybrids are yearly produced in the EU (more than 3,000 in 2005; Kenward & Larsson, 2006) and some of them escape into the wild (642 hybrids escaped in Great Britain from 1983 to 2007, Fleming *et al*., 2011). The chances of a hybrid falcon hybridising further with a native wild species are few, primarily because hybridisation in captivity is nearly always the result of artificial insemination and hybrid of both sexes possess markedly lower fertility, both in the first generation and in the second. Therefore, the risk of hybrid falcons causing an introgression of non-native genes into a wild population is very low.

Nevertheless escaped captive falcons can survive in the wild until the breeding age (over 2 years old) and then produce offspring, as confirmed by the at least 12 proven cases of breeding of hybrids with wild falcons. This means that a risk of introduction of non-native genes through falconry, even if low, appears as unavoidable and must be taken into account, especially in the case of the globally threatened saker falcon *Falco cherrug*, classified as Endangered in the IUCN Red List (Nittinger *et al*., 2006). For this reason 6 of the 16 EU countries where falconry is permitted do not allow the use of hybrids (Kenward & Larsson, 2006).

There is significant polarity surrounding this issue, but it is clear that the risks posed by hybrids as non-native species, even if low, should be addressed in a cohesive manner.

"Ferreting" is a hunting technique using the ferret *Mustela furo*, probably a domesticated form of the European polecat, for chasing rabbits out of their burrows. Ferreting is a long-held tradition that has been practiced at least since the Roman times and that is still used in some European countries (e.g. United Kingdom, Spain, Italy); in Australia it is an important method to control the rabbit plague. Occasionally ferrets are lost and not recaptured after hunting and can form self-sustaining feral populations (Medina & Martin, 2009). Introductions of ferret are reported for New Zealand, Australia, United Kingdom, Spain, Italy (Long, 2003). Ferret is an opportunistic predator that can have severe consequences for native fauna, in particular in island ecosystems where it can pose significant conservation threats to ground and burrow nesting birds, shorebirds and seabirds (Bodey *et al*., 2011; Courchamp *et al*., 2003, Dowding & Murphy, 2001). Moreover there are evidences that it can produce fertile hybrids with the polecat (Davidson *et al*., 1999). Ferrets can also represent an important economic and sanitary threat as a vector of bovine tuberculosis (Caley & Hone, 2005).

Dogs have always been used for hunting and have been bred to hunt many types of quarry using different hunting techniques. Escape of hunting dogs can occur, especially during driven hunting that involve large packs of hounds. Lost dogs, can cause severe disturbance (predation, stress, alteration of distribution, etc.) to many wild species (e.g.: Bateson & Bradshaw 1997, Ciucci & Boitani 2008, Silva-Rodriguez & Sieving, 2012).

3.3 Impacts of alien species introduced for hunting

It must be noted, that only a limited proportion of introduced species successfully establish into the wild, spread, and cause significant impacts on the environment, the economy, or human health (Keller *et al*. 2011). This general pattern also applies to non-native species introduced for hunting purposes. However, several game species have been shown to cause a range of negative consequences on indigenous species and ecosystems (Arroyo & Beja, 2002; Scalera *et al*., 2012):

- competition:
    - in Italy, interspecific competition with the introduced fallow deer *Dama dama* has been identified as the principal cause of the population crash of the endemic subspecies of Roe deer *Capreolus capreolus italicus*, forced into low quality habitats in a Mediterranean woodland, (Focardi *et al*., 2006);
    - a dietary overlap between native red deer and exotic bovids (mouflon *Ovis orientalis musimon* and aoudad *Ammotragus lervia*) has been found in central Spain during limiting summer conditions; this leads authors to hypothesize an interspecific competition and to recommend a control of the introduced species (Miranda *et al*., 2012);
- predation:
    - evidences of substantial predation of threatened reptile and amphibian populations by wild pigs *Sus scrofa* were pointed out analysing the stomach content of shot animals in Georgia, USA (Buck Jolley *et al*., 2010);
    - feral ferrets had a significant predatory impact on the northern brown kiwi (*Apterygiformes mantelli*) an endangered ground nesting bird endemic to New Zealand, that results in a severe population decline (McLennan et al., 1996).
- disease and parasite transmission:
    - introduction of the wapiti deer *Cervus elaphus canadensis* from North America to the Mandria Hunting Preserve (Northern Italy) in 1865 caused the first introduction of the giant liver fluke *Fasciolodes magna* now spread across central Europe (Kralova-Hromadova *et al*., 2010);

  - the alien Sika deer *Cervus nippon* transmitted the Asiatic blood-sucking nematode *Asworthius sidemi* to the 100% of the Polish population of the endangered European bison *Bison bonasus* (Drodz *et al*., 2003);

- genetic pollution:
  - hybridization and genetic homogenization of red-legged partridge *Alectoris rufa* and rock partridge *Alectoris greca* caused by massive introduction of captive-bred stock, often with hybrid from interbreeding with the congeneric chukar partridge *Alectoris chukar* has been documented several times in France, Spain and Italy (Barbanera *et al.*, 2009 and 2010);

- habitat alteration:
  - evidences of a highly negative impact of the rabbit and the aoudad on the abundance and distribution of endemic understory plant species were found in the Canary pine forest in La Palma (Spain) (Garzon-Machado *et al*., 2010);
  - experimental evidences demonstrate the effect of fallow deer browsing on the habitat of common nightingale *Luscinia megarhynchos* and potentially on other birds dependent on dense understory vegetation (Holt *et al.*, 2010).

- diffusion of alien species:
  - rabbits can be a dispersing agent trough endozoochory of the seeds of invasive alien plants, as showed for *Acacia Farnesiana* in Canary Islands (Salas *et a*l., 2009) and for opium poppy *Papaver somniferum* in Chile (Fernandez & Saiz, 2007).

The introduction of non-native game species can also have serious economic impact to agriculture and forestry: in Germany damage to cereal crops, vegetable fields, vineyards and orchards caused by wild rabbits exceed € 5 million per year (Gebhart, 1996); yearly total cost of rabbit damage are estimated to be about € 212 million in UK (Williams *et al*., 2010). In Emilia-Romagna, a region of central Italy, from 2003 to 2007 the common pheasant caused damage to crops for about € 1 million (Emilia-Romagna Regional Government, unpublished data).

Furthermore, hunting has been identified as an indirect pathway of introduction of alien plants (Hulme *et al*., 2008) used by hunters for habitat restoration (e.g. shelter, hedges, small wetlands and woodlands) or food supply to game, (game crops, artificial feeding; e.g topinambur *Helianthus tuberosus* in Poland (Bzdęga *et al*., 2009).

3.4 The role of hunters in IAS surveillance and control

Hunters carry with them a deep, traditional knowledge of species and natural environment and often have close links with rural communities. Across Europe, hunters contribute to the conservation of biodiversity working with scientists through monitoring and research (FACE, 2011). Hunters are thus a very good example of the concept of "citizen science" or "citizen as a sensor", terms used for programs based on the involvement of volunteers to monitor natural resources for improving management and/or research, often allowing scientists to accomplish studies that otherwise would hardly be feasible. It must be stressed that the "citizen science" approach is in general also aimed at promoting a public engagement, information and education. Properly trained hunters could indeed be effectively involved in monitoring programmes of IAS distribution and could play a fundamental role in terms of surveillance on new IAS arrival or introduction, to support an early warning and rapid response system (Gallo & Wait, 2011; Genovesi *et al*., 2010) or to raise awareness on IAS. It must be noted that the European Union is currently evaluating the possibility to develop a EU Citizen Science Reporting System for Invasive Alien Species (http://circa.europa.eu/Public/irc/env/ias/library), where hunters could indeed provide a valuable support.

Examples of the central role that hunters can play in facing with IAS and in raising awareness on this issue are the involvement in monitoring and control of raccoon *Procyon lotor* in Germany since the fifties (Vos *et al*., 2012) or the project on the management of raccoon dogs *Nyctereutes procyonoides* in Scandinavia, headed by The Swedish Association for Hunting (Dahl *et al*., 2010; see Box 3: The role of hunters in controlling invasive alien species: the management of raccoon dog in Scandinavia).

THE ROLE OF HUNTERS IN CONTROLLING INVASIVE ALIEN SPECIES:
THE MANAGEMENT OF RACCOON DOG IN SCANDINAVIA

An example of the central role that hunters can play in contrasting IAS is the development of an early warning system for the Raccoon dog within the Life Project "Management of the invasive Raccoon Dog *Nyctereutes procyonoides* in the north-European countries" (LIFE09 NAT/SE/000344), headed by The Swedish Association for Hunting and wildlife Management (Dahl *et al*., 2010). The project is essentially aimed at preventing the establishment of the raccoon dog in the Nordic countries and to contain its further expansion. The LIFE project is using an innovative management approach based on the following actions:

- monitoring presence and movements of raccoon by IR cameras (with scent lures) and winter tracking;
- capturing animals using traps or dogs;
- sterilization, ear-tagging and radio-tagging (GPS) of all captured individuals;
- monitoring movements of radiomarked raccoons in order to use them as "Judas animal" (facilitating detection of non-tagged individuals);
- controlling of unmarked animals living in the same social unit of each Judas animal;
- education and training of local communities, hunters, ornithologists and nature conservationists on species recognition, tracking, hunting and trapping;
- information of the general public for encouraging the reporting of raccoon sightings.

The results so far gathered are very encouraging and underline the absolute importance of a cooperation within and between countries to contain a mobile invasive species such as the raccoon dog.

Fig. 1 – Information material produced as a part of the Life Project "Management of the invasive Raccoon Dog *Nyctereutes procyonoides* in the north-European countries" (LIFE09 NAT/SE/000344).

The involvement of recreational hunters in control programmes of non-native species is a more controversial issue (Wittenberg and Cock, 2001), and in some cases it has be shown to not be very effective in controlling or eradicating IAS. Reasons are manifold: hunters may be interested in managing only some invasive game species, hunters may select only preferred targets (e.g. mature trophy males), hunting can reduce the detectability of the target population by increasing elusive behaviours, and hunters may be reluctant to undertake eradication campaigns or intense control programs because of the conflicting interest in maintaining populations to be harvested in the long term.. Furthermore, a proportion of the hunters may be reluctant to undertake eradication programs because these are considered by them as incompatible with their ethical views on the role of hunting and hunters. In addition to these aspects, it must also be highlighted that in many cases the hunting pressure required for significantly reducing the population of an established and expanding alien species would to be so high to become technically unfeasible.

4. CONTEXT

4.1 The International context

Convention on Biological Diversity (CBD).

The CBD acknowledges the impacts caused by IAS at Article 8.h, calling Parties to "*prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats and species*". Sustainable use of biological diversity is one of the three objectives set out in the Convention's first article (http://www.cbd.int/sustainable/).

At the 4th CBD-COP in Malawi during 1998, twelve principles (*The Malawi Principles*) of the ecosystem approach to biodiversity management were identified (http://www.cbd.int/doc/meetings/cop/cop-04/information/cop-04-inf-09-en.pdf). The 7th CBD-COP in Malaysia during 2004, adopted the *Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity* (http://www.cbd.int/sustainable/addis-principles.shtml). The Malawi and Addis Ababa principles provide a fundament for conserving biodiversity through the sustainable use (hunting included) of its components, recognising that humans cultures are an integral part of ecosystems.

The CBD has identified IAS as a major cross-cutting theme and at the 6th CBD-COP in 2002 adopted the decision VI/23 (http://www.cbd.int/decision/cop/?id=7197) "Alien species that threaten ecosystems, habitats or species" and his annex "Guiding principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species"; hunting was not cited as pathway for introduction of alien species.

A technical note (UNEP/CBD/SBSTTA/9/INF/32 5 November 2003, http://www.cbd.int/doc/meetings/sbstta/sbstta-09/information/sbstta-09-inf-32-en.pdf) was prepared an Ad Hoc Technical Expert Group (AHTEG) pursuant to paragraph 9 of decision VI/23 which requested to identify and explore from a technical perspective specific gaps and inconsistencies in the international regulatory framework of the threats of invasive alien species (IAS) to biological diversity, including consideration of various pathways. The technical note state that "*hunting (release of reared game) […] provide other pathways for introductions"* and suggest that "*soft' policy tools (codes of conduct, guidance, certification etc.) can play an important role in building awareness and best IAS prevention and management practices. Their development is often quicker than for binding measures and can be led or supported by stakeholders in the private sector*". The outcome of the AHTEG was adopted by CBD Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) at its 11th Meeting, in November 2005, with Recommendation XI/12.

At the 10th CBD-COP in Nagoya, 2010, the Decision X/38 (http://www.cbd.int/decision/cop/?id=12304) included hunting among the pathways of introduction of invasive alien species and genotypes, in addiction to pathways highlighted in the decision VI/23 and his annex. An AHTEG was established to further explore issues on invasive alien species and "*to suggest ways and means, including, inter alia, providing scientific and technical information, advice*

and guidance, on the possible development of standards by appropriate bodies that can be used at an international level to avoid spread of invasive alien species that current international standards do not cover, to address the identified gaps and to prevent the impacts and minimize the risks associated with the introduction of invasive alien species as pets, aquarium and terrarium species, as live bait and live food with the present terms of reference".

International Union for Conservation of Nature (IUCN) – Species Survival Commission (SSC)

The 51st Meeting of IUCN, in Gland, 2000, approved the Guidelines for the prevention of biodiversity loss caused by alien invasive species (http://intranet.iucn.org/webfiles/doc/SSC/SSCwebsite/Policy_statements/IUCN_Guidelines_for_the_Prevention_of_Biodiversity_Loss_caused_by_Alien_Invasive_Species.pdf), prepared by the SSC Invasive Species Specialist Group (ISSG). The goal of these guidelines is to prevent further losses of biological diversity due to the deleterious effects of alien invasive species, according to Article 8 (h) of the Convention on Biological Diversity. As recommended action the guidelines suggest "*to develop collaborative industry guidelines and codes of conduct, which minimise or eliminate unintentional introductions*" .

The final report of the workshop "Recreational Hunting: Standards and Certification" (http://www.conservationforce.org/pdf/SUSG_Workshop_Summary_Report_final.pdf) held in London, 2006 by the members of the SSC Sustainable Use Specialist Group (SUSG) state that "*a range of possible mechanisms exist for enhancing the sustainability, conservation contribution and public acceptance of hunting, including: certification, assisting in government cooperation and improved governance, development of standards, best-practice guidelines, codes of conduct, and model systems*". Among the major problems that need to be addressed, specialists pointed out the presence of practices that undermine potential conservation benefits of hunting such as introduction of alien species to hunt and breeding genetic "freaks" or hybrids to hunt. The development of standards, codes of conduct, voluntary guidelines and other "benchmark of good practice" are indicated as an appropriate answers to address this problems.

In 2006 the Wild Species Resources Working Group (WISPER) of the SSC European Sustainable Use Specialist Group (ESUSG) produced the "Guidelines on Sustainable Hunting in Europe" (http://www.ruralnaturaleza.com/files/sostenible_europa.pdf). The aim of the document is to provide a (non-binding) set of guidelines for the sustainable hunting of wild bird and mammal species, but also applicable in other context such as hunting with falcons. The document defines principles, targets and guidelines. One of the two main ecological principles is that "*hunting should not adversely affect the long-term conservation status of the biological community to which the hunted species belongs*". Targets include the maintenance of a genetic diversity compatible with the game species conservation (A.b) and the improvement of biological community species diversity (B.a). Alien game species are directly mentioned in two recommendations: "*only reintroduce game species belonging to the list of native species in accordance with the IUCN guidelines on reintroduction of species*" (A.7) and "*not introduce or encourage non-native (alien) species*" (A.8).

The IUCN Position Statement on Translocation of Living Organisms – Introductions, Re-Introductions and Re-stocking were prepared by the SSC Re-introductions Specialist Group (RSG) and approved at Gland in 1987 (http://www.iucnsscrsg.org/download/IUCNPositionStatement.pdf). This statement is an initial attempt to describe translocation and provide a comprehensive (terminology, principles and guidelines) aimed "*to reduce the damaging impact of introduction on the balance of natural systems*". Hunting is recognized as a pathway for the introduction of non-native species

The updated version of IUCN Guidelines for Re-Introductions and Other Conservation Translocations were developed by a Task Force of the Reintroduction and Invasive Species Specialist Groups, working between 2010 and 2012. (http://www.issg.org/pdf/publications/RSG_ISSG-Reintroduction-Guidelines-2013.pdf).These guidelines are intended to act as a guide for procedures useful to re-introduction programmes aimed at biological conservation and restoration of a species and not for hunting purposes.

4.2 The European context

The Birds Directive

Article 11 of the Directive 79/409/EEC on the conservation of wild birds ("The Birds Directive") calls to the prevention of damage to local flora and fauna by the introduction of bird species which not occur naturally in the wild state in the European territory of the Member States. However, the Guidance document on hunting under "The Birds Directive" (http://ec.europa.eu/environment/nature/conservation/wildbirds/hunting/docs/hunting_guide_en.pdf) does not address hunting as a pathway in its own right for introductions of alien species (e.g. stock replenishment).

The Bern Convention

Article 11.2.b of the Convention of Conservation of European Wildlife and Natural Habitats ("Bern convention", 1979) requires Parties to promote the reintroduction of native species and strictly control the introduction of non-native species.

In 2003 the Bern Convention adopted a European Strategy on Invasive Alien Species (http://www.cbd.int/doc/external/cop-09/bern-01-en.pdf). The strategy identifies priorities and key actions in order to prevent or minimise adverse impact of IAS, and proposes measures required to recover species and natural habitats affected by IAS.

Hunting and falconry are addressed as pathways for alien species, and in this regard the Strategy recommends to "*work with the Federation des associations de chasseurs de l'UE (FACE) and national hunting and shooting organisation to assess risks associated with introduction of alien game species for restocking. As appropriate, cooperate in the elaboration, adoption and implementation of a European Code of Conduct on Hunting to regulate and manage such introductions*" and to "*work with the International Association for Falconry and Conservation of Bird of Prey to prevent escapes into the wild of alien birds of prey used for falconry and hybridisation with native species. As appropriate, cooperate in the elaboration, adoption and implementation of a European Code of Conduct on Falconry*". The European Strategy stressed the need of an active involvement of hunters in surveillance, monitoring and mitigation of impact of invasive species.

The European Charter on Hunting and Biodiversity

The Standing Committee of the Bern Convention in Strasbourg on November 2007 in Warsaw, adopted the European Charter on Hunting and Biodiversity, carried out by a Working Group with experts, representatives from Bern Convention Parties and non-governmental Organisations pursuant to the Recommendation 1689 (2004) from the Parliamentary Assembly of the Council of Europe (http://assembly.coe.int/Main.asp?link=/Documents/AdoptedText/ta04/EREC1689.htm). This recommendation advocated for a European charter on hunting, as a guide setting out common principles and good practices for hunting.

The Charter is rooted on CDB Malawi and Addis Ababa Principles and has been drafted with the support of the IUCN/SSC-ESUSG, the Federation of Associations for Hunting and Conservation of the European Union (FACE), and the International Council for Game and Wildlife Conservation (CIC).

The goal of the Charter is to promote principles and guidelines aimed to ensure that hunting in Europe is practiced in a sustainable manner, while avoiding negative impacts on biodiversity and making a positive contribution to the conservation of species and habitats and the needs of society (http://ec.europa.eu/environment/nature/conservation/wildbirds/hunting/index_en.htm).

The principles 4 of the Charter focuses on hunting and alien species ("Maintain wild populations of indigenous species with adaptive gene pools") and defines the following guidelines to regulators and managers:

- deter the release of new alien species that could become invasive and/or negatively effect native fauna or flora;

- engage hunters in programmes to remove invasive alien species;
- facilitate the reestablishment of originally indigenous species of fauna and flora in accordance
- with IUCN guidelines and have clear management plans that define their recovery;
- incorporate genetic considerations into management plans;
- seek transboundary cooperation to ensure genetic adaptability of populations;
- monitor the genetic characteristics of species populations of special concern to hunters and hunting tour operators:
- accept the return through natural recolonisation of wild species that were once indigenous to
- an area, taking into account the socio-economic context;
- favour re-stocking from appropriate sources but only introduce or reintroduce species in accordance with IUCN guidelines;
- avoid exclusive selection for specific phenotypic or behavioural traits of individuals which are not representative of the wild species population and can consequently be detrimental;
- aid scientists and managers in monitoring genetic characteristics of populations.

Other guidelines in the Charter suggest to hunters and mangers to:

- encourage the creation of policies and structures that reduce conflicts and create synergies between hunting and other conservation interests, reward best practices (e.g. with subsidies or privileges), and regulate against malpractice (3.1.2.1.b);
- account for possible negative impacts of hunting on other ecosystem services and minimise and mitigate these (3.5.2.1.c);
- actively contribute to the conservation and restoration of habitats at appropriate scales where feasible (3.5.2.2.a);
- use only native flora for habitat restoration (3.5.2.2.c);
- have knowledge regarding wildlife ecology and conservation practices (3.8.2.2.a);
- have sufficient knowledge on the identification, habits and ecology of game-species as well as non-game species (3.9.2.2.b);

The EU strategy on Invasive Species

In order to addressing the gap of comprehensive instruments at EU level for tackling invasive alien species, in 2008 the Commission adopted a Communication to the Council and the European Parliament titled: "Towards an EU Strategy on Invasive Species" presenting policy options for developing an EU Strategy on the issue (http://ec.europa.eu/environment/consultations/invasive_aliens.htm).

In 2011, the EU biodiversity strategy to 2020 was launched (COM(2011)244), including the target 5 "Combat Invasive Alien Species": "*by 2020, Invasive Alien Species (IAS) and their pathways are identified and prioritised, priority species are controlled or eradicated, and pathways are managed to prevent the introduction and establishment of new IAS*" and the action 16 "Establish a dedicated instrument on Invasive Alien Species", aimed to "*fill policy gaps in combating IAS by developing a dedicated legislative instrument by 2012*".

In 2011 EU established three working groups, with the participation of IAS experts, Member States and stakeholders (including the FACE and the ISSG), aimed at providing opinions and recommendations to the Commission in relation to the preparation of a dedicated instrument on IAS. These recommendations will be further examined and elaborated by the European Commission, in its impact assessment and in the preparation of a policy to tackle the issue of invasive alien species. The three Working Groups focused on three main topic areas; (1) prevention; (2) early warning and rapid response; (3) eradication, containment, management and restoration. Main results and positions

expressed have been summarized in ten dedicated reports (http://circa.europa.eu/Public/irc/env/ias/library), that reflect the discussion among the Working Groups, but do not represent an official position of the European Commission.

The report "Eradication, Containment, Management and Restoration" include a section on eradication and consumptive use (especially hunting) of IAS. Practical considerations on this issue are:

- the consumptive use of IAS is unlikely to assist in eradications and may hinder the achievement of eradication or containment strategies;
- promoting the consumptive use of IAS places a value on the species, which can encourage its maintenance or spread;
- bounty schemes have led to further introductions or 'farming' of the species to maintain income – which clearly work against any objective to eradicate;
- when researching eradication plans it is often necessary to understand the population response per unit of control effort, having uncontrolled consumptive use at this stage can complicate planning for eradication;
- the skills and knowledge of hunters can be valuable for the practical elements of eradication. Their involvement should be based on an agreed code of conduct. Government supervision during eradication or containment operations should be ensured;
- however, if a species has progressed to become widespread and eradication or containment is no longer feasible (the mitigation, coexistence or acceptance phases), then consumptive use can play an important part in the management of the species. However, care is needed to ensure the prospect of consumptive use does not become a motive to assist establishment or spread.

4.3 National initiatives

Only few countries in Europe adopted specific regulations relevant to prevent introductions of non-native species for hunting purposes. For instance, since 1997, Denmark regulate the release of non-native game species, by means of the Hunting Act: (http://www.retsinfo.dk/DELFIN/HTML/A1997/0011429.htm). Likewise Finland adopted his Hunting Act in 1993 (http://www.finlex.fi/fi/laki/kaannokset/1993/en19930615.pdf), banning the import and release into the wild of game species of foreign origin without the permission of the Ministry of Agriculture and Forestry.

Some national hunter's organisations have adopted voluntary codes of ethical conduct (e.g. French Federation of Hunters – http://chasseaubroc.free.fr/chartechasseenfrance.htm) aimed at encouraging hunting ethics. This self-regulation rules emphasize the responsibility of hunters towards wildlife and nature and on the role of hunters in the conservation of biodiversity; however, but none of these documents explicitly refer to hunting as a pathway of non-native species introduction.

Some information on the national rules and regulations on IAS in five European countries (Finland, Ireland, Slovenia, Spain and Sweden) are also reported in a recent report of FACE (2013). The purpose of this report is to gain a better understanding of already existing national regimes on IAS in order to better support work at EU level aimed at the adoption of a dedicated and robust policy to tackle the issue of IAS.

4.4 The European Hunter's position statement

Europe's hunters, represented by FACE and its Members, actively contributed to the production of the European Charter on Hunting and Biodiversity. Moreover FACE is directly involved in the ongoing development of the EU strategy on IAS and have recently produced a Manifesto for Biodiversity (http://www.face.eu/biodiversity/index.html) with key themes reflecting the

commitment of the association to contribute to the debate on biodiversity and the post-2010 targets. The Manifesto was reviewed and revised after the 10th CBD-COP in Nagoya, 2010, to ensure full consistence with the decisions taken by the global community.

The Manifesto addresses the IAS issue, stating that there may be the need of regulation and control measures, and makes two specific commitments:

- FACE and its Members will communicate to hunters the necessity to identify, control and avoid the introduction of alien animal and plant species.
- FACE and its Members will contribute to policy formulation for issues such as the control of Invasive Alien Species (IAS) and large carnivore conservation.

Other commitments on sustainability of hunting and the maintenance of ecosystem services in the Manifesto are:

- FACE and its Members will create better understanding of sustainable use principles and their implementation, as promoted by the Addis Ababa Principles of the CBD and the European Charter on Hunting and Biodiversity of the Council of Europe.
- FACE and its Members will lead efforts for a new sustainable wildlife use initiative, complementary to the Sustainable Hunting Initiative that has a credible representation and support from wildlife users.
- FACE and its Members will endeavor to improve information on ecosystems and the services that they provide by continuing to be involved in collaborative research and monitoring that contributes to the placing of a true value on biodiversity assets.

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APPENDICES

EUROPEAN CODE OF CONDUCT ON HUNTING AND IAS

AIM AND SCOPE

Invasive alien species (IAS) are a major driver of biodiversity loss and ecosystem change, and therefore both the Strategic Plan of the Convention on Biological Diversity and the European Union Biodiversity Strategy to 2020 call for improved prevention and response to biological invasions. The struggle against invasive species can only be won with the support of the key stakeholders, encouraging responsible behaviors and ensuring their involvement in raising awareness, detecting invasions and enforcing responses.

The present Code of Conduct aims to provide a set of voluntary principles for hunters and hunting managers to be adopted in order to improve sustainability of hunting, avoiding negative impacts caused by the introduction and spread of invasive alien species for hunting purposes[1], and to strengthen the contribution of hunters to the management and conservation of biodiversity.

The Code takes into account the existing initiatives and relevant obligations and principles of the Directive 79/409/EEC (the Birds Directive), the Directive 92/43/EEC (the Habitat Directive), the Bern Convention and the Convention on Biological Diversity (CBD). Furthermore, the Charter is based on the Malawi and Addis Ababa Principles for a conservation of biodiversity through the sustainable use (hunting included) of its components.

This European Code of Conduct on Hunting and IAS is a contribution to the implementation of points (1) *Building awareness and support*, (5) *Prevention*, (6) *Early detection and rapid response* and (7) *Mitigation of impacts* of the European Strategy on Invasive Alien Species adopted by the Bern Convention.

Furthermore, the Code represents a contribution of the hunters to the "2020 European Strategy on biodiversity", with particular reference to target 5, and to the Strategic Plan 2011-2020 of the CBD (http://www.cbd.int/cop/cop-10/doc/press/press-briefs-en.pdf).

Scope of this Code is to address several key aspects of the issue of "hunting and IAS", and to contribute to enhance what already stated on this issue mainly in the European Charter on Hunting and Biodiversity (see Annex 1).

The Code uses the definitions agreed by (1) the Conference of the Parties to the Convention on Biological Diversity for the purposes of the CBD Guiding Principles, (2) the European Strategy on Invasive Alien Species adopted by the Bern Convention and (3) the international scientific community (see Box 1 of Report).

PRINCIPLES

1. Avoid intentional and unintentional releases of new invasive alien game species

Invasive alien species are recognised as one of the major threats for biodiversity and also impose considerable impacts on economy and human health. Pathways of introduction have changed in last decades, showing a decrease in deliberate release (e.g. hunting) and an increase in unintentional introductions.

[1] It must be noted that only a limited proportion of non-native species introduced for hunting successfully establish into the wild, spread, and cause significant consequences on the environment, the economy, or human health. However, there are indeed cases of game having that cause impacts on biodiversity.

Since ancient times hunting has been an important pathway for the intentional introduction of alien birds (in particular *Galliformes* and *Anseriformes*) and mammals (in particular *Artiodactyla* and *Lagomorpha*). In addition to the intentional releases of alien species for hunting purposes, it should also be mentioned the unintentional introductions (escapes) of alien species living in fenced hunting areas or used in animal-aided hunting (e.g. falconry, ferreting). Analyses of the most updated data for Europe highlight that hunting has been the main pathway for introduction of birds and one of the most important for mammals in this region.

It must be stressed that the pathways of introduction have significantly changed in the last decades, and nowadays the intentional introduction of new alien game species is much less common than in the past.

Several reasons explain this decreased importance:

- increased awareness of hunters of the problem of biological invasions,
- changes in national and international regulations,
- adoption of more sustainable hunting management principles,
- increase of natural populations of game species.

Despite this trend, new, often illegal, introductions of alien game species are occasionally still reported in different countries. Therefore it is fundamental to proactively address the IAS problems by avoiding intentional introductions of new alien game species and reducing the risk of escapes of those kept in captivity or in fenced areas. Adopting such a responsible behaviour, recommended as a best practice by the IUCN Guidelines on Sustainable Hunting in Europe, is considered as a key step in order to ensure that hunting is practiced in a sustainable manner, the main goal of the European Charter on Hunting and Biodiversity.

2. Avoid intentional and unintentional introductions and spread of invasive alien plants for game food and shelter

Hunting has been identified also as an indirect pathway of introduction and spread of alien plants used by hunters for habitat restoration (e.g. shelter, hedges, small wetlands and woodlands) or food supply to game. Introduced plants do not necessarily become invasive, but in some cases may cause habitat degradation instead of restoration, posing a threat to native plants and animals, and causing economical impacts due to additional costs for management, reduction in yields of crops and damage of infrastructure.

It is therefore very important to increase hunters' awareness on this issue, in order to minimise the risk of causing IAS introductions. Habitat restoration as well as food supply to game species should be carried out exclusively using native plants (better if of local provenance) or, at least, avoiding the use of invasive or potentially invasive alien plants.

3. Use alien species for restocking only if non-invasive or introduced in ancient historic times

Even if the introduction of an alien species should always be considered as an ecosystems disturbance, not all alien species are invasive and some become invasive after a shorter or longer time lag.

Many alien species has been introduced as quarry since Middle Ages or even before. Some of them have not become invasive (e.g. common pheasants) but others can indeed cause significant impacts on biodiversity (e.g. wild rabbit on islands).

Priority needs to be given to avoiding restocking with recently introduced IAS rather than contrasting restocking of those species that established as a result of ancient introductions (indicatively those that occurred before the 15th century), especially if these are not invasive.

However, even the restocking of species introduced in ancient historic times, in particular on insular ecosystems, should be based on a precautionary approach, evaluating on a case by case basis and considering first the impacts caused and then the historical and cultural value.

As stated in the European Charter on Hunting and Biodiversity, in any case, restocking shall be carried out strictly following the IUCN Guidelines for Re-introductions and other Conservation Translocations.

4. Select sources for restocking from populations with appropriate genetic and disease management

A translocated species can have strong negative effects at the level of species/populations through hybridization (intra- and inter-specific), disease transmission (pathogenic or vector/reservoir) or pathogens and parasites introduction. Introduction of wildlife for game restocking is in fact considered as a major pathway of genetic homogenization and hybridization. Homogenization can cause a reduction in vigor or reproductive success. Inter-specific hybridization can threaten the genetic integrity of native species and, in some cases, even lead to population decline. In any case genetic pollution involves the risk of loss of biodiversity and should avoided.

Game restocking has also been recognized as a pathway for introduction of diseases or new alien pathogens. Some game species (in particular *Galliformes*) are often supplemented by commercial stocks of captive-bred individuals and sanitary problems can be particularly serious in the case of hand-reared game birds, as the rearing conditions (artificial environment and high densities) dramatically increase the risk for the spread of parasites and infectious diseases.

Management and restocking plans should consider biogeographical and conservation issues. Appropriate genetic characteristics of source stocks for restocking should be ensured, and the release of hybrids or mixes from different biogeographical areas should be avoided, especially when these are known to pose a threat to native species.

While it must be stressed that it is not possible, despite all appropriate precautions, to ensure that stocks are completely "parasite and disease free", the risk of introducing a new disease or pathogen to the destination area should be lowered selecting, for restocking plans, only safe sources, gone through adequate sanitary surveillance and/or to quarantine procedures.

5. Practice animal-aided hunting minimizing the risks of escapes and of impacting native species

The unintentional introductions (escapes) of species used in animal-aided hunting (e.g. falconry, ferreting, drive hunting with dogs) can cause impacts on native species. Domestic forms and feral animals of domestic species use in hunting (dogs, ferrets, etc.) in fact represent alien species that in some cases can cause severe impacts on biodiversity[2].

Falconry is a traditional hunting technique, recently stated as Living Human Heritage by UNESCO. Falconry is practiced throughout Europe and often use is made of non-native birds of prey, some of which are hybrids with native birds. The chances of a hybrid falcon hybridising further with a native wild species are very limited but the risk of introduction of non-native genes through falconry should be carefully taken into account.

Most of the threats arising from falconry are due to a bad practice of this traditional hunting technique. It is therefore important that falconers take measures to minimize any possible risk caused by the introduction of non-native genes through falconry, and to apply appropriate training methods for hunting. In order to ensure a safe and sustainable practice of falconry, it is also important to encourage the adoption of voluntary self-regulations (e.g. codes of conduct as recently proposed by

[2] Dogs are known to cause impacts on biodiversity, for example by predating native species or hybridising with the wolf. However, considering there are no evidences that escaped hunting dogs have formed self-sustaining populations in the wild in Europe, the present Code of Conduct does not cover this specific topic.

the International Association for Falconry and the Conservation of Birds of Prey - IAF). Falconers should also negotiate the adoption of appropriate national/regional regulatory measures (e.g. regulation adopted by the Government of Canary Islands in 2011), with national or regional authorities, taking into account the scientific evidence for risk of gene introgression or the establishment of invasive populations of raptors.

In terms of self-regulation, falconers should as a starting point adopt the recommendations included in the position statement of the International Association for Falconry and Conservation of birds of prey on falcon hybrids:

- hybrids be fostered if possible by a parent that does not occur locally in the wild;
- hybrids only be hacked[3] in large conditioning pens;
- hybrids only be flown with reliable telemetry equipment;
- maximum efforts be made to recover any hybrid that is lost;
- hybrids should never be deliberately released.

Responsible falconers should adopt all possible measures to prevent escapes of birds of prey, in particular of hybrids or non-native birds. Furthermore, a registration scheme, aimed at identifying the origin of each bird (pure-bred or hybrid), should be adopted and, consequently, any bird should be registered and individually marked by a ring and/or a microchip. Also the establishment of a web-based monitoring system for lost/escaped hybrid or exotic raptors should be considered.

Finally, within the context of the Birds Directive (79/409/EEC), falconers should be encouraged to reduce the use of hybrids and, specifically, to avoid the use of hybrids with any species which exists only in North America.

6. Consider eradication and control[4] as essential management tools to tackle IAS and support their implementation also when targeting game species

Prevention can reduce new introductions but when an invasive alien species is established it can be necessary to activate eradication and/or control measures.

Eradication often becomes impossible or very costly when the invasive species has widely established. When eradication is considered as impractical, control - aimed at reducing spread, abundance and density of IAS to an acceptable level in the long-term – could become necessary.

Eradication should be considered as the priority response in the case of recently introduced IAS, rather than for ancient introductions, especially of non-invasive species. Special attention is needed for insular ecosystems where potential impacts on biodiversity are greater and, given their often small size and isolation, eradication can be particularly effective.

Any control or eradication programme must be adequately planned and therefore, before starting it, a cost/benefit analysis should be realized, outcomes should clearly defined and appropriate monitoring of the results should be implemented.

As already mentioned in European Charter on Hunting and Biodiversity, hunters should accept and support the possibility that a non-native invasive species, even if introduced and exploited for hunting purposes, could be contained or eradicated if relevant to preserve biodiversity. The skills and knowledge of hunters can be particularly valuable in this context and, if properly aware and trained, they could be effectively involved in control or eradication programs and support an early warning and rapid response system in case of new IAS arrival.

Once accepted by hunters that an alien game species could be controlled or removed, the extent of support that hunters can give to remove the species must be evaluated by authorities on a case by case basis.

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[3] Method of “soft release” to learn flying skills

[4] The term “control” here refers to both control and containment.

Any control program should evaluate the biological traits of the IAS, the natural and social contexts, the removal methods, and the efficiency as well as costs. Control and eradication methods must be chosen taking into account their efficacy, cost, safety, environmental impact and social acceptability. Public support for IAS eradication or containment programs is likely to be contingent on the adoption of methods able to minimize avoidable suffering by animals. As clearly recognized by the Principle 10 of the European Charter on Hunting and Biodiversity, hunters too need, when involved in eradication or containment programs, to contribute to acknowledge and promote this approach.

7. Collaborate in monitoring and surveillance programmes on IAS

The deep and traditional knowledge of species and of the natural environment that hunters can bring let indeed provide a valuable contribution to monitoring and study of wildlife species as well as of biodiversity, and it is important to enhance a better collaboration with European wildlife managers and scientists. Hunters are a very good example of the concept of “citizen science” or “citizen as a sensor”, terms used for programs based on the involvement of volunteers to monitor natural resources for improving management and/or research.

If properly informed and trained, hunters could indeed be effectively involved in monitoring programmes, gathering information on IAS distribution and abundance, or playing a fundamental role in terms of surveillance of new IAS arrival or introductions, crucial to enable an early warning and rapid response system. As a key step to encourage accurate reporting, concise and accurate information and training materials should be developed.

ANNEX 1: RELATIONSHIP BETWEEN THE "EUROPEAN CODE OF CONDUCT ON HUNTING AND IAS" AND THE "EUROPEAN CHARTER ON HUNTING AND BIODIVERSITY"

EUROPEAN CODE OF CONDUCT ON HUNTING AND IAS	**ECHB**
1. Avoid intentional and unintentional releases of new invasive alien game species	*3.4.2.1.A*
2. Avoid intentional and unintentional introductions and spread of invasive alien plants for game food and shelter	*3.5.2.2.C*
3. Use alien species for restocking only if non-invasive or introduced in ancient historic times	*3.4.2.2.B*
4. Select source for restocking from populations with appropriate genetic and disease management	*3.4.2.1.D, 3.4.2.2.B*
5. Practice animal-aided hunting minimizing the risks of escapes and of impacting native species	*3.4.2.1.A*
6. Consider eradication and control as essential management tools to tackle IAS and support their implementation also when targeting game species	*3.4.2.1.B, 3.10*
7. Collaborate in monitoring and surveillance programmes on IAS	*3.4.2.2.D*