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Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

IRISH STANDARDS OF MODERN ZOO PRACTICE

Supporting the European Communities (Licensing & Inspection of Zoos) Regulations (2003)
S.I. No. 440 of 2003

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APPENDICES

Introduction

01. The EC Zoos Directive (Directive 1999/22/EC) requires EU Member States to regulate zoos in accordance with its provisions. The Directive is transposed into national legislation in Ireland by means of Statutory Instrument No. 440 of 2003 European Communities (Licensing and Inspection of Zoos) Regulations 2003.

02. References in these Standards, including to legislation, apply to Ireland only.

03. In pursuance of Article 6 of the Regulations, the Minister for Arts, Heritage and the Gaeltacht, having consulted such persons on a list compiled under Article 12 of the Regulations, and other persons as they have seen fit, hereby specifies the following Standards of Modern Zoo Practice (the Standards); that is, Standards with respect to the management of zoos and the animals in them. Due to the widely differing nature of zoo collections, not every Standard will apply equally to all zoos.

04. To aid the application of these Standards, pre-inspection audit forms, inspection report forms and feedback forms will be provided as part of the pre-inspection licencing process, examples of which are found in Appendix 11. Pre-inspection audit forms must be completed by zoo operators prior to inspections and inspection report forms must be used by zoo inspectors to report their findings.

05. Compliance with these Standards does not guarantee that the requirements of the Animal Health and Welfare Act 2013 (AHWA 2013) and any other animal welfare legislation have been met. In particular, attention is drawn to the operator's responsibilities under the AHWA (2013) and their duty of care to the animals in their collection and ensuring compliance with the legislation.

06. Compliance with these Standards does not guarantee that the requirements of the Safety, Health and Welfare at Work Act 2005 (S.I. No. 10 of 2005) and other relevant legislation have been met. In particular, attention is drawn to guidance issued by the Health and Safety Authority, relating to safety, health and welfare standards for employers and persons at work in zoos. Zoo operators are strongly advised to acquaint themselves with these requirements and other relevant legislation including, but not limited to, that on transport of animals, fire prevention and food hygiene.

07. These Standards are supplemented by additional, regularly updated Guidance Notes, which provide further detail and advice on the processes of implementation of the Regulations. These are available through the Department of Arts, Heritage and Gaeltacht (DAHG).

Interpretation of terms used

08. The following terms as defined here are used in these Standards and in associated documentation:

'animal'	means animals of the classes Mammalia, Aves, Reptilia, Amphibia, Pisces, and the phyla Arthropoda and Mollusca (i.e. any mammal, bird, reptile, amphibian, fish or insect, arachnid, crustacean or other arthropod, cephalopod or gastropod) or other multicellular organism that is not a plant or fungus.
'animal training'	is the modification of an animal's behaviour by a human carer to achieve a goal.
'circus'	means an individual, organisation or company which travels from place to place where wild animals (as defined below) are kept or introduced wholly or mainly for the purpose of giving performances or performing tricks that are not considered natural behaviour, typically in a large tent, in a series of different locations.
'conservation'	has many definitions, for the purposes of these Standards it is defined as 'an action that effectively enhances the survival of species and habitats'. '*In situ* conservation' is considered conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of some domesticated or cultivated species, in the surroundings where they have developed their distinctive properties. '*Ex situ* conservation' is conservation of components of biological diversity outside their natural habitat. Both *in situ* and *ex situ* conservation are often intrinsically linked.
'enclosure'	means any accommodation provided for zoo animals
'enclosure barrier'	means a physical barrier to contain an animal within an enclosure
'keeper'	includes any person employed by a zoo with direct responsibility for the care of any animal or persons in contact with animals under the direction of a keeper, excepting members of the public
'the list'	means the list compiled by the Minister of authorised zoo inspectors under Article 6 of the Regulations. This list comprises persons responsible for the inspection of animals in zoos, and for advising on their keeping and welfare, and the management of zoos generally
'performing animal'	means an animal that is taken away from, or disturbed in, its usual environment and/or social group, or trained/set-up to perform specific desired behaviours for the purposes of public display.
'pet shop'	means a premises whose primary business is to sell animals as pets and the keeping of animals in any such premises with a view to their being sold in the course of such a business, whether by the keeper or any other person. It should be noted that a zoo may have a pet shop on site or sell a small number of animals as pets, this does not define the entire premises as a pet shop.

'Regulations'	in the Standards refers to the European Communities (Licensing and Inspection of Zoos) Regulations 2003 (S.I. No 440 of 2003).
'stand-off barrier'	means a physical barrier set back from the outer edge of an enclosure barrier in order to provide further distance between the public and exhibited animals.
'taxonomic category'	means a group or assemblage of species, family or class recognised as an entity in scientific classification.
'welfare'	refers to the state of an individual animal. It describes how an animal is coping with the conditions in which it lives and how the animal perceives its experiences. Meeting the physical and behavioural needs of an animal should ensure it experiences a good quality of life. Welfare is impacted by basic foundations of care (basic survival related needs) such as environmental conditions, health care, and basic nutrition. Zoos must also consider the important behavioural outcomes that are a result of the husbandry programme, such as social interaction, mental stimulation and the availability of choice. Such opportunities can promote pleasurable experiences and therefore good animal welfare. The focus in the Standards is therefore on promoting positive animal welfare states within the zoo and aquarium community.
'wild animal'	means any animal not normally domesticated in Ireland.
'zoo'	as defined under European Directive 1999/22/EC is a permanent establishment where animals of wild species (as defined above) are kept for exhibition to the public for 7 or more days a year, with the exception of circuses, pet shops (as defined above) and establishments which Member States exempt from the requirements of this Directive on the grounds that they do not exhibit a significant number of animals or species to the public and that the exemption will not jeopardise the objectives of this Directive. Note, for the purposes of these Standards, where a permanent establishment is closed to the public but maintains a collection of wild animals kept for the purposes of exhibition to the public external to the facility, on 7 or more days in a twelve month period, then the holding facility is classed as a zoo with regards to these regulations. This includes 'Hawk Walks', 'Mobile Zoos' and other similar operations.

Animal welfare in the modern zoo environment

09. Modern zoos and aquariums should use the most-up-to-date information, evidence and knowledge to achieve its conservation mission and ensure it has an ongoing commitment to continued progression in best-practice animal welfare and holistic animal care.

10. All zoos must strive to achieve high welfare standards for the animals in their care through:

    (i) the implementation of proactive policy and programmes that monitor and improve the quality of life for the animals in the zoo's care.
    (ii) the provision of environments that focus on the animals' physical and behavioural needs.
    (iii) the development of a positive working culture and attitude to delivering positive animal welfare states.

11. The five domains below, described in more detail in subsequent sections, provide a framework for the Standards. These five domains are based on the Five Domains model of animal welfare developed by Mellor and Beausoleil (2015) and which underpins the World Association of Zoo and Aquariums (WAZA) Animal Welfare Strategy.

Welfare is a state within an animal and is understood in terms of what the animal experiences subjectively. As such, assessment and interpretation of the diverse range of behaviours across the varied taxa in zoological collections can be challenging. Zoos should ensure that they are current with science-based understanding of animal welfare, including assessments and related disciplines, relevant to the species in their collection.

The basic principle of any successful animal welfare programme is to focus on providing positive welfare outcomes rather than simply minimising negative welfare experiences.

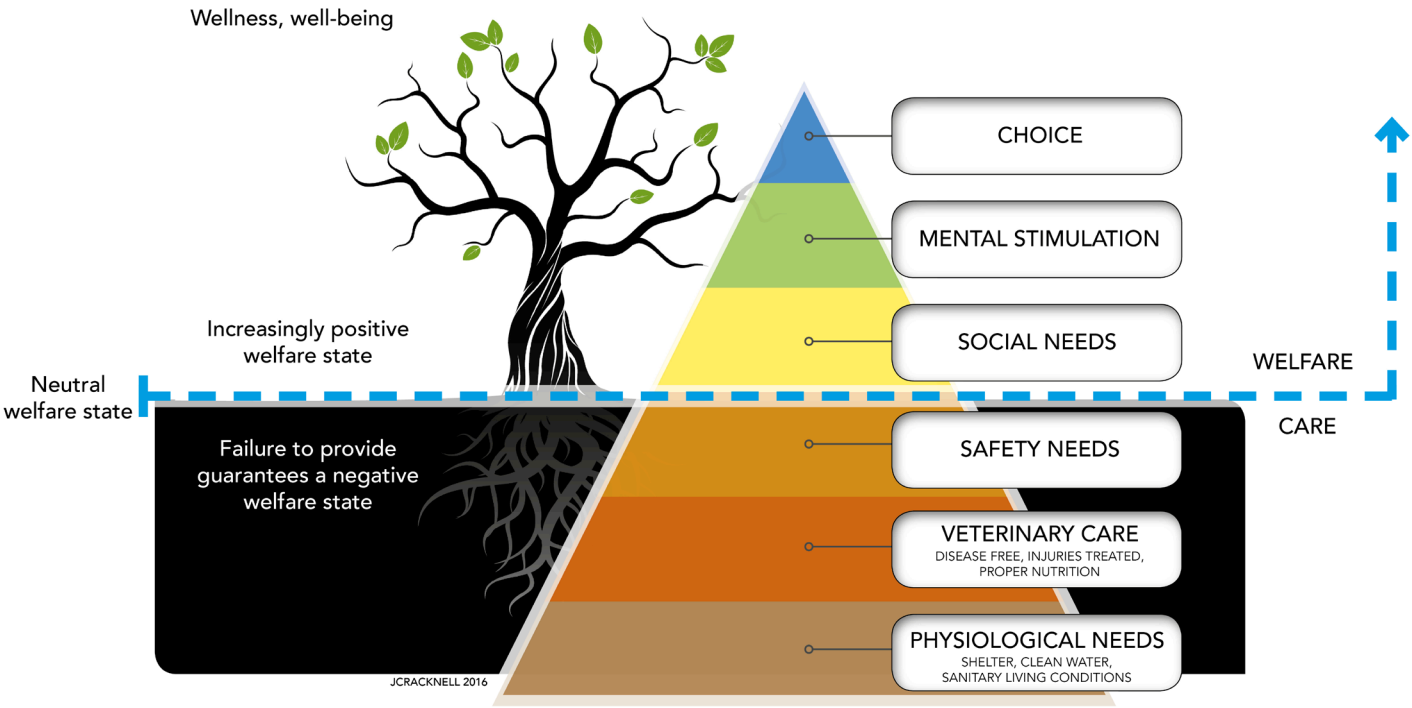
In order for an animal to have a positive experience, many of its basic or functional needs must be met first. Provision of basic elements such as oxygen, food, water, suitable thermal environment and the avoidance of significant injury or disease must be met before an animal can begin to have positive experiences. Meeting the basic needs of the animal therefore, at best, move the animal's welfare state from a negative one to a neutral position. Simply providing the basic physical needs, whilst important, is not sufficient alone.

Zoos should deliver this basic foundation of survival related factors (experiences related to nutrition, environment, physical health) as well as establish environments and care programmes that promote positive behaviour and mental stimulation. Experiences can be thought of as falling into one of two areas: (i) experiences that motivate basic survival related behaviour, e.g. thirst motivating an animal to drink, or (ii) experiences related to the animal's perception of their existing circumstances, negative examples such as fear, loneliness, or boredom verses positive examples including playfulness, comfort, curiosity, or contentment. The zoo should aim to both minimise negative experiences and provide positive experiences through environment design, enrichment programmes, positive social groupings and structures, and other aspects of the husbandry programmes.

Using the Five Domains model the first four domains are considered as a focus on survival related aspects: nutrition, environment, health and behaviour. Considering all of these interrelated, internal and external factors their collective consequences are assigned to the fifth "mental" domain which represents the combined welfare state of the animal as a result of the additive positive and negative impacts provided by the collection.

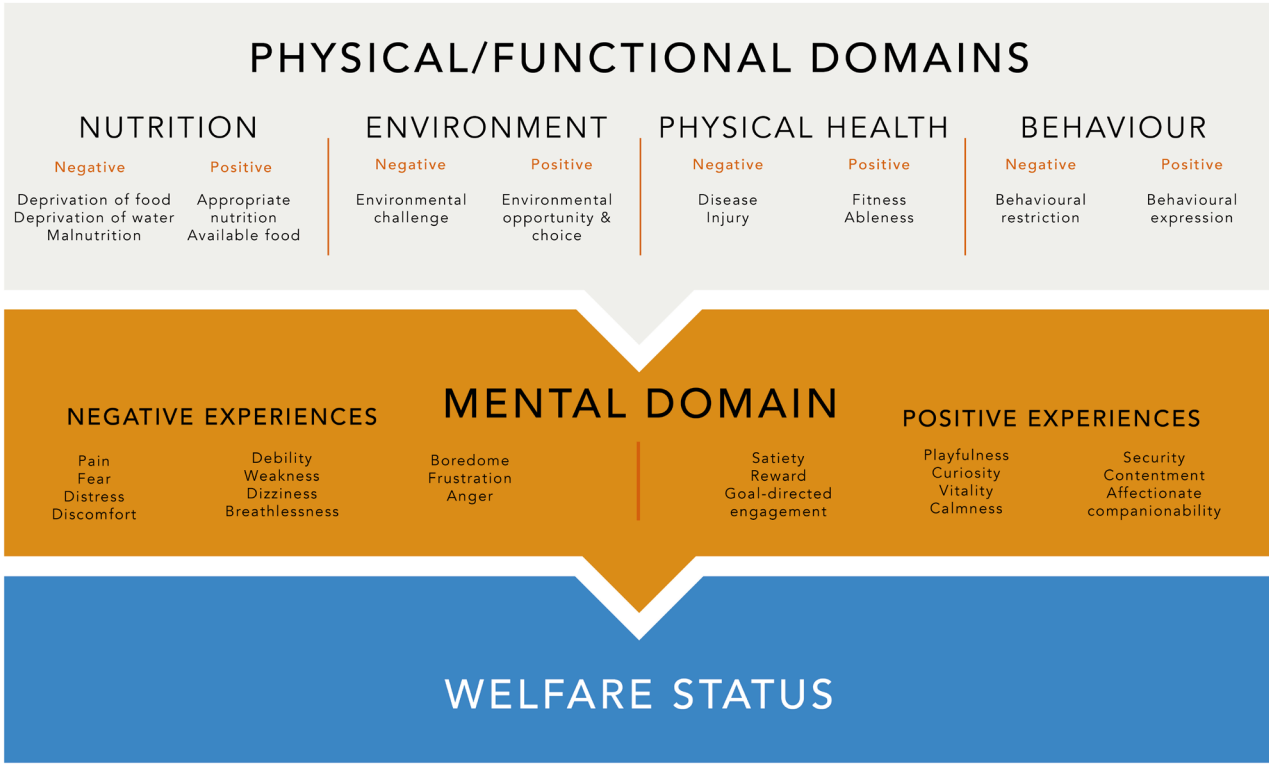
Obviously an animal's welfare state is a dynamic process and so this requires the development of active, ongoing processes for repeated, continual animal welfare assessment, monitoring over time and providing an ability to detect and correct poor welfare if it occurs, and to maintain and promote good to very good welfare.

The Five Domains model provides a useful and practical model for zoos and aquariums. By applying knowledge of negative, neutral and positive welfare states, animal welfare assessment is possible and achievable. It is a framework that enables collections to recognise and meet animals' survival needs and helps to provide opportunities for animals to experience positive welfare states.



Maslow's hierarchy of needs is a concept introduced in 1943 to express a theory of human motivation. This widely accepted model still remains a very popular framework and can be applied to the animals in our care. The bottom levels of the pyramid reflecting the fundamental needs of an animal, failure to achieve these can only result in a negative welfare state. Delivery of these fundamental elements results in a neutral welfare state, yet provides a baseline to build positive experiences and positive welfare outcomes. The latter not being possible without the basic foundations being in place. Current thinking in animal welfare assessment is to focus on the positive outcomes and experiences rather than minimising negative welfare states or simply providing basic foundations of animal care. WAZA's Animal Welfare Strategy illustrates this aspiration with the image of the tree above: the roots represent the critical foundational requirements for survival, the trunk health care and safety needs, and the crown the site of the most varied and complex welfare-related activities that the best zoo or aquarium makes available to the animals.

Five Domains model



The Five Domains model for understanding animal welfare, divided into physical/functional and mental components, provides examples of how internal and external conditions give rise to negative (aversive) and positive (pleasant) subjective experiences, the integrated effects of which give rise to an animal's welfare status (modified, with permission, from The World Association of Zoos and Aquariums Animal Welfare Strategy, 2015)

Section one | Nutrition & Water

1.1 Both food and water are basic needs. Food should be presented in a manner and frequency commensurate with the natural behaviour of the species, as well as the individual's nutritional requirements, which may vary according to season and life stage.

1.2 Food provided must be presented in an appropriate manner and must be of the nutritive value, quantity, quality and variety appropriate for the species, and for the condition, size and physiological, reproductive and health status of the individual animals. Presentation method should ensure individuals are not able to dominate food sources.

1.3 Sufficient fresh, clean drinking water must be available at all times for all animals requiring it.

1.4 Supplies of food and drink must be kept and prepared under hygienic conditions, in particular:

(a) food and drink must be protected against dampness, deterioration, mould or from contamination by insects, birds, vermin or other pests;
(b) supplies of perishable food and drink, other than those brought into the premises fresh on a daily basis, should be kept, where appropriate, under refrigeration;
(c) preparation of food and, where appropriate, drink should be undertaken in a separate area suitably designed and constructed;
(d) staff should be instructed to observe strict standards of personal hygiene and should conform to good hygiene practice in the preparation of food, having due regard to the risk of cross contamination between equipment, utensils and surfaces;
(e) receptacles for food and drink must not be used for any other purposes;
(f) meat (including fish) should have separate utensils, separate storage, and be prepared in a separate area from fruit, vegetables and other food stuffs, or a written policy outlining segregation methods developed and implemented.

1.5 The natural behaviour of the animals, particularly social aspects, should be considered when offering food and drink. Feeding and drinking receptacles, when used, should be of appropriate design and positioned to ensure food and water is accessible and available to every animal kept in an enclosure. Mixed exhibits must be designed to ensure access to food and water is available to all animals within the enclosure.

1.6 Feeding methods must be safe for animals and staff.

1.7 Live feeding of vertebrate prey is to be discouraged (see Section 5). Although the Animal Health and Welfare Act (2013) does not prohibit the feeding of animals with live prey, the live feeding of vertebrate prey should be avoided save under exceptional circumstances, and only with veterinary, specialist nutritionist or herpetologist advice. It should be noted that whilst not specifically prohibited under the Animal Health and Welfare Act (2013) the feeding of live vertebrates could potentially lead to an offence due to the possibility of causing suffering or failing to meet the needs of either the predator or prey animal. Where it has to be undertaken, a written justification and ethical review process must have been undertaken and agreed by senior staff weighing up the welfare of predator and prey; feeding must be observed and live prey not left in the enclosure. Such feeding must not take place in the presence of the public.

1.8 Food and drink, and feeding and drinking receptacles when used, must be placed in positions which minimise the risks of contamination from soiling by the animals, wild birds, rodents or other pests.

1.9 Food, water and other drinking receptacles, where used, must be regularly cleaned.

1.10 Self-feeders, where used, should be inspected twice daily to ensure that they are working

effectively and do not contain caked or unfit food. Water lines should also be checked twice a day.

1.11 Uncontrolled feeding of animals by visitors must not be permitted. Where controlled feeding occurs, it should be on a selective basis only, with suitable food sold, provided or approved by the operator. The quantity supplied per day must be managed to avoid over-feeding.

1.12 Uneaten food must be removed as appropriate to maintain hygiene.

1.13 Nutritionist, veterinary or other specialist advice with regard to all aspects of nutrition must be obtained and followed.

1.14 A record of all diets and dietary changes must be maintained

Section two | Environment

2.1 An environment consistent with a species' requirements must be provided, both indoors and outdoors. This should include shelter and shade from rain, wind, heat and cold as appropriate but also provide opportunities for the expression of natural behaviour. For example, animals that dig and root must be provided with suitable substrates, and climbers with appropriate three-dimensional environments. A balance must be struck between hygiene and the species' biological requirements.

2.2 Zoo animals are often confined for long periods in indoor areas. Zoos and aquariums must provide for the behavioural needs of animals at all times and the design and associated enrichment consideration of both indoor and outdoor enclosures must reflect this, regardless of season, inclement weather or other factors. It is recommended that enclosures are designed to facilitate 24 hour free access to both indoor and outdoor enclosures, except where weather conditions would result in poor welfare.

2.3 Consideration must be given to not just the physical needs but also the natural history and behavioural needs of the animal, suitable stocking levels, and provision of areas of escape from other animals or the public, and avoiding dominance of preferred areas/resources by individuals.

2.4 The zoo must provide an enclosure designed to minimise the risk of injury to an animal. The design should allow animals to get away from each other and not permit individual animals to become cornered. In mixed species' exhibits, care should be taken that one species cannot injure another (or pose a disease risk).

2.5 Enclosures should be designed to minimise the risk of predators entering the exhibit and consideration of long term management of the species to mitigate injury from the environment itself e.g. slides, mesh types or moats.

2.6 The temperature, ventilation, lighting (both levels, spectral distribution, and duration) and noise levels of enclosures must be suitable for the comfort and well-being of the particular species of animal at all times. In particular:

(a) consideration must be given to the special needs of pregnant and newly-born animals;
(b) newly-arrived imported animals should be allowed to become fully acclimatised into their new environment. In some cases, this may be a gradual process;
(c) aquaria for aquatic animals need to be adequately aerated, according to the number kept in each aquarium, and must be heated or cooled according to the needs of the species. Environmental parameters (e.g. salinity, water quality) must

be suitable for the species and monitored regularly; and

(d) indoor housing must protect against extremes of sunlight, heat, draughts and cold, and provide appropriate humidity.

SEE APPENDIX 9 FOR SPECIFIC DETAILS REGARDING SPECIALIST EXHIBITS

2.7 Animals in outdoor enclosures must be provided with sufficient shelter for their comfort and well-being. Refuge areas must be provided for animals to escape the permanent gaze of the public.

2.8 Enclosures must be designed to allow for animals' normal defence reactions and appropriate 'flight' or escape distances to allow animals to remove themselves visually and/or physically from other individuals.

2.9 Enclosures and barriers to enclosures must be maintained in a condition which presents no likelihood of harm to animals. In particular:

(a) any defect in barriers or appliances likely to cause harm to animals must be rectified at once. If this is not possible, the animals should be removed from the possibility of any contact with the source of the danger until rectified; a record should be kept of any action taken;

(b) any vegetation capable of harming animals must be kept out of their reach;

(c) water-filled and dry moats used for the confinement of animals must provide a means of escape back to the enclosure for animals falling into them. Moats are not suitable for all species;

(d) any natural materials (e.g. plants and their products, such as seeds or fruit) or any introduced non-natural materials (e.g. paint, chemicals, treated substrates and treated water) should be assessed for toxicity to the species held before use.

2.10 All plant and fixed equipment, including electrical apparatus, must be installed and maintained in such a way that they do not present a hazard to animals, and their safe operation cannot be disrupted by them.

2.11 Where environmental quality is dependent on external utilities, adequate backup facilities must exist in case of failure.

2.12 Adequate provision must be made for servicing, maintenance and uninterrupted operation of life-support systems.

2.13 Tools and other portable equipment must not be left unattended in places where they could cause animals harm, provide a means of escape, or serve as missiles.

2.14 Rubbish likely to cause harm in animal enclosures must be cleared as soon as possible.

2.15 Proper standards of hygiene, both in the personal hygiene of staff and in enclosures and treatment rooms should be maintained and consider the needs of the animals. In particular:

(a) special attention must be given to the management and appropriate cleaning of enclosures and equipment within them, to reduce the risk of disease. In the case of aquatic animals, there must be regular monitoring of water quality;

(b) suitable, non-toxic cleaning agents must be readily available, along with supplies of water and the appropriate safe means to apply them;

(c) veterinary advice must be obtained and followed regarding the routine cleaning and sanitation requirements of enclosures or other areas. Particular care must be taken if an infectious disease is identified in any animal.

2.16 The drainage of all enclosures should be capable of removing efficiently all excess water.

2.17 Any open drains, other than those carrying surface water, must be outside enclosures.

Section three | Physical health

Routine observation

3.1 The condition, health and behaviour of all animals should be checked at least twice daily by the person(s) in direct charge of their care whilst taking care to avoid unnecessary stress or disturbance.

3.2 Any animals which give cause for concern must be thoroughly assessed as to whether they are distressed, sick or injured. Where necessary they must receive immediate attention and treatment.

3.3 A daily record must be kept by the person(s) in direct charge of the animals, indicating changes to the prescribed diet, health checks carried out, any unusual behaviour or activity or other problems, and remedial actions taken.

Enclosures

3.4 Every effort must be made to provide a suitably hygienic environment from which pathogens are excluded or controlled.

3.5 Enclosures, both indoor and outdoor, must be of a size and design, and animals and enclosures must be managed so as to:

(a) avoid animals within herds or groups being unduly dominated by individuals;
(b) avoid the risk of persistent and unresolved conflict between herd or group members, or between different species or age groups in mixed exhibits;
(c) ensure that the physical carrying capacity of the enclosure and/or system is not over-burdened;
(d) prevent an uncontrolled build-up or spread of parasites and other pathogens;
(e) remove any refuse and allow drainage of waste water.

3.6 Trees within or near animal enclosures must be regularly inspected and lopped or felled as necessary to avoid animals being harmed by falling branches, toxicity or trauma. Trees and climbing plants must be pruned to prevent aiding animal escape.

3.7 Distance or barriers between animals and between enclosures and visitors must be sufficient to minimise transmission of disease or of potential pathogens.

Veterinary care

SEE APPENDIX 6 FOR ADDITIONAL DETAILS REGARDING VETERINARY PROGRAMME

3.8 A comprehensive programme of preventative and curative veterinary care must be established and maintained under the supervision of a veterinary surgeon who is familiar with current practice in the care of zoo animals, particularly in the types maintained in the collection. He or she must make arrangements to meet the ethical responsibilities of veterinary cover, set out in the Veterinary Council of Ireland Professional Conduct for Veterinary Practitioners.

3.9 A written preventative medicine programme must be developed and implemented including, where appropriate, vaccination; worming; disease surveillance; post mortem policy; contraception; and quarantine/import/export procedures appropriate to the species held within the collection. This must reflect current best practice and be updated where appropriate.

3.10 The veterinary service must be suitably qualified, experienced or competent with regards to the species in the collection. Where a zoo uses a local veterinary practice for basic cover, supported by a specialist (or a specialist supported by a local veterinary practice), adequate advance arrangements must be made to allow early contact and discussion between all parties whenever necessary, and particularly for emergency cases.

3.11 The veterinary surgeon must supply evidence of his or her Continued Veterinary Education (CVE) if requested by the inspectors, preferably demonstrating continued professional development relevant to the species held within the collection.

3.12 The veterinary surgeon should be responsible for, or actively involved in, the following:

(a) routine inspections of the collection;
(b) directing or carrying out treatment of all sick animals;
(c) administration of vaccines, worming and other aspects of preventive medicine;
(d) health monitoring of animals including submission of blood and other samples for laboratory examination;
(e) safe and proper collection, preparation and dispatch of diagnostic and other samples. Where these tasks are to be carried out by someone other than the veterinary surgeon, a suitably qualified or appropriately trained member of zoo staff should be nominated to carry out the task e.g. a trained senior keeper, a laboratory technician or veterinary nurse;
(f) training of zoo personnel in health, hygiene and zoonotic disease;
(g) ensuring that post-mortem examinations of animals are carried out where necessary;
(h) supervision of quarantine premises and other such tasks required by law or as part of good zoo veterinary practice;
(i) the nutrition and the design of diets;
(j) planning and exhibit design;
(k) the establishment of written procedures to be followed in the event of the accidental use of dangerous drugs.

3.13 The level of veterinary facilities must be consistent with the welfare needs of the animals.

3.14 Comprehensive records must be kept – where possible on computer – and be made available to inspectors covering the following:

(a) preventive medicine;
(b) clinical medicine and surgery;
(c) pathological findings from ante-mortem testing; and
(d) results of post-mortem examination and testing.

3.15 There must be systems for regular review, by the relevant veterinary and curatorial staff, of clinical, behavioural and pathological records and mortality. Husbandry and preventive medical practices must be reviewed where problems become apparent.

3.16 Zoo management must ensure that the zoo, or a local hospital, or their veterinarian has readily available antidotes to potentially toxic veterinary products used at the zoo.

3.17 A member of staff must be readily available at all times to authorise the euthanasia of sick animals on veterinary advice. There must be provision of an effective humane method of euthanasia and standard written protocols should be set down.

3.18 Adequate facilities must be available either at the zoo or within a reasonable distance for the post-mortem examination of all species held at the zoo.

3.19 Dead animals must be handled in a way which minimises the risk of transmission of infection.

3.20 Animals that die at the zoo must undergo post-mortem examination in accordance with veterinary advice unless, on an individual case-by-case basis, the zoo's official veterinary adviser states in writing that it is not necessary. Where appropriate, samples for diagnosis or health monitoring should be taken for laboratory examination.

3.21 Retained samples must be stored in conditions advised by the veterinary surgeon and away from animal feeding substances. The establishment of a reference collection should be encouraged.

Isolation, quarantine & containment

3.22 Quarantine and isolation procedures to facilitate biosecurity must be in place that are appropriate for individual species' disease risks.

3.23 Dedicated accommodation, off-show where necessary, must be available for the isolation and examination of newly arrived animals, and for the quarantine and care of unduly distressed, sick or injured animals.

3.24 Facilities should be available for hand-rearing and nursing animals.

3.26 Newly arrived animals should be kept isolated for as long as is necessary to ensure proper examination, acclimatisation and quarantine before introduction to other animals in the collection.

3.27 Particular attention must be paid to hygiene in the quarters where isolated or quarantined animals are kept, whilst at the same time, taking all reasonable steps to provide for the physical and behavioural needs of the animals. This is particularly the case where animals are to be held for long periods.

3.28 Protective clothing and utensils used by staff in the isolation area must be used, cleaned and stored only in that area.

Sanitation & control of disease

3.29 Clinical waste and refuse must be regularly removed and disposed of in a manner compliant with current legislation.

3.30 A safe and effective programme for the control or deterrence of pests and vermin and where necessary predators, must be established and maintained throughout the zoo. Any use of rodenticide must consider the impact on collection animals if accidentally ingested.

3.31 Health risks posed by the use of power hoses on animal waste must be minimised.

3.32 Staff should be instructed to report in confidence any medical condition or disability which might affect their capacity to manage the animals in a safe and competent manner.

Specific considerations

3.33 Specialist techniques used on animals to make them safe for exhibit or to allow them to be exhibited in a particular way (e.g. pinioning waterfowl) must be kept under continual review. Documented evidence of consideration and rationale must be available for review by the inspectors (e.g. ethical review minutes) and must take into consideration individual animals' welfare. Current legislation and codes of practice must be followed.

3.34 Where native wildlife species are rescued or temporarily re-homed prior to release by a zoo the collection must be able to demonstrate clear segregation of collection animals from wildlife to

ensure welfare and to prevent the spread of disease into or out of the collection. Such isolation and segregation techniques must be demonstrated in the documented preventative health care programme.

Section four | Behaviour

4.1 Animals should be allowed the opportunity to express all normal behaviours, with the exception of those (e.g. predatory behaviour) that would impair the welfare of the individual or other animals, either in the long or short-term.

4.2 Animals must be provided with effective methods of behavioural stimulation, through environmental design and management, and specific, targeted animal care programmes, working together to promote positive welfare outcomes.

4.3 Animals must be protected from fear and distress. Areas of consideration include group composition, sex ratios and numbers of animals in an enclosure, and space and furniture in both indoor and outdoor areas.

4.4 Animals often benefit from mixed species environments. However, inter-species conflict can cause stress and this needs to be monitored, recorded and reviewed, including safety from potential predators.

4.5 Predators and prey species should not be kept in visual, aural or olfactory shared spaces.

4.6 Captive breeding should be encouraged where appropriate and must comply with the Animal Collection Plan (see 5.5). Appropriate control measures should be put in place to prevent overpopulation.

4.7 Zoos must keep up-to-date with information on biology, husbandry and welfare, especially when considering the keeping of species that they have not housed before. This knowledge must be incorporated into husbandry protocols and housing design.

4.8 Accommodation must incorporate as many aspects as possible of the natural habitat of the species that would promote good welfare in each of the five domains, meeting both the physiological and psychological needs of the animal.

4.9 Enclosures must be equipped with species appropriate bedding material, branchwork, burrows, nesting boxes, pools, substrates and vegetation and other enrichment materials designed to aid and encourage normal behaviour patterns and minimise any abnormal behaviour.

4.10 Facilities must take into account any breeding and/or growth of animals and must be capable of satisfactorily providing for their needs at all stages of their growth and development or have in place a written policy that will provide for all their future needs.

4.11 Animals of social species should be maintained in compatible social groups that reflect the makeup of social groups in the wild. They should only be kept isolated for the shortest time possible under veterinary instruction, or for the benefit of the conservation and welfare needs of the individual or group, and where this is not detrimental to the individual animal.

4.12 Animals of different taxa should not be allowed to interbreed.

4.13 Where a hybrid animal is transferred to another collection, the recipient organisation must be informed that the animal is a hybrid. Unless under veterinary advice, all hybrids should be

permanently sterilised prior to transfer.

4.14 Animals must be handled and managed only by, or under the supervision of, appropriately qualified, experienced competent staff. Handling must be done with care, in order to protect the animals' well-being, and avoid unnecessary discomfort, stress or physical harm.

4.15 Any direct physical contact between animals and the visiting public must only be for restricted periods of time and under conditions consistent with animals' welfare, and not likely to lead to their discomfort. All animals should be monitored by competent staff for signs of fear, anxiety, stress and discomfort. If such signs are seen, contact should cease until a time where the animal is deemed by suitably competent staff to have sufficiently recovered and mitigating measures have been put in place to avoid future episodes. Decisions to permit direct contact between animals and the public must be assessed by the ethical review process.

4.16 Animals must not be provoked for the benefit of the viewing public.

SEE APPENDIX 7 FOR ADDITIONAL DETAILS REGARDING ANIMAL CONTACT AREAS

4.17 Animals must not be permanently locked outside for the benefit of the public in an area where there is no appropriate or effective shelter, particularly in adverse weather conditions.

4.18 Animals which may interact in an excessively stressful way must not be maintained in close proximity to each other.

4.19 Suitable, separate if appropriate, accommodation for pregnant animals and animals with young should be available in order to minimise unnecessary stress. Housing and husbandry of such animals should reflect current knowledge and best practice.

4.20 Animals temporarily accommodated away from others should not be separated for such a period of time that there would be difficulties in their re-introduction to the group.

4.21 Animals destined for rehabilitation (e.g. casualty animals) must not be on public display if this is likely to causes stress or compromise their eventual release.

4.22 Smoking by zoo staff must be prohibited except in designated areas. In open-air collections smoking by visitors must be prohibited where the health and welfare of animals may be compromised and in accordance with current legislation.

Section five | Mental consideration

5.1 Zoos must demonstrate their commitment to ensuring negative welfare states are minimised and that positive welfare states are promoted.

5.2 A written policy or statement must be produced outlining the zoo's commitment to managing animal welfare. This must be read and understood by all staff and evidence provided of a culture that promotes positive animal welfare. The zoo or aquarium must be able to demonstrate staff knowledge of animal welfare assessment relating to the species they care for.

5.3 The zoo must undertake and be able to demonstrate an evolving, ongoing, documented process of animal welfare assessment, review and improvement, if required.

This may be demonstrated through dedicated processes or policy and/or ethical review meeting minutes and/or documentation and actions taken reported in the animal records. These must be

made available to inspectors during inspections. Areas to be considered should include current animal welfare legislation and the World Association of Zoos and Aquariums Animal Welfare Strategy.

5.4 Zoos must have an active and effective environmental enrichment programme across the taxa, in both the inside and outside environments, that is part of the daily routine. This should consist of written records of enrichment design, species use, duration of installation, effectiveness, safety and schedules of use.

5.5 The zoo must produce an annually updated Animal Collection Plan (or Institutional Collection Plan) that gives an overview of the current state of the animal collection and the role of each species within it. This must align with overall species conservation plans, where appropriate, and minimise negative and maximise positive welfare states in the animals. This should include consideration of whether the zoo is able to meet the welfare needs of the animals concerned, given their species, and using up to date animal welfare knowledge.

Animal Collection Plans should include basic information such as common and scientific name; IUCN Red List threatened category; species role (e.g. conservation, research, education, visitor experience, or no current role if none) and information regarding the future management plans for the species within the collection e.g. phase species out, breeding management recommendations, and other operational requirements for the successful management of the individual species. Animal welfare should be embedded throughout the Animal Collection Plan, such that it can be demonstrated that it has been considered when creating or altering the plan (e.g. in ethical review minutes).

5.6 The zoo must have a documented ethical review process, which should be used particularly in situations where the use of animals (e.g. acquisition, management or disposal for conservation, education or research) may be in conflict with the best welfare interests of the animal or animals involved.

SEE APPENDICES 2 & 3 FOR ADDITIONAL DETAILS REGARDING WELFARE & ETHICAL REVIEWS

Section six | Transportation & movement of live animals

SEE APPENDIX 5 FOR ADDITIONAL DETAILS REGARDING ANIMAL TRANSPORT, ACQUISITION AND DISPOSAL, AND APPENDIX 8 FOR TRAINING OF ANIMALS

6.1 Surplus zoo stock must only be passed on to responsible persons who have the appropriate facilities, resources and expertise to ensure the welfare of the animals. Where necessary, the appropriate licences for the keeping and management of the species must be held.

6.2 Facilities suitable for lifting, crating and transportation of all the types of animals kept within the zoo to destinations both inside and outside the zoo should be readily available.

6.3 Zoos must ensure that they comply fully with the requirements of the Convention on International Trade in Endangered Species (CITES) and the current legislation implementing the Convention in Ireland. CITES governs the import, export, sale and other commercial use – including display – of species, both living and dead, listed in its Appendices. Zoos must ensure that they have a certificate issued under Article 10 of Council Regulation (EC) No 338/97 for Annex A CITES specimens (live or dead) that are to be used or displayed commercially. However an Article 10 certificate is not required if a zoo has a separate certificate issued under Article 60 of Commission Regulation (EC) No 865/2006. Article 60 certificates enable all specified Annex A listed zoo animals to be used or displayed commercially where they are being primarily used for breeding or research and educational purposes of benefit to the conservation of the species. A separate Article 10 certificate is required if the zoo intends to transfer for commercial use any Annex A specimens other than to a zoo issued with an Article 60 certificate.

6.4 Other considerations to be taken into account when animals are moved to accommodation outside the zoo include:

(a) transport must conform with all other current regulations, including Department of Agriculture, Food and the Marine and IATA provisions.
(b) the accommodation the animal is being moved to, and the animals it is to be mixed with, must not compromise the welfare of that individual or of the other animals.
(c) all efforts must be made to ensure a positive welfare state is promoted

6.5 Catching and transportation techniques must take account of the animal's temperament and escape behaviour in order to minimise injury, damage and distress.

6.6 Any animal taken outside the zoo must be in the personal possession of the operator of the zoo, or of competent persons acting on his/her behalf, and adequate provision must be made for its and the public's safety and well-being.

6.7 All animals taken outside the zoo must be kept securely at all times. Animals should be kept away from direct contact with persons other than the zoo operator or competent persons acting on his/her behalf, unless the zoo operator is satisfied that the animal is not likely, when under control, to suffer distress or cause injury or to transmit or contract disease. Zoo operators should exercise caution and discretion in the case of the removal of any animals from the zoo, since their behaviour may become less predictable when away from their usual enclosures.

Section seven | Conservation & Education

SEE APPENDICES 1 & 4 FOR FURTHER DETAILS ON MEETING THE CONSERVATION & EDUCATION REQUIREMENTS OUTLINED IN THE EC ZOOS DIRECTIVE

7.1 In 1999 conservation and education became subject to legislative control in Ireland when the EC Zoos Directive came into force. These requirements have been transposed into domestic legislation in Ireland (by means of Statutory Instrument No. 440 of 2003 European Communities (Licensing and Inspection of Zoos) Regulations 2003) and are further explained below.

Conservation measures

7.2 The Directive requires that zoos undertake conservation measures and gives a number of options for doing so. The options given are:

(a) participating in research from which conservation benefits accrue to the species, and/or;
(b) training in relevant conservation skills, and/or;
(c) the exchange of information relating to species conservation and/or;
(d) where appropriate, captive breeding, and/or;
(e) where appropriate, re-population or reintroduction of species into the wild.

7.3 Zoos must therefore undertake, as a minimum, at least one of these options. The measures required should be proportionate to the size and type of zoo.

7.4 Where the relevant species are held, a zoo must be an active participant in recognised species management programmes.

7.5 Zoos must be able to demonstrate their conservation measures, including research if undertaken. At a minimum a zoo must have a documented conservation policy that outlines how it will meet the requirements of the Regulations. This should include consideration of how this relates to the World Zoo and Aquarium Conservation Strategy and the type and level of input the zoo provides for national or international conservation programmes.

7.6 Zoos should generally be able to demonstrate that they encourage research. Research can be developed through forging links with Higher Education Institutions.

7.7 In any research carried out, care must be taken to comply with all relevant legislation and be subject to ethical review.

Education measures

7.8 The Directive requires that zoos must promote public education and awareness in relation to the conservation of biodiversity, particularly by providing information about the species exhibited and their natural habitats. The measures required should be proportionate to the size and type of the zoo.

7.9 A zoo must have a written education strategy and an active education programme.

7.10 Suitable facilities, commensurate to the size of the zoo, should be available for education purposes.

7.11 Accurate information about the species exhibited must be available. This must include, as a minimum, the species name (both scientific and common), its natural habitat and some of its biological characteristics and details of its conservation status, for example as defined by the IUCN Red List Categories and Criteria.

7.12 The zoo should be able to demonstrate:

(a) the educational role of the zoo as set out in any mission statement;
(b) how the written education plan applies to different types of people who visit the zoo.

7.13 Zoos must keep records of their conservation and education activities and should be encouraged to evaluate the effectiveness of their contribution to these activities by collecting appropriate evidence and/or engaging in research projects to do this.

7.14 Zoos should ensure that information signage and interpretation is accessible, readable, accurate, safe and considers the diverse range of visitors and age groups that visit the zoo.

Section eight | Public safety in zoos

SEE ALSO APPENDICES 7 & 9 FOR SPECIES & ACTIVITY SPECIFIC CONSIDERATIONS

Principles

8.1 The authority shall not attach to a licence a condition which relates only or primarily to the health, safety or welfare of persons working in the zoo, unless a lack of action may impact public safety or animal welfare. These are dealt with under separate Health and Safety legislation.

8.2 Points regarding the containment of hazardous animals are particularly important to the animals' welfare, as actions following escapes may result in the injury or death of the animal in order to guard public safety.

8.3 Risk assessments relating to public safety must be undertaken where appropriate and significant findings should be available for examination by the Inspector.

Insurance

8.4 Zoo operators must have insurance cover which covers them and every other person under a contract of service or acting on their behalf, against liability for any damage or injury which may be caused by any of the animals or by other factors, whether inside or outside the zoo, including during transportation to other premises. Any upper limit on the sum insured must be set at an adequate but realistic level.

Enclosures

8.5 Other than when under the control of authorised staff, animals kept in the zoo must be maintained at all times in enclosures or, in the case of free-running animals, within the perimeter of the zoo.

8.6 All animals must be kept in enclosures so constructed as to avoid escape. Gates and doors to enclosures must be securely locked so as to prevent unauthorised opening. In general, there

should be a double gate/door system in place to prevent escape from the secure area should one gate/door be breached.

8.7 Barriers must be designed, constructed and maintained to contain animals within enclosures. Vegetation, climbing structures or other items should be maintained in such a way as to not aid escape.

8.8 Like all enclosure barriers, gates and doors to enclosures must be strong and effective in containing the animals. In particular, gates and doors should be designed and maintained so as to prevent animals from lifting them from their hinges or unfastening the securing device.

8.9 Gates and doors to animal enclosures where the public are admitted, and any enclosure or stand-off barrier, must be designed, constructed and maintained so as not to trap or otherwise injure visitors, particularly children or those with disabilities. Where electric fencing is installed it must conform to the appropriate Irish or European Standards. Electric fencing used for animal containment must be checked daily and have back-up power in case of a power cut.

8.10 Animals that can climb or jump must be kept in enclosures secure enough to prevent them from escaping. The minimum recommended height of enclosures/barriers as stated in national or international industry standards (BIAZA, EAZA or AZA) such as those associations' Husbandry Guidelines should be taken into consideration. Digging or burrowing animals must be kept in enclosures so constructed as to avoid escape underneath barriers.

8.11 Viewing panels used in enclosures should be able to withstand attacks by the species contained within.

8.12 Where fences are used to enclose animals, the supporting posts must be firmly fixed into the ground. Fence material should be sufficiently secured to supporting posts in such a way that the weight of the animal enclosed could not detach it from the support nor dislodge the supporting posts.

Management & maintenance

8.13 Buildings, structures and areas to which the public have access must be maintained in safe condition.

8.14 The visiting public must not be allowed to enter any buildings or other areas of the zoo premises which could present an unreasonable risk to their health and safety.

8.15 Areas where visitors are encouraged to go should have surfaces to avoid the risk, as far as is reasonably practicable, of visitors falling or tripping.

8.16 Where a flight of steps is used as a means of access for visitors within the premises, a handrail should also be provided. Consideration should be given to providing shallow gradients for pushchairs and disabled access.

8.17 Trees within areas where visitors are likely to be walking or sitting should be regularly inspected and managed by a suitably qualified person as appropriate to avoid visitors being harmed by falling trees/branches. Similarly, vegetation such as nettles and thistles should be controlled to avoid injury to visitors.

8.18 Where a walkway passes over an animal enclosure it should be designed, constructed and maintained to ensure that it is safe. It should also be maintained, sited and protected so as to withstand contact by animals.

Protection of the public

8.19 Every person licensed to use a firearm must undergo formal training by a suitably qualified person. Every trained operator should undergo periodic refresher training and practice. Such training should be recorded and available for inspection.

8.20 Where a zoo holds any primate, carnivore, elephant, or hoofed mammal, listed in category one of Appendix 12, appropriate firearms must be available, unless a risk assessment has shown that a firearm would not provide the most appropriate means of protection to the public from that animal, and other arrangements have been made. Firearms, ammunition and darting equipment, where provided, must be:

(a) available for immediate use by licensed and trained operators;
(b) cleaned and maintained as recommended by the manufacturer;
(c) kept securely when not in use or under maintenance.

8.21 Appropriate staff must be trained in medicines handling (including those used for chemical restraint): its risks; side effects; human risks if misused; and emergency protocols.

8.22 Where used to contain animals, moats (whether wet or dry) must be surrounded by a stand-off e.g. fences, walls, hedges or shrubbery, sufficient to prevent the public from approaching too close to the edge. Consideration should be given to whether rescue equipment such as lifebuoys should be provided.

8.23 Barbed, razor wire or electrified fences should be beyond the reach of members of the public.

8.24 Stand-off barriers must be provided and be designed, where necessary, to ensure public safety particularly to prevent direct contact with category one hazardous animals – see Appendix 12.

8.25 Safety barriers must be designed to prevent children from getting through, under or over them. They should also be designed to discourage visitors from sitting on them.

Free-ranging species

8.26 Under Section 56 of the Wildlife (Amendment) Act (2000) (No. 38 0f 2000) zoos and others must prevent the deliberate release or permitting to escape into the wild of non-indigenous species. This is particularly relevant if free-ranging species are kept within the zoo grounds but not confined in enclosures.

8.27 Under the EC Zoos Directive zoos are required to be active in '…preventing the escape of animals in order to avoid possible ecological threats to indigenous species'.

8.28 Zoos must take into account the Wildlife (Amendment) Act (2000) where there are free-flying psittacine birds or birds of prey in flying displays. Zoos must be aware of the legislation and take every precaution to prevent escapes. Particular points to note are:

(a) bird of prey centres which use birds in flying demonstrations should train birds sufficiently to ensure their return;
(b) where possible, transmitters should be used to help zoo staff to locate birds which have strayed;
(c) zoos which allow birds to free-fly should encourage them to remain on site by providing roosting areas, nest boxes, and feeding points; and
(d) enough staff should be available to retrieve birds when lost.

SEE APPENDIX 9.7 FOR FURTHER DETAILS ON MANAGING BIRDS OF PREY

Escapes

8.29 The perimeter boundary, including access points, must be designed, constructed and maintained to discourage unauthorised entry and, so far as is reasonably practicable, as an aid to the confinement of all the animals within the zoo.

8.30 Zoos must have systems in place to minimise the risks of theft, malicious damage or release of animals by intruders entering the grounds out of hours.

8.31 Zoo operators must assess whether any danger may arise in the event of an animal escaping from its enclosure, and consider the possible or likely attempted escape route from the zoo if this were to happen.

8.32 Every effort must be made, so far as it is reasonably practicable, to effect the recovery, live or dead, of any escaped animals.

8.33 The procedures to be adopted in the event of escapes within or from the zoo (or of accidental or unauthorised releases) of any animal should be brought to the attention of, and available to, all members of staff, and other relevant personnel as considered necessary, in a written document.

8.34 Procedures relating to escapes of animals must be established and include the following:

(a) the reporting of every escape by the quickest possible means to the most senior member of staff available;
(b) the response to an escape in all situations; for example, whether daytime staff are on duty, whether visitors are present, and whether more than one animal has escaped;
(c) what needs to be done in the event of an escape; including recapturing the animal, protecting visitors, alerting the An Garda Síochána and, where necessary, the licensing authority;
(d) the control of visitors, including reassurance, ushering into buildings, closing doors and windows, evacuating the zoo;
(e) the security of the perimeter barrier, involving the closure of all points of access to, and exit from, the zoo;
(f) the provision of firearms and darting equipment to tranquillise or kill escaped animals, precise details of which are to be discussed and agreed by the zoo operator and the local An Garda Síochána (regular training with firearms and darting equipment should be conducted and documented);
(g) the provision of adequate equipment for members of any recapture party, including, where necessary, vehicle protection.

8.35 A member of staff should be readily available at all times to take decisions regarding euthanasia of escaped animals.

8.36 The zoo must establish a clear chain of responsibility, which must be written and up to date. It must be notified to all staff, and posted on notice-boards in staff areas.

8.37 The zoo must be responsible for the selection of the appropriate firearm or darting equipment to deal with escaped animals.

8.38 Zoo operators must ensure that all members of staff are familiar with emergency procedures when animals escape. In particular, emergency animal escape drills must be carried out at least four times a year, recorded and regularly reviewed, this should include at least two drills involving the escape of a category one species (where present). For aquaria that only have aquatic lower vertebrates or invertebrates the emergency drills can be replaced with appropriate emergency procedures e.g. envenomation, electrocution or other relevant procedures following discussion

and approval by inspectors.

8.39 All escapes must be recorded and detailed reports made. Risk assessments must be continually reviewed in the light of experience. A zoo must notify to the licencing authority as soon as possible, and, in any case, not later than 24 hours following escape from the confines of the zoo of any non-domestic animal. Zoos are recommended to record 'near misses' and actions taken.

8.40 As far as is reasonably practicable, zoos must prevent the release of parasites, diseases or non-native plants and animals through effluent water and other routes. Waste water should be appropriately treated to ensure that this does not occur.

Exits

8.41 Exits should be suitably located and adequately signed.

8.42 Each main exit must be kept clear and be capable of being easily opened from inside to allow the release of visitors from the zoo. All such gates should be capable of being closed and secured to prevent the escape of animals.

Signage

8.43 Suitable warning signs and information must be provided where animals and visitors may come into contact.

8.44 An adequate number of safety signs (in accordance where appropriate, the Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2007 (S.I. No. 732 of 2007) (or any future amendments)), giving warning of the hazard either by symbol or a combination of symbol and words, must be provided on any electrified fence.

8.45 Warning must be given of all edges where a person might fall. Such edges must be guarded by a barrier capable of preventing children from falling.

8.46 Any buildings where a hazard exists must be kept locked. Warning notices should be displayed to indicate that access is either unsafe or not permitted.

8.47 Other areas must be clearly defined, e.g. by means of barriers and warning notices; or, where access is allowed to vehicles operated by zoo staff, by notices and road markings.

8.48 Zoos should consider the use of symbol-based signs wherever practicable to assist, for example, foreign visitors and children.

8.49 Safety signs on any electrified section of perimeter fence should face both outwards and inwards.

Section nine | Animal records

9.1 Records must be kept and maintained of all individually recognisable animals and groups of animals in the zoo. Where possible, animals should be individually identifiable.

9.2 The records must be kept either on a card index or computer, or other type of retrieval system from which information can be quickly examined.

9.3 Records must be kept up to date and be available on site for six years. Provision should be made for long-term archiving in a secure format.

9.4 The records must provide the following information:

(a) identification and scientific name;
(b) origin (i.e. whether wild or captive-born, including identification of parents, where known, and previous location/s, if any);
(c) dates of entry into, and disposal from, the collection and from and to whom;
(d) date, or estimated date, of birth or hatching;
(e) sex (where known);
(f) any distinctive markings, including tattoos, freeze-brands, rings or microchips;
(g) clinical data, including details of and dates of any treatment given;
(h) behavioural and life history data;
(i) date of death and the result of any post-mortem examination and laboratory investigations;
(j) where an escape has taken place, or damage or injury has been caused to, or by, an animal to persons or property, the reason for such escape, damage or injury must be recorded and a summary of remedial measures taken to prevent recurrence should be provided;
(k) food and diets.

9.5 In addition to the individual records, an annual stock record of all animals must be kept. A copy must be forwarded to the licencing authority no later than 1 April of the year following that to which it relates. The annual stock record should include the following:

(a) common and scientific names of the species;
(b) CITES Appendix and EU Annex where applicable
(c) hazardous animal categorisation (see appendix 12)
(d) total in the collection at 1 January;
(e) number of arrivals into the collection from all outside sources during the year;
(f) number of births or hatchings within the collection during the year;
(g) number that died including culls;
(h) number that departed the collection, including sales, breeding loans, etc.;
(i) total remaining in the collection at 31 December;
(j) the sex of each animal, where known, must be recorded – e.g. 1.2.3 indicates one male, two females and three unsexed.

9.6 The records should be set out in a multi-column format as follows, or should be similar to those that are produced by ZIMS or ARKS:

Common name	Scientific name	CITES Appendix / EU Annex	Haz Cat	Total at 1st Jan 2015	Arrived	Born	Died	Departed	Total at 31st Dec 2015
Black tailed marmoset	*Mico melanurus*	2 / B	2	1.1.0	1.2.0	0.2.0	1.0.0	0.0.0	1.5.0

9.7 Where a zoo includes a wildlife rehabilitation operation a separate annual stock record of all native or rescued wildlife must be kept. This must include the same details as outlined in section 9.5 above but clearly separate the rescue/rehabilitation population from the permanent collection animals. This must be submitted no later than April 1st to DAHG along with the permanent collection animal stock inventory.

Section ten | Staff & training

SEE ALSO APPENDIX 10 - STAFF & STAFF TRAINING

10.1 Number of staff and their experience and training must be sufficient to ensure compliance with the Standards at all times, taking due allowance for holidays, sickness and other absences.

10.2 A list must be maintained of all staff authorised to work with the animals, together with lines of responsibility and levels of expertise, training, and qualifications.

10.3 A suitably competent member of staff must always be available and in charge.

10.4 All animal staff must be competent for their individual responsibilities and given the opportunity to undergo formal training to achieve appropriate qualifications.

10.5 Continuous in-house staff training must be a regular aspect of the zoo.

10.6 The zoo operator must make every effort to ensure that their staff do not have any convictions under any current animal welfare or conservation legislation.

Section eleven | Public facilities

First-Aid

11.1 First-aid equipment must be readily accessible on the premises.

11.2 First aid points must be adequately signed.

11.3 An adequate number of staff trained in first-aid must be available during the zoo's normal operating hours.

11.4 Written instructions must be provided for staff on the provision of health care and the procedures to be followed in the event of an incident involving any venomous animal and a visitor or staff member. These instructions must include immediate action to be taken and required information on a pre-prepared form for forwarding to the local hospital which should include:

(a) the time and nature of the bite or sting and the species inflicting it;
(b) the specification, for cross-reference purposes, of the anti-venom which accompanies the patient;
(c) the telephone number of the nearest poisons centre;
(d) the telephone number of the zoo and of an appropriate senior staff member;
(e) the telephone number of the appropriate specialist who must be contacted;
(f) where applicable, the medical records of the member of staff;
(g) details of the vet or any staff involved in handling venomous species.

SEE APPENDIX 9.3 - VENOMOUS SPECIES

Toilets

11.5 Adequate, properly equipped and maintained toilet facilities must be provided.

11.6 Clean water for washing must be provided along with soap and means of drying hands.

Parking

11.7 Zoo operators must ensure, in liaison with local stakeholders where necessary, that parking facilities are sufficient to meet the anticipated needs of visitors to the zoo.

Provisions for particular needs

11.8 Suitable shelter and seats should be provided for use, in particular, by elderly people and parents with young children.

11.9 Arrangements should be made to meet the needs of visitors, including those with disabilities, where reasonable, practical and appropriate.

Section twelve | Display of zoo licence

12.1 The current licence to operate a zoo or a copy of it, including all additional pages and conditions, must be displayed at each public entrance of the zoo.

APPENDICES

Appendix one | The EC Zoos Directive

a1.1 Council Directive 1999/22/EC relating to the keeping of wild animals in zoos was given force of law in Ireland in 2003. By way of background the Directive required Member States to license and inspect zoos to ensure good standards of animal care, and set the framework for the participation of zoos in conservation and education.

a1.2 The Directive required Member States to ensure that all zoos:

- 'participate in research from which conservation benefits accrue to the species, and/or training in relevant conservation skills, and/or the exchange of information relating to species conservation and/or, where appropriate, captive breeding, re-population or reintroduction of species into the wild;'
- 'promote public education and awareness in relation to the conservation of biodiversity, particularly by providing information about the species exhibited and their natural habitats;'
- 'accommodate their animals under conditions which aim to satisfy the biological and conservation requirements of the individual species, inter alia, by providing species specific enrichment of the enclosures; and maintaining a high standard of animal husbandry with a developed programme of preventive and curative veterinary care and nutrition;'
- 'prevent the escape of animals in order to avoid possible ecological threats to indigenous species and preventing intrusion of outside pests and vermin;'
- 'keep up-to-date records of the zoo's collection appropriate to the species recorded.'

a1.3 Guidance is provided on these elements in these Standards.

Closure of zoos

a1.4 A significant addition to the regulatory regime that stemmed from the EC Zoos Directive is the provisions for the closure of a zoo. The EC Directive provides for partial or full closure in the case of breach of conditions, and for the closure of an unlicensed zoo, including withdrawal or modification of a licence for licenced zoos.

a1.5 Under the Directive the licensing authority is now required to approve any arrangements made for the welfare or disposal of animals following the closure of a zoo.

a1.6 Full details of the licencing process, including closure of zoos, can be found in the Statutory Instrument No. 440 of 2003 European Communities (Licensing and Inspection of Zoos) Regulations 2003, with a summary found in the ZLGN02 Guidance note available from DAHG.

Appendix two | Animal Welfare

a2.1 Whereas zoos and aquariums of the past were places where animals were displayed for the pleasure of visitors, today's zoos and aquariums must be centres for animal welfare. They must ensure that the conditions for animals in their care are the best that can be delivered.

a2.2 Zoos and Aquariums must demonstrate an ongoing commitment to animal welfare in all operations and to all animals in their care.

a2.3 Zoos must strive to achieve:

(a) high welfare standards for all animals in their care,
(b) provide environments that focus on animals' physical and behavioural needs, considering the five domains,
(c) to offer continued education and training of staff in animal welfare,
(d) demonstrate a commitment to animal welfare research,
(e) to apply animal welfare knowledge and the five domains to the creation or alteration of the Animal Collection Plan (including whether to stock a species, breed from the animals, and invest in new facilities),
(f) to apply animal welfare knowledge to exhibit design and
(g) to being leading centres for animal welfare.

In doing so the Irish zoo profession will establish and maintain, as a minimum, acceptable welfare standards and related best practice.

Animal welfare assessment consideration

a2.4 Zoos and aquariums must develop an evolving, ongoing, documented process of animal welfare assessment, management and implementation. Zoos and aquaria are recommended to incorporate the current WAZA Animal Welfare Strategy into their process.

a2.5 Welfare assessments are a continuous, ongoing process that constantly evolve to ensure best welfare standards are delivered for the individual animal. Implementing a welfare process is not a quick fix but a considered, long-term approach to managing, delivering, documenting and auditing sound welfare strategies. When first approaching a welfare assessment a collection is recommended to take a snapshot of the current welfare situation and highlight any areas of concern and making them a priority, identifying animals with known complex welfare needs and then develop individual welfare programmes, moving on to other species based on the priorities identified in the initial review.

a2.6 Animal welfare is an intrinsic part of any collection, impacting the operation of any business involving the captive management of animals. Therefore a welfare assessment process should include consideration of the myriad interactions involved in the collection's animal management programmes. Areas for consideration, as recommended by the WAZA Animal Welfare Strategy (review for additional details), include:

Animal welfare and assessment

(a) Methods of animal welfare assessment – what is animal welfare, how does it apply to the species in the collection and how can it be effectively and consistently monitored and improved;
(b) Develop and maintain a staff culture that practices regular reporting and monitoring of animals' behaviours and health. Maintaining and keep updated all associated

animal records;

(c) Utilising and keeping up-to-date with current animal welfare research and applying it to the local situation in an individual zoo;

(d) Use the Five Domains animal welfare model to understand and assess different animal welfare states;

Monitoring and management of animal welfare

(e) Review transportation and translocations, ensuring any potential welfare risks are minimised or removed. Ensure that receiving collections' welfare programmes are concurrent with your own;

(f) Ensure high standards of animal welfare and health care, including preventative health care interventions;

(g) Develop comprehensive animal health plans that represent whole life care and not generic species-specific programmes;

(h) Develop protocols to prevent and manage disease outbreaks, including quarantine and isolation procedures;

Environment and enrichment

(i) Build staff skills, internal culture and commitment to embed enrichment strategies and activities into the daily management of all animals. It is important to not see enrichment as an additional element, but as an integral part of husbandry practices;

(j) Develop enrichment challenges, choices and comfort opportunities for animals to maximise their psychological health;

(k) Evaluate enrichment successes and failures, and share this knowledge with other collections. Considering design to stimulate a diversity of species-specific natural behaviours;

(l) Include environmental enrichment into exhibit design and upgrades;

(m) Share enrichment stories with visitors to broaden their understanding and education of animal biology and welfare;

Exhibit design

(n) Design of enclosures to facilitate care, husbandry and management without undue stress or injury;

(o) Consider species-specific characteristics and prioritise in environmental design to facilitate good welfare;

(p) Monitor the animal's use in an exhibit and review for future planning or for immediate changes to improve welfare;

(q) Communicate with visitors about animal welfare and how they can take personal actions to improve animal welfare themselves;

(r) Consider the provision of features that allow animal multiple choices or control over their environment;

Breeding programmes and collection planning

(s) Consider, demonstrably, animal welfare in all breeding plan and species management decisions such that negative welfare consequences are minimised, and positive welfare maximised for animals;

(t) When breeding (or managing) animals for release give specific attention to balancing animal welfare with survival in the wild and replenishment of wild populations, and ensure programmes follow the IUCN Guidelines for Reintroductions and Other Conservation Translocations;

(u) Develop a clear euthanasia policy that utilises the most humane methods, based on up to date research, that outlines the circumstances for use and who can undertake or make decisions related to euthanasia;

(v) Ensure species-specific animal welfare considerations are fully integrated into long-term animal collection planning that guarantees animals can be provided with whole-life care and a high level of welfare throughout their lives;
(w) Ensure that when considering importations during animal transactions that all animals come from sources that do not impact either their conservation or the welfare of individuals or the wild populations, or reinforce commercial production or management where animals' welfare may be compromised;

Conservation welfare

(x) Establish animal welfare as a key component in all conservation activities and projects supported by your organisation;
(y) Work with partner field conservation organisations and collaborate on animal welfare knowledge and skills that are relevant to their field operations, and may impact on the captive husbandry if those animals are held;
(z) Evaluate whether the animal welfare implications of conservation activities are outweighed by the conservation benefits;
(aa) Make sure in your conservation work and your conservation partners', the review of an individual's needs and the promotion of positive animal welfare is considered at all times;

Animal Welfare Research

(bb) Prioritise animal welfare and welfare monitoring as areas for research collaboration;
(cc) Continue to use and apply findings based on sound scientific research to support good animal welfare in zoo and aquarium management;
(dd) Use an animal ethics, welfare or research committee with external representation to consider and oversee research activities and increase scientific rigour across your operations;
(ee) Develop a research policy and research protocols to ensure that in all research involving animals any potential animal welfare concerns are clearly identified and any compromise is minimised, transient and justified in terms of the objective of the research;
(ff) Encourage conservation medicine as a research-based area of activity to enhance welfare generally and conservation welfare in particular;

Partnerships in Animal Welfare

(gg) Make sure all of your staff, including your animal management and veterinary staff members, closely collaborate and are up to date with professional standards of animal health and welfare;
(hh) Collaborate and partner with universities, research bodies and other zoological institutions to further understanding of animal welfare states and animal sentience;
(ii) Partner with animal welfare organisations and external animal welfare experts through representation on animal ethics and welfare committees or similar in reviewing animal welfare in your organisation;
(jj) Encourage partnerships with zoological collections to facilitate the development of positive welfare outcomes through staff training, staff exchanges or exchange of procedures;

Engagement and interaction with visitors

(kk) Avoid using animals in any interactive experiences when their welfare may be compromised;
(ll) Undertake specific animal welfare evaluations and risk assessments based on risks to animals' welfare, broken down by the five domains, with mitigating measures put in place and persons' responsible identifed. This should be reviewed regularly or

when changes to the programme are made and ongoing monitoring of all individual animals being used in interactive experiences. Withdraw animals from such activities if behavioural and other indices of distress are elevated and do not use them again until they have sufficiently recovered and suitable mitigating measures put in place to avoid the same happening again;

(mm) Ensure that messaging and content of shows that accompanies all interactive experiences and the intent of any related presentations is to raise conservation awareness and/or achieve conservation outcomes and assess, similar to education programmes, whether messaging is effective;

(nn) Do not undertake, contribute or participate in animal shows, displays or interactive experiences where animals perform unnatural behaviours. Species conservation should be the overriding purpose;

(oo) Set in place processes to ensure that all animals in your zoo or aquarium are treated with respect, this includes how animals are depicted and presented;

(pp) Explain to visitors, through interpretation or talks, how animal welfare prioritised within your organisation

Assessing animal welfare

a2.7 A key part of protocols and practices designed to ensure that animal welfare remains at acceptably high levels is the need for ongoing assessment of an animal's welfare.

a2.8 Both negative and positive experiences are of welfare significance and an animal's welfare state reflects the balance between them. In general, welfare will only be negative when negative experiences predominate, neutral when the negative and the positive experiences are in balance overall and positive when positive experiences predominate.

a2.9 Knowledge and expertise is critical to the promotion of positive welfare states. Understanding species-specific needs can greatly reduce negative experiences by applying the relevant knowledge and skills to promoting positive states.

a2.10 Behaviour is commonly considered to be an indicator of the welfare state and health of an animal. Animal welfare science provides a basis for cautiously interpreting animal behaviour in terms of what the accompanying subjective experiences may be.

a2.11 The behaviour domain of the Five Domains model incorporates this and refers to animal's likely perceptions of their external circumstances and the resulting associated negative or positive experiences.

a2.12 Animal welfare assessment is a critical component of modern animal care in zoos and aquariums. Assessment approaches have several facets and employ indices based on physical/functional conditions and behaviours that align with the negative and/or positive experiences animals may have.

a2.13 Whilst the Standards do not specify the format or methodology of the welfare assessment some basic principles of an assessment protocol should consider the following points: they should be species-specific, based on most up to date knowledge of the species and factors that impact their welfare; individual-specific, based on history, ongoing issues, and other factors; carried out regularly and more frequently when significant changes are going on (e.g. building work; after hours event); include overnight monitoring where possible without disturbing the animals; involve keepers as much as possible, or those directly involved in the animals' care; methods should consider the impact of different people doing the monitoring, and correct any variation as much as possible; persons doing monitoring must be sufficiently trained and knowledgeable about the individual species; outcomes of monitoring should be discussed / reviewed regularly so that timely changes can be made, where necessary; those monitoring welfare should be consulted during any changes that could impact the individuals' welfare (e.g. building work; changes to opening

hours; events; enclosure refurbishment; changes to species housed next door); and engage and communicate with other collections holding similar animals to share knowledge.

Appendix three | Ethical Review Process

a3.1 Ethics addresses questions relating to how groups of people decide to regulate their behaviour, such as the decisions they make about what is legitimate and acceptable in pursuit of their aims, and what is not, and the grounds for those decisions.

a3.2 Zoos must develop their mission led activities mindful of their social and environmental responsibilities. This provides an intrinsic link to moral and ethical considerations, which may range from the impact of activities overseas to the commercial operations of the organisation and the way in which their animals are managed in captivity.

a3.3 There are times when a balance has to be struck between what is best in terms of conservation, education, disease control or other goals and what is best for the interests, particularly the welfare, of individual animals. These decisions may be difficult and the aim of ethical review is to help ensure that all these concerns are taken fully into account.

a3.4 An ethical review process is therefore needed that can provide the means and encouragement for healthy, open and transparent debate with regard to ethical dilemmas as well as creating a framework to underpin and document the ethical considerations undertaken. Ultimately providing a mechanism to address "should the zoo do this" and if so, "have steps been taken to minimise the risk of harm to welfare or ethical standing?"

a3.5 There is an increasing tendency towards committees or groups of people serving as 'review' and 'audit' bodies on ethical issues. Zoos should be aware of the importance of ethics and have their own policy for dealing with ethical issues.

a3.6 A large body of knowledge has been built up relating to ethics and review committees. Much of this stems from human medicine circles, where ethical review is a pre-requisite for most clinical studies, and the scientific research community, where ethical evaluation of projects involving animals is the norm. For instance establishments licensed under the European Union (Protection of Animals Used for Scientific Purposes) Regulations 2012 (S.I. No 543 of 2012) are required to have an ethical review in place as part of their project evaluation process.

a3.7 Zoos can benefit from independent assessment and it is strongly recommended that membership of any ethics committee or review process has external representation. This increases robustness and independence from the zoo operator's considerations but also broadens the scope and viewpoints that may not always be apparent or representative of the wider community if solely relying on individuals employed by the zoo.

a3.8 Zoos must have some form of documented ethical review process, particularly in situations where the use of animals (e.g. acquisition, management or disposal for conservation, education or research) may be in conflict with the best welfare interests of the animal or animals involved. In some cases there is merit in having a committee that looks at all ethical issues, both human and animal.

a3.9 Much of the work of participants in the ethical review process is likely to involve judging the ethical acceptability of obtaining, keeping and disposing of animals in their use in conservation, education, research or other programmes. Examples of issues that might be assessed by the ethical review process include:

(a) in what circumstances an animal should be euthanased;
(b) is hand rearing of animals appropriate;
(c) whether waterfowl in enclosures should be pinioned;
(d) adequacy of procedures;
(e) animal transfer policy (acquisition and disposition);
(f) culling policy;
(g) research projects;
(h) compliance with conservation and educational policies;
(i) handling of animals by the public for educational purposes or displays.

a3.10 In all cases ethical reviews must be undertaken and documented in accordance with the zoo's formal ethical review process. In the case of a large zoo consideration should be given to the establishment of its own ethics committee, but this may not be practicable for smaller establishments. Smaller collections may instead opt for access to ethical advice from another committee or individuals, collaborate with other zoos to form joint ethical committees, or in some cases engagement of an ethics adviser may be appropriate.

a3.11 Whatever choice is made, the following points are important:

(a) the committee must not be perceived as being merely an agent of the management: it should have independence and, at the very least, provide advice to the zoo operator;
(b) the committee should not consist only of scientists –although scientists may be able to advise on practicalities and research, they are not necessarily qualified to judge what is ethically acceptable;
(c) where possible, junior staff from the zoo and members of the local community should be represented on the committee;
(d) the committee's work should be carried out in as open a way as possible, bearing in mind the need, on occasions, to respect confidentiality;
(e) the committee itself should be subject to review, with formal arrangements for changes to membership, rotation of chairman, and co-option of persons with particular skills.

a3.12 The question of ethical review is one that is likely to confront zoos more and more frequently in the coming years. However, zoos of the future will be better able to justify their existence and the work they do if they have a system in place that permits their activities to be scrutinised independently and impartially.

Appendix four | Conservation & Education

a4.1 Inspectors should assess conservation (including research, if undertaken) and educational standards and advise on performance against them.

Conservation

a4.2 Section 7 sets out the statutory conservation and education requirements of the Zoos Directive. There are a series of potential options given for conservation measures:

(a) participating in research from which conservation benefits accrue to the species, and/or;
(b) training in relevant conservation skills, and/or;
(c) the exchange of information relating to species conservation and/or;
(d) where appropriate, captive breeding, re-population or reintroduction of species into the wild.

a4.3 There are a number of options and the types of measures that can be taken to comply with the Directive's requirements. Zoos can participate in conservation activities of benefit to species in a number of ways. These activities can be undertaken in the zoo (*ex situ*) and/or in the wild (*in situ*), which may be in Ireland or abroad, and maybe species or habitat focused.

a4.4 Zoos must be able to demonstrate their conservation measures, including research if undertaken. At a minimum a zoo must have a documented conservation policy that outlines how it will meet the requirements of the Regulations. This should include consideration of how this relates to the World Zoo and Aquarium Conservation Strategy and the type and level of input the zoo provides for national or international conservation programmes.

a4.5 Many modern zoos carry out research. Participating in research from which conservation benefits accrue is one of the options to meet the Directive's requirements.

a4.6 Participating in research should be within the scope of any collection. At the minimum this need constitute no more than collecting and collating information for statistical purposes. Record keeping should therefore be comprehensive and carried out in a systematic way. Where possible, zoos should use standard protocols for data collection to enable analysis. Data collection will usually be carried out by zoo staff, but there may be scope to involve volunteers, research workers or students. Data on specimens can be made available to outside projects.

a4.7 Most zoo based research causes no harm to the animals involved, forms part of the routine management and requires no intervention with the animals in order to collect data. However, even apparently harmless research (e.g. dietary manipulation, blood sampling) requires careful thought and planning and should be subject to independent assessment.

a4.8 The European Union (Protection of Animals Used for Scientific Purposes) Regulations 2012 (S.I. No 543 of 2012) specifies that a regulated procedure is "any use, invasive or non-invasive, of an animal for experimental or other scientific purposes… which may cause the animal a level of pain, suffering, distress or lasting harm..." The performance of such research requires licensing of the project and the person carrying out the work and is subject to periodic visits to the establishment by authorised inspector of the Irish Medicines Board.

a4.9 Few zoos in Ireland carry out research covered by the S.I No 543 of 2012. But because the Act is very broad in its scope, zoos should be aware that even relatively harmless studies on animals might be subject to such controls. Visiting scientists need to be advised about the legislation

before embarking on research work. If there is any doubt the zoo operator should consult the Irish Medicines Board.

a4.10 Research is of very limited value if the results are not made available to others, especially where they can help to influence the welfare, health or conservation of animals. Data needs, at the very least, to be readily available on request; preferably it should also be published.

a4.11 Zoos should be encouraged to evaluate the effectiveness of their research.

a4.12 There are many ways in which zoos can directly support field conservation projects, including through financial contributions. However, simply seeking donations towards conservation projects, e.g. through collection boxes, will not in itself be sufficient to meet the requirements of the legislation.

Education

a4.13 The Zoos Directive requires zoos to promote public education and awareness in relation to the conservation of biodiversity, particularly by providing information about the species exhibited and their natural habitats. Education must be one of the core objectives of a zoological collection.

a4.14 A modern zoo must contribute in as many ways as possible to the education of visitors. They can, for example, use graphics and other devices to provide information and raise awareness, inform visitors about links of captive animals with conservation programmes specific to the zoo or other global efforts.

a4.15 The education potential for zoos is more than information and amazement at seeing and learning about wild animals; it is also to support conservation and enrich the experiences and heighten the awareness of visitors, creating empathy and support for wildlife and the natural world.

a4.16 It is important to recognise that education is not exclusive to focusing upon children; everyone can be the target for 'learning' experiences, which can be formal or informal. Therefore, all members of staff can contribute to the education programme and education delivery should be considered the remit of all staff in a zoo, not just a dedicated education department.

a4.17 The documented education strategy should facilitate the translation of educational aims and objectives into policy and practice. Educational aims that may be featured in the strategy include:

(a) to excite, enthuse and interest people in the natural world;
(b) to encourage public understanding of conservation issues;
(c) to develop public support and action to address conservation concerns;
(d) to provide experiences for visitors to enable them to make choices about their impact upon the environment (both positive and negative)

The strategy document should clearly state areas of policy for achieving these aims:

(a) all education projects should comply with relevant legal and health and safety requirements;
(b) the welfare of animals should not be compromised to achieve educational aims;
(c) education projects and programmes should be undertaken by appropriately trained staff;
(d) education programmes and projects should be evaluated using appropriate and quantifiable means;
(e) the educational effectiveness and opportunities of new/modified exhibits should be discussed at the design stage.

The strategy may be developed further to discuss aspects of implementation, for example, the

a4.18 provision of staff, facilities, graphics, talks, publications and special events.
An active education programme is one that is responsive to the needs of the users and is available for the majority of the time. The programme can be developed for specific target audiences, e.g. schools; although there are good opportunities to develop programmes targeted at general visitors, adults and post-16 learners.

a4.19
Inspectors, zoos and the licencing authority should be familiar with the education standards expected in member zoos of the British and Irish Association of Zoos and Aquariums (BIAZA).

a4.20 In addition to written education plans, points to consider include:

(a) that zoo education is broader than in schools and should be targeted at all visitors;
(b) educational material should, where possible, be linked to National Curricula;
(c) methods of interpretation for visitors to the zoo should include signs, graphics, activities, interactive displays and demonstrations;
(d) zoos should be encouraged to participate in zoo education networks.

Appendix five | Animal Transport, Acquisition & Disposal

a5.1 The BIAZA Animal Transfer Policy should be complied with where appropriate. Elements of this appendix are taken from the BIAZA Animal Transfer Policy and collections are advised to review the whole document in conjunction with these Standards.

Animal transfer policy

a5.2 Zoos must ensure that due diligence has been undertaken and that every reasonable precaution has been taken to determine that a transfer involving specific animals or institutions will not contribute to the laundering of animals, the illegal sourcing of animals, the continuation of poor welfare conditions, the unsustainable removal of animals from the wild (or without proper consideration and legal compliance) or the support of ethically challenging industries.

a5.3 All arrangements for the acquisition and disposal of animals must comply with the relevant Irish and European legislation.

a5.4 Zoos and aquariums are encouraged to develop an individual policy on the acquisition and disposition of animals, which is synergistic with the Animal Collection Plan (see Section 5.5 for details)

a5.5 The primary sources of animals within collections should be those bred within zoos and aquariums. Zoos and aquariums must not encourage the laundering of animals through third parties or countries, or contribute financially or morally to the continuation of poor welfare conditions through either the acquisition or disposition of animals.

Transport of live animals

a5.6 Arrangements for transport must comply with Council Regulation (EC) no 1/2005 on the protection of animals during transport and related operations; the European Communities (Animal Transport and Control Post) Regulations 2006 (S.I. No 675 of 2006); the Convention on International Trade in Endangered Species of Flora and Fauna (CITES); and the Guidelines on Transport and the Regulations of the International Air Transport Association (IATA), and any other relevant regulations.

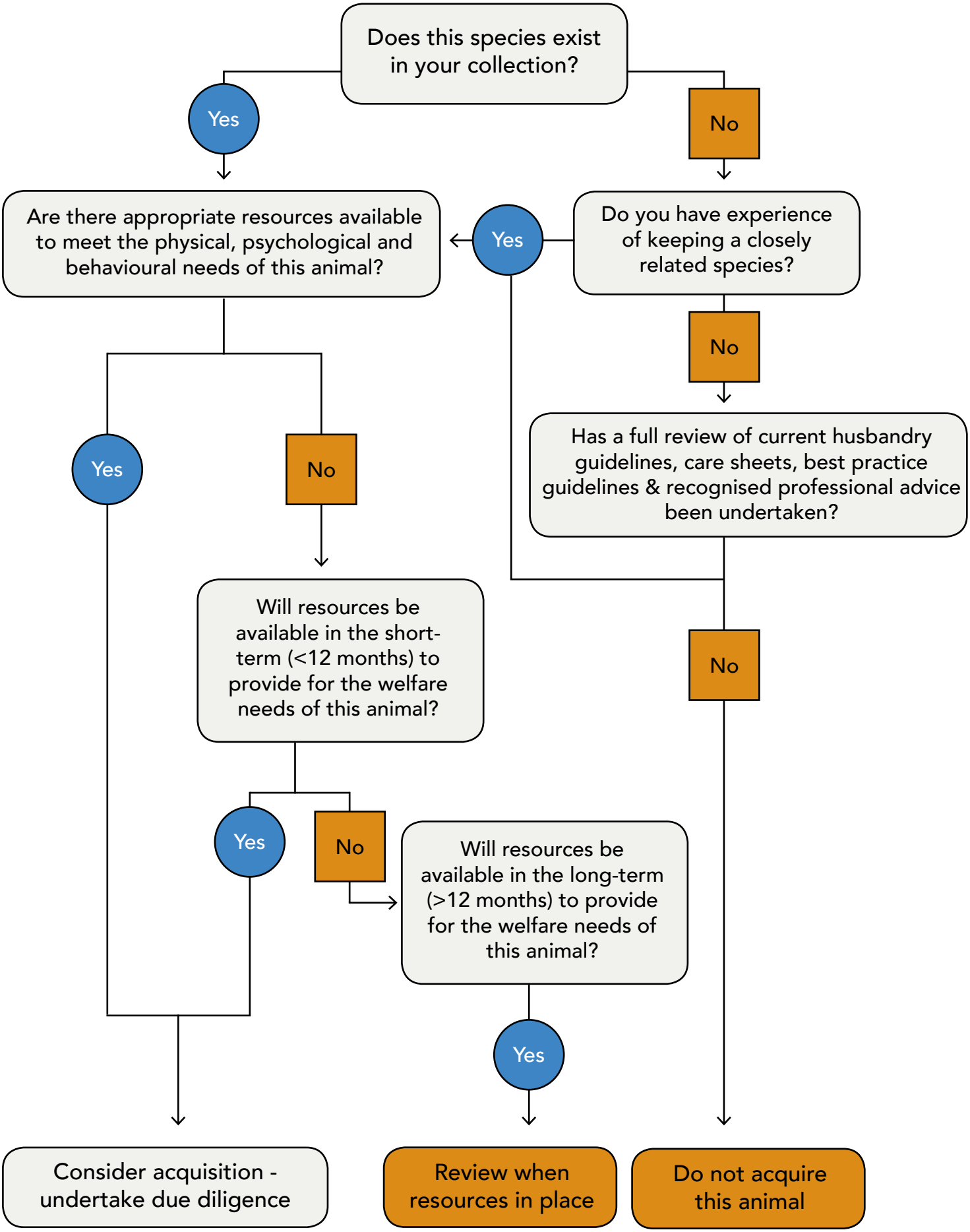
Animal acquisition

a5.7 The acquisition of any animal must take into consideration:

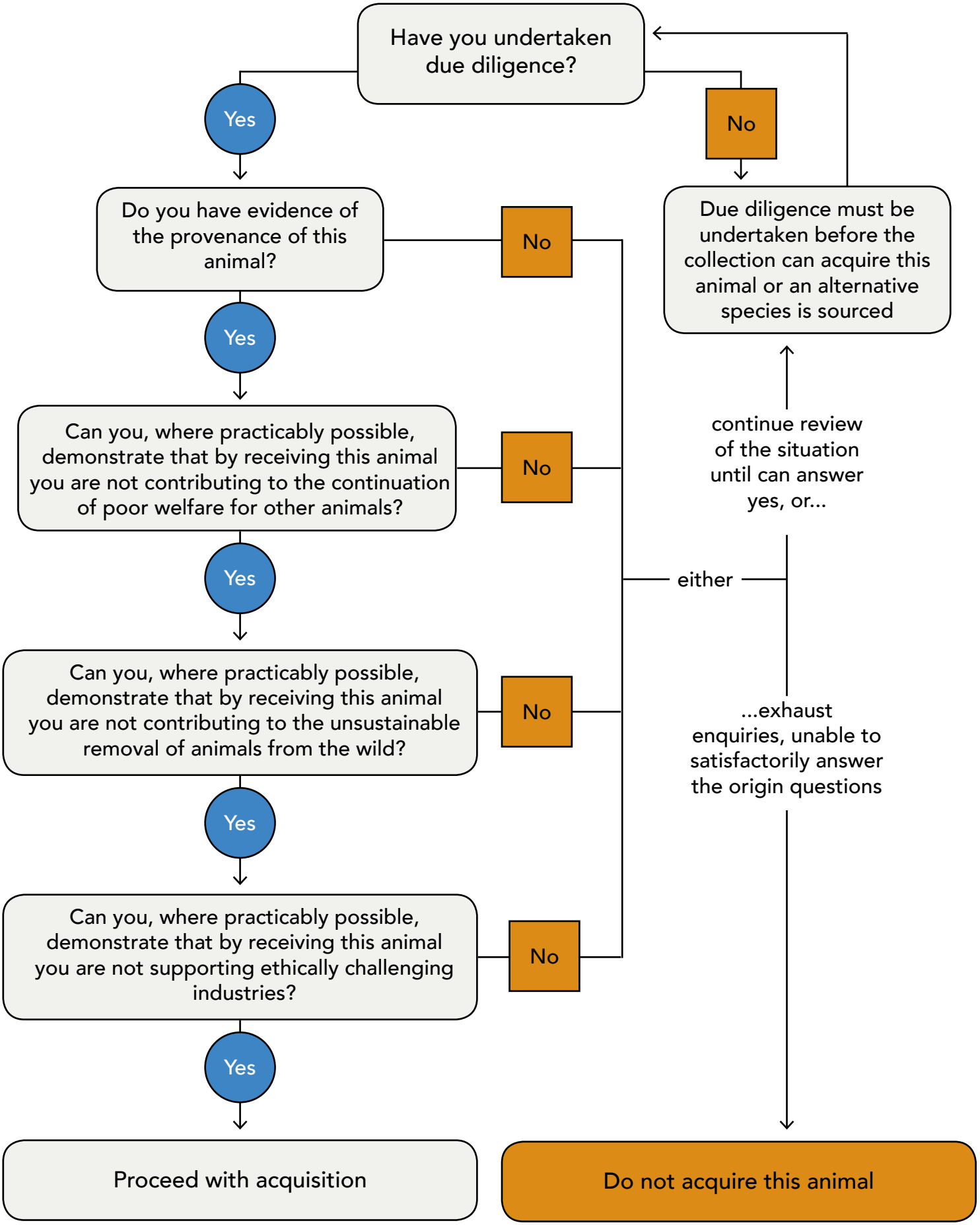
(a) the legality of the acquisition;
(b) the need for so doing;
(c) the provenance of the animal
(d) the welfare of the animal (including those remaining at the supplier).
(e) whether the animal is captive bred or wild caught and if the later then the methods of acquisition are sustainable and as part of a recognised conservation initiative
(d) the source is considered ethically sound

a5.8 When receiving animals, collections must be capable of providing appropriate levels of husbandry based on the five domains.

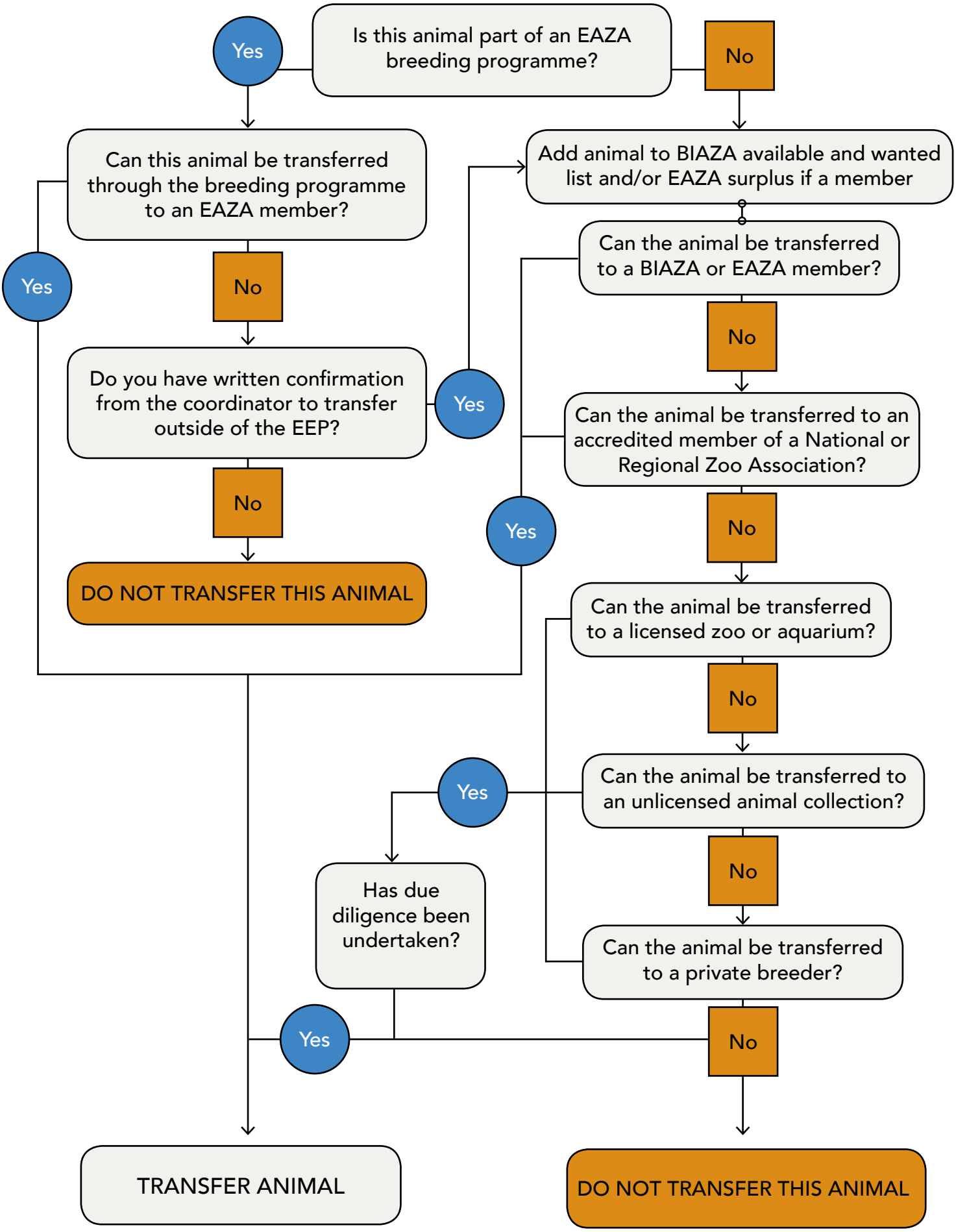
Decision process for acquiring a new animal



Undertaking due diligence



Decision process for disposing of an animal



Disposition of live animals

a5.9 Surplus stock is any individual that a collection no longer wishes to house, for any reason. When disposing of such stock operators must, where practicable, ensure that it is only passed to persons with the appropriate facilities, resources and expertise conforming with the five domains. Precautions must also be taken to ensure that recipients are likely to safeguard the animal's welfare in any subsequent transactions.

a5.10 If animals bred in zoos are sold as pets to the general public, the same standards and duty of care to the animals must be adhered to as in Appendix 5.9 above.

Animal intended for release

a5.11 The guidelines of the Reintroduction Specialist Group of the Species Survival Commission of the World Conservation Union (IUCN) should be followed when considering or undertaking the release of animals into the wild. Consideration should also be given to using other recognised guidelines and legislative compliance including the provisions of the Wildlife Act 1976 to 2012 (and any subsequent amendments).

a5.12 Animals intended for release present special challenges in comparison with those staying in the zoo. For example, health care may need to be different and exposure to stressors may be necessary, as care and facilities in a recipient country may fall below the standard in Ireland. Zoos involved in release programmes should make every effort to conform as closely as possible to the IUCN standards and reconcile these as far as possible with the legitimate needs of the project. Particular attention should be paid to the suitability of any temporary care facilities.

a5.13 Specific attention must be paid to biosecurity and the prevention of release of non-native species into the wild and/or the release of pathogens that may impact native wildlife populations, such as through native wildlife release programmes or waste water and effluent containing pathogens, e.g. chytridiomycosis.

a5.14 Zoos must have regard to legislation dealing with the control of invasive alien species including EU Regulation 1143/2014 and the relevant provisions of the Birds and Natural Habitats Regulations 2011 (S.I. 477of 2011).

Euthanasia

a5.15 Euthanasia is an acceptable procedure only if an animal cannot be provided with captive conditions which satisfy their welfare needs, considering the five domains, or it cannot be released into the wild. Although breeding for conservation purposes is to be encouraged, species for which there is marginal or no conservation value should be carefully assessed on whether to allow them to breed, and, if not, appropriate action taken to prevent stock from increasing unnecessarily. In the main, measures should be taken to control unwanted or unnecessary breeding. These are preferable to euthanasia of healthy stock, however culling surplus animals is a recognised management technique in certain circumstance which must be highlighted by ethical review.

a5.16 Euthanasia is justifiable under certain conditions, which include the following:

(a) if, in the opinion of a vet, an animal is suffering from an incurable disease, or severe pain or suffering which cannot be alleviated;
(b) if a zoo has to close, euthanasia may be the only option for some animals and the most humane for others;

(c) if the animal poses a serious and unavoidable threat to human safety (e.g. because it has escaped);
(d) culling of surplus stock (including unacceptable sex ratios) where over-crowding compromises the welfare of the animals so that it is impractical to maintain them within the five domains.

a5.17 It is important that a modern zoo has a policy, with appropriate protocols, to ensure humane and timely euthanasia to minimise suffering. This information should be made available to Inspectors and form part of the audit process. The policy should be capable of demonstrating that zoo operators have:

(a) information and guidance from their veterinary surgeon on euthanasia, including emergency methods;
(b) facilities for the humane despatch of animals of all the species kept, including for killing casualties under emergency conditions;
(c) support and advice on public relations aspects of the killing of animals; and
(d) ensured that methods utilised and their use are legally compliant.

Appendix six | Veterinary Programme

Veterinary services

a6.1 The EC Zoos Directive requires zoos to have '…. a developed programme of preventive and curative veterinary care and nutrition'.

a6.2 In assessing the level of veterinary services needed, the over-riding factor must be animal health and welfare. The consulting veterinary surgeon will often be in the best position to assess the requirement, but it is important that operators have access to and make use of the best veterinary knowledge. Special-interest veterinary associations exist and may be able to provide help in locating specialist advice.

a6.3 Continuing Veterinary Education (CVE) is now available in zoo and wildlife medicine and fish health and production, with post graduate qualifications available to the general practitioner, for example the RCVS Certificate in Zoological Medicine or the European College of Zoological Medicine Diplomas. It is essential that zoo veterinarians make every effort to be up-to-date and to participate in further formal training. It is also important that full advantage is taken of the availability of other specialists, such as those with expertise in veterinary dermatology, ophthalmology, cardiology, and human medicine.

a6.4 In order to provide comprehensive veterinary care, a zoo may choose to use a local veterinary surgeon for basic cover, but this must be supported by an experienced, preferably specialist, zoo (or fish) veterinary surgeon, or vice versa. In both cases, adequate provision must be made for early contact and discussion when needed.

a6.5 The level of veterinary service should be appropriate to the size and type of the collection. Over and above emergency calls, there should be sufficiently frequent regular advisory visits to assess general health and preventative veterinary practices. A minimum recommended frequency for different types of collections is as follows:

(a) Large zoos – weekly
(b) Medium sized zoos – 2 weekly
(c) Large bird parks – monthly
(d) Large aquaria, small bird parks – 2 monthly
(e) Medium sized aquaria (especially with other animals), specialist reptile exhibits, small and mixed zoos – 3 monthly
(f) Small aquaria, butterfly houses, small parks aviaries, museum-type vivaria, small falconry centres – 6 monthly

Depending on the nature of the collection, smaller collections may require more frequent veterinary visits where appropriate, for instance if they include a wildlife rehabilitation service or rescue facility with a significant number of animals requiring frequent veterinary assessment.

a6.6 It may be feasible to extend an emergency visit into a regular visit provided that it occurs at an appropriate interval from the previous regular visit.

a6.7 Definitions of the different type of zoos are difficult to arrive at, and it is at the inspector's discretion to decide into which category any particular zoo should fall.

On-site facilities

a6.8 Adequate facilities must be available at the zoo for routine or emergency examination of animals. Where these are basic, specialised clinical facilities should be available within a reasonable distance. There must be adherence to both legal standards and codes of practice relating to radiography, storage and use of drugs and firearms.

a6.9 Where a full veterinary service is not available at the zoo, a dedicated treatment room should be provided at the premises and be available at all times for use for the routine examination of animals. There should be minimum facilities of an examination table, hot and cold running water, heating, ventilation, lighting and power. The room should be of sufficient size for the purpose, have washable floor and wall surfaces, and be maintained in a clean condition with adequate drainage.

a6.10 Facilities must be available for the isolation and treatment of aquatic animals where these form part of the zoo collection. These should include separate holding tanks of appropriate dimensions to cope with the full range of species within the collection and the different water types (temperate, tropical, freshwater and seawater). Systems of catching up and moving sick fishes to the treatment facility should be in place, particularly for large fishes. Treatment tanks should be isolated from other water systems within the zoo or aquarium.

a6.11 Facilities should be available for collecting, restraining, treating and, if necessary, for administering a general anaesthetic, for euthanasia and for the after-care of all species kept at the zoo. These should be made available to the veterinary surgeon within a period which minimises unnecessary suffering to sick animals.

a6.12 Where a full-time resident veterinary service is located at the zoo, the facilities must be adequately equipped for the reasonable and foreseeable veterinary needs of the collection.

a6.13 All drugs, vaccines and other veterinary products should be kept safely under lock and key with access by authorised persons only. Regular inspection by the veterinary surgeon to remove out-of-date drugs should be carried out. Full records of drug stock, usage and disposal should be kept.

a6.14 Medicinal products should only be administered under the direction and control of a veterinary surgeon.

a6.15 All unwanted or contaminated veterinary equipment must be disposed of safely. For example equipment should not be left in places where it could be reached by any animal and sharp instruments such as syringes and needles should be disposed of as specified in current legislation e.g. in rigid containers or incinerated after use.

Post-mortem facilities

a6.16 Normally animal carcasses should be quickly and safely removed to a professional veterinary laboratory. Where this is not possible, facilities should be provided for conducting post-mortem examinations and processing resulting samples in a safe and hygienic manner. If immediate post-mortem examinations are not possible, then in consultation with the veterinary surgeon, refrigerated facilities for storage need to be provided pending removal in a suitable insulated container to a post-mortem laboratory. Specimens should not be frozen unless specifically requested by the veterinary surgeon. In the case of animals which rapidly degenerate e.g. fish, where rapid diagnosis is essential, it is acceptable for post mortems to be carried out on site by suitably trained non-veterinary staff (but see 3.18 and 9.5.5)

a6.17 Facilities provided on the premises for post-mortem examinations should be suitably equipped for the species in the collection.

a6.18 Following post-mortem examinations conducted on the zoo premises, carcasses and organs should be disposed of swiftly and in accordance with the European Union (Animal By-Products) Regulations 2014 (S.I. No 187 of 2014).

a6.19 Whenever possible, carcasses of interesting animals or important species should be offered to a recognised scientific institution. Museums in particular will often welcome such material and make it available for study, thus extending the scientific and educational role of the animal. Sometimes there is a conflict between the requirements of the museum and the need for a full post-mortem examination of the animal. In such cases a careful decision has to be made as to which takes priority. Post-mortem techniques that minimise damage to the carcass have been devised and can often be used in such circumstances.

a6.20 All zoos, whether transferring dead specimens for education or research to a recognised scientific institution or retaining for their education needs, must ensure that the specimens are used and/or transferred in compliance with current legislation, particularly the requirements of CITES.

a6.21 Museums usually require skins but not soft tissue. Zoos should be aware of this and endeavour to retain soft tissue for pathological examination or deposit in a reference collection.

Appendix seven | Animal Contact Areas

Introduction

a7.1 There are advantages and disadvantages in having animal contact areas, both for the public and animals. The benefits include:

(a) the public may gain a better understanding and awareness of the species by being in closer contact and not having to view the animals in a conventional caged environment. As a result, the public's appreciation of the zoo and its educational value may be enhanced;
(b) controlled handling of suitable animals can be an important learning experience e.g. what does a snake feel like?
(c) the animals may be allowed into larger and more complex areas than would be possible in the more conventional cage/enclosure;
(d) the presence of the public may prove an enriching experience for the animals.

a7.2 However, direct contact may present dangers to the public and cause stress or injury to the animals. The purpose of this appendix is to provide guidance so that the optimum environment and experience is encouraged, both for the animals and the public.

a7.3 All situations where the public and animals are in direct physical contact should be subject to regular risk assessment and review before the activity commences. Where the risk assessment indicates that controls are required to reduce the risk, then steps will need to be taken to tighten controls.

General provisions

a7.4 Zoo operators should exercise caution and discretion in the removal of even non-hazardous animals from enclosures, since the behaviour of all animals is less predictable when away from their usual environment.

a7.5 All walk through exhibits, whether for hazardous or non-hazardous species, should have clearly delineated areas distinguishing public areas from those for the animals. There should be appropriate signs, supervision and barriers to ensure that the public do not enter the animal-only areas.

a7.6 Where an animal is to be considered to be used to give rides to the public a full ethical review must be undertaken to ensure that the decision is appropriate and if so that the animal's welfare needs are met and that they are treated with respect. Particular care should be taken to avoid injury to visitors when animals are used for rides.

a7.7 Hazardous animals should not be allowed out of their usual enclosures for the purpose of direct contact with the public, except where the zoo operator is satisfied that such animals are not, when under control, likely to cause injury or transmit disease. This should be judged on a case-by-case basis once an adequate risk assessment has been carried out, and procedures developed to control risks to visitors and animals to an acceptable level. In the case of category one hazardous animals removal of animals for the purpose of direct contact with the public must only occur following written authorisation by the licencing authority.

a7.8 Where hazardous animals are allowed out of their usual enclosures, or the public into their enclosures, an appropriate number of authorised and experienced members of staff must accompany the animal or animals.

a7.9 The zoo must have adequate hand-washing and sanitising facilities, close to the contact point and obviously signposted.

a7.10 Supervisors should ensure that, following contact with animals, children wash their hands. Prominent signs should remind parents or accompanying adults of this. Hot and cold water with soap is the current recommended method.

a7.11 There must be adequate staff supervision in all contact areas. This should be commensurate with the type of animal and degree of risk, and to ensure the welfare of the animal. At all times whilst the public have access to the contact area there must be an appropriate number of staff on hand to ensure the welfare of the animals is not compromised by excessive handling.

a7.12 If children are in contact with, or feeding animals, prominent signs must warn them not to place their face against the animals, nor to put their hands in their own mouths afterwards.

a7.13 Signs should be displayed prohibiting the public from taking any unauthorised food into animal-contact areas and warning of the risks of animal bites.

a7.14 The zoo must ensure that animal contact situations specifically consider the risk of zoonotic disease and steps are taken to mitigate the risks to staff and visitors.

Walk-through exhibits

a7.15 In walk-through exhibits the following points should be noted:

(a) appropriate risk assessments, particularly regarding zoonotic diseases and direct or indirect contact with animals, must be undertaken and reviewed regularly by a suitably qualified person (this would usually be a veterinary surgeon). These will be dependent on animal species and exhibit design and should cover risks to both public and animal safety;
(b) numbers of people allowed in the exhibit at any time, and allowable visitor behaviour and activities, must be consistent with the animals' welfare;
(c) appropriate staffing must be available, and protocols in place for staff to intervene in defence of either the visitor or animal if any conflict arises;
(d) staff and/or visitors should have a clearly indicated means of contacting assistance if required, including that of trained first-aiders;
(e) feeding of animals should only take place under supervision by staff.

Diving experience exhibits

a7.16 It has become commonplace for the larger public aquaria to allow sports and hobby divers to dive in shark and other tanks and pools as 'workers' to clean them or as a 'visitor experience'. Risk assessments and management of these dives should reflect the status of the diver in this context and the diver must hold a relevant professional qualification.

a7.17 If this practice is permitted, it must be subject to the same provisions that are applied to other animal-contact situations and in particular to walk-through exhibits.

Touch pools

a7.18 Points to note on touch pool exhibits are:

(a) touch pools that permit direct-access should be continually supervised;
(b) if supervision by a staff member is not continuous, the exhibit must be designed so that the depth and breadth of the exhibit make it impossible for the public to reach the animals, or there should be protection by a barrier or cover;
(c) protocols should be in place to minimise the stress of the animals used in touch-pools, such as being rotated throughout the day to allow animals a quiet period to minimise stress;
(d) staff must be properly trained in the handling and care of the species held and the management of visitors around the touch pool;
(e) there must be frequent assessment of the protocols used;
(f) there must be an adequate educational contribution from the experience to justify it;
(g) specific records must be kept of animal use, illness and deaths;
(h) aquatic invertebrates should not normally be taken out of the water;
(i) removal of stings from rays to make them safe for display in open touch pool type exhibits must not be permitted.

Drive-through enclosures

a7.19 Where dangerous animals are kept in drive-through enclosures, entry and exit to the enclosures should be through a system of double gates, with sufficient space between to allow the gates to be securely closed to the front and rear of any vehicle which may enter the enclosures. This includes areas with cattle grids for hoof stock to allow enclosures to be secured overnight.

a7.20 In the case of dangerous carnivores, the access gates should be protected by fencing positioned at right angles to the perimeter fence on each side of the roadway within the enclosure, be of the same standard as that for the main enclosure barrier and extending back from the access for a distance of at least 25 metres.

a7.21 Double gates should be designed and maintained so that, where hazardous animals are within or have access to the enclosure secured by the gates, one gate cannot be opened until the other has been securely closed. Provided no danger to the public is thereby caused, provision may be made for this arrangement to be overridden in the event of an emergency.

a7.22 For other non-hazardous animals (except those grazing or hoofed animals where a cattle grid would be sufficient to contain them) single entry and exit gates, supervised at all times, should be provided.

a7.23 Access points between enclosures should be controlled to prevent animals entering from adjoining enclosures.

a7.24 Electronic pressure pads or sensors, where used, should be designed and installed to ensure that in the event of their failure, any gate they control will close automatically or otherwise operate to ensure that animals are safely secured within their enclosures.

a7.25 Gates which are mechanically operated should have an alternative method of control so they can be opened and closed manually in the event of an interruption of the power supply or other emergency.

a7.26 Operators of mechanically-operated gates should have a clear, unobstructed view of the gates under their control and of the area in the vicinity of those gates.

a7.27 A one-way road system should be used to assist the traffic flow and thus reduce the risk of accidents. Stopping should only be permitted at places where the road is at least two vehicles wide.

a7.28 Where dangerous carnivores and primates and any other hazardous wild animal are kept:

(a) Access to vehicles without a solid roof should be prohibited;
(b) No vehicle should be allowed access unless a rescue vehicle capable of effecting its recovery is immediately available; and
(c) Notices, which are readily visible and easy to read, should be displayed to warn visitors whilst in the enclosure to: stay in the vehicle at all times; keep all doors locked; keep windows and sun-roof closed; and sound the horn or flash the headlights and await the arrival of a rescue vehicle if their vehicle breaks down.

a7.29 Continuous observation by trained staff should be maintained over the entire area of each enclosure containing any hazardous animal. Staff working in emergency vehicles, gate control and observation towers and elsewhere within the enclosure should keep in touch by electronic means. A back-up system (using, where appropriate, whistles, horns or flags) should be rehearsed and be ready for situations when equipment is inoperative.

a7.30 The supervising staff member should be armed with an appropriate firearm, and be trained in its use so that a hazardous animal can be killed in an emergency if this will save human life or prevent injury. He or she should be authorised to act in the event of an emergency.

Appendix eight | Training of Animals

General provisions

a8.1 There are three main reasons why animals are trained in zoos:

(a) to assist in their captive management, such as compliance with routine husbandry;
(b) to improve their welfare, for example, by training to facilitate routine veterinary procedures to be carried out without the need for an anaesthetic; and
(c) to participate in educational talks and demonstrations.

a8.2 The objective of training must always be clearly defined in the context of:

(a) animal welfare
(b) keeper safety
(c) public safety

a8.3 All training programmes should provide a net welfare benefit to the animal.

a8.4 Behaviour is strengthened / increased if followed by the addition of a stimulus the animal desires (known as positive reinforcement) or the removal of a stimulus the animal does not desire (negative reinforcement). Likewise behaviour is weakened / decreased if followed by the addition of a stimulus the animal does not desire (positive punishment) or the removal of a stimulus the animal desires (negative punishment).

a8.5 Zoos should develop operant conditioning programmes based around positive reinforcement training. Where negative reinforcement is used, it must never compromise the welfare of the animal, negative punishment is preferred e.g. a 'time out'. Written protocols should be established in zoological collections, which clarify approved, and non-approved, training methods.

a8.6 When animals are being trained there should be adequate facilities to separate them from groups to off-show, non-public areas.

a8.7 Records must be kept and made available for inspection of all abnormal, unpredictable or otherwise significant behavioural irregularities for each animal at each training session and each demonstration.

a8.8 Where public educational demonstrations are carried out, all trainers and the person responsible for exhibiting the demonstration must be compliant with the Animal Health and Welfare Act (2013) (S.I. No 15 of 2013) and other relevant legislation.

a8.9 There must be adequate supervision of training and display by a senior member of staff with specific responsibility for doing so.

Use of animals in demonstrations outside the zoo

a8.10 The Standards consider for the purpose of the said Regulations an animal shall be treated as kept in a zoo when it is elsewhere in the personal possession of the operator of the zoo, or of competent persons acting on their behalf e.g. when an animal is taken out on outreach or a falcon on a 'hawk walk'.

a8.11 Zoos must consider the welfare needs of an animal and public safety when ever an animal is removed from the grounds of the zoo for education or media activities. It is imperative such

movements are risk assessed and that the insurers provide cover for any such activities.

a8.12 Zoos must ensure that they have a certificate issued under Article 10 of Council Regulation (EC) No 338/97 for Annex A CITES specimens (live or dead) that are to be used or displayed commercially. However an Article 10 certificate is not required if a zoo has a separate certificate issued under Article 60 of Commission Regulation (EC) No 865/2006. Article 60 certificates enable all specified Annex A listed zoo animals to be used or displayed commercially where they are being primarily used for breeding or research and educational purposes of benefit to the conservation of the species. A separate Article 10 certificate is required if the zoo intends to transfer for commercial use any Annex A specimens other than to a zoo issued with an Article 60 certificate.

a8.13 Zoo operators who take animals to other locations for commercial or other purposes must make it clear to the other individuals or organisations concerned the circumstances under which the animals are provided and may be used. This must accord with the zoo's policy statement on such arrangements.

This policy statement should clearly set out that:

(a) the health and welfare of the animals will not be prejudiced; and
(b) that accommodation is adequate for the species and commensurate with the time to be spent away from normal accommodation.

a8.14 The user organisation should clearly understand that the designated member of the zoo's staff accompanying the animals (or such other person as the zoo may designate) will have the absolute right to say for how long and for what purposes the animals may be used.

a8.15 Whilst the comments regarding direct contact between public and animals made earlier may well apply, the operator should ensure that appropriate guidelines for the use of animals are followed. An example for consideration would include the RSPCA Guidelines for the Welfare of Performing Animals (2012).

Appendix nine | Specialist Exhibits

a9.0.1 The European Communities (Licensing and Inspection of Zoos) Regulations 2003 applies to all wild animals kept in zoos. These Standards therefore apply to species that may have very different environmental requirements.

a9.0.2 Whilst basic rules apply to the management of all species – and the five domains are appropriate to all living animals – there is often a need for more specific guidelines when Inspectors are faced with less familiar animals.

a9.0.3 The following guidance notes have therefore been drawn up. They should be read in conjunction with the appropriate management guidelines and other published data. At this stage only some specialist exhibits are covered; in the course of time there is likely to be further guidance.

a9.0.4 Zoos and Inspectors are encouraged to make full use of the latest Taxon Advisory Group or BIAZA Guidelines and other sources when assessing exhibits. Zoos and experts in many parts of the world are developing guidelines and these should be referred to.

9.1 Invertebrates

a9.1.1 While some collections contain only invertebrates, more often they form part of larger zoos. However, many of the Standards that can readily be applied, or adapted, to other collections are of limited relevance to invertebrates.

a9.1.2 Invertebrates should be kept within their preferred body temperature range or allowed access to a temperature gradient. Where doubt exists, a choice of habitats, with different temperatures and relative humidities (and where appropriate different substrates) should be available.

a9.1.3 Contact with potentially toxic chemicals must be avoided. These include insecticides, disinfectants and heavy metals (which can prove lethal to molluscs).

a9.1.4 Water quality is important to many invertebrates – not only those that are totally aquatic but also those that live or breed in damp places and/or require high levels of humidity. Consideration must also be given to ensure this is balanced with adequate ventilation to prevent disease.

a9.1.5 Health screening should be carried out upon arrival of new invertebrates into the collection, particularly for wild-caught stock. A quarantine area and/or isolation facilities are desirable.

a9.1.6 Veterinary guidance on invertebrates is developing. Personnel responsible for invertebrate collections should, therefore, view veterinary advice from a suitably knowledgeable veterinary surgeon as important in keeping animals healthy.

9.2 Reptiles & amphibians

a9.2.1 Under prevailing climatic conditions in Ireland, most species of non-native reptiles and amphibians require a controlled environment for survival in captivity. Some of these environments may require water. Animals may be kept in fully controlled vivaria, or in open enclosures inside a larger controlled climate space. Some species may be comfortable outdoors during periods of good weather. Controlled environments must meet the specimens requirements for temperature regulation, humidity, light (including photoperiod), air and water quality. Due to the self contained nature of exhibits, attention to enclosure hygiene and disease control is especially important.

Temperature

a9.2.2 Vivaria must provide a thermal gradient around the preferred body temperature of the species of animal kept. Natural daily and seasonal variations should be provided. Heat sources must be designed and fitted to prevent injury to the animal. Sources must be thermostatically controlled and enclosures must be fitted with a visible monitoring system such as a min/max thermometer. Installation of a constant readout system is encouraged, so that fluctuations can be recognised retrospectively, alternatively temperatures must be manually recorded over a 24 hour period using a max/min thermometer or similar device that provides evidence of temperature variation during the monitoring period (including overnight).

a9.2.3 For aquatics species such as crocodilians and aquatic chelonia water areas should be heated to the appropriate temperature for the species concerned. Intense overhead heating may be required for large specimens to provide suitable basking areas on land.

a9.2.4 Relative humidity (RH) is the product of a combination of temperature, moisture content of the air and ventilation. However ventilation must not be eliminated to increase humidity. Hide structures and different substrates can be used to provide local humid areas. Measurement of relative humidity should be continuous, but daily readings are acceptable and should be recorded (especially for susceptible species). RH range for reptiles and amphibians varies depending on the natural habitat of the species. It is vital that the individual RH requirements of species are met. Many decorative features of the exhibit will affect the RH, including substrates, pools, waterfalls, misting and the inclusion of live plants.

Lighting

a9.2.5 Lighting should be appropriate in strength, photoperiod and type for the species held and may be varied to replicate seasonal changes. Ultraviolet (UV) light from full spectrum sources is essential for many species when not available naturally to enable natural Vitamin D-3 synthesis. Most glazing materials do not transmit natural UV light. Artificial UV light sources have a limited life and must be replaced regularly. Evidence of assessment of UVB output of light bulbs, at suitable locations where animals can access the light source, must be documented or alternatively a written policy outlining the timing of replacement of bulbs before they are life expired, with evidence to that effect, must be instituted.

Air quality

a9.2.6 There should be sufficient ventilation to maintain air quality and RH in the exhibit without compromising temperature control. This may be facilitated by situating vivaria within suitably ventilated warm areas.

Water quality and provision

a9.2.7 Pools large enough for full immersion are required by many reptiles and amphibians, and for reproduction in many species of amphibians. Water quality is maintained by regular replacement of the water and cleaning of the pool surface or a suitable filtration unit. Attention should be given to sudden temperature change and the risk of introducing toxic disinfectant residues during water changes. Larger pools for semi or fully aquatic species should have water treatment facilities and quality should be monitored on a regular basis, as for aquaria. Fully aquatic species need sufficient space for comfortable swimming and to allow sufficient exercise. Beaching areas should be provided where appropriate. Transmission of pathogens and other biological agents between exhibits via communal water systems and tools, or into waste water where it may impact native species, is a major risk, and must be avoided. Provision of drinking water may not be straightforward in some species. Cloud and rainforest reptiles may only drink from droplets on vegetation and desert species may lick surface condensation. De-chlorination of drinking water may improve palatability.

Furniture and substrates

a9.2.8 For normal display purposes, naturalistic exhibits should be used with substrates appropriate to the natural habitat of the species. As confinement increases pressure on substrates, they should be monitored regularly and not allowed to become contaminated. Waste and uneaten food should be removed daily. Basking and concealment sites and rough surfaces to aid sloughing should be provided. Climbing material should be provided for arboreal species. Where animals are kept outdoors, care should be taken to avoid the risk of flooding or of animals burrowing or climbing out. More natural planting and substrates are possible. Predator and pest control are particularly important under these circumstances.

Space requirements

a9.2.9 General comments about the space needs of all animals apply to reptiles and amphibians. However, it must be remembered that many reptiles grow quickly in early life and often continuously thereafter, and so frequently outgrow their enclosures. If enclosures are not large enough to accommodate the future growth of the species exhibited, there must be a clear plan for its future accommodation. As a minimum snakes must be provided sufficient usable area to allow them to stretch out fully in at least one direction.

Service areas

a9.2.10 Service passages should be large enough for comfortable working and handling of the animals. Access to enclosures should not be so awkward as to restrict observation or cleaning. Service areas must be kept free of clutter (see Appendix 9.3). Handling and catching equipment should be readily available close to enclosures, and there should be hand washing facilities for staff.

Feeding

a9.2.11 Live feeding of vertebrate prey is to be discouraged (see Section 5). Although the Animal Health and Welfare Act (2013) does not prohibit the feeding of animals with live prey, the live feeding of vertebrate prey should be avoided save under exceptional circumstances, and only with veterinary, specialist nutritionist or herpetologist advice. It should be noted that whilst not specifically prohibited under the Animal Health and Welfare Act (2013) the feeding of live vertebrates could potentially lead to an offence due to the possibility of causing suffering or failing to meet the needs of either the predator or prey animal. Where it has to be undertaken, a written justification and ethical review process must have been undertaken and agreed by senior staff weighing up the welfare of predator and prey; feeding must be observed and live prey not left in the enclosure. Such feeding must not take place in the presence of the public.

Records

a9.2.12 Records must be kept of all individual animals. In addition to the normal information, these need to cover environmental parameters, feeding, sloughing and egg-laying.

9.3 Venomous species

a9.3.1 Zoos keeping venomous species of reptile, amphibian, fish or invertebrates must ensure that sufficient staff trained in specific venomous species management are available at all times.

a9.3.2 Venomous animals should be kept either in solid walled or roofed enclosures (with suitable means of escape-proof ventilation) or in enclosures where the walls are of adequate height and design to prevent non-flying animals from escaping or reaching staff or visitors.

a9.3.3 Service areas for non-aquatic venomous species should be secure with the equivalent of a lock-gate system. Service areas should be free of escape routes or places to hide, for example into

cavity walls.

a9.3.4 Aquaria or vivaria containing venomous species must be individually marked with warning signs identifying the species and quantity in the service area. The enclosures must be kept individually locked and access available only to authorised persons.

a9.3.5 Appropriate staff training must be given, and a written protocol made available on action to be taken in the case of escape or bites. Regular escape and envenomation drills must be carried out and recorded, and audits of protocols conducted. A minimum of four envenomation drills per year is recommended.

a9.3.6 The appropriate in date anti-venom must either be held at the zoo (and should accompany a bitten or stung patient to hospital) or be readily available to the appropriate hospital. It must be kept in strict accordance with the manufacturer's instructions. The location of anti-venom and hospitals should be decided on the basis of specialist medical advice and recorded in a written risk assessment.

a9.3.7 Local medical authorities should be made aware in advance of any zoo keeping venomous species. This should be regularly updated by the zoo concerned. The appropriate medical authorities should be consulted and made aware of the procedure to be followed by the zoo in the event of incidents involving venomous bites and stings. A list of specialist help and contact details must be available and readily accessible in case of an emergency.

SEE APPENDIX 12 FOR FURTHER DETAILS ON HAZARDOUS ANIMAL CATEGORISATION

9.4 Pinnipeds and marine birds

a9.4.1 As with other aquatic species, there can be difficulties in inspecting facilities for marine mammals and birds. These guidelines are intended to assist inspectors with limited marine mammal experience. Further reference may be made to the relevant management guidelines by EAZA, BIAZA, and AZA. Cetaceans have not been kept in Irish zoos or aquariums for some years.

Accommodation space

a9.4.2 Attention should be given to the adequate provision of both land and water space. In general more active species, such as sea lions, need considerable land space, but all groups are primarily aquatic and should be provided with the maximum possible water space. No specific provisions are needed for breeding, with the exception of nest holes / boxes for some penguins and ledges for seabirds, but the risk of drowning in young pinniped pups, particularly sea lions and fur seals (which cannot swim at birth), must be noted. Male pinnipeds tend to harass females after birth, and provision for separate accommodation for mother and pup is needed. The design of land space should avoid the loss of penguin eggs by immersion.

Construction

a9.4.3 Sea bird droppings are particularly destructive and surfaces need to be highly resistant. All land areas should be designed to allow water and waste run off to drain without contaminating the pool, as far as practicable. Pool and land surfaces should have a durable, non-toxic, non-porous and waterproof finish, and should be coloured to reduce glare. In the case of pinnipeds, pool walls should be smooth to prevent injury. Land surfaces with sand, pebbles or vegetation are acceptable, provided cleansing and drainage are to an acceptable standard.

Temperature, light and ventilation

a9.4.4 Environmental temperatures should be appropriate for the species. Most species of marine

mammals and seabirds can be comfortably kept in Ireland, so long as shade is provided for exceptionally harsh or hot weather. Antarctic ice-dwelling penguin species need year-round cooling and require specialised closed environment exhibits with low temperatures, filtered air and high ventilation rates. High reflective light levels in pinniped exhibitions should be avoided because of the risk of eye discomfort and disease.

Water management

a9.4.5 The aim of water management is to provide a safe and appropriate environment for the species, bearing in mind that the particular requirements for closed systems differ greatly from open water. Marine species produce large amounts of highly nitrogenous waste, which reacts with chemicals to produce noxious by-products and acts as an ideal substrate for micro-organisms.

a9.4.6 Marine species are adapted to salt water and the provision of a salt water environment is beneficial. Baikal seals are adapted to fresh water.

a9.4.7 Operators must set written parameters for water quality using published guidelines and should make sufficient measurements and keep records to show that these are consistently met. Any chemicals used in this process should be capable of being readily measured in water and should be non-toxic and non-irritant at concentrations applied. The safety of incoming water, where this is not from a mains source, should be regularly checked. If on-line monitoring of water parameters (such as salinity, pH, chlorine and temperature) are not incorporated in the system, measurements should, as a guide, be taken and recorded at the following frequencies:

temperature	daily
salinity	daily
chlorine etc	daily
pH	daily
ozone/redox	continuous
bacteria	monthly

With respect to bacterial monitoring this must take into consideration knowledge of the system and the water quality management methods utilised. If documented evidence is made available that the system is effectively sterile then the interval of testing can be increased to a more reasonable time scale in discussion with the inspectors.

a9.4.8 The inspectors should thoroughly investigate the training and level of understanding of water systems and their monitoring by zoo staff.

a9.4.9 There should be clear precautions and instructions for protecting the animals, staff and the public from hazards and in emergencies. These may include electrical/water hazards, chemical leakage or over dosage, plant failure, fire and water loss. Such precautions will generally include the facility to drain pools quickly, provide separate temporary accommodation for animals, and evacuation plans. Where separate pools are available for quarantine purposes, they must include a separate water system.

a9.4.10 The method of disposal of waste water from closed or fill-and-empty systems should be regularly examined as to environmental and public safety.

Nutrition and veterinary care

a9.4.11 Preparation and storage of food and the use of appropriate supplements to counteract nutritional inadequacy are particularly important in piscivorous species. If animals are scatter fed, the risks from deteriorating fish must be considered and uneaten food removed. Salt supplementation may be required if fresh water is used in pools.

a9.4.12 Zoos should have adequate facilities for handling the animals safely should the need arise. This may involve training and use of physical restraint devices. The restraint and anaesthetic

requirements for marine mammals differ substantially from those for terrestrial species. Preventive treatment against avian malaria may be required for outdoor penguins in the summer based on veterinary advice.

a9.4.13 Written protocols must be produced that demonstrate the implementation of best current practice in the thawing of frozen fish prior to its use for food to ensure food safety and nutrition is optimal.

a9.4.14 There should be adequate facilities for handling the animals safely should the need arise. This may involve training and use of physical restraint devices. The restraint and anaesthetic requirements for marine mammals differ substantially from those for terrestrial species.

Public safety

a9.4.15 Marine mammals and penguins bite. All of them can reach much farther than it appears, and penguins, sea lions and fur seals can climb and also leap from water. Barriers around pools and land areas should take this into account. Where visitor contact is possible with penguins outside their enclosures, there must be adequate staff supervision (see Appendix 7 - Animal contact areas).

a9.4.16 Zoonosis protocols should be produced for all piscivorous aquatic mammals, with a particular focus on the risk of seal finger from pinniped bites.

9.5 Public aquaria

Water quality

a9.5.1 Although water quality requirements of different species vary it is important that certain basic parameters are monitored and recorded, and that due care is taken to cater for particular species requirements.

a9.5.2 Water quality monitoring must be carried out as routine. The collection must ensure that the monitoring is carried out frequently enough to ensure good water quality and welfare for the animals housed:

for new exhibits or ones that have undergone major servicing, daily monitoring should include temperature, salinity (ppt), pH, total ammonia (to assess un-ionised ammonia), and nitrite; and, on a weekly basis, dissolved oxygen and nitrate; these results must be documented and comments added to show what has happened if there is a poor result and what has been done to rectify it.

after a one month period, if an aquarium is stable, the following tests can be carried out weekly rather than daily salinity (ppt), pH, total ammonia (to assess un-ionised ammonia), nitrite, dissolved oxygen and nitrate; daily monitoring of temperature must continue. These results must be recorded and comments added to show what has happened if there is a poor result and what has been done to rectify it. More frequent testing and recording of results is then required until the aquarium is stable with acceptable results.

At all times there must be provision of sufficient water testing equipment to allow monitoring of water quality and its maintenance within set parameters to meet the species specific requirements.

a9.5.3 Public aquaria must use effective water quality testing kits or equipment which provide meaningful results. There should be some quality control of test procedures, either by parallel sampling or calibration against set standards.

a9.5.4 Zoos or aquaria must demonstrate knowledge of the incoming water quality and the normal local baselines specific to that locale. This must be documented as part of the general water quality testing of the facility and policy outlining management where required must be in place.

a9.5.5 Aquarists must have access to on-site laboratory facilities, including light microscopy, and be trained in basic post mortem techniques for sample collection.

a9.5.6 The veterinary surgeon should be familiar with current practice regarding veterinary care of fish, especially the species with which he or she is expected to deal. He or she should be responsible for, or actively involved in, the following:

(a) routine visits; (see Appendix 6 – Veterinary programme);
(b) staff training in disease recognition and basic lab techniques;
(c) directing or carrying out treatment of sick animals;
(d) preparing a set of treatment protocols for aquaria.

a9.5.7 Aquarium divers must operate to current HSA legislation and any related Approved Codes of Practice. Divers should be familiar with the behaviour and requirements of the species with which they are diving.

a9.5.8 Feeding techniques vary; for example, some institutions favour stick-feeding of sharks, but hand feeding may be acceptable if risk assessments have been carried out and insurers agree.

a9.5.9 Consideration must be given to behavioural requirements and the provision of environmental enrichment in aquaria, particularly for the cephalopods such as octopi and cuttlefish.

9.6 Waterfowl

a9.6.1 Most non-domestic waterfowl are given the freedom of a pen and not contained overnight. Exclusion of predators such as foxes, cats and smaller mammals is an important part of waterfowl management. This will include use of predator-proof fencing (essential to exclude foxes), electric fencing, trapping and shooting. Care should be taken in selecting species for open-topped enclosures.

a9.6.2 Wild waterfowl that visit the collection can present dangers in the form of disease or contamination of water supplies. Allowance has to be made for this when planning enclosures or setting stocking densities.

a9.6.3 Pens for waterfowl must be carefully designed and smaller areas may need to be at least 50% water. Less water is acceptable for geese which graze. Birds must be able to enter and leave the water without difficulty: therefore, edges should be sloping with a gradient of one in three or less. Perimeter fences should be 2 metres high (preferably 3m) and buried to approximately 0.5m. A pulsed electric fence to deter predators is essential if the fence is less than 2m high.

a9.6.4 Water is essential for most species if they are to perform their normal behavioural repertoires. Water may be static but systems that allow for inflow/outflow are to be preferred, so long as they do not encourage the spread of pathogenic organisms from one pen to another. Water quality is important; areas for waterfowl need careful planning. Vegetation provides shelter, protection and shade and can protect birds from chilling and frostbite. Tropical species may require indoor, sometimes heated, accommodation.

a9.6.5 Areas of grass may be essential for some species, e.g. *Branta* and *Anser* geese, swans, shelducks, sheldgeese and grazing ducks (widgeon species, Falcated teal, Baikal teal). When grass is in short supply supplementary feeding with pellets may be necessary. Waterfowl vary in their dietary requirements but a mixture of layers pellets (the smaller size for smaller ducks) and wheat provides an acceptable supplement – or primary source of nutrients for most of the less

specialised species.

a9.6.6 Mixing of species has to be considered very carefully. Some waterfowl are aggressive or territorial and best kept apart. Others are sociable and will live together as a group, but care is needed to ensure an appropriate sex ratio. Very careful thought is needed before mixing waterfowl with other species of animal, such as mammals; deer, antelope and other ungulates can damage waterfowl, or be a source of long-term stressors. Exclusion fencing, fixed 30 cm above the ground, may allow waterfowl to escape from interference.

a9.6.7 Pinioning of birds is currently legal in Ireland but should not be undertaken lightly and with regards to the Standards is considered an act of veterinary medicine. Collections should have an ethical policy and code of practice regarding pinioning and be prepared to defend it. (See Appendix 3 – Ethical review process)

a9.6.8 Other points particular to waterfowl include:

(a) the availability of nest boxes;
(b) incubation, brooding and facilities for grain storage;
(c) provision of grit (soluble and insoluble).

a9.6.9 Breeding facilities for waterfowl may, depending on the species, include nest boxes and nesting material. Nest box design is all-important: the size and position of the opening can make a great deal of difference to breeding success. Hybridisation should be avoided by not mixing similar species in the same pen.

a9.6.10 There are human health and safety considerations in the keeping of waterfowl. Ponds can be a source of infectious organisms. Electric fences must be positioned such that the public cannot come into contact with them and pond edges must be fenced where necessary.

a9.6.11 Advice on the keeping of waterfowl is available from a number of organisations including EAZA, BIAZA, the British Waterfowl Association and the Wildfowl and Wetlands Trust.

9.7 Birds of prey

a9.7.1 Birds of prey (*Falconiformes, Accipitiriforms, Cathartiformes and Strigiformes*) are kept in a variety of ways and for a variety of reasons. These include:

(a) aviaries, where birds enjoy relative freedom of movement, and are kept for display and or captive breeding;
(b) demonstration birds, tethered or not, that are free flown regularly for the general public, including 'Hawk Walks';
(c) homing of the occasional permanently disabled wild bird, for educational or captive breeding purposes;
(d) sick or injured wild birds, held for treatment and rehabilitation.

a9.7.2 Each of these categories of keeping brings with it particular requirements in terms of good management. Some of these are outlined below: other relevant information is to be found in various codes of practice and publications.

Aviaries

a9.7.3 Birds of prey kept in aviaries are generally managed in a similar way to other birds. Particular points to note are:

(a) choice of species - some species, such as accipiters, are by temperament less well suited to zoos. Their nature makes them very difficult to house and manage and

they should only be kept in specialist collections;

(b) food - whole animal diets are needed, or meat that has been properly supplemented. No food type should be used exclusively. All birds of prey must have access to clean drinking and bathing water daily;

(c) aviary design - enclosures should provide suitable vantage points for the species, as many raptors prefer to be up high. Perching should be appropriate for the species housed. Sizes should reflect the flying capabilities of the species. For example large vultures are unable to land lightly and so need enough space to land without causing injury. Most birds of prey are more settled in pens with at least one solid wall. Retreats may be necessary for more nervous individuals;

(d) mixing genera is rarely a good idea, and if done, should be managed with extreme care. Knowledge of the individual birds and experience in dealing with birds of prey in general is essential.

Demonstration birds

a9.7.4 Tethering - birds of prey kept as demonstration birds are subject to restraint by tethering for part of their lives, so that they can be free-flown for the public. Important considerations are:

(a) flying - birds that are tethered must be flown at least four times a week unless tethered under veterinary advice for medical treatment. Zoos must not permanently tether any bird. All birds must be given the opportunity to fly or move around freely during part of the year, for example in an aviary for rest periods from demonstrations, breeding or moulting. Recommended period is a minimum of one month in a twelve month period.

(b) rest and moulting - all collections must allow sufficient aviary space to rest working birds and allow them to moult.

(c) birds not to be tethered - owls and vultures, particularly the New World vultures must not be tethered. They can easily be trained to fly from pens and this is the preferred way to house them. It is accepted that as juveniles during initial training tethering maybe required for a short period, often less than a month in the bird's life.

(d) safety at night - tethered birds are very vulnerable to attack by other wild animals, so they should be well protected at night. Birds that are put away at night should be placed in areas that meet appropriate welfare standards as outlined in the Animal Health and Welfare Act (2013) and the Wildlife Act, 1976 (Birds of Prey) Regulations 1984 (S.I. No 8 of 1984) and must not be left shut in for unreasonably long periods. Unless under veterinary instruction birds, particularly owls, must not be shut away in boxes at night.

(e) flying areas - flying areas should be free of hazards for birds and should not be close to cages containing animals that might catch or kill a bird should it alight on or in the cage. Taking birds to and from the demonstration area should be made as safe and stress free as possible by travelling in a suitable vehicle. Flying areas should not be directly adjacent to, or in view of tethered birds.

(f) staffing - staff should be well versed in training methods, weight reduction issues, handling techniques, and maintenance of equipment and birds. They should also be capable of passing on the correct and up to date information about the birds to the watching public.

(g) escape - birds that are free-flown are always at risk of being lost. If not found, most demonstration birds will eventually die. Such incidents can be reduced by good training, experienced handlers and by ensuring that birds being flown wear telemetry for radio tracking. Telemetry is strongly recommended for all training birds, free ranging species such as the falcons, birds being flown for the first time following rest periods or if a bird is being flown in an outside event where the territory is unfamiliar. Staff must pay attention to weight management and suitable training programmes as these should minimise escapes.

Disabled wild birds

a9.7.5 Permanently disabled wild birds of prey will sometimes come into a collection and can be useful either as an educational bird, or, with the rarer species, as a part of a captive breeding programme. Consideration must be given to:

(a) Individual needs - the welfare and quality of life of these birds should be paramount. Badly injured birds, however rare, which are not capable of living a reasonable life should be euthanased. Birds which are too nervous to be displayed in public must not be kept on public display. Permanently disabled birds should not be tethered.
(b) Housing - often these birds are either unable to fly and or land properly. Perching should reflect the ability of the bird in question.
(c) Pairing - when paired with non-injured birds, aggression levels will need to be monitored, as an injured bird will be less able to cope.
(d) There are other legal requirements specific to many wild birds (as well as other native species) which must be adhered to and a full ethical review of permanently bringing a wild bird into captivity must be undertaken and demonstrated to inspectors.

Sick or injured wild birds

a9.7.6 Sick or injured wild birds should not, in theory, form an integral part of any zoo or collection. However, given the definition of a zoo under the Regulations, some establishments which tend casualties and have seven or more public open days a year will be subject to the licensing requirements of the law and liable to inspections. Some particular points relating to such collections are:

(a) disease control - sick or injured birds are more prone to disease than healthy animals. Health monitoring and hygiene needs therefore need to be rigorous, in order to minimise risks to other birds, staff and visitors. Consideration must also be given to the risk of disease cross contamination from collection birds and subsequent release of disease in rehabilitated birds into native populations.
(b) welfare - most of the birds will have come in from the wild and will already be stressed. Exposure to the public will exacerbate this. It is therefore strongly recommended that save in exceptional circumstances, recovering wild birds should not be displayed to the general public.
(c) accommodation - facilities must cater for injured birds' special needs. Birds destined for release may need to be kept under conditions where they can retain their escape behaviour, gain confidence and fitness in flight and behave naturally.

a9.7.7 The requirements for owls (*Strigiformes*) closely mirror those described above, with some differences. Tethering is of particular note and its use should be minimised only to young birds during training to prevent damage to the distal limbs. Injured or disabled wild adult owls are not usually considered suitable for captivity and should be reviewed on a case-by-case basis.

Bird of Prey licence

a9.7.8 Some birds of prey in zoos may be subject to control under several different pieces of legislation, for example the Wildlife Act, 1976 (and its subsequent amendments) and CITES. Legislation concerning welfare, animal health, travel, and veterinary treatment may be relevant. It is important for operators to understand which legislation applies to zoos.

a9.7.9 Zoos are specifically reminded that under the Wildlife Act, 1976 (Birds of Prey) Regulations 1984 (S.I. No 8 of 1984) an individual, or in this case a zoo, is required to hold a Birds of Prey licence that enables them to either engage in falconry or have in his possession or under his control any bird of prey, their young or eggs of said species. As per the Wildlife (Amendment) Act

2000 the term birds of prey or falconry is defined to include birds of the orders *Accipitiriformes*, *Falconiformes*, and *Strigiformes*. With respect to the Standards it is noted that at the time of the statutory release of the Wildlife (Amendment) Act 2000 *Accipitiriformes* included the *Cathartiformes*, which in 2014 was separated into its own recognised order. As such the Standards consider all four orders under the term Birds of Prey.

'Hawk Walks'

a9.7.10 In the case of 'Hawk Walks' or similar displays where birds of prey are managed in a facility closed to the public but kept there for the purposes of exhibition to the public external to the facility, on 7 or more days in a twelve month period, then the Standards consider the holding facility to be classed as a zoo with regards to these regulations.

9.8 Elephants

a9.8.1 Elephants are long-lived, highly intelligent animals with large natural ranges and a complex social life. Meeting their needs in captivity is challenging. These standards should help inspectors and others in assessing the extent to which these welfare needs are being met, and in particular, in assessing the welfare needs of individual elephants and the measures being taken to secure good elephant welfare. Given the reproductive biology and the lifespan of elephants, collections are recommended that they should plan for space and facilities for at least 30 years.

a9.8.2 Inspectors, licencing authorities and zoos should also consult the current BIAZA Management Guidelines for the Welfare of Zoo Animals: Elephants. Elephant-keeping zoos should engage constructively with the Elephant Welfare Group (administered by BIAZA), which may include assisting with monitoring and recording welfare and other parameters, to help the Group monitor progress in the Irish and British herd.

The captive environment

Social structure

a9.8.3 African and Asian elephants should never be mixed in the same social grouping.

Cows

a9.8.4 Elephants should be kept in stable, female groups, preferably of related animals. Matriarchal herds should be the norm. However zoos which need to keep herds of unrelated, non-productive, older or problem elephants should also comply with these Standards.

a9.8.5 Female elephants must have the opportunity for social contact with at least one other elephant at all times, and ideally physical contact; at a minimum they should have the opportunity for physical contact whenever keepers are present, with unrestricted access to each other not less than 16 hours in any 24 hour period. Elephants must also all have the option to get away from other elephants if they so desire, either through the use of space or physical barriers. Compatibility, especially for unrelated females, is much more important than absolute number of adult females present. The absolute minimum must be two adult cows; ideally a collection should have more with a preferred minimum being four adult cows, but only if they are socially compatible. The routine and prolonged separation of cows is unacceptable and zoos should keep records of such periods, the reasons for this separation, the action being taken to re-introduce these elephants and the time frame for doing so. Such records should be made available to zoo inspectors upon request and follow up inspections maybe required to ensure compliance with proposed improvements in the individual elephant's social situation.

Bulls

a9.8.6 Bull elephants can be difficult to manage (particularly in musth) and are not always compatible with cows. Bulls are also highly social and it is not acceptable to subject them to prolonged physical and social isolation from other elephants, however provision must be made for them to be separated from cows and other bulls when necessary. Therefore the bulls must be given the option to have direct physical contact with other elephants, if they choose to do so, however, they must also have the option of separation if they choose. It is recommended that bulls are either (i) housed so they can mix regularly with family herd, ideally with another bull present, to facilitate social learning (one older bull, one younger bull), or (ii) are kept separately in a bachelor herd with other bulls of varying ages. A profile should be drawn up for each bull and should be reviewed (in combination with a risk assessment) at least every six months. Risk assessments should include risk to staff and other elephants but also potential health and welfare risks from the management policies of the collection that may impact the individual bull concerned (see animal welfare audit – Appendix two). A management regime must be drawn up and modified in the light of the development of the elephant's character. All collections keeping bulls must have the facility to carry out any essential veterinary procedure in such a way that is safe for all staff and the elephant concerned (e.g. Elephant Restraint Device or comprehensive anaesthetic protocols and associated equipment). All collections keeping bulls must ensure that staff are adequately trained to work with bulls.

Elephant transfers & social considerations

a9.8.7 It is recommended to avoid repeated or frequent movement of bulls between facilities.

a9.8.8 It is recommended to avoid repeated or frequent movement of cows between facilities. Female calves should remain in their natal group throughout their lives and this should be incorporated into a zoo's (minimum) 30 year elephant plan.

a9.8.9 Calves have a long learning period and must be brought up in a matriarchal group. Female elephants must learn calf care and benefit from the presence of a young animal. Cows should generally stay with their maternal herd, while bulls may need to be removed if their presence is no longer tolerated. It is recommended that each bull should stay in the maternal herd, until puberty (unless he is involved in excessive aggressive behaviour), as this is the age at which they would naturally leave (to avoid inbreeding). The age will vary with individuals, herd structure and facilities. The social development of young bulls is also increasingly recognised as being very important, benefiting from the presence of older, adult males; and this must not be overlooked.

Enclosures

a9.8.10 Indoor and outdoor accommodation must be provided, and other than in exceptional weather conditions, elephants should have access to both over a 24-hour period and be able to choose where they spend their time.

a9.8.11 The indoor and outdoor environment should be positively challenging and stimulating to the animals and contain devices and structures which enrich the environment and encourage natural behaviour,including, as a minimum requirement, for example; moving around, dust bathing, bathing, scratching, digging and exploration. Elephants need variety in their environments, and both indoor and outdoor enclosures must have variety and complexity. In addition visual barriers must be provided, and sufficient space, both inside and outside, to permit elephants to get away from one another if they choose to do so.

a9.8.12 Indoor enclosures should provide a minimum of 300m^2 for four (or fewer) animals and should increase by 80m^2 for each additional animal over two years old. Separation and isolation facilities (i.e. separate pens) must be provided for veterinary and behaviour management purposes. The indoor stall size for a bull must be at least 160m^2 and should take into account that a mature bull can reach vertically up to six metres. Ceilings, plumbing and electrical

installations etc. must be out of reach. For collections containing enclosures with dimensions smaller than specified, an ethical review must be undertaken and the rationale provided to the satisfaction of the licencing authority.

a9.8.13 Indoor enclosures must allow for elephants to move freely as a group, turn and lie down. The enclosures must be well ventilated but at low velocity to avoid draughts and must be well lit, preferably with natural sky-lights and the ability to fade the lighting to minimise disturbance to the elephants. The inside temperature should be no less than 16°C with an area able to be maintained at 21°C for sick or debilitated animals.

a9.8.14 Concrete flooring for indoor enclosures can cause foot and joint problems for elephants so enclosures must use alternative substrates and minimise or eliminate use of concrete. Deep, coarse sand, approximately 2 metres deep, is strongly recommended as the primary indoor substrate, particularly in the sleeping area, as it encourages natural behaviours important for good welfare, such as recumbent sleep. It is imperative that sand is maintained in a hygienic fashion and regularly turned to prevent compaction. Fine sand can be used but easily becomes compacted simulating a concrete like substrate. Whilst sand should comprise the majority of the substrate present, if space permits, a range of other manipulable natural substrates (e.g. mud, clay, dust) could be provided. Other flooring should be quick-drying, well-drained and able to be readily cleaned and disinfected. It should be relatively smooth but not slippery and with a degree of 'give' so that elephants can lie down comfortably. Concrete, rubber or tile should only be used for a small treatment or training area, if at all.

a9.8.15 Outdoor enclosures must be as large as possible and encourage walking (and also exploration, foraging, social interaction and maintenance behaviours (e.g. dust-bathing). The minimum shared enclosure size should be 6,000m^2 for eight or fewer sexually mature adults, for bull, cow or mixed sex enclosures. An additional 400m^2 should be added for each additional adult elephant. Ideally more space should be given, and size should reflect current best practice as robust captive husbandry research knowledge develops. Collections are recommended to consult with the BIAZA Elephant Welfare Group when any new builds are being considered. There should be a plan to develop this if this amount of space is not already provided. Enclosures must be flexible and allow for separation where needed. Consideration should be given to design that incorporates current knowledge of the welfare aspects, if any at all, of environmental infrasound and potential impact it may have on the elephants.

a9.8.16 The outdoor area must be protected from extremes of sunlight, wind and rain i.e. shelter provided should be large enough so that all elephants can use it at the same time. Zoos should provide heated outdoor enclosures for cold or inclement weather, unless elephants are given free access between indoor and outdoor enclosures.

a9.8.17 Outside substrates must be primarily natural; soil or grass is recommended, with good drainage. A combination of an all-weather substrate (such as sand or hard standing) and a softer substrate (sand or soil) is recommended to help promote foot pad and toenail wear.

a9.8.18 Elephants must be provided with the opportunity to bathe, and enclosures should incorporate a pool, dust baths and mud wallows. The pool must be deep enough for the largest elephant in the collection to be able to submerge completely. Pools should have multiple access points to avoid animals becoming 'trapped' in the pool by other elephants and must have gentle entry slopes with non-slip surfaces. Pools should be monitored for use and, if not being used, steps taken to investigate why not (e.g. water temperature, ease of access) and appropriate changes made. Consideration should be given to provide a variety of other forms of water in both the indoor and the outdoor enclosures; these can include waterfalls and/or sprinklers. New elephant facilities should give consideration to having indoor pools to allow all year round access.

Boundaries

a9.8.19 Barriers must prevent escapes and direct contact with the public and must also ensure the safety

and well-being of both the elephants and staff. Methods of quick escape must be provided for keepers.

a9.8.20 Barriers and gates should not have horizontal bars, which would allow elephants to climb. The minimum height is 1.9m for cows and 2.5m for bulls. A large bull may require a 3m barrier. Safety corridors and stand-off areas must be at least 4m wide.

a9.8.21 Gates should be robust and any hydraulic system should have manual back-up and/or alternative power. Gates must be capable of being operated remotely by staff i.e outside the area within elephant reach, and must be able to be opened and closed quickly with a stop facility to ensure trunks/tails are not crushed.

a9.8.22 Electric fences used as a secondary barrier must be of sufficient voltage to deter elephants and must have a fail safe alarm system. Electric fences should not normally be used as a main barrier, but where they remain, suitably trained staff must be present, directly supervising the animals. Moats are not suitable as barriers and should not be used.

Feeding and nutrition

a9.8.23 Feeding should match natural feeding activity as much as possible as per best practice and current knowledge for elephant nutritional guidelines. Currently browse is considered to account for the majority of the diet; elephant diets should be high in fibre and low in nutrients with browse and hay comprising at least 70% and the remaining 30% comprising pellets and other foodstuffs.

a9.8.24 Food should be varied in its presentation, and food should encourage a full range of natural foraging behaviour. This would include scatter feeds to encourage movement throughout the enclosure, provision of browse to encourage foraging, some food placed up high (so must stretch to reach it), and access to grass for grazing. Hay/browse should be available at all times (day and night); this may include use of mechanical feeders or other devices to deliver food at unpredictable times throughout the day. Food should be placed throughout the exhibit to avoid competition for access to food and to encourage movement. Zoos should provide some food in an intellectually challenging manner, such as through the use of puzzle feeders, hidden treats, or other forms of food-based environmental enrichment. Forage must be of appropriate quality and analysed by appropriate laboratories to ensure it remains within nutritional guidelines.

a9.8.25 Food that gives readily digestible energy such as grains, bread, fruit, vegetables and low-fibre pellets should not be used in bulk as they can cause unnecessary weight gain. Food used as treats should be factored into the overall diet formulation. Body condition scoring must be performed quarterly on each individual elephant, with changes monitored over time and reviewed annually to identify and manage any significant changes of body condition. Zoos should be able to weigh elephants regularly and compare to body condition scoring.

a9.8.26 Animals must have access to clean drinking water at all times from the indoor and the outdoor areas.

a9.8.27 A nutritional plan must be drawn up and maintained for each elephant, the elephant monitored regularly and the diet and food presentation modified when needed. The zoo must be able to demonstrate steps taken to mitigate, or manage if already present, obesity in the elephant herd through careful dietary management combined with physical exercise, avoiding methods that would be detriment to the individual elephant.

Behavioural management

a9.8.28 The individual behaviour of elephants must be continually monitored and assessed. A useful, considered behavioural monitoring tool is the Elephant Welfare Group (EWG) Behavioural Welfare Assessment Tool. This is designed to be used on a quarterly basis and scores submitted

to the EWG. Zoos can use these scores to monitor changes in behavioural welfare over time, and review them annually to identify any significant changes. Each elephant's behavioural management plan should be modified based on monitoring results, and any changes detected over time. Zoos should endeavour to monitor elephant behaviour throughout the night period, every night, whenever keepers are not present. This can be accomplished through collection of video footage, which is reviewed daily, or by the presence of a keeper throughout the night. Zoos must have video cameras to facilitate overnight behaviour monitoring, and to cover indoors and as much outdoor space as possible to enable review of any behaviour, both good and bad, day and night.

a9.8.29 Extensive and varied enrichment must be provided in both the inside and outside environments and be part of the daily routine. Zoos must have a planned, rotated programme of enrichment in place. The enrichment programme must provide novelty, and must have clearly defined aims and evaluation methods. It must be a continuous process, carried out each day as an integral part of the management programme, and records must be kept and made available to inspectors upon request. Both the enrichment plan and regular and routine evaluation of the efficacy of enrichment used should be clearly documented.

Healthcare

a9.8.30 A healthcare/welfare plan must be drawn up, monitored and reviewed/updated at least quarterly (but the appropriate frequency to be established in the light of the individual health needs), for each elephant. It must include:

(a) Baseline information on its state of health;
(b) Behavioural concerns, including stereotypy;
(c) Health checks, including foot health; and locomotion including gait and lameness;
(d) Exercise and measures taken to encourage it;
(e) Weight and body condition score.

a9.8.31 The plan should record any health and welfare problems identified, the steps taken to address them and the improvements achieved.

a9.8.32 General health should be assessed regularly and should form part of the daily routine.

Staff training

a9.8.33 Risks should be effectively managed through the process of risk assessments and should include the installation of elephant facilities that are appropriate for the bulls and cows managed by the institution. Risk assessments must include all management procedures used e.g. free and protected contact and take into account the working of each staff member with each elephant.

a9.8.34 A collection must have a monitored and written staff training programme. This must encompass training of new staff and training reviews of existing staff and also must include the outcomes from all the risk assessment that have been carried out.

a9.8.35 There must be a recognized 'group' of elephant handlers, who work as a team. This team must have a structure which includes a team leader, who is responsible for ensuring that agreed protocols, procedures and training are correctly carried out and implemented.

a9.8.36 Trainees must work alongside two fully trained members of staff until they are deemed competent when working with elephants. There should be an elephant management training programme with an evaluation suitable for each level of training (see Appendix 5: Staff Training in the current BIAZA Management Guidelines for the Welfare of Zoo Animals: Elephants). Members of staff should continuously update their training to ensure they continue to adopt best practice.

Use of chains and shackles

a9.8.37 Physical restraint of elephants through the use of chains and shackles must be minimised. There are sound safety and husbandry/welfare management reasons for its continuation at present but the consequences of bad practice are significant and severe. There is justification for limited periods of chaining for certain husbandry and veterinary procedures but this must be limited to a single period of no more than one hour unless under veterinary instruction. Any use of chaining for a period greater than one hour must be recorded in the animal's records including rationale and justification for this exception.

a9.8.38 All chains and shackling equipment must be maintained to the highest standard and replaced immediately if damaged or showing signs of wear and tear.

a9.8.39 Written, generic approval of routine chaining must be given by senior management in a zoo. In addition the parameters of exceptional chaining must be defined and recorded in the animal's records.

a9.8.40 Zoos should work to move away from the use of chains to more appropriate restraints such as strapping. Elephants must never be chained (or other tethering method) for periods in excess of one out of 24 hours, except in exceptional circumstances under veterinary instruction. Only named, trained persons may carry out chaining. This may include elephant experts brought in for staff training and/or elephant transportation. Any unplanned variations from routine practice must be documented and management notified.

a9.8.41 Keepers must be adequately trained in the procedure and safety aspects followed.

Training

a9.8.42 The ankus is a tool used to cue the elephant to maintain commands and train them. It is recommended that zoos should move away from using the ankus or hook, and move towards use of positive reinforcement methods for training. Zoos should develop operant conditioning programmes based around positive reinforcement training. Where negative reinforcement is used, it must never compromise the welfare of the animal, negative punishment is preferred.

If the ankus or hook is to be used then it must be used only by staff who have had appropriate training. Correct use of the ankus will not injure, hurt or break the skin or cause any other kind of physical or mental injury. The handle of the ankus must never be used to hit an elephant. Any injuries caused by an ankus must be reported in an incident book in conjunction with a full report that details the situation and circumstances of its use, the elephant(s) involved and the members of staff present. The report must be reviewed by management and be made available to inspectors.

a9.8.43 Zoos should develop operant conditioning programmes based around positive reinforcement training. Written protocols should be established in zoological collections, which clarify approved, and non-approved, training methods.

a9.8.44 Zoos should have a programme that trains elephants to allow appropriate management and veterinary practices such as blood draws, administration of fluids or antibiotics via injections or per rectum, and daily checks including temperature assessment. This must include animals of all ages, especially in the case of calves at risk of EEHV.

Electric goad

a9.8.45 Electric goads must only ever be used to protect human safety in extreme situations (e.g. when there is an imminent threat to life) and never as a way of controlling the animal to ensure compliance. Goads may be used only by staff that have had appropriate training. In all cases where an electric goad has been used, a full report must be produced detailing the situation

and circumstances of its use. The report must be reviewed by management and be made available to inspectors.

Appendix ten | Staff & Staff Training

Training

a10.1 Continuous in-house staff training and development should be a standard feature of the zoo. Typical topics include:

- animal husbandry;
- animal welfare;
- health and safety and first aid;
- action in emergencies, escape, illness;
- safety procedures;
- emergency euthanasia;
- basic sampling for health monitoring and diagnosis;
- food hygiene;
- zoonotic disease and management strategies;
- diseases especially (re-)emerging ones such as tuberculosis, *Salmonella enteritidis, Escerichia coli* 0157, Hantavirus;
- diving hazards;
- management of species used in animal-contact areas;
- *in-situ* and *ex-situ* conservation;
- educational techniques

a10.2 Training records must be kept for each member of staff demonstrating that appropriate training is current and has been undertaken with respect to aspects of animal husbandry relevant to the species of animal under the member of staff's care. This can include documented internal formal or informal training, provision of external training, and/or conference or workshop attendance.

Staff

a10.3 The zoo operator must make every effort to ensure that their staff do not have any convictions under the European Communities (Licensing and Inspection of Zoos) Regulations 2003 or a background of the ill-treatment of animals under any animal welfare or conservation legislation including:

- Animal Health and Welfare Act (2013) (S.I. No 15 of 2013)
- Wildlife Act (1976) (S.I. No 39 of 1976) (and its subsequent amendments)
- Control of Trade in Endangered Species (CITES) or related offences as stated in the Wildlife (Amendment) Act 2000 and related legislation
- Veterinary Practice Act (2005) (S.I. No 22 of 2005)

Appendix eleven | Example Inspection Forms

a11.1 To aid the application of these Standards, pre-inspection audit forms, inspection report forms and feedback forms will be provided as part of the pre-inspection licencing process, examples of which are found in this appendix with originals available from www.ahg.gov.ie

a11.2 Pre-inspection audit forms must be completed in full by zoo operators prior to inspections and inspection report forms must be used by zoo inspectors to report their findings.

a11.3 The following forms are available:

Form	Code	Use
Pre-inspection audit form	PIA	Pre-inspection documentation for the operator to complete.
Zoo Inspection Report	ZIR	Inspection report form, forms basis of licence conditions and outline of inspection details.
Zoo Inspection conditions and recommendations	ZIRCR	Ancillary document to assist inspectors to list recommendations and conditions on the day of inspection.
Zoo Inspection feedback - operators	ZIOF	Feedback form for operators to feedback to DAHG on performance and inspection process.
Zoo Inspection feedback - DAHG	ZIF	Feedback form for DAHG to feedback to inspectors on performance and inspection process.
Zoo Licence application form	ZLA	Application form for new zoos.
Zoo Inspection Report conditions review form	I-ZIR	Inspection report form, specifically for review of the conditions, ancillary to main form if required e.g. interim inspections.
Exemption application form	EXAF	Used by operators to apply for exemption from the regulations. Includes assessment of exemption.
Exemption inspection form	ZER	Use by inspectors to document site visits to ensure exemptions are suitable and appropriate.
Non-licenced premises assessment	NLPA	Standard form to assess non-licenced premises to assess whether they are a zoo or not.

a11.4 Operators are advised to use the most current zoo licencing form, available online or direct from DAHG.

Appendix twelve | Hazardous Animal Categorisation

Zoo animals are categorised in the following list into three risk levels on the basis of the animal's ability to cause harm to people (visitors and staff), the scale of harm if it should do so, and the likelihood, due to the nature of the animal, to cause the harm.

The list considers access as part of the normal operation of the zoo through husbandry practices, visitor-animal experiences, and in the case of escape where the behaviour can change considerably when an animal is removed from its usual environment.

Category One (greater risk)

a12.1.1 Contact between the public and staff with animals in Category One is likely to cause serious injury or be a serious threat to life, on the basis of hazard and risk of injury, toxin or disease, irrespective of the age and vulnerability of the individual person.

a12.1.2 Animals in Category One must either be separated from the public by a barrier of suitable design in order to prevent physical contact between the animals and members of the public within their designated areas, or, with the prior approval of the licencing authority, be provided with adequate supervision to allow the public and the animals to be in the same area without hazard.

a12.1.3 The responsibility for any relaxation of the need to provide non-touch barriers (i.e. prevent direct contact between animal and public) for Category One species lies with the licencing authority, acting upon the advice of inspectors nominated by the Minister.

a12.1.4 Animals in Category One may only be taken out of their enclosures and into the same areas as members of the public, or the public into the animals' enclosures, if the operator of the zoological collection, being the keeper of the animals, has reason to believe (by virtue of the animals' ages, sexual states, supervision, training, individual histories, enclosure size and design, or other relevant matters) and has satisfied to the licencing authority in writing that he has such reason, that the animals, being under the supervision of authorised and experienced members of staff, will not cause injury to the public.

a12.1.5 The keeper of any individual animal in Category Two or Three that has behaved in a way that has caused serious injury, or was likely to have caused serious injury or transmit disease, is obliged to treat that animal as if it were in Category One.

Category Two (intermediate risk)

a12.2.1 Contact between the staff, public and animals in Category Two may result in injury or illness, on the basis of hazard and risk of injury, toxin or disease, but is not likely to be life threatening.

a12.2.2 Animals in Category Two would normally be separated from the public by a barrier, but this barrier need not, of necessity, prevent all physical contact between the animals and members of the public, though it should be such as to render negligible any risk involved. The responsibility for assessing the kind of barriers needed for Category Two species lies with the operator of the zoological collection, who must take into account the behaviour of the individual animals and of other factors as are relevant to each situation.

a12.2.3 Some Category Two animals, given adequate space and refuge, may be maintained as free ranging, free-flying or walk-through exhibits. In these circumstances the operator must be able

to satisfy the licencing authority, citing relevant experience, that it is reasonable that the species involved can be safely exhibited in the manner proposed. The operator must also be able to satisfy the licencing authority that the individual animals in such exhibits are unlikely to cause harm to members of the public.

Category Three (least risk)

a12.3.1 All animals not listed in Category One or Category Two are automatically in Category Three. This does not necessarily mean that they do not present a hazard or risk to members of the public. This category contains many taxa in respect of which knowledge and experience of captivity is currently lacking. The zoo operator should, therefore, carry out a risk assessment to determine the appropriate barrier.

Notes

The following notes are additional to the above and are intended to help inspectors to interpret the categorisations and the listings.

N1 This list is intended to indicate the level of hazard and risk to members of the public and staff from animals kept in premises licensed under the Regulations. It should not be interpreted as indicating the level of hazard and risk from animals encountered in any other circumstances. In particular it should not be used to indicate the level of hazard and risk from animals kept in homes, circuses, pet shops and other places not covered by the Regulations. This list does not take into account animal welfare.

N2 The list will act as an aid to inspectors in determining whether a barrier is appropriate for a particular species or individual. It should also aid zoo operators in carrying out risk assessments on barrier types from a public safety perspective, which should be done in accordance with guidance issued by the Health and Safety Authority. Risk assessments should reflect the peculiarities of any particular animal kept, irrespective of the categorisation afforded to its species in this list, and should take into account the potential for theft or actions of unbalanced members of the public.

N3 Animals in Category One may only be exhibited to the public in the absence of non-touch barriers with the prior approval of the licencing authority.

N4 Category Two animals may, under certain circumstances, be exhibited to the public in the absence of non-touch barriers. Although prior approval by the licencing authority is not required, the operator of the zoological collection must be able to provide the licencing authority with precedents and other relevant information which show the practice to be safe. In cases of doubt, or where there is no precedent, the operator should seek the advice of the zoo inspectorate through the Department of Arts, Heritage and the Gaeltacht.

N5 Where Category Two species are exhibited without non-touch barriers (e.g. in walk-through areas, areas with no stand-off barriers, exhibits involving public handling, and free-flying demonstrations), the details of the practices being followed must be recorded in writing and be made available to the inspectors under the Regulations and the licencing authority, at the time of any subsequent inspection.

N6 The likelihood of bites, pecks, scratches, etc. caused by any individual animal which is in unusual circumstances (for example which is being injudiciously handled, or cornered thereby affecting its behaviour) is not to be taken as a measure of the natural ferocity of a species. This is mentioned so that species aren't considered overly hazardous on the basis of anecdotal reports of behaviour under such circumstances.

N7 In some species, e.g. those which live in herds, there is a greater likelihood of attack and injury from the leading animals (usually the leading males) than from other members of the group, especially in any breeding season. Extra caution is required at such times. In mammal species in which the young accompany the females, nursing females are likely to present a higher level of risk than at other times. Birds defending eggs and hatchlings are likely to present a higher level of risk than at other times.

N8 In most species, the young do not present the same order of hazard as might be expected from adults (except in the case of venomous animals). Whilst in some instances hand-reared animals are safer than naturally reared animals, this is not always so, particularly with species of wild ungulates and many species of birds. Because of their very small size, young of many hazardous invertebrate species require more stringent security than the larger adults.

Unless otherwise stated in the list below, the age, size or sex of a specimen of a Category One species cannot be used to justify treating it as a lower category of risk, except with the prior approval of the licencing authority (see a12.1.3, a12.1.4 and N3 above). In any event, zoo operators are reminded to carry out risk assessments if treating any individuals differently from the category to which they are assigned in this list.

N9 The list below includes all those kinds of mammals, birds, reptiles, amphibians, fish and invertebrates that are thought to present significant hazards in zoological gardens and aquaria (ie those falling within Categories One and Two). Any variation in classification and nomenclature may not be taken to imply that the categorisation of a species has changed. The barrier for any taxa not listed in either Category One or Two must be determined by the zoo operator on the basis of risk assessments, which should be open to scrutiny by inspectors.

N10 Hybrid animals should be placed in the same category as the more hazardous of the parent species.

N11 Animals normally domesticated in Ireland have not been included in this list. Attention is drawn to the possibility that individuals of such species may be very dangerous.

N12 Where categorization is of a taxon of animals, e.g. the genus *Cacatua*, the categorization has been made on the basis of the highest risk species within that taxon.

N13 In the case of bird species listed in Category Two (Intermediate Risk), attention is drawn to the hazard of injury from beaks and talons, in particular in the case of birds which are tethered in mews, e.g. birds of prey. Such birds should, when unsupervised, be separated by a non-touch barrier from members of the public.

N14 Attention is drawn to the hazard of all zoonotic infections, but with particular emphasis on the possible higher risks of humans contracting Chlamydia infection from some birds, including parrots and related species, and Salmonella and similar infections from some reptiles, including tortoises, if they are closely handled.

N15 It is also stressed that the higher primates are more closely related to man, and may therefore be more likely to carry zoonotic diseases. The risk of serious disease being carried in this manner is greater in imported animals than in long-established groups. There is also the risk of higher primates acting as intermediaries in the transfer of disease from one human to another.

N16 Attention is drawn to the possible risk of humans contracting rabies from many mammalian species, should the disease become indigenous. The risk from newly imported animals is controlled under quarantine regulations and is outside the scope of these provisions.

N17 In the listings below the following abbreviations apply: Special Electric Risk (E); Special Kicking Risk (K); Special Pecking Risk (P); Special Venom Risk (V).

Categorisations and listings

a12.4.1 If a taxon is not listed then it should be considered as being in Category Three. Note that the taxonomic group is being assessed for risk categorisation and that other members of a genus (or family where no genus is listed) that are not listed in the examples should be considered to share the same classification of risk. If unsure please contact the licencing authority or inspectorate and they can provide clarification where a species is not listed.

a12.4.2 Species are listed in taxonomic order by order, suborders, family, and then finally within a family the genus or species, in alphabetical order to facilitate review.

Mammals

Taxonomic group		Risk Category
Order MONOTREMATA		
Family Ornithorhynchidae		
Ornithorhynchus	Platypus	2V
Infraclass MARSUPIALIA		
Family Didelphidae		
Chironectes	Yapok or Water Opossum	2
Didelphis	Large Opossums	2
Lutreolina	Thick-tailed Opossum	2
Metachirops	Philanders or Four-eyed Opossums	2
Metachirus	Brown Four-eyed Opossums	2
Family Dasyuridae		
Dasyuroides	Kowari	2
Dasyurus	Quolls & Native Cats	2
Sarcophilus	Tasmanian Devil	1
Family Phascolarctidae		
Phascolarctos	Koala	2
Family Vombatidae		
Lasiorhinus	Hairy-nosed Wombat	2
Vombatus	Common Wombat	2
Family Phalangeridae		
Trichosurus	Brush-tailed Possums	2
Family Macropodidae		
Macropus antilopinus	Antelope Kangaroo	2
Macropus fuliginosus	Western Grey Kangaroo	1 K
Macropus giganteus	Great Grey Kangaroo	1 K
Macropus robustus	Wallaroo or Euro	1 K
Macropus rufus	Red Kangaroo	1 K
Order TUBULIDENTATA		
Family Orycteropidae		
Orycteropus	Aardvark	2
Order HYRACOIDEA		
Family Procaviidae		
Dendrohyrax	Tree Hyraxes	2

Heterohyrax	Bush Hyraxes	2
Procavia	Rock Hyraxes	2
Order PROBOSCIDEA		
Family Elephantidae		
Elephas	Asian Elephant	1
Loxodonta	African Elephant	1
Order CINGULATA		
Family Dasypodidae		
Priodontes	Giant Armadillo	2
Order PILOSA		
Family Bradypodidae		
Bradypus	Three-toed Sloths	1
Choloepus	Two-toed Sloths	1
Family Myrmecophagidae		
Myrmecophaga	Giant Ant-eater	1
Tamandua	Tamanduas	2
Order PRIMATES		
Family Lemuridae		
Eulemur	Lemurs	2
Hapalemur	Bamboo Lemurs	2
Lemur	Lemurs	2
Prolemur	Greater Bamboo Lemur	2
Varecia	Ruffed Lemur	2
Family Lepilemuridae		
Lepilemur	Weasel & Sportive Lemurs	2
Family Indriidae		
Avahi	Woolly Indri	2
Indri	Indri	2
Propithecus	Sifakas	2
Family Daubentoniidae		
Daubentonia	Aye-Aye	2
Family Callitrichidae		
Callimico	Goeldi's monkey	2
Callithrix	Marmosets - all species in genus	2
Cebuella	Pygmy marmosets	2
Leontopithecus	Lion-tamarins - all species in genus	2
Saguinus	Tamarins - all species in genus	2
Family Cebidae		
Cebus	Capuchin Monkeys	1
Saimiri	Squirrel Monkey	2
Family Aotidae		
Aotus	Douroucouli	2
Family Pitheciidae		
Cacajao	Uakaris	2
Callicebus	Titis	2
Chiropotes	Bearded Sakis	2

Pithecia	Sakis	2
Family Atelidae		
Alouatta	Howler Monkeys	1
Ateles	Spider Monkeys	1
Brachyteles	Woolly Spider Monkeys	1
Lagothrix	Woolly Monkeys	1
Family Cercopithecidae		
Sub-family Cercopithecinae		
Allenopithecus	Allen's Monkey	1
Cercocebus	Mangabeys	1
Cercopithecus	Guenons	1
Chlorocebus	Vervet Monkey	1
Erythrocebus	Patas Monkey	1
Macaca	Macaques	1
Mandrillus	Mandrill	1
Miopithecus	Talapoin Monkey	2
Papio	Baboons	1
Theropithecus	Gelada	1
Sub-family Colobinae		
Colobus	Colobus Monkeys	1
Nasalis	Proboscis Monkeys	1
Presbytis	Surelis	1
Procolobus	Red & Olive Colobus Monkeys	1
Pygathrix	Snub-nosed & Douc Monkeys	1
Semnopithecus	Langurs & Leaf Monkeys	1
Family Hylobatidae		
Hoolock (Bunopithecus)	Hoolock gibbon	1
Hylobates	Gibbons	1
Nomascus	Gibbons	1
Symphalangus	Siamang	1
Family Hominidae		
Gorilla	Gorilla	1
Pan	Chimpanzees, Bonobos	1
Pongo	Orang-utan	1
Order ERINACEOMORPHA (commonly included in the Insectivora)		
Family Erinaceidae		
Echinosorex	Moonrat	2
Hylomys	Lesser Moonrat	2
Neohylomys	Hainan Moonrat	2
Podogymnura	Mindanao Moonrat	2
Order SORICOMORPHA (commonly included in the Insectivora)		
Family Solenodontidae		
Solenodon	Solenodons	2
Order CHIROPTERA		
Family Pteropodidae	Fruit bats	2
Family Phyllostomidae - Subfamily Desmodontinae		

Desmodus	Vampire bats - all species in genus	1
Diaemus	White-winged vampire bat	1
Diphylla	Hairy-legged vampire bat	1
Order CARNIVORA		
Family Felidae		
Subfamily Felinae		
Acinonyx	Cheetah	1
Caracal	Caracal	1
Felis	Wild cats (noon-domestic)	1
Herpailurus	Jaguarundi	1
Leopardus	Ocelot, other wild cats	1
Leptailurus	Serval	1
Lynx	Lynxes	1
Otocolobus (Felis)	Pallas's Cat	1
Profelis (Caracal)	African Golden Cat	1
Prionailurus	Medium wild cats	1
Puma	Cougar	1
Other Felinae	(Less common species not listed)	1
Subfamily Pantherinae		
Neofelis	Clouded Leopard	1
Panthera	Lion, Tiger, Leopards, Jaguar	1
Uncia	Snow leopard	1
Family Viverridae		
Subfamily Paradoxurinae		
Arctictis	Binturong	2
Arctogalidia	Small-toothed Palm Civet	2
Macrogalidia	Sulawesi Palm Civet	2
Paguma	Masked Palm Civet	2
Paradoxurus	Palm Civets	2
Subfamily Hemigalinae		
Chrotogale	Owston's Palm Civet	2
Cynogale	Otter Civet	2
Diplogale	Hose's Palm Civet	2
Hemigalus	Banded Palm Civet	2
Subfamily Prionodontinae		
Prionodon	Asiatic Linsangs	2
Subfamily Viverrinae		
Civettictis	African civet	2
Genetta	Genets	2
Poiana	Linsangs	2
Viverra	Civets	2
Viverricula	Small Indian Civet	2
Family Eupleridae		
Subfamily Euplerinae		
Cryptoprocta	Fossa	1
Eupleres	Falanouc	2

Fossa	Malagasy Civet	2
Subfamily Galidiinae		
Galidia	Ring-tailed Mongoose	2
Galidictis	Malagasy Mongooses	2
Mungotictis	Malagasy Mongooses	2
Salanoia	Malagasy Mongooses	2
Family Nandiniidae		
Nandinia	African Palm Civet	2
Family Herpestidae		
Atilax	Marsh Mongoose	2
Bdeogale	Mongooses	2
Crossarchus	Kusimanse	2
Cynictis	Yellow Mongoose	2
Dologale	Pousargue's Mongoose	2
Galerella	Slender Mongooses	2
Helogale	Dwarf Mongoose	2
Herpestes	Mongooses	2
Ichneumia	White-tailed Mongoose	2
Liberiictis	Liberian Mongoose	2
Mungos	Banded Mongoose	2
Paracynictis	Selous' Mongoose	2
Rhynchogale	Meller's Mongoose	2
Suricata	Meerkat	2
Family Hyaenidae		
Crocuta	Spotted Hyaena	1
Hyaena	Hyaenas	1
Proteles	Aardwolf	2
Family Canidae		
Alopex	Arctic Fox	2
Canis lupus	Wolf	1
Canis spp. (wild species only)	Coyote, Jackals	2
Chrysocyon	Maned Wolf	2
Cuon	Dhole	1
Dusicyon	South American Foxes	2
Lycaon	Hunting Dog	1
Nyctereutes	Raccoon Dog	2
Speothos	Bush Dog	2
Vulpes	Common Foxes	2
Otocyon	Bat-eared Fox	2
Family Ursidae		
Ailuropoda	Giant Panda	1
Helarctos	Sun Bear	1
Melursus	Sloth Bear	1
Selenarctos	Asiatic Black Bear	1
Thalarctos	Polar Bear	1
Tremarctos	Spectacled Bear	1

Ursus	Brown & American Black Bears	1
Clade PINNIPEDIA		
Family Otariidae		
Arctocephalus	Fur Seals	1
Callorhinus	Northern Fur Seal	1
Eumetopias	Steller's Sealion	1
Neophoca	Australian Sealion	1
Otaria	Southern Sealion	1
Zalophus	California Sealion	1
Family Odobenidae		
Odobenus	Walrus	1
Family Phocidae		
Cystophora	Hooded Seal	1
Erignathus	Bearded Seal	1
Halichoerus	Grey Seal	1
Histrophoca	Ribbon Seal	1
Hydrurga	Leopard Seal	1
Leptonychotes	Weddell Seal	1
Lobodon	Crab-eating Seal	1
Mirounga	Elephant Seals	1
Monachus	Monk Seals	1
Ommatophoca	Ross Seal	1
Pagophilus	Harp Seal	1
Phoca	Common, Ringed, Caspian & Baikal Seals	1
Family Mustelidae		
Aonyx	Small-clawed Otters	1
Arctonyx	Hog Badger	2
Conepatus	Hog-nosed & South American Skunks	2
Eira	Tayra	2
Enhydra	Sea Otters	1
Galictis	Grison	2
Gulo	Wolverine	1
Ictonyx	Zorilla	2
Lutra	Otters	1
Lyncodon	Patagonian Weasel	2
Martes	Martens	2
Meles	Badger	2
Mellivora	Ratel	1
Melogale	Ferret Badgers	2
Mephitis	Skunks	2
Mustela	Minks, Stoats, Weasels	2
Mydaus	Malay Badger	2
Poecilictis	Libyan Weasel	2
Poecilogale	White-naped Weasel	2
Pteronura	Giant Otter	1
Spilogale	Spotted Skunks	2

Taxidea	American Badger	2
Vormela	Marbled Polecat	2
Family Procyonidae		
Bassaricyon	Olingo	2
Bassariscus	Cacomistle & Ringtail	2
Nasua	Coatis	2
Nasuella	Mountain Coati	2
Potos	Kinkajou	2
Procyon	Raccoons	2
Family Ailuridae		
Ailurus	Red Panda	2
Order PERISSODACTYLA		
Family Equidae		
Equus	(wild species) Wild Horses, Asses & Zebras	1
Family Tapiridae		
Tapirus	Tapirs	1
Family Rhinocerotidae		
Ceratotherium	White Rhinoceros	1
Dicerorhinus	Sumatran Rhinoceros	1
Diceros	Black Rhinoceros	1
Rhinoceros	Asiatic Rhinoceroses	1
Order ARTIODACTYLA		
Family Suidae		
Babyrousa	Babirusa	1
Hylochoerus	Giant Forest Hog	1
Phacochoerus	Wart Hog	1
Potamochoerus	Bush Pig and Red River Hog	1
Sus	(wild species) Wild Boar	1
Family Tayassuidae		
Catagonus	Chaco Peccary	1
Tayassu	Peccaries	1
Family Hippopotamidae		
Choeropsis	Pygmy Hippopotamus	1
Hippopotamus	Hippopotamus	1
Family Camelidae		
Camelus	Camels	1
Lama guanicoe	Guanaco	2
Vicugna	Vicuna	2
Family Cervidae		
Alces	Moose, European Elk	1
Blastocerus	Marsh Deer	2
Capreolus	Roe Deer	
	(adult males)	1
	(females and young)	2
Cervus		
(larger species)	Red Deer, Wapiti, Sika Deer	1

(other species)	Fallow Deer, etc.	
	(adult males)	1
	(females and young)	2
Elaphurus	Pere David's Deer	1
Hippocamelus	Guemals	2
Mazama	South American Brockets	2
Odocoileus	Mule Deer, White-tailed Deer	2
Ozotoceros	Pampas Deer	2
Panolia	Brow-antlered deer	
	(adult males)	1
	(females and young)	2
Rangifer	Caribou, Reindeer	
	(adult males)	1
	(females and young)	2
Family Giraffidae		
Giraffa	Giraffe	1
Okapia	Okapi	2
Family Antilocapridae		
Antilocapra	Pronghorn Antelope	2
Family Bovidae		
Addax	Addax	1
Aepyceros	Impala	2
Alcelaphus	Hartebeests	2
Ammodorcas	Dibatag	2
Ammotragus	Aoudad or Barbary Sheep	1
Antidorcas	Springbok	2
Antilope	Blackbuck	2
Bison	American Bison, Wisent	1
Bos	(wild and larger exotic domestic species) Ankole, Banteng, Gaur, Yak, Kouprey	1
	others	2
Boselaphus	Nilghai	2
Bubalus	Anoas, Tamarau, Water Buffalo	1
Budorcas	Takins	1
Capra	(wild species) Tur, Markhor, Ibex, Wild Goats	
	(adult males)	1
	(females and young)	2
Capricornis	Serows	2
Cephalophus	Duikers	2
Connochaetes	Wildebeests or Gnus	1
Damaliscus	Bontebok, Blesbok, Topi, & Hunter's Hartebeest	2
Gazella	Gazelles	2
Hemitragus	Tahrs	
	(adult males)	1
	(females and young)	2

Hippotragus niger	Sable Antelope	
	(adult males)	1
	(females and young)	1
Hippotragus equinus	Roan Antelope	
	(adult males)	1
	(females and young)	2
Kobus ellipsiprymnus	Common Waterbuck	
	(adult males)	1
	(females & young)	2
Kobus defassa	Defassa Waterbuck	
	(adult males)	1
	(females & young)	2
Kobus kob	Kob	
	(adult males)	1
	(females & young)	2
Kobus leche	Red Lechwe	
	(adult males)	1
	(females & young)	2
Kobus megaceros	Nile Lechwe	
	(adult males)	1
	(females and young)	2
Kobus vardoni	Puku	2
Litocranius	Gerenuk	2
Nemorhaedus	Goral	2
Oreamnos	Rocky Mountain Goat	2
Oryx	Oryxes and Gemsbok	1
Ovibos	Musk Ox	1
Ovis	(large wild species) Argali, Bighorn	1
	(small wild species) Mouflon, Urial	2
Pantholops	Tibetan Antelope or Chiru	2
Pelea	Rhebok	2
Procapra	Chinese Gazelles	2
Pseudois	Bharal	2
Redunca	Reedbuck	2
Rupicapra	Chamois	2
Saiga	Saiga	2
Sylvicapra	Common Duiker	2
Synceros	African Buffalo	1
Taurotragus	Eland , Giant Eland	1
Tetracerus	Four-horned Antelope	2
Tragelaphus	Nyalas, Bushbuck, Sitatunga, Kudus, Bongo	
	(adult males)	1
	(females and young)	2
Order CETACEA		
Family Delphinidae		

Feresa	Pygmy Killer Whale	1
Globicephala	Pilot Whales	2
Grampus	Risso's Dolphin	2
Orcinus	Killer Whale	1
Pseudorca	False Killer Whale	1
Family Monodontidae		
Monodon	Narwhal (adult males)	2
Family Physeteridae		
Kogia	Pygmy Sperm Whales	2
Family Ziphiidae		
Berardius	Arnoud's & Baird's Beaked Whales	2
Hyperoodon	Bottle-nosed Whales	2
Mesoplodon	Beaked Whales	2
Tasmacetus	Tasman whale	2
Ziphius	Cuvier's Beaked Whale	2
Order RODENTIA		
Sub-order Sciuromorpha		
Family Sciuridae		
Ratufa	Giant Squirrels	2
Sub-order Castorimorpha		
Family Castoridae		
Castor	Beavers	2
Sub-order Hystricomorpha		
Family Hystricidae		
Atherurus	Brush-tailed Porcupines	2
Hystrix	Crested Porcupines	2
Thecurus	Indonesian Porcupines	2
Trichys	Long-tailed Porcupine	2
Family Erethizontidae		
Chaetomys	Thin-spined Porcupine	2
Coendou	Tree Porcupines	2
Echinoprocta	Amazon Porcupine	2
Erethizon	North American Porcupine	2
Family Dinomyidae		
Dinomys	Pacarana	2
Family Caviidae		
Hydrochoerus	Capybara	2
Family Cuniculidae		
Cuniculus	Pacas	2
Family Myocastoridae		
Myocastor	Coypu	2
Family Capromyidae		
Capromys	Hutias	2
Plagiodontia	Hispaniola Hutia	2

Reference for taxonomic groupings: Mammal species of the world, Wilson and Redder, 3rd Ed 2005

Birds

Taxonomic group		Risk Category
Order STUTHIONIFORMES		
Family Struthionidae		
Struthio	Ostrich	1
Family Rheidae		
Pterocnemia	Darwin's Rhea	2
Rhea	Common Rhea	2
Family Casuariidae		
Casuarius	Cassowaries	1
Dromaius	Emu	2
Order ANSERIFORMES		
Family Anhimidae	Screamers	2
Family Anatidae	Geese, Swans and Ducks	2
Plectopterus	Spurwinged Goose	2
Order CAPRIMULGIFORMES		
Family Steatornithidae		
	Oilbird	2
Family Podargidae		
	Frogmouths	2
Family Caprimulgidae		
	Nightjars	2
Family Aegothelidae		
	Owlet Nightjars	2
Order OTIDIFORMES		
Family Otididae		
Ardeotis	Kori and Large Bustards	2
Chlamydotis	Houbara Bustard	2
Order GRUIFORMES		
Family Gruidae		
Anthropoides	Blue & Demoiselle Cranes	2P
Balearica	Crowned Crane	2P
Grus	Cranes	2P
Order CHARADRIIFORMES		
Family Stercorariidae		
Skuas		2
Order CICONIIFORMES		
Family Ciconiidae		
Anastomus	Open-bill Storks	2P
Ciconia		
Ciconia ciconia	White Stork	2P
Ciconia episcopus	White-necked Stork	2P
Ciconia nigra	Black Stork	2P
Ephippiorhynchus	Saddle-billed Stork	2P
Euxenura	Maguari Stork	2P

Ibis	Painted Storks (NB not Ibises)	2P
Jabiru	Jabiru	2P
Leptoptilos	Marabou and Adjutant Storks	2P
Mycteria	Wood Stork	2P
Xenorhynchus	Black-necked Stork	2P
Order PELECANIFORMES		
Family Ardeidae		
Ardea cinerea	Grey Heron	2P
Ardea herodias	Great Blue Heron (includes Great White Heron)	2P
Ardea purpurea	Purple Heron	2P
Ardea goliath	Goliath Heron	2P
Ardea imperialis	Great White-bellied Heron	2P
Egretta alba	Large (Great) Egret	2P
Family Pelecanidae		
Pelecanus conspicillatus	Australian Pelican	2
Pelecanus crispus	Dalmatian Pelican	2
Pelecanus erythrorhynchus	American White Pelican	2
Pelecanus occidentalis	Brown Pelican	2
Pelecanus onocrotalus	Great White Pelican	2
Order CATHARTIFORMES		
Family Cathartidae		
Cathartes	Turkey & Yellow-headed Vultures	2
Coragyps	American Black Vulture	2
Gymnogyps	Californian Condor	1
Sarcorhamphus	King Vulture	2
Vultur	Andean Condor	1
Order ACCIPITRIFORMES		
Family Sagittariidae		
Sagittarius	Secretary Bird	2
Family Pandionidae		
Pandion	Osprey	2
Family Accipitridae	Hawks	
Subfamily Elaninae		
Chelictinia	Scissor-tailed kite	2
Elanus	Kites	2
Gampsonyx	Pearl Kite	2
Subfamily Gypaetinae	Tribe Pernini	
Aviceda	Cuckoo Falcons & Lizard Hawks	2
Chondrohierax	Hook-billed Kite	2
Elanoides	Swallow-tailed Kite	2
Eutriorchis	Madagascar Serpent Eagle	2
Hamirostra	Black-breasted Buzzard	2
Henicopernis	Long-tail & Black Honey Buzzards	2
Leptodon	Gray-Headed Kite	2
Lophoictinia	Square-tailed Kite	2
Pernis	Honey Buzzards	2

Subfamily Gypaetinae	Tribe Gypaetini	
Gypaetus	Bearded Vulture	2
Gypohierax	Palm-nut Vulture	2
Neophron	Egyptian Vultures	2
Polyboroides	African Harrier Hawk	2
Subfamily Gypaetinae	Tribe Circaetini	
Circaetus	Snake Eagles	2
Dryotriorchis	Congo Snake Eagle	2
Pithecophaga	Monkey-eating Eagle	1
Spilornis	Serpent Eagles	2
Terathopius	Bateleur	2
Subfamily Gypaetinae	Tribe Gypini	
Aegypius	European Black Vulture	1
Gyps	Vultures and Griffon Vultures	1
Sarcogyps	Red-headed Vulture	2
Torgos	Lappet-faced Vultures	1
Trigonoceps	White-headed Vulture	2
Subfamily Gypaetinae	Tribe Accipitrini	
Accipiter	Hawks, Sparrow Hawks & Goshawks	2
Aquila	Eagles	2
Busarellus	Black-collared Hawk	2
Butastur	Grey-faced Buzzard-Eagle	2
Buteo	Buzzards	2
Buteogallus	Savannah Hawk and Solitary eagles	2
Circus	Harriers	2
Erythrotriorchis	Red Goshawk	2
Geranoaetus	Black-chested Buzzard-Eagle	2
Geranospiza	Crane Hawk	2
Haliaeetus	Bald, Sea & Fish Eagles	2
Haliastur	Brahminy & Whistling Kites	2
Harpagus	Kites	2
Harpia	Harpy Eagle	1
Harpyopsis	New Guinea Harpy Eagle	1
Hieraaetus	Eagles	2
Ichthyophaga	Grey-headed Fishing Eagle	2
Ictinaetus	Black Eagle	2
Ictinia	Kites	2
Kaupifalco	Lizard Buzzard	2
Leucopternis	Hawks	2
Lophaetus	Long-crested Eagle	2
Macheirhamphus	Bat Hawk	2
Megatriorchis	Doria's Hawk	2
Melierax	Chanting Goshawks	2
Milvus	Black & Red Kites	2
Morphnus	Crested Eagle	2
Parabuteo	Harris' Hawk	2

Polemaetus	Martial Eagle	1
Rostrhamus	Kites	2
Spizaetus	Hawk-Eagles	2
Stephanoaetus	Crowned Eagle	1
Urotriorchis	African Long-tailed Hawk	2
Order STRIGIFORMES		
Family Strigidae		
Subfamily Ieraglaucinae		
Ninox	Booboks	2
Uroglaux	Papuan Boobok	2
Subfamily Surniinae		
Aegolius	Whet-Owls	2
Athene	Little & Burrowing Owls	2
Micrathene	Elf Owl	2
Surnia	Hawk-Owl	2
Subfamily Striginae		
Asio	Short-eared owls	2
Bubo	Eagle-Owls and Snowy Owls:	
	(adults breeding or with young)	1
	(other adults)	2
Ciccaba	Owls	2
Ketupa	Fish Owls	2
Nesasio	Fearful Owl	2
Otus	Scops owl	2
Pseudoscops	Jamaican Owl	2
Ptilopsos	White-faced owl	2
Pulsatrix	Spectacled Owls	2
Scotopelia	Fishing Owls	2
Strix	Owls	2
Family Tytonidae		
Phodilus	Bay Owls	2
Tyto	Barn Owls	2
Order CORACIIFORMES		
Family Bucerotidae		
Aceros	Hornbills	2
Anorrhinus	Bushy-crested Hornbill	2
Anthracoceros	Hornbills	2
Berenicornis	White-crested Hornbills	2
Buceros	Hornbill	2
Bucorvus	Ground Hornbills	1
Bycanistes	Hornbills	2
Ceratogymna	Black-casqued & Yellow-casqued Hornbills	2
Penelopides	Hornbills	2
Ptilolaemus	White-throated Brown Hornbill	2
Rhinoplax	Helmeted Hornbill	2

Tockus	Hornbills	2
Order FALCONIFORMES		
Family Falconidae		
Daptrius	Caracaras	2P
Falco	Kestrels and Falcons	2
Herpetotheres	Laughing Falcon	2
Micrastur	Forest Falcons	2
Microhierax	Falconets	2
Milvago	Milvago Caracaras	2P
Phalcobaenus	Caracaras	2P
Polyborus	Crested Caracara	2P
Spiziapteryx	Spot-winged Falconet	2
Order PSITTACIFORMES		
Family Strigopidae		
Nestor	Kaka & Kea	2
Strigops	Kakapo	2
Family Cacatuidae		
Calyptorhynchus	Red-tailed black cockatoos	2
Cacatua	Cockatoos and Corellas	2
Callocephalon	Gang-gang Cockatoo	2
Eolophus	Galah	2
Probosciger	Palm Cockatoo	2
Zanda	Yellow-tailed Black Cockatoos	2
Family Psittacidae		
Amazona	Amazon Parrots	2
Anodorhynchus	Hyacinthine & Indigo Macaws	2
Ara	Macaws	2
Coracopsis	Vasa Parrots	2
Cyanopsitta	Little Blue Macaw	2
Psittacus	African Grey Parrot	2
Order PASSERIFORMES		
Family Corvidae		
Corvus albicollis	African White-necked Raven	2
Corvus corax	Raven	2
Corvus coronoides	Australian Raven	2
Corvus crassirostris	Thick-billed Raven	2
Corvus cryptoleucus	White-necked Raven	2
Corvus mellori	South Australian Raven	2
Corvus rhipidurus	Fan-tailed Raven	2
Corvus ruficollis	Brown-necked Raven	2

Reference for taxonomic groupings: Bird Families of the World, Winklet, Billerman and Lovette, 1st Ed 2015

Reptiles

Taxonomic group		Risk Category
Order CHELONIA / TESTUDINATA		
Family Chelidae		
Batrachemys	Snake-necked Turtles	2
Chelus	Matamata	2
Elseya	Australian Snapping Turtles	2
Family Chelydridae		
Chelydra	Snapping Turtle	1
Macroclemys	Alligator Snapping Turtle	1
Family Testudinidae		
Testudo elephantopus	Galapagos Giant Tortoise	2
Testudo gigantia	Aldabra Giant Tortoise	2
Testudo spp.	Common Tortoises (over 0.3m. carapace length)	2
Family Cheloniidae		
Caretta	Loggerhead Turtle	2
Chelonia	Green Turtle	2
Eretmochelys	Hawksbill Turtle	2
Lepidochelys	Ridley Turtles	2
Family Carettochelyidae		
Carettochelys	Pitted-shell Turtle	2
Family Trionychidae		
Chitra	River Softshell Turtles	2
Cyclanorbis	Nubian & Senegal Softshell Turtles	2
Cycloderma	Aubrey's & Bridled Softshell Turtles	2
Dogania	Softshell Turtles	2
Lissemys	Soft Terrapin	2
Pelochelys	Softshell Turtles	2
Trionyx	Softshell Turtles	2
Order SQUAMATA		
Family Iguanidae		
Iguana spp.		
All specimens >0.6m snout to vent		1
Family Helodermatidae		
Heloderma	Gila Monster and Beaded Lizard	1V
Family Varanidae		
Varanus spp.		
All specimens >0.6m snout to vent		1
All specimens <0.6m snout to vent		2
Family Boidae	Pythons and Boas	
	all specimens over 3 m.	1
	all smaller specimens	2
Family Colubridae		
Ahaetulla	Horizontal-pupilled or Asian Vine Snakes	2

Boiga dendrophila	Mangrove Snake	1V
Boiga irregularis	Brown tree snake	1V
Boiga spp.	other Boigan species	2
Clelia	Mussurana	1V
Dispholidus	Boomslang	1V
Enhydris	Water Snake	2
Eteirodipsas	Madagascar Boigine Snake	2
Homalopsis	Water Snake	2
Hydrodynastes	False Water Cobra	2
Leptodeira	Cat-eyed Snake	2
Macroprotodon	European Boigine Snake	2
Mapolon	Montpelier Snakes	1V
Oxyrhopus	South American Boigine Snake	2
Phalotris lemniscatus	Dumeril's Diadem Snake	1V
Phylodryas olfersi	Green Boomslang	1V
Psammophis	Swift Snakes	1V
Rhabdophis	Yamakagashi	1V
Spilotes	Black and Yellow Rat Snake	2
Tachymenis peruviana	Peruvian Racer	1V
Telescopus	European Boigine Snake	2
Thelotornis	Twig Snake	1V
Thrasops	Black Tree Snakes	2
Xenodon severus	Amazon False Fer-de-lance	IV
Family Atractaspidae		
Atractaspis	Burrowing Vipers	1V
Family Elapidae		
Acanthophis	Death Adder	1V
Aipysurus	Olive-brown Sea Snake	1V
Aspidelaps	Shield-nose Snakes	1V
Boulengerina	Water Cobras	1V
Bungarus	Kraits	1V
Callophis	Oriental Coral Snakes	1V
Demansia	Australian Brown Snakes	1V
Dendroaspis	Mambas	1V
Denisonia	Australian Copperheads	1V
Elaps	African Cobras	1V
Elapsoidea	African Cobras	1V
Emydocephalus	Western Pacific Sea Kraits	1V
Enhydrina	Beaked Sea Snake	1V
Hemachatus	Ringhals	1V
Hydrophis	Sea Snakes	1V
Lapemis	Sea snake	1V
Laticauda	Sea Kraits	1V
Leptomicrurus	Slender Coral Snakes	1V
Maticora	Long-glanded Coral Snakes	1V
Microcephalophis	Small-headed Sea Snakes	1V

Micrurus	Western Coral Snakes	1V
Naja	Cobras	1V
Notechis	Australian Tiger Snakes	1V
Ophiophagus	King Cobra	1V
Oxyuranus	Taipan	1V
Pelamis	Yellow-bellied Sea Snake	1V
Pseudechis	Australian Black Snakes	1V
Pseudohaje	Cobras	1V
Walterinnesia	Desert Black Snakes	1V
Family Viperidae		
Subfamily Azemiopinae		
Azemiops	Fea's Viper	1V
Subfamily Causinae		
Causus	Night Adders	1V
Subfamily Crotalinae		
Agkistrodon	Copperheads and Moccasins	1V
Bothrops	Lance-head Snakes	1V
Crotalus	Rattlesnakes	1V
Lachesis	Bushmaster	1V
Sistrurus	Pygmy Rattlesnakes	1V
Trimeresurus	Asian Lance-head Snakes	1V
Subfamily Viperinae		
Atheris	African Tree Vipers	1V
Bitis	Puff Adders	1V
Cerastes	Horned and Common Sand Vipers	1V
Echis	Saw-scaled Viper	1V
Eristicophis	McMahon's Viper	1V
Pseudocerastes	False Cerastes	1V
Vipera	True Adders and Vipers	1V
Order CROCODILIA		
Family Crocodylidae		
Alligator	Alligators	1
Caiman	Caimans	1
Crocodylus	Crocodiles	1
Gavialis	Gharials	1
Osteolaemus	Dwarf Crocodiles	1
Tomistoma	False Gharial	1

Reference for taxonomic groupings: Integrated Taxonomic System www.itis.gov

Amphibians

Taxonomic group		Risk Category
Order CAUDATA		
Family Cryptobranchidae	Giant Salamanders	
All specimens >0.8m snout to vent		1
All specimens <0.8m snout to vent		2
Family Amphiumidae	Congo eels	2
Order ANURA		
Family Dendrobatidae		
Phyllobates aurotaenia	Kokoe poison frog	1
Phyllobates bicolor	Black-legged poison frog	1
Phyllobates terribilis	Golden poison frog	1
Others in family Dendrobatidae		1
Family Bufonidae		
All in Family Bufonidae	True toads	2

Reference for taxonomic groupings: Integrated Taxonomic System www.itis.gov and Threatened Amphibians of the World, Stuart *et al*, 1st Ed 2008

Fish

Taxonomic group		Risk Category
Class Actinopterygii		
Infraclass Teleostei		
Order ANGUILLIFORMES		
Family Congridae	Conger Eels	2
Family Muraenidae	Moray Eels	1
Order SALMONIFORMES		
Family Esocidae	Pikes	2
Order CYPRINIFORMES		
Family Characidae		
Serrasalmus	Piranha and Pacu	2
Family Electrophoridae	Electric Eel	1E
Order SILURIFORMES		
Family Clariidae	Catfish	2
Family Malapteruridae	Electric Cat Fish	1E
Family Ariidae	Sea Cat Fish	2V
Family Plotosidae	Cat Fish	2
Order BATRACHOIDIFORMES		
Family Batrachoididae	Toad Fish	1V
Order CHANNIFORMES		
Family Channidae	Snake Heads	2
Order SCORPAENIFORMES		

Family Scorpaenidae	Scorpion Fishes	1V
Family Synanceidae	Stone Fish	1V
Order PERCIFORMES		
Family Acanthuridae	Surgeonfish, Tangs, Unicornfish	2
Family Sphyraenidae	Barracudas	2
Family Trachinidae	Weever Fish	2V
Family Uranoscopidae	Star-Gazers	1V
Family Siganidae	Rabbit Fish (Teleost)	2V
Order TETRAODONTIFORMES		
Family Balistidae	Trigger Fish (larger specimens only)	2
Class Chondrichthyes		
Subclass Elasmobranchii		
All sharks > 1.5m		1
Family Alopiidae	Thresher Shark	1
Family Carcharhinidae	All species	1
Family Dasyatidae	Sting Rays	2V
Family Hexanchidae	Comb-toothed Sharks	1
Family Lamnidae	Porbeagle	1
Family Myliobatida	Eagle Ray	2V
Family Odontaspididae	Sand Shark	1
Family Orectolobidae	Carpet and Nurse Sharks	1
	Wobegong and Angel Sharks	1
Family Potamotrygonidae	Freshwater Sting Rays	1V
Family Sphyrnidae	Hammerhead Sharks	1
Family Squatinidae	Monk Fish	2
Family Torpedinidae	Electric Rays	1E
Subclass Holocephali		
Family Chimaeridae	Rat fish	2

Reference for taxonomic groupings: Integrated Taxonomic System www.itis.gov

Arthropods

Taxonomic group		Risk Category
Sub-Phylum CHELICERATA		
Class Arachnida		
Order ARANEAE		
Infraorder Mygalomorphae		
Family Theridiidae		
Latrodectus	Black Widow or Redback Spiders	1 V
Family Sicariidae		
Loxosceles	Brown Recluse or Violin Spiders	1 V
Family Hexathelidae		
Atrax	Australian funnel-web spiders	1V

Family Ctenidae		
Phoneutria	Wandering Spiders	1V
Family Theraphosidae		
	New World Bird-eating spiders or Tarantulas	2
	Old World Bird-eating spiders or Tarantulas	2V
Class Scorpionidea		
Family Buthidae	Buthid Scorpions	1V
Family Scorpionidae		
Hemiscorpius lepturus		1V
Scorpio maurus	Israeli gold scorpion	2V
Sub-phylum Mandibulata		
Class Chilopoda		
Order SCOLOPENDROMORPHA		
Family Scolopendridae	Giant Centipedes (Scolopendra spp.)	2V
Class Diplopoda		
Orders SPIROBOLIDA		
Family Pachybolidae		
Aphistogoniulus coralipes	Malagasy fire millipede	2
Family Rhinocricidae		
Adenobolus monilicornis	Bumblebee millipede	2
Orders SPIROSTREPTIDA		
Family Spirostreptidae		
Archispirostreptus spp.	Giant African millipedes	2
Ophistreptus spp.	Giant African millipedes	2
Spirostreptus spp.	Giant African millipedes	2
Telodeinopus sppp.	Giant African millipedes	2
Class Insecta		
Order PHASMIDA		
Family Pseudophasmatidae		
Anisomorpha spp.	Walking Stick Insects	2
Agathemera spp.	Walking Stick Insects	2
Neophasma spp.	Walking Stick Insects	2
Peruphasma spp.	Walking Stick Insects	2
Pseudophasma spp.	Walking Stick Insects	2
Family Phasmatidae		
Eurycantha calcarata	Spiny Stick Insect (mature males)	2
Order HEMIPTERA		
Family Belostomatidae		
Abedus spp.	Water bugs	2
Belostoma spp.	Water bugs	2
Lethocercus spp.	Water bugs	2
Family Reduviidae	Assassin Bugs	2
Class Crustacea		
Sub-class Malacostraca		
Order STOMATOPODA	Mantis Shrimps	2

Order DECAPODA		
Family Nephropidae	(large specimens) Lobsters	2
Family Coenobitiae	Robber Crabs	2

Reference for taxonomic groupings: SSSMZP, defra, 2012

ECHINODERMATA

Taxonomic group		Risk Category
Class Echinoidea		
	Long-spined Sea Urchins	2

MOLLUSCA

Taxonomic group		Risk Category
Class Cephalopoda		
Family Octopodidae		
Enteroctopus spp.	Giant Octopus	1V
Hapalochlaena	Blue-ringed Octopuses	1V
Octopus vulgaris	Common Octopus	2V
Family Sepiidae		
Metasepia pfefferi	Flamboyant cuttlefish	1V
Sepia bandensis	Dwarf cuttlefish	1V
Sepia officinalis	Common cuttlefish	2V
Class Gasteropoda		
Family Conidae	Cone shells (some species)	1 V

Reference for taxonomic groupings: SSSMZP, defra, 2012

Appendix thirteen | Wild Animal Categorisation

Wild animals

a13.1 'Wild animals', with respect to these Standards, are defined as any animal not normally domesticated in Ireland.

a13.2 There is no authoritative statement on which animals fall into the "normally non-domestic" and "normally domestic" categories as interpretation of legislation is a matter for the Courts. However, an informal view on the more common cases that have caused uncertainty is set out below.

a13.3 To explain the thinking, the two categories have been sub-divided into the following five sub-groups. Species not in groups one to four will almost certainly be in five.

a13.4 Hybrid species should be treated as not normally domesticated if one of the parents is from sub-group three to five. Where there is doubt about a species, the inspectors or operators may check with the licencing authority.

Animals considered normally domesticated or not normally domesticated				
Species normally domesticated in Ireland and therefore not 'wild animals' for the purposes of the Standards		Species not normally domesticated in Ireland and therefore to be considered 'wild animals' for the purposes of the Standards		
Group 1	Group 2	Group 3	Group 4	Group 5
True domestic breeds of species that have been kept in Ireland for so long, and in such large numbers, that their status as "normally domesticated in Ireland" is clearly justified (exotic domestic breeds of the same species as those listed here are included, eg. Vietnamese pot-bellied pigs).	True domestic breeds, and selectively bred wild species, introduced to Ireland relatively recently, but now so commonly kept outside zoological collections as to justify regarding them as "normally domesticated in Ireland".	True domestic breeds of species introduced to Ireland relatively recently, and kept in relatively low numbers, and that therefore should be regarded as "not normally domesticated in Ireland" (exotic domestic breeds of species in list 1 are included in that list).	Wild species, commercially farmed or widely bred by hobbyists (including some species which have been selectively bred and therefore may be considered domestic), but where this is so recent as to render the species "not normally domesticated in Ireland".	True wild species, where domesticity is not seriously suggested.
Examples: horses/ponies, donkeys, cattle, sheep, goats, pigs, dogs, cats, ferrets, rabbits, pigeons/ doves, chickens, turkeys, ducks, geese.	Examples: guinea pigs, hamsters, gerbils, rats, mice, chinchillas, budgerigars, canaries, guinea fowl, peafowl, goldfish, koi carp, golden orfe, llamas, alpacas.	Examples: camels, water buffalo, Ankole cattle, yak, reindeer.	Examples: deer, ostriches, wild boar, American bison, aquarium and pond fish (excluding those in 2.), cage and aviary birds (excluding those in 2.), waterfowl (excluding those in 1.), giant African land snails.	Examples: All species not listed in 1. to 4.

Conservation sensitive

a13.5 'Conservation sensitive' means any species listed in Appendix I of CITES and/or listed in the following categories of the IUCN Red List of Threatened species (Extinct in the wild; Critically Endangered; Endangered; Vulnerable).

Hazardous

a13.6 'Hazardous' means any species listed in categories one and/or two of Appendix 12 of the Irish Standards of Modern Zoo Practice.

Appendix fourteen | Additional useful information

a14.1 The following documents, websites and other sources of information are considered useful ancillary documents that facilitate compliance with the European Communities (Licensing & Inspection of Zoos) Regulations 2003 S.I. No. 440 of 2003.

a14.2 The contents of this appendix are not exhaustive nor should they be considered to form part of the Standards. More these should be considered alternative sources of information complimentary to the Standards, unless directly referred to in the main body of the Standards.

a14.3 Collections are reminded that they keep current with trends in best practice in zoo management. Sources include current scientific literature; zoo professional bodies; relationships with other zoos; textbooks; websites; training courses and other relevant and appropriate sources of information.

Zoo licencing & related legislation

National Parks and Wildlife Service - Zoo Licencing in Ireland
http://www.npws.ie/licences/education-and-science/zoo-licences

European Communities (Licensing & Inspection of Zoos) Regulations 2003: S.I. No. 440 of 2003 - governs licensing of zoos and aquaria in Ireland
http://www.irishstatutebook.ie/eli/2003/si/440/made/en/print

EC Zoos Directive (Directive 1999/22/EC) – the European Directive outlining the requirements and licensing requirements of EU member states
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1999:094:0024:0026:EN:PDF

The Balai Directive 92/65/EEC (amended) on rules for trade between EU Member States (in live animals & germ plasm) not covered elsewhere by EU legislation on specific domestic species. Bodies (e.g. zoos) may have all or part of their premises approved, & these bodies should find it simpler to transfer animals to approved premises in other EU Member States.
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1992L0065:20040703:EN:PDF

CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival
http://www.cites.org/
http://www.speciesplus.net

Council Regulation (EC) No 338/97 on the protection of species of wild fauna and flora by regulating trade – provision of Article 10 for live or dead commercial use of animals listed in Annex A CITES
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1997R0338:20080411:EN:PDF

Commission Regulation (EC) No 865/2006 laying down detailed rules concerning the implementation of Council Regulation (EC) No 338/97 – additional detailed rules for implementation of the above, provides for Article 60 to be issued for live or dead commercial use of animals listed in Annex A CITES
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2006R0865:20080225:EN:PDF

Safety, Health and Welfare at Work Act 2005
http://www.irishstatutebook.ie/2005/en/act/pub/0010/
http://www.hsa.ie/eng/

European Union (Animal By-Products) Regulations 2014 S.I. No. 187 of 2014
http://www.irishstatutebook.ie/eli/2014/si/187/made/en/print

Animal Health and Welfare Act 2013 S.I. No. 15 of 2013
http://www.irishstatutebook.ie/eli/2013/act/15/enacted/en/html

Zoo professional bodies & supporting documentation

British and Irish Association of Zoos and Aquariums (BIAZA) is the British and Irish professional zoo body
http://www.biaza.org.uk

European Association of Zoos and Aquaria (EAZA) is the umbrella organisation for Europe
http://www.eaza.net

World Association of Zoos and Aquariums (WAZA) is the global zoo and aquarium professional body
http://www.waza.org/en/site/home

EU Zoos Directive Good Practices Document
http://ec.europa.eu/environment/nature/pdf/EU_Zoos_Directive_Good_Practices.pdf

U.K. DEFRA "Zoos expert committee handbook" gives guidelines on how to implement the regulations on conservation, education, research and ethics
available at https://www.gov.uk/search?q=zoos+expert+committee+handbook

Zoo Animals: Behaviour, management and welfare, Editors Hosey, Melfi and Pankhurst – useful overview of zoo animal management

An introduction to Zoo Biology and Management, Rees - useful overview of zoo animal management

BIAZA Animal Transfer Policy (and other useful Codes of Practice)
http://www.biaza.org.uk/animal-management/animal-management-resources/

Conservation & Education

Actions for Biodiversity 2011-2016: Ireland's National Biodiversity Plan
http://www.npws.ie/legislation/national-biodiversity-plan

WAZA Conservation Strategies
http://www.waza.org/en/site/conservation/conservation-strategies

WAZA Towards Effective Environmental Education (WAZA Magazine vol. 15) (2014)
http://www.waza.org/files/webcontent/1.public_site/5.conservation/environmental_education/WAZA%20Magazine%2015.pdf

WAZA Towards Sustainable Population Management (WAZA Magazine vol. 12) (2011)
http://www.waza.org/files/webcontent/1.public_site/6.marketing_and_media/publications/WAZA%20Magazine12.pdf

WAZA Towards Integrated Species Conservation (WAZA Magazine vo. 14) (2013)
http://www.waza.org/files/webcontent/1.public_site/5.conservation/integrated_species_conservation/WAZA%20Magazine%2014.pdf

World Conservation Union (IUCN) Red list of Endangered Species lists wild animal species and their conservation status
http://www.iucnredlist.org/

IUCN Guidelines for Reintroductions and Other Conservation Translocations
https://portals.iucn.org/library/efiles/edocs/2013-009.pdf

Veterinary programmes & husbandry

WAZA Animal Welfare Strategy
http://www.waza.org/en/site/conservation/animal-welfare-1439197763

Extending the 'Five Domains' model for animal welfare assessment to incorporate positive welfare states, D.J. Mellor and N.J. Beausoleil, 2015, Animal Welfare, 24: 241-253

Zoo and Wild Animal Medicine, Editors Miller and Fowler – currently the 8th Edition, a very useful overview of zoo and wildlife medicine. Considered the principal textbook for zoo veterinary work.

Zoo Animal and Wildlife Immobilization and Anesthesia, Editors West, Heard and Caulkett – currently 2 editions, a useful overview of anaesthesia across a wide range of species.

Reptile Medicine and Surgery, Editor Mader – a useful review of medicine and surgery for reptiles and amphibians.

Advances in reptile lighting: A resource for all reptile keepers
http://www.uvguide.co.uk/index.htm

Fish Disease: Diagnosis and Treatment, Noga – useful overview of fish husbandry and disease management.

The Marine Aquarium Reference: Systems and Invetebrates, Moe – useful book on the management of marine aquarium systems, including water quality management

Captive Seawater Fishes: Science and Technology, Spotte – another useful book on the management of marine aquarium systems, including water quality management

Invertebrate Medicine, Lewbart – useful overview of invertebrate medicine

BSAVA Manual of Wildlife Casualties, Editors Mullineaux, Best and Cooper - a useful overview of native wildlife care and management. Other species specific texts exist.

USDA Handling fish fed to fish-eating animals: A manual of standard operating procedures
https://www.aphis.usda.gov/animal_welfare/downloads/marine_mammals/mmfish.pdf

USDA Handling frozen/thawed meat and prey items fed to captive Exotic animals: A manual of standard operating procedures
https://www.aphis.usda.gov/animal_welfare/downloads/big_cat/handlemeat.pdf

EAZA Best Practice Guidelines (species specific)
http://www.eaza.net/conservation/programmes

Note: collections are reminded to review the appropriate husbandry manuals for individual species as well as consult sources found in the current scientific literature.

Hand washing & infection control

Open Farms and Pet Farms in Ireland: A practical guide to preventing and controlling infection
http://www.ehai.ie/products/open-farms-guidance-document-.1151.html