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SOUTH AFRICAN NATIONAL STANDARD

Zoo and aquarium practice

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Table of changes

Change No.	Date	Scope

Abstract

Specifies provisions for the management and operation of all zoos and aquariums, including reptile parks, crocodile farms, lion parks, bird parks, insectariums and any combination of these. It includes provisions for management systems, the husbandry and welfare of animals, conservation and research practices, and educational and recreational aspects.

Keywords

animal housing facilities, animal husbandry, animals, animal welfare, aquariums, birds, education, hygiene, insecta, management, marine mammals, nature conservation, procedures, quality management system, recreation facilities, reptiles, underwater, zoos.

Foreword

This South African standard was approved by National Committee StanSA SC 5140.38C, *Steering committee for nature conservation – Zoological gardens*, in accordance with procedures of Standards South Africa, in compliance with annex 3 of the WTO/TBT agreement.

Annexes A, B and C are for information only.

Introduction

Zoos and aquariums wish to be recognized as being effective and trusted public centres maintaining the highest possible standards of both *in-situ* and *ex-situ* conservation, education, research practices, and animal husbandry and welfare. This standard has been drawn up as a means of defining the manner in which South African zoos and aquariums should operate in the fulfillment of this vision.

Where applicable, this standard is intended to be used as a reference. Implicit in the principles of modern zoos and aquariums are the following concepts:

- a) permanent siting of the entity;
- b) a supportive environment for the animals, personnel and the public;
- c) active involvement in the maintenance of biodiversity;
- d) management for the wider benefit of the community; and
- e) provision of educational opportunities for learning about animals and their habitats.

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Zoo and aquarium practice

1 Scope

This standard lays down provisions for the management and operation of all zoos and aquariums, including reptile parks, crocodile farms, lion parks, bird parks, insectariums and any combination of these (referred to in this standard as "institutions", see 3.12). It includes provisions for management systems, the husbandry and welfare of animals, conservation and research practices, and educational and recreational aspects.

This standard does not cover the management or operation of circuses, pet shops and commercial breeding operations that are not open to the public, or animal rehabilitation facilities.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this standard. All normative documents are subject to revision and, since any reference to a normative document is deemed to be a reference to the latest edition of that document, parties to agreements based on this standard are encouraged to take steps to ensure the use of the most recent edition of the normative document indicated below. Information on currently valid national and international standards can be obtained from Standards South Africa.

Building a future for wildlife: The World Zoo and Aquarium Conservation Strategy. 2005. Published by the World Association of Zoos and Aquariums. Berne, Switzerland.

3 Definitions and abbreviations

NOTE The meaning of defined terms is determined by context, but in cases of dispute concerning meaning, the decision of the authority administering this standard is final.

For the purposes of this standard, the following definitions and abbreviations apply:

3.1

acceptable

acceptable in terms of international norms

3.2

adequate

sufficient and suitable for the intended purpose

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animal

mammal, bird, reptile, amphibian, insect or other multi-cellular organism that is not a plant or a fungus, to which the provisions of this standard apply

3.4

captivity

state wherein animals are kept by human beings, whereby the animals' day-to-day needs, welfare and wellbeing are subject to human intervention and care

3.5

competent

capable of executing one's duties effectively

3.6

ethology

study of the cause and function of animal behaviour under natural and captive conditions

3.7

environmental enrichment

process of improving the functional adaptation of animals in captivity by ensuring optimal reproduction, or improved health and wellbeing, or both

3.8

exotic animal

species whose normal distribution does not naturally occur within the recognized boundaries of the relevant country that adopts this national standard

3.9

euthanasia

bringing about of a humane death without unnecessary pain or suffering

3.10

IATA

International Air Transport Association

3.11

indigenous animal

animal that occurs naturally within the recognized boundaries of the relevant country that adopts this national standard

3.12

institution

zoo or aquarium including reptile park, bird park, insectarium and any combination of these, as defined in 3.24

3.13

IUCN

International Union for the Conservation of Nature and Natural Resources

3.14

justifiable

supportable by argument

3.15

normal behaviour

behaviour that occurs at a frequency, duration and intensity within the range expressed by wild conspecifics

3.16

pet

animal kept in a household for companionship and amusement

3.17

specimen

animal, or organ, gamete, part or product derived therefrom

3.18

suitable

appropriate for the intended purpose

3.19

technical

non-administrative in nature

3.20

veterinarian

person registered as a veterinarian in accordance with the relevant national legislation (see annex A)

3.21

welfare

provision of circumstances that contribute to the wellbeing of the animal

3.22

wellbeing

homoeostasis

tendency towards a relatively stable equilibrium between interdependent elements, especially as maintained by physiological and psychological processes

3.23

wild animal

species of animal not normally domesticated in the relevant country that adopts this national standard

3.24

zoo and aquarium

permanent legal establishment, primarily open to and administered for the visiting public, for the ethical maintenance and exhibition of living organisms for the demonstrable purposes of education, conservation and research

4 Management systems

Each institution (see 3.12) should establish and maintain a management system appropriate to the scope of its activities and the provisions of this standard, and should have a documented collection plan.

NOTE SANS 9001 gives an example of requirements for a quality management system.

5 Conservation

NOTE For further information see B.1.

5.1 Institutions should perceive themselves as having an important and influential conservation capacity. This recognition should be evident by means of an operational declaration made by the chief executive officer (CEO) of the institution to this effect.

5.2 The main objectives for holding animals in an institution should be for demonstrable conservation, educational or research pursuits.

5.3 All institutions should participate in a demonstrable manner in at least one of the following conservation-related practices:

- a) *ex-situ* or *in-situ* research from which conservation benefits accrue to species;
- b) staff training in relevant conservation skills;
- c) exchange of information relating to species conservation; and
- d) structured captive breeding, repopulation or reintroduction of species into the wild.

Involvement in such activities should be measurable, recognized and endorsed by the relevant authorities or regional zoo association or chapter thereof (see B.1.3).

5.4 All institutions should promote public education and awareness in relation to the conservation of biodiversity, by at least providing information about the species exhibited and their natural habitats.

5.5 All institutions should be active and contributing participants in captive species management programmes recognized and endorsed by the relevant regional zoo association or chapter thereof (see B.1.3).

5.6 All institutions should have a measurable policy regarding the conservation of energy and water, the cycling of waste and waste reduction and the environmentally sustainable operation of the facility as a whole.

5.7 All institutions should strive to develop an integrated approach to conservation that encompasses all elements of the institution's operation including collection planning, exhibit theming, sustainable operation, *in-situ* support, research, education and marketing.

6 Education

NOTE For further information see B.2.

6.1 Conservation education should be included in the mission statement of all institutions.

6.2 All institutions should have a written education plan, including goals and objectives and pathways for their achievement. The education plan should take account of the following:

- a) at all times, the education message should be relevant to the person or group addressed;
- b) the education message should be well defined and holistically presented in terms of the integrated conservation approach of the institution;

- c) the conservation message should be applicable to schools, so as to address the requirements of outcomes-based education and curricula;
- d) the conservation message for the public at large should be cross-curricular, and should attempt to address situations facing people in their everyday circumstances;
- e) the message should be simple and easy for all ages to understand and interpret;
- f) the conservation message should be demonstrable to all visitors to the institution;
- g) the message should be positive, attractive and inviting;
- h) institution-based education should take into consideration the cultural, ethnical and ethical differences amongst different groups of people with regard to the utilization of natural resources; and
- i) transfer of skills should be a strong part of any educational programme.

6.3 The education programme should be the responsibility of the CEO or his or her deputy. If possible, at least one paid staff member, with experience or training in education, should be employed in the education department of the institution.

6.4 Education staff members should be involved in exhibit design, graphics, interpretation and all structured programmes for visitors.

6.5 Every attempt should be made to collaborate with the national education authority and other zoos as widely as possible.

6.6 A resource centre with adequate reference material should be available.

6.7 All education programmes should be evaluated regularly.

6.8 If volunteers are used for education, adequate policies and procedures for recruitment, training, management and evaluation should be in place. Institutional staff, volunteers and tenants should understand the role they play in educating the public and they should actively participate in all aspects of the educational programme.

7 Research

7.1 Institutions should be able to demonstrate that research in its broadest definition is encouraged.

7.2 The responsibility for ensuring this rests with the CEO or his or her deputy. If possible, at least one paid staff member with research experience or training, should be employed to undertake at least some level of research.

7.3 At the very least, institutions should ensure that a collection of relevant data from the animals is kept in their facility. The institution should ensure that this information is used in a scientific manner so as to benefit the animals concerned.

7.4 In any research, care shall be taken to comply with all relevant legislation (see annex A) and the research shall be subject to ethical review.

7.5 Where institutions are not able to undertake their own research projects, they should get involved with research programmes of an *in-situ* or *ex-situ* nature, by collaborating with scientists operating in the field who have presented a research protocol acceptable to the ethics committee of the institution. This could be achieved by assisting with manpower, funding or access to facility resources.

8 Husbandry and welfare of captive animals

NOTE For further information see B.3.

8.1 General

8.1.1 The World Zoo Conservation Strategy of the World Association of Zoos and Aquariums actively identifies responsible institutions as being those that consider animal welfare issues. All institutions should ensure the welfare of the animals under their care and should afford protection to those animals, in compliance with the relevant Acts and Regulations (see annex A).

8.1.2 All institutions should provide suitable environments to the animals in their care, and in so doing should consider the following:

- a) an animal's motivations to perform functions and behaviours important to itself; and
- b) the cognitive aptitudes and requirements of some animals will have a direct bearing on the nature and complexity of the environment they require.

8.1.3 A balance should be achieved between the provision of enclosures that fulfil the needs of the animal and the demands of the visitor to the institution for aesthetically appealing institution enclosures.

8.1.4 Institutions should determine the requirements of species and, where possible, individual animals, and assess their ability to effectively supply those requirements, particularly in relation to the long-term accommodation and care of animals.

8.1.5 Institutions should not wilfully acquire and maintain animals for which they cannot reasonably provide the appropriate species' requirements as well as the requirements outlined in this standard.

8.1.6 The assessment of species' requirements should be based on an understanding of the species in the context of its natural history, ethology and captive husbandry. The needs of an individual animal may differ from the norms for the species and provision should be made to assess and supply those needs.

8.2 Enclosure and environmental design

8.2.1 The requirements of the species should direct the design and management of the institution enclosures and the enclosures should provide resources consistent with the species' requirements. Animal enclosures should be designed to meet the physical, physiological and psychological requirements of the animal, and provisions should be made in this regard to include:

- a) allowing the animal opportunities of expressing most normal expected behaviours;
- b) allowing the animal opportunities to attain environmental protection and comfort;
- c) the appropriate challenges and stimulation;
- d) protection from continual fear and defence reactions;
- e) protection from distress and injury; and
- f) effective management including hygiene, veterinary care and health matters.

8.2.2 Enclosure design should specifically make provisions and allowances to include the following environmental welfare factors:

- a) **Environmental security:** An animal should have a safe haven or retreat in which to rest and feel secure and which is always accessible. An area of refuge is particularly important for shy and nervous animals that might need to escape from public viewing. Such an area can be a den, an elevated resting place, sufficient space in the enclosure to cater for the animal's defence reactions and exceed the animal's flight distance, a burrow or equivalent structure, nests with nesting materials or, for some species, companions or compatible conspecifics. Appropriate shelter should be provided against environmental conditions and should always be spacious and accessible to all animals in an enclosure.
- b) **Environmental complexity:** The long-term captive environment should be sufficiently complex to allow an appropriate range of locomotor activities, sensory stimulations and species' behaviours conversant with balanced resources and animal requirements. These might include walking, climbing, swinging, running, swimming, diving, burrowing, flying, smelling and foraging, as appropriate to the species and individual animals. Factors such as an animal's nocturnal or diurnal requirements should also be considered.
- c) **Environmental challenge:** An animal should be able to obtain fulfilment for appropriate courses of action and be in a situation where it can make demands on the environment that have the probability of being satisfied. Environmental enrichment devices and programmes should be used to create opportunities for achievement to give animals control over their environment.
- d) **Environmental novelty:** An element of unpredictability should be included in captive environments whilst maintaining animal and public safety. Novelty should involve the rotation of environmental furniture, behavioural toys and management regimes. Novelty and routine should be balanced appropriately. Captive environments should not remain static and inconsistent with the species' requirements.

8.2.3 The following behavioural checklist should be used to identify important behavioural considerations for each species:

- a) feeding behaviour;
- b) excretory and elimination behaviour;
- c) agonistic and aggressive behaviour;
- d) sexual and reproductive behaviour;
- e) relaxation behaviour;
- f) comfort-seeking behaviour;
- g) investigatory behaviour;
- h) mimicry and group behaviour;
- i) care-seeking behaviour; and
- j) care-giving behaviour.

8.2.4 For every animal, specific requirements should be considered in relation to any possible:

- a) species-specific physiological needs,
- b) particular social requirements, and
- c) behavioural developments over an animal's life span and the impact and demand these would have on the animal's environment.

8.2.5 Specific physiological requirements of animal species should determine their suitability for specific institutional environments. Institutions should determine which animals or species are not suitable in certain regions or under prevailing conditions and the institution should not keep such animals unless the appropriate physiological environmental requirements of that animal or species can be provided.

8.2.6 Group composition, sex ratios and the number of animals in an enclosure should be suitably catered for.

8.2.7 Animals of social species should normally be maintained in compatible social groups. Individuals should only be kept isolated for conservation reasons, veterinary treatment and hospitalisation, for the benefit of the individual, the group, or other justifiable reasons and where such isolation is not detrimental to the individual animal.

8.2.8 Inter-species interaction should be monitored, recorded and reviewed in mixed species environments. Where detrimental conflict arises, species should be separated.

8.2.9 Enclosures should be of a size and design, and animals should be so managed as to:

- a) prevent animals within herds or groups being unduly dominated by individuals, resulting in excessive physical or psychological stress (or both);
- 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 or system is not over-burdened;
- d) prevent an uncontrolled build-up or spread of internal and external parasites and pathogens;
- e) remove any refuse and allow drainage of wastewater and excess rainwater; and
- f) allow for appropriate human intervention including capture, handling, cleaning and maintenance, and general husbandry practices.

8.2.10 Animals should not be provoked for the benefit of the viewing public. Institutions should take adequate safety measures to prevent the animals being provoked or stressed by visitors and, where relevant, excessive disturbances and stress being caused by the presence of animals in adjoining enclosures.

8.2.11 Suitable and separate, if appropriate, accommodation for pregnant animals and animals with young should be available in order to minimize unnecessary stress.

8.2.12 Animals temporarily accommodated away from others should not be separated for such a period of time, or in such a way that there would be difficulties in their re-introduction to the group or, if difficulties arise, the introduced animal should be removed and housed elsewhere.

8.2.13 Animals destined for rehabilitation should not be used for public-animal contact.

8.2.14 The temperature, ventilation, lighting (both level and spectral distribution), humidity and noise levels of enclosures should be suitable for the comfort and wellbeing of the particular species of animal at all times. In particular,

- a) consideration should be given to the special needs of pregnant and newly born animals,
- b) newly-arrived animals should be allowed to become fully acclimatized into their new environment,
- c) tanks for aquatic animals should be adequately aerated according to the number of animals kept in each tank, and should be heated or cooled according to the needs of the species, and other environmental parameters (for example, salinity and water quality) should be suitable for the species,
- d) accommodation should provide adequate shelter and comfort that will protect against extremes of sunlight, heat, draughts and cold, rain and snow, compatible to the species' requirements, and
- e) consideration should be given to the isolation of pools for dolphins and certain fish species against sound and vibration.

8.2.15 Enclosures and barriers to enclosures should be maintained in a condition and manner that presents no likelihood of harm to animals and will incorporate such reasonable measures as may be required to confine the animals. In particular,

- a) barriers should be erected and positioned in a manner that allows a reasonable flight or safety distance between visitors and contact with the enclosure,
- b) enclosures should always be constructed to fully ensure the safety of animals, personnel and visitors,
- c) any defect noted in an enclosure barrier or in any appliances or equipment within animal enclosures likely to cause harm should be repaired or replaced, or the animal should be relocated immediately,
- d) any vegetation capable of harming animals should be kept out of reach of the animals concerned,
- e) water-filled and dry moats used for the confinement of animals should provide a means of escape back into the enclosure for animals falling into them,
- f) any natural materials (for example, plants and their products, such as seeds or fruit) or any introduced non-natural materials (for example, paint, chemicals, rubber, plastics, treated substrates and treated water) should be assessed for toxicity to the species held before use,
- g) the design and construction of the enclosure should ensure that the animal does not escape, and is deterred from attempting to escape, and
- h) fire hazards should be identified, and personnel should be trained and equipped to deal with fires.

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

8.2.17 Where environmental quality is dependent on external utilities (for example, water and electricity), adequate backup facilities should exist in case of failure.

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

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

8.2.20 Extraneous matter likely to cause harm in animal enclosures should be cleared as soon as possible.

8.2.21 Proper standards of hygiene in enclosures and treatment rooms should be maintained. In particular,

- a) special attention should be given to the management and appropriate cleaning of enclosures and equipment within them to reduce the risk of disease and, in the case of aquatic animals, there should be daily monitoring of water quality,
- b) suitable cleaning agents should be readily available, along with a supply of water and the appropriate safe means to apply them, and they should be applied only by trained personnel, and
- c) advice from a veterinarian or other competent person should be obtained and followed regarding the routine cleaning and sanitation requirements of enclosures or other areas, and particular attention should be paid if an infectious disease is identified in any animal.

8.2.22 There should be a compromise between environmental hygiene requirements and the biological requirements of the animal. Management should strive to attain this compromise.

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

8.2.24 Trees within or near animal enclosures should be regularly inspected and lopped or felled as necessary to preclude animals being harmed by falling branches, toxicity or trauma. Trees and climbing plants should be pruned to prevent the escape of any animals.

8.2.25 Enclosures should be designed to allow for animals' normal defence reactions and appropriate flight or escape distances.

8.2.26 Surfaces, fittings and substrates in an enclosure should be carefully chosen so as not to be harmful to the animals.

8.3 Feeding and food hygiene

8.3.1 Feeding

8.3.1.1 Feeding practices should make provision for the following needs:

- a) Food of the appropriate nutritive value, quantity, quality and variety, appropriate to the animals condition, age and size, and physiological, reproductive and health status.
- b) The behavioural requirements and motivations of the animal. The appropriate method of food presentation should be determined for each species. Factors to be considered include:

- 1) the position within the enclosure for feeding, for example, animals might require to be fed off the ground or in a den;
- 2) the form in which food is presented, for example, animals might require whole-foods including carcasses, feathers, fur, bones, shells and whole plants, and public sensitivities relating to the aesthetics of whole-carcass feeding should be measured against the likely benefits to the feeding animal, and management practices should be applied accordingly;
- 3) the manner in which food is presented, for example, animals might be motivated to forage, root, tear, or dive for food;
- 4) social, family and group hierarchical structures;
- 5) the frequency of feeds and the occupational value of frequency feeding according to the behaviour of the species;
- 6) the behavioural implications of feeding. Care should be taken that feeding does not reinforce any unwanted behaviour; and
- 7) competition at feeding times might result in some individuals eating more than others, so several feeding sites might be necessary in an enclosure to resolve this.

8.3.1.2 Regarding the feeding of live prey, Sections 2(1) (g) and (h) of the Animal Protection Act, 1962 (Act No. 71 of 1962) outline offences relating to the liberation of animals to attack or the danger of attack by other animals" (see annex A).

8.3.1.3 The rotation of feeding times, the frequency of daily feeds, variation in the amounts and types of food fed, and the feeding method should be considered in a balanced perspective in relation to a routine feeding programme as a method of environmental enrichment.

8.3.1.4 Fresh, clean drinking water of sufficient quantity should be available in the appropriate manner at all times.

8.3.1.5 Veterinary or other specialist advice in all aspects of nutrition should be obtained and followed.

8.3.1.6 A record of all diets should be maintained.

8.3.1.7 Feeding by visitors, where permitted, should be on a selective basis only, with suitable food sold, provided or approved by the CEO or his or her deputy. Uncontrolled feeding of animals by visitors should not be permitted.

8.3.2 Food hygiene

8.3.2.1 Supplies of food and drink should be kept and prepared under hygienic conditions. In particular,

- a) food and drink should be stored in specially maintained storage areas protected against dampness, deterioration and mould or from contamination by pests such as certain insects, birds and rodents;
- 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, and used for no other purpose;

- d) personnel 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) all personnel working with food should be tested annually for tuberculosis; and
- f) receptacles for food and drink should not be used for any other purposes.

8.3.2.2 Food and drink, and feeding and drinking receptacles, should be placed in positions that minimize the risks of contamination from soiling by the animals themselves, or by wild birds, rodents or other pests.

8.3.2.3 Feeding methods should be safe for animals and personnel.

8.3.2.4 Receptacles for food and water, where used, should be regularly cleaned.

8.3.2.5 Self-feeders and automated watering systems, where used, should be inspected daily to ensure that they are working effectively and are not contaminated.

8.3.2.6 Uneaten food should be removed as appropriate to maintain hygiene.

8.3.2.7 Periodic application of disinfectants in each enclosure should be made according to the directions of the authorized veterinary officer of the institution. The disinfectants should only be applied by suitably trained personnel.

8.4 Animal health and veterinary care

8.4.1 Curative and preventive veterinary medicine should be provided. Every effort should be made to provide a correct diet and suitably hygienic environment from which contaminants and pathogens are excluded or controlled.

8.4.2 Personnel should be competent in recognizing and assessing common indicators of good welfare, which include:

- a) the good physical condition of an animal;
- b) monitoring systems for recognizing increased incidence of disease, trauma, pain and psychological responses (stress);
- c) the performance and development of normal and expected behaviours;
- d) normal levels of development, growth, reproduction and life expectancy;
- e) an animal's active interaction with the environment and the expression of appropriate and expected behavioural repertoires, including relaxation and play behaviour; and
- f) a confident, vigilant (not excessive) animal that reacts well to new or unexpected stimuli.

8.4.3 An auditable record should be kept by the personnel in direct charge of the animals, indicating changes to the prescribed diet, health checks, any unusual behaviour or activity or other problems and remedial action taken.

8.4.4 A comprehensive programme of care should be established and maintained under the supervision of a veterinarian who is familiar with current practice in the care of institution animals, particularly of the species maintained in the collection. The veterinarian should make arrangements to meet any appropriate ethical and legal responsibilities. The animals should be handled and cared

for only by personnel who have adequate training and experience in the handling of the individual species of animal.

8.4.5 Communication and delegation of responsibilities between the veterinarian and institution personnel is of the utmost importance and each party should understand its responsibilities.

8.4.6 The veterinarian should be responsible for, or be actively involved in the tasks listed below:

- a) routine inspections of all the animals in the institution;
- b) the treatment and preventive medication protocols of the institution;
- c) health monitoring of animals, including submission of blood and other samples for laboratory examination;
- d) safe and proper collection, preparation and dispatch of diagnostic and other samples;
- e) training of institution personnel in health and hygiene;
- f) ensuring that post-mortem examinations of dead animals are carried out whenever possible;
- g) supervision of quarantine premises and other such tasks required by law or as part of good institution veterinary practice;
- h) nutrition and the compilation of diets; and
- i) the establishment of written procedures to be followed in the event of the accidental use of dangerous drugs.

Where these tasks are to be carried out by someone other than the veterinarian, a suitably qualified or appropriately trained member of staff should be nominated to carry out the task, for example, a laboratory technician or veterinary nurse.

8.4.7 The level of veterinary facilities and care should be consistent with the overall welfare needs of the animals.

8.4.8 Comprehensive records should be kept covering the following:

- a) preventive medicine;
- b) clinical medicine and surgery;
- c) pathological results from diagnostic testing; and
- d) results of post-mortem examinations.

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

8.4.10 Institutions should confirm that the institution, and a local hospital, or their veterinarian has readily available antidotes to potentially toxic drugs and veterinary products used at the institution.

8.4.11 If there is no in-house veterinarian, a competent member of personnel should be readily available at all times to take decisions regarding the euthanasia of sick animals on veterinary advice. There should be provision for an effective humane method of euthanasia and standard written protocols should be established (see 8.6).

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8.4.12 Adequate facilities should be available either at the institution or within a reasonable distance from the institution for the post-mortem examination of all species held at the institution.

8.4.13 Nursery facilities should be available for hand-rearing and nursing of animals.

8.4.14 Particular attention should be paid to hygiene in the quarters where isolated or quarantined animals are kept.

8.4.15 Protective clothing and utensils used by personnel in the isolation area should be used, cleaned and stored only in that area.

8.4.16 Dedicated off-display quarantine accommodation should be available for the isolation and examination of newly-arrived animals, and for the care of unduly distressed, sick or injured animals.

8.4.17 Newly-arrived animals should be kept isolated or in quarantine for as long as is necessary or in accordance with the veterinary import permit issued by the relevant authority (see annex A), to ensure proper examination, acclimatization and quarantine of new arrivals before being introduced to other animals in the collection.

8.4.18 Clinical waste and refuse should be regularly removed and disposed of in a manner approved by the municipal authority. For animals that are in quarantine, this is usually supervised and controlled by the State Veterinarian of the area or district.

8.4.19 A safe and effective programme for the control or deterrence of pests (including feral cats and birds) and, where necessary, predators, should be established and maintained throughout the institution.

8.4.20 Personnel should be instructed to report, in confidence, any medical condition or disability which might affect his/her capacity to manage the animals in a safe and competent manner. Keeper personnel should be instructed to report immediately if they contract or were in contact with any infection that they have reason to believe could be transmitted to, and adversely affect the health of any animal, and management should then take appropriate action.

8.4.21 Specialist techniques used on animals to make them safe for exhibition(s) or to allow them to be exhibited in a particular way (for example, the pinioning of waterfowl) should be kept under continual review.

8.4.22 Care should be taken that exotic and indigenous animals do not transmit diseases to one another.

8.4.23 All personnel that work with animals, and especially those working with primates, should be tested annually for tuberculosis.

8.4.24 Precautions should be taken to ensure that animals imported from abroad are free of all known infectious viral, bacterial and protozoan diseases, and have been treated for internal and external parasites.

8.5 Veterinary facilities

NOTE For further information see annex B.

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

8.5.2 Where a full-time veterinary service is located at the institution, the facilities should be adequately equipped for the reasonable and foreseeable veterinary needs of the collection.

8.5.3 Where a full veterinary service is not available at the institution, a dedicated treatment room should be provided at the premises and be available at all times for the use for the routine examination and treatment of animals. 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. There should be minimum facilities that should include:

- a) an examination table;
- b) hot and cold running water;
- c) appropriate ambient temperature;
- d) adequate ventilation;
- e) adequate lighting; and
- f) electrical power.

8.5.4 Facilities for the isolation and treatment of aquatic animals should be available. 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 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.

8.5.5 Facilities for collecting, restraining, treating and, if necessary, for the administration of general anaesthesia, for euthanasia and for the after-care of all species kept at the institution should be available. These should be made available to the veterinarian within a period that minimizes unnecessary suffering to sick animals.

8.5.6 All drugs, vaccines and other veterinary products should be kept safely under lock and key with access by authorized persons only. Regular inspection should be carried out by the veterinarian and expired drugs removed. Full records of drug stock, usage and disposal should be kept.

8.5.7 Medical products should only be administered in accordance with the treatment protocols of that institution.

8.5.8 All used, unwanted or contaminated veterinary equipment should be disposed of safely, in accordance with current legislation.

8.6 Euthanasia

8.6.1 Persons performing euthanasia should only do so in accordance with legislation and acceptable practices.

8.6.2 Euthanasia of animals should be recognized as an acceptable procedure and management tool, and may be justifiable under certain conditions, including the following:

- a) when recommended by a veterinarian;
- b) when irresolvable stress or conflict prevails and where changes in social structure result in distress, and where there is no option of release;

- c) when an institution operator is unable to ensure acceptable facilities and conditions for animals and where there is no option of release;
- d) when an animal poses a danger and unavoidable threat to human safety;
- e) where no other suitable accommodation can be found for the animal;
- f) in cases of old age, non-breeding or severe injury; and
- g) where no other suitable option exists.

8.6.3 An institution operator should have a policy and standard operating procedure for the euthanasia of animals. Such policies and procedures should demonstrate the following:

- a) information and guidance relating to euthanasia, including emergency methods received from a veterinarian;
- b) facilities and equipment to perform euthanasia upon all animals kept, are available and serviceable at all times including casualties under emergency conditions; and
- c) competent trained personnel with access to the necessary facilities and equipment are available and contactable at all times.

8.6.4 The euthanasia of animals including mice, rats, guinea pigs, rabbits and birds destined to be fed to other animals should also be carried out ethically and in accordance with recognized welfare standards. A zoo operator should ensure that all zoo personnel are fully aware of acceptable euthanasia methods and are trained and experienced in those methods.

9 Transportation and movement of animals

9.1 General

The transportation and movement of animals should conform to all relevant legislation, standards and guidelines relating to permits, mode of transport, veterinary requirements, containment and welfare.

9.2 Welfare during transportation

9.2.1 Detailed consideration should be given to the wellbeing of animals being transported, including transportation within institution premises and transfers from one institution to another.

9.2.2 Changes in an animal's normal behaviour could be expected as a reaction to being moved and transported, and every precaution should be taken to ensure the safety of the animal, other animals, personnel and other persons.

9.2.3 Any transfer of an animal is potentially stressful for the animal and this should be considered at all times. If the stress is severe, appropriate steps should be taken (such as the use of tranquillizers) to reduce the level of stress as much as possible.

9.3 Responsibilities

9.3.1 A competent person should be appointed for ensuring the health, wellbeing and security of the animals being transported and such a person should carry written authorization from that institution.

9.3.2 Before any animal is transported, the responsible person should ensure that all relevant transport arrangements have been attended to, including vehicle suitability, route plans, permits and any necessary en-route facilities.

9.4 Transportation facilities

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

9.5 Transportation standards

9.5.1 Where appropriate, the conditions and facilities as required by IATA for the transportation of animals internationally should be used as minimum guidelines. Transport conditions and facilities should be specifically designed for the species being transported.

9.5.2 All transport, accommodation and facilities should be free of projections, fittings or structures that might pose a risk of injury to the animals being transported.

9.5.3 Ventilation should be suitable to allow the animals being transported appropriate airflow and optimal wellbeing.

9.5.4 The flooring of all transport containers should ensure, where appropriate, secure footing for the animals. As appropriate to the species and the circumstances, bedding or absorbent material should be provided on transport cage floors.

9.5.5 Where appropriate to the species, provision should be made to adequately supply animals with drinking water on long journeys.

9.5.6 Prevailing and expected climatic conditions should be taken into account and immediate action should be taken to correct the effect of adverse extremes if they are encountered or anticipated.

9.5.7 Contingency plans should be made to counter the effects of unplanned delays in transportation, especially where such delays might subject the animals to excessive heat, cold, thirst or hunger.

9.5.8 Appropriate equipment, drugs, tools and supplies should be readily available to deal with eventualities and accidents that could reasonably occur during all phases of the transportation process.

9.5.9 Animal records should accompany all animal transfers. As a minimum requirement, the records should provide the recipient with sufficient information to adequately accommodate, feed and treat (if applicable) any animal being transferred.

10 Record keeping

NOTE For further information see annex B.

10.1 Records should be kept and maintained of all individually recognizable animals and groups of animals in the institution. Where possible, animals should be individually identified.

10.2 Records should be kept either on card index or computer, or any other retrieval system from which information can be easily extracted.

10.3 Provision should be made for long-term archiving in a secure format.

10.4 The records should provide the following information:

- a) identification and scientific name;
- b) origin (i.e. whether captive-born or wild, including identification of parents where known and previous locations, if any);
- c) dates and details of entry into, and disposal from, the collection;
- 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 and dates of any treatment given;
- h) behavioural and life history data;
- i) food and diet; and
- j) date of death and result of any post-mortem examination and laboratory investigations.

10.5 An annual stock list or inventory of all animals should be kept. If required, a copy should be forwarded to the relevant authorities.

11 Personnel and training

11.1 Institutions should have at least one full-time officer (the CEO or his or her deputy) in charge of the institution at all times. The said officer should be delegated adequate administrative and financial powers.

11.2 The number of personnel and qualified or competent consultants and their levels of expertise should be sufficient to attend to all the needs of the animals under their care at all times.

11.3 The CEO or his or her deputy should ensure that all personnel who handle animals, samples or specimens (or both) or operate specific equipment and who make professional judgements, are competent. When using personnel that are undergoing training, appropriate supervision should be arranged.

11.4 The CEO or his or her deputy should formulate the goals with respect to the education and skills development of the personnel. The training programme should have procedures for identifying training needs and providing training to personnel. The training programme should be focused on present and future activities of the institution.

11.5 The CEO or his or her deputy should use personnel who are permanently employed by, or under contract to, the institution. Where additional personnel are used, the institution should ensure that such personnel are supervised and that the work they perform does not put at risk the institution's compliance with the requirements of this standard.

11.6 The CEO or his or her deputy should have job descriptions for managerial personnel and technical personnel involved in specific activities.

11.7 The CEO or his or her deputy should authorize personnel to perform specific types of activities, to operate particular types of equipment, or make professional judgements. The institution should maintain records of the relevant competence evaluations, educational and professional qualifications, training and experience of all technical personnel.

11.8 A programme of personnel training at the appropriate level should be implemented and maintained to ensure familiarity and competence of personnel within the following areas:

- a) animal care;
- b) animal welfare;
- c) behaviour enrichment;
- d) animal behaviour;
- e) animal training;
- f) the biology of and general information regarding the species under the employee's care;
- g) food, hygiene and nutrition;
- h) basic sampling for health monitoring and diagnosis;
- i) zoonoses and especially new emerging diseases;
- j) information on species used in animal contact areas;
- k) animal handling and transportation;
- l) health and safety procedures, including first aid;
- m) emergency procedures including incidents of escape, fire, natural disasters, animal attack and emergency euthanasia;
- n) relevant legislation and standards; and
- o) conservation education.

12 Visitor's facilities

12.1 First aid

12.1.1 In terms of the relevant legislation (see annex A), first aid equipment should be readily accessible on the premises.

12.1.2 First aid points should be adequately sign-posted.

12.1.3 An adequate number of personnel trained in first aid should be available during the institution's usual operating hours.

12.2 Toilets

12.2.1 Adequately equipped and maintained toilet facilities should be provided commensurate with the anticipated maximum number of visitors to the institution.

12.2.2 Clean water for washing should be provided along with soap and a means of drying hands.

12.2.3 Toilets should be accessible to disabled people.

12.3 Parking

In collaboration with the local authority and local traffic authority, institutions should ensure that safe and secure parking facilities are sufficient to meet the anticipated needs and number of visitors to the institution.

12.4 Provisions for particular needs

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

12.4.2 Arrangements should be made to meet the reasonable needs of special-needs visitors including the disabled.

13 Public safety

13.1 Insurance

Institutions should have such insurance, including public liability, that covers the institution, every person under contract of service or acting on its behalf, and visitors, against liability for any damage or injury which might be caused by any of the animals, whether inside or outside the institution, including during transportation to other premises. Any upper limit on the sum insured should be set at an adequate but realistic level.

13.2 Enclosures

13.2.1 Other than when under the control of authorized personnel, animals kept in the institution should be housed in escape-proof enclosures at all times or, in the case of free-ranging animals, within the perimeter of the institution.

13.2.2 Gates and doors to enclosures should be kept secured so as to prevent unauthorized entry and should be at least as strong and effective in containing the animals as the rest of the enclosure barriers. Such gates and doors should also be designed, constructed and maintained so as to prevent animals from lifting them from their hinges or unfastening the securing device.

13.2.3 Enclosures should be free from any vegetation or other items that would aid an animal escaping or attempting to escape.

13.2.4 Gates and doors to animal enclosures where visitors are admitted, and stand-off barriers should be designed, constructed and maintained so as not to trap or otherwise injure visitors.

13.2.5 Where used to contain animals, moats (whether wet or dry) should be surrounded by fences, walls, hedges or shrubbery to prevent the public from approaching too close to the edge.

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

13.2.7 Safety barriers should be designed, constructed and maintained to ensure public safety, and should prevent children climbing over, under or through them and should discourage persons from sitting on them.

13.3 Exits

13.3.1 Exits should be suitably located and adequately sign-posted.

13.3.2 Each exit should be kept clear and capable of being easily opened from inside to allow the exit of visitors from the institution. Such gates should be capable of being closed and secured to prevent the escape of animals.

13.4 Signage

An adequate number of clearly visible safety signs, providing warning by means of a symbol, words or a combination of symbols and words, should be displayed at each enclosure containing any species of dangerous animal, or where animals and visitors come into contact, or in any other circumstance that can be deemed dangerous to the visiting public.

13.5 Management and maintenance

13.5.1 Buildings, structures and areas to which the public has access should be maintained in accordance with the applicable legislation (see annex A).

13.5.2 Any area that is accessible to the public should not present an unreasonable risk to health and safety.

13.6 Protection of the public

13.6.1 Every personnel member licensed to use a firearm should undergo training with regular refresher courses and appropriate practice.

13.6.2 Firearms, ammunition and darting equipment, where provided, should be:

- a) available for immediate use;
- b) used by trained personnel only;
- c) cleaned and maintained as recommended by the manufacturers; and
- d) kept securely under lock and key when not in use or under maintenance.

13.7 Escapes

13.7.1 The institution should have a procedure that deals with animal escapes. The procedures to be adopted in the event of any escapes should be brought to the attention of and made available to all members of personnel, in a written document.

13.7.2 Appropriate emergency procedures should be instituted in case of the escape of animals from their enclosures, or if unauthorized persons should enter an enclosure. These procedures should include the use of the appropriate equipment and deployment of adequately trained personnel, and should be tested and updated regularly for any loopholes or oversights.

13.7.3 The perimeter boundary, including access points, should be designed, constructed and maintained to discourage unauthorized entry and act as an aid to the confinement of all animals within the institution.

13.7.4 Institutions should have such security in place as to minimize the risk of theft, malicious damage or release of animals by intruders entering the grounds after hours.

13.7.5 Every effort should be made to effect the recovery, live or dead, of any and all escaped animals.

13.7.6 A competent member of personnel with sufficient authority to take decisions regarding euthanasia of escaped animals should be available at all times.

13.7.7 Local conservation authorities might require notification of the escape of non-domesticated animals.

13.8 Fires

All municipal regulations regarding the prevention and extinguishing of fires should be adhered to.

14 Training of animals, shows and demonstrations

NOTE For further information see annex B.

14.1 There are only four main reasons why animals may be trained in institutions:

- a) for the behavioural enrichment and stimulation of the animal;
- b) to assist in their captive management such as routine husbandry;
- c) to improve their wellbeing, for example, training an animal such as an elephant to facilitate routine veterinary procedures that would ordinarily require anaesthetic or other forms of unpleasant and stressful restraint; and
- d) to participate in measurable and reputable educational talks and demonstrations.

14.2 Clear training objectives should be defined in relation to animal welfare, keeper safety and public safety.

14.3 Training methods should be based on operant conditioning, employing positive reinforcement techniques. Negative reinforcement and punishment techniques should never form the basis of training methods and should only be used as corrective techniques. Negative reinforcement and punishment techniques, where used, should be used responsibly and compassionately, and only through absolute necessity, and should be done under supervision and with the approval of an ethics committee.

14.4 Training areas, equipment and facilities should be suitable and should not compromise the welfare and wellbeing of animals.

14.5 Personnel involved in animal training and display should be suitably qualified, experienced and competent at ensuring the use of acceptable animal training methods and techniques. Animal trainers should be kept updated on techniques.

14.6 Training methods, programmes and ethics should be documented and approved by management before the training or display of animals. An ethical review process should be established and utilized to scrutinize animal training and display practices. Inappropriate and unethical practices should be identified and terminated.

14.7 Accurate records relating to all aspects of an animal's training and display should be maintained, and should be of such a nature that any adverse physical or behavioural irregularities will be revealed.

14.8 Animals should not be subjected to abnormal demands and performances that compromise their wellbeing. Examples of such abnormal practices include demands made by visitors, resulting

in continuous petting or holding, or other demands causing possible negative or disturbing stimuli such as noise. In relation to any given demonstration, criteria should include justifiable and meaningful objectives and where human-animal interaction programmes exist, they should at all times be controlled, supervised, monitored and appropriate to the animal's habituation status and capabilities.

14.9 Corresponding standards for accommodation, training and demonstration practices should apply to an institution's animals situated off-site. Where animals are moved to other locations away from the institution, the requirements in this standard should be applied and should ensure the welfare of the institution's animals.

15 Animal contact areas

NOTE For further information see annex B.

15.1 General

15.1.1 Only contact which is neutral or of benefit to the animals should be permitted. The wellbeing of the animals should be regularly assessed.

15.1.2 The special risks presented by and to children should be considered.

15.1.3 Caution and discretion should be exercised in the case of the removal of animals from their enclosures, since the behaviour of all animals might be less predictable when they are away from their usual enclosures. Dangerous and potentially dangerous animals should not be allowed out of their enclosures for the purpose of direct contact with the public, except where management is satisfied that such animals are not, when under control, likely to cause injury or disease. Where dangerous animals are allowed out of their usual enclosures, at least two authorized and experienced personnel members should accompany each animal.

15.1.4 The institution should have adequate hand-washing and sanitizing facilities that are close to the contact point between animals and the public. These facilities should be obviously sign-posted. The facilities should be provided with potable running water, soap and disposable towels or hot-air blowers. Supervisors should ensure that, following contact with animals, visitors wash their hands. If the situation is supervised by parents or guardians, prominent signs should recommend the washing of hands.

15.1.5 There should be adequate supervision in all contact areas, commensurate with the type of animal and the type of risk.

15.1.6 Signs prohibiting the consumption of food in animal contact areas should be displayed.

15.2 Risk assessment

All situations where the public and animals are in direct physical contact should be subject to regular annual risk assessment. The benefits of any such contact should be considered, as should any adverse effects.

15.3 Walk-through exhibits

NOTE For further information see annex C.

15.3.1 Thorough risk assessments of walk-through exhibits should be carried out and regularly reviewed.

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15.3.2 Animals should be regularly and thoroughly screened for any zoonotic diseases.

15.3.3 The public should be informed of what is acceptable conduct in the presence of the animals.

15.3.4 No feeding of animals by visitors should be permitted except when strictly controlled by a member of the personnel.

15.3.5 Eating or the carrying of food, including sweets or chewing gum, by the public should be prohibited.

15.3.6 Potential harmful effects of flash photography and other devices should be taken into consideration.

15.3.7 Smoking should be prohibited.

15.4 Touch pools

15.4.1 Touch pools should be designed and constructed in such a way as to have adequate refuge areas to which animals can go if stressed.

15.4.2 Touch pools that allow direct access should be continuously supervised.

15.4.3 Animals utilized in touch pools should be rotated throughout the day to minimize stress.

15.4.4 Personnel should be adequately trained in the handling and care of the species held and the management of people around the touch pool.

15.4.5 There should be an adequate educational benefit from the exercise to justify it.

15.4.6 The mutilation of animals (for example, the removal of stings from rays) to make them safe for display in open touch pools is not permitted (see annex A).

15.5 Drive-through exhibits

NOTE For further information see annex C.

Drive-through exhibits should be subject to the prevailing local conservation ordinances relating to the establishment of game reserves (see annex A).

16 Ethical review processes

16.1 An institution should appoint its own ethics committee and should access ethics advice from other committees, individuals or advisors. It should be incumbent upon each institution operator to source competent ethical advice where it exists and implement such advice.

16.2 Institutions should have some form of ethical review process, particularly in situations where the use of animals might be in conflict with the best welfare interests of the animals. Examples of ethical issues are

- a) sources and methods of acquisition of institution animals,
- b) loan practices and the disposal, transfer and sale of institution animals,
- c) euthanasia practices and policies,

- d) surgical mutilations,
- e) human-animal interaction programmes,
- f) the design and appropriateness of enclosures for animals,
- g) research projects,
- h) education and conservation functions, and
- i) welfare and husbandry practices relating to the promotion of good welfare standards and the recognition of sub-standard welfare conditions.

16.3 An institution's ethical review committee should

- a) be effective in relation to allowing independent critical review and assessment of ethical issues and it should not be perceived as merely an agent of institution management,
- b) consist of members including, but not restricted to, personnel – junior or otherwise, local community representation, animal welfare representation proficient in captive animal welfare, and veterinary (including behavioural) expertise,
- c) work in an open and transparent manner whilst recognizing possible requirements for confidentiality,
- d) be open to peer review with formal arrangements for changes to membership, rotation of chairperson, and co-option of persons with particular skills,
- e) meet regularly, and
- f) create mechanisms that provide for:
 - 1) the review of husbandry practices and acceptable standards for institution animals; and
 - 2) procedures for regular reporting to management.

17 Animal transactions

NOTE For further information see annex B.

17.1 Acquisition

17.1.1 Animal transactions and trade should conform to all appropriate national (see annex A) and international legislation, standards, conventions and guidelines.

17.1.2 An institution's primary scope of business should not be the trade in animals.

17.2 Disposal

17.2.1 An institution should not intentionally dispose of animals in any of the following ways:

- a) to any laboratory conducting research or testing of any kind, unless subject to prior ethical review by the institution;
- b) to any hunting concern; or

c) to any facility not conforming to national legislation or, in the instance of animals being exported outside of the Republic of South Africa, not conforming to international legislation.

17.2.2 When disposing of animals, an institution should ensure that the animals are only passed to persons or institutions with the appropriate documentation, facilities, resources and expertise.

17.2.3 To avoid problems associated with surplus animals, an institution should be responsible for ensuring that animal breeding is controlled. Breeding programmes should be managed efficiently and wisely to prevent overpopulation and to ensure that each animal or group of animals can be maintained under conditions conducive to their long-term welfare and in compliance with this standard. Particular recognition and implementation of preventative breeding practices should be afforded to species that are generally known to be difficult to house or place in institutions or captivity.

17.2.4 Only institution personnel competent at reintroducing or rehabilitating animals into the wild should do so, as the process involves specialised facilities, skills, experience and knowledge. The release of animals into the wild should be undertaken in accordance with recognized national (see annex A) and international guidelines, standards and legislation.

Annex A
(informative)

Acts and Regulations

The following Acts and Regulations are relevant to this standard, for the management of zoos and aquariums in the Republic of South Africa:

- a) Animal Diseases Act, 1984 (Act No.35 of 1984);
- b) Animals Protection Act, 1962 (Act No.71 of 1962), sections 2(1)(g) and (h) (regulations regarding the feeding of live prey);
- c) Occupational Health and Safety Act, 1993 (Act No.85 of 1993); and
- d) Veterinary and Para-Veterinary Professions Act, 1982 (Act No.19 of 1982).

Annex B
(informative)

Commentary

B.1 Conservation

B.1.1 One of the main criticisms directed at zoos and aquariums regarding their role in conservation are that zoos and aquariums are concerned with single, or small groups of animals, while conservation is concerned with populations and biodiversity in general. This fact needs to be kept in mind and zoos and aquariums should be conscious, at every opportunity, to connect work done by themselves to natural populations whether through creating awareness by the exhibits, through the education programmes or through research.

B.1.2 Institutions have a responsibility to operate in a manner that uses the earth's natural resources in a sustainable manner. Institutions have a variety of ways in which they may actively contribute to the ethic of nature and environmental conservation, namely:

a) *in-situ*

- 1) by providing habitat or aids to indigenous species on the grounds of the institution;
- 2) by ensuring that the operation of the institution is performed in an environmentally sustainable manner;
- 3) cooperating with other bodies in the establishment of reserves, the management of habitats and the approved translocation and protection of threatened animals and plants; and
- 4) encouraging environmentally responsible behaviour by visitors.

b) *ex-situ*

by forging partnerships with foreign zoos and other bodies that are active in areas relevant to the conservation of indigenous wildlife. Assistance can be provided in terms of funding, advice, donation of materials, secondment of staff or offers of provision of training. Potential for involvement will vary with the size of the establishment, but no matter how small, all should consider participating in captive species management programmes).

B.1.3 In South Africa, regional zoo and aquarium interests are represented by the South African chapter of the Pan-African Association of Zoological Gardens, Aquaria and Botanic Gardens (PAAZAB). PAAZAB is the only African regional zoo association recognized by the World Association of Zoos and Aquariums (WAZA). PAAZAB operates its own regional captive species management programme known as the African Preservation Programme or APP.

B.2 Education

It should be remembered that the future of species held in zoos and aquariums depends on people and the educational role of zoos and aquariums in conservation cannot be overstated.

B.3 Husbandry and welfare of captive animals

B.3.1 Animal welfare and wellbeing

This standard seeks to identify important components of animal welfare and wellbeing within the zoo environment. An animal's wellbeing is dependent upon the institution providing circumstances that positively contribute towards the psychological, and physical health of each animal.

Animals have needs relating to the expression of behaviours and a need for a suitable and comfortable environment. They also have physical needs appropriate for daily survival. The environment provided by the institution and the management systems employed will influence how these needs are fulfilled.

B.3.2 Enclosure and environmental design

Institutions should not regard environmental enrichment as an optional responsibility. Appropriate stimulation and challenges should form part of the management process and should be regarded as a necessary component of animal care and husbandry. A suitably complex environment is generally one that rarely remains static and is one that will afford an animal an opportunity to re-navigate and familiarize itself with new stimuli within its environment. Identifying behavioural, physiological, social and developmental needs of animals will assist in the design of appropriate environments.

B.3.3 Feeding

Both food and water are basic needs and the manner in which food and water are presented to institution animals is equally important. Animals can be motivated to spend a large proportion of their active time locating food.

B.4 Veterinary facilities

B.4.1 The level of veterinary services needed should be determined by the veterinarian who will often be in the best position to assess the need, but it is important that operators have access to and make use of the best veterinary knowledge.

B.4.2 In order to provide comprehensive veterinary care, an institution might choose to use an appropriately experienced external veterinary surgeon/specialist.

B.4.3 Over and above emergency calls, there should be frequent regular advisory visits to assess general health and preventative veterinary practices. It might be feasible to extend an emergency visit into a regular visit provided that it occurs at an appropriate interval from the previous regular visit.

B.5 Record keeping

Accurate record keeping for collections of animals is an absolute necessity.

B.6 Training of animals, shows and demonstrations

Under certain circumstances, the training of animals can be a benefit to both animals and management practices. However, the training and demonstration of institution animals should be justifiable and done in a responsible way, and should be based on an animal's natural behaviour and motivations, as well as its learning and physical abilities.

From an educational perspective, institutions should only exhibit and demonstrate animals in a manner and environment that fosters respect and informative appreciation of a particular animal, its environment, and its intrinsic value.

Training programmes should ultimately result in a net welfare benefit to the animal, by considering any detrimental welfare cost factors balanced against any possible benefits to the animal associated with the training or display of such an animal.

The manner in which institution animals are demonstrated and portrayed in advertisements or other activities associated with entertainment, such as chimp's tea parties, should be reviewed by each institution in relation to community attitudes, ethics, and incumbent responsibilities towards community education, sensitization towards animals, their environments and general value systems.

B.7 Animal contact areas

There are advantages and disadvantages in having animal contact areas, both for the public and animals. Such advantages include the following:

- a) the public might gain a better understanding and awareness of the species by being in closer contact with them;
- b) enhancing the public's appreciation of the institution and its educational role;
- c) controlled handling of suitable animals can be an important learning experience;
- d) the animals might be allowed into larger and more complex areas than would be possible in more conventional enclosures; and
- e) the presence of the public might prove an enriching experience for the animals.

B.8 Animal transactions

In addition to ethical issues surrounding the accommodation and husbandry of animals, practices relating to the acquisition and disposal of institution animals also require ethical review. An institution's responsibility towards an animal's welfare should extend beyond the animal's period of stay at the institution, to reasonably incorporate the source and manner in which an animal has been acquired, as well as its destination upon leaving the institution.

Annex C

(informative)

Specialist exhibits

C.1 General

Certain taxa of animals require more specific guidelines over and above those presented in the body of this standard.

C.2 Invertebrates

C.2.1 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, relative humidities and substrates should be available.

C.2.2 Contact with potentially toxic chemicals should be avoided.

C.3 Reptiles and amphibians

C.3.1 General

C.3.1.1 Reptiles and amphibians invariably require a climatically controlled environment for survival in captivity. Such controlled environments should provide all of the animal's needs for heat, humidity, light and photoperiod, air and water quality.

C.3.1.2 Enclosures should provide a thermal gradient around the preferred body temperature of the species. Natural daily and seasonal variations should be provided, including variations in relative humidity.

C.3.1.3 Heat sources should be designed and fitted in such a way as to prevent injury to the enclosure inmates.

C.3.1.4 Lighting should be appropriate in strength, photoperiod and type for the species held. Ultraviolet light from full spectrum sources is essential for many species when not available naturally.

C.3.1.5 There should be sufficient ventilation to maintain air quality and relative humidity in the exhibit without compromising temperature control.

C.3.1.6 Pools large enough for full immersion are required by many reptile and amphibian species, and for reproduction by many amphibians. Water quality should be controlled, according to the size of the water container concerned. Fully aquatic species require sufficient space for comfortable swimming and to allow adequate exercise. Beaching areas should be provided as appropriate to the species.

C.3.1.7 For normal display purposes, naturalistic exhibits should be used with substrates equivalent to the natural habitat of the species. As confinement increases pressure on substrates, they should be changed regularly and not allowed to become contaminated.

C.3.1.8 Waste and uneaten food should be removed daily.

C.3.1.9 Basking and concealment sites and rough surfaces to aid sloughing should be provided.

C.3.1.10 Service passages should be large enough for comfortable working and handling of the animals. Access to enclosures should not restrict observation or cleaning.

C.3.2 Venomous species

C.3.2.1 Institutions keeping venomous species of reptile, amphibian, fish or invertebrate should ensure that trained personnel are available at all times.

C.3.2.2 Venomous animals should be kept in enclosures where the walls are of adequate height and design to prevent non-flying animals from escape.

C.3.2.3 Service areas for non-aquatic venomous species should be secured with the equivalent of a lock-gate system. Service areas should be free of clutter and routes of escape.

C.3.2.4 Enclosures containing venomous species should be individually marked with warning signs in service areas and access limited only to authorized trained personnel.

C.3.2.5 Written protocols should be established for all conceivable emergency circumstances surrounding the maintenance of venomous species in captivity (see C.3.3).

C.3.3 Snake demonstrations

C.3.3.1 The responsible use of live venomous and non-venomous snakes in public demonstrations could have positive educational potential and impact. However, cognizance should be taken of the following factors:

a) Unlike the use of other vertebrate animals in public demonstrations, the use of snakes in the same context does not usually involve any prior training or positive conditioning of the animals. The behavioural repertoires normally presented during demonstrations with venomous snakes require the snakes to exhibit threat or defensive behaviour.

As standard positive reinforcement training techniques do not appear to be as effective in snakes, the usual method is to provoke such responses that involve stressing the snake to a high degree (for example, provoking a cobra to spread a hood).

b) Live snake demonstrations do not usually involve the same degree of willing cooperation on the part of the snake as is normally seen in mammalian or avian public demonstrations.

c) Snakes that are manually restrained behind the head on a routine basis during demonstrations (for example, for milking demonstrations) will ultimately suffer cervical muscular and gingival tissue trauma.

d) The use of live venomous snakes for the purposes of public demonstration is an activity that is highly dangerous to both the handler and the snake being handled.

C.3.3.2 The use of live snakes in public demonstrations should be subject to ongoing assessment by the institution with special consideration to potential offences in respect of existing legislation (see annex A).

C.3.3.3 Snakes used for public demonstrations should be rotated on a regular basis and wherever practical, housed individually to allow for an adequate recovery and feeding period between demonstrations.

C.3.3.4 The manual restraint or "necking" of venomous snakes for public demonstration is discouraged.

C.3.3.5 A barrier of adequate height or width should be present between the handler and the viewing public during the course of demonstrations with live venomous snakes. Such a barrier should prevent physical access between the viewing public and the snake.

C.3.3.6 Demonstrations with live venomous snakes should be conducted by trained personnel with appropriate handling tools and equipment.

C.3.3.7 A written protocol on action to be taken in the event of snake escapes or bites should be made available to all personnel involved in the handling of snakes. Regular practices should be carried out and recorded, and audits of protocols conducted.

C.3.3.8 The appropriate up-to-date antivenom should be held on site and should accompany a bitten victim to the hospital. The antivenom should be stored in accordance with the manufacturer's instructions. The location of storage of the antivenom and the hospitals to be utilized should be decided on the basis of specialist medical advice and recorded in a written risk assessment. Personnel members should be trained in the latest first-aid methods for treatment of snakebite victims. Personnel members should be certified in first-aid procedures and the certification should be kept current.

C.3.3.9 Local medical authorities should be made aware in advance of facilities either for keeping venomous species or for performing venomous species demonstrations. The appropriate medical authorities should be consulted and made aware of the procedure to be followed in the event of incidents involving venomous bites. A list of specialist help and contact details should be available and readily accessible in the event of an emergency.

C.4 Marine mammals and birds

C.4.1 General

Wild marine mammals and birds live in a medium in which organic and inorganic waste are quickly diluted or readily dissipated. In most zoological settings, pool water is recycled through filtration and water treatment systems, with only a small percentage being replenished daily to make up for losses due to splash-over or filter backwash discharge. To ensure optimum quality, marine animal pool water is usually subjected to biological disinfection, mechanical filtration and chemical treatment of both dissolved and particulate matter. These processes are not exclusive and the efficacy of one method of treatment is usually dependent on that of another, as well as on the physical and chemical parameters of the medium.

The design of water treatment systems varies considerably between zoos and aquaria. In all operations, the establishment of optimum water parameters should be based on both the physiological needs of the animals and the efficiency of the water processing techniques involved.

C.4.2 Environmental parameters

C.4.2.1 Environmental quality records should include test parameters for water quality, tests for added chemicals, bacteria culture test results, amounts of added chemicals, a facility maintenance log, a filtration operation log and a water quality log.

C.4.2.2 Pool water should be monitored daily for basic chemical parameters as appropriate for closed or open circulation systems. In particular,

- a) water should be tested twice daily and treated as necessary to maintain pH values of not less than 7,6 or more than 8,2,

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- b) water should be tested twice daily for concentration of chlorine or other oxidizing agents (or both). The total of the free and combined chlorine should not exceed the specification requirements of the particular animal;
- c) water should be free of residual dissolved ozone;
- d) where cetaceans and carnivores are maintained in closed water systems, the water should be treated with sodium chloride or a combination of sodium chloride and other naturally occurring sea salts so as to maintain a salinity of not less than 22×10^{-3} mg/kg; and
- e) permissible levels of ammonium, nitrates or nitrites (or both), should be maintained.

C.4.2.3 Microbial growth in pool water should be limited through a programme of water turnover rate, skimming, disinfection, bacterial monitoring and general exhibit maintenance.

C.4.2.4 All marine mammal and bird enclosures should be provided with adequate ventilation.

Indoor facilities should be ventilated by natural or artificial means to provide a flow of fresh air that minimizes the accumulation of chlorine or other fumes and noxious odours. A vertical air space of at least two metres should be maintained in all primary enclosures, including pools of water.

C.4.2.5 Zoos and aquaria should minimize exposure of marine mammals and birds to noises of sufficient intensity or type to cause auditory discomfort or stress. A plan of acoustic monitoring of marine mammal enclosures in particular, should be in place. All sound-generating mechanical equipment located in close proximity to marine mammal and bird enclosures should be acoustically isolated.

C.4.3 Husbandry

C.4.3.1 Marine mammals and birds should be provided with a high quality diet consisting of sufficient food types to account for changes in food availability, and to provide for dietary preference of individual animals and nutritional supplements such as vitamins. Nutritional adjustments should be made for

- a) growth,
- b) maintenance,
- c) gestation/lactation,
- d) minimum diet,
- e) activity level,
- f) air and water temperature, and
- g) animal enrichment.

C.4.3.2 Weight guidelines should be established as optimum ranges for each animal.

C.4.3.3 Food analyses should be performed on a routine basis and be subjected to expert quality control.

C.4.3.4 Food should be stored at temperatures and for maximum duration appropriate for each food type to minimize deterioration.

C.4.3.5 Storage programmes, thawing procedures and food preparation processes should be designed to prevent bacterial contamination and loss of nutrients.

C.4.3.6 Vitamin supplementation should be individualized for each animal.

C.4.3.7 Routine and appropriate procedures for the cleaning, disinfection and sanitation of food preparation equipment and facilities should be established. Standing water, rusty surfaces and organic debris should be eliminated immediately.

C.4.4 Veterinary-medical programmes

C.4.4.1 Each institution should have a programme of ongoing animal health assessment. This should typically include

- a) regular veterinary rounds;
- b) daily monitoring of each animals' physical appearance, activity, temperament or changes in behaviour by husbandry personnel; and
- c) a procedure for recording and communicating health status issues between husbandry personnel and veterinary personnel.

C.4.4.2 Complete physical examinations should be performed at regular intervals on each marine mammal in the collection. Physical examinations should include

- a) determination of weight change,
- b) comparison of food intake and body weight,
- c) blood sampling for haematology, blood chemistry and appropriate hormonal analyses,
- d) vaccinations, and
- e) other laboratory tests as needed.

C.4.4.3 Normal physiological values and serum banks for retrospective studies should be established for each marine mammal in the collection.

C.4.4.4 Each institution should implement a programme of employee health and sanitation.

C.5 Public aquaria

C.5.1 Water quality

C.5.1.1 Water quality monitoring should be carried out as routine. For new exhibits or ones that have undergone major servicing, regular monitoring should include temperature, salinity (as milligram per kilogram or as specific gravity (SG) in salt water tanks), pH value, total ammonia and nitrite, and dissolved oxygen.

This should be measured daily at first and then at least twice weekly after stabilization. After a one-month period, if a tank is stable, tests can be carried out weekly. At all times, there should be provision of sufficient water treatment equipment to ensure maintenance of water. Water quality should be maintained within set parameters to meet species-specific requirements.

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C.5.1.2 Aquarists should have access to on-site laboratory facilities, such as basic microscopy, and be trained in sample collection.

C.6 Waterfowl

C.6.1 As most non-domesticated waterfowl are given the freedom of a pen and not contained overnight, enclosure barriers should be predator-proof. Predator control is a vital element of waterfowl management.

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

C.6.3 Birds should be able to enter or leave the water without difficulty, therefore, edges should be sloping with a gradient of 1:3 or less.

C.6.4 Collections should have a justifiable ethical policy and code of practice regarding pinioning.

C.6.5 Every effort should be made to prevent hybridization between exotic and free-ranging indigenous waterfowl. All hybrids should be disposed of in an ethical and appropriate manner.

C.7 Birds of prey

C.7.1 Aviaries

C.7.1.1 Whole animal diets, or meat that has been appropriately supplemented are needed. No food type should be used exclusively. All birds of prey should have access to clean drinking and bathing water daily.

C.7.1.2 Enclosures should provide suitable vantage points and perching should be appropriate for the species housed.

C.7.1.3 Enclosure size should afford the birds suitable space for exercise.

C.7.2 Demonstration birds

C.7.2.1 Birds that are tethered or leashed should be flown at least four times a week unless tethered for medical treatment.

C.7.2.2 All collections should allow sufficient aviary or mews space to rest working birds and allow them to moult.

C.7.2.3 Tethered birds are vulnerable to attack by other wild animals and should be well protected at night.

C.7.2.4 Flying areas should be free of hazards and should not be close to cages containing other animals or adjacent to, or in view of other tethered birds.

C.7.2.5 Personnel should be well versed in training methods, weight reduction issues, handling techniques and maintenance of equipment and birds.

C.7.2.6 Tethered birds should have unrestricted access at all times to shelter from prevailing weather conditions.

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