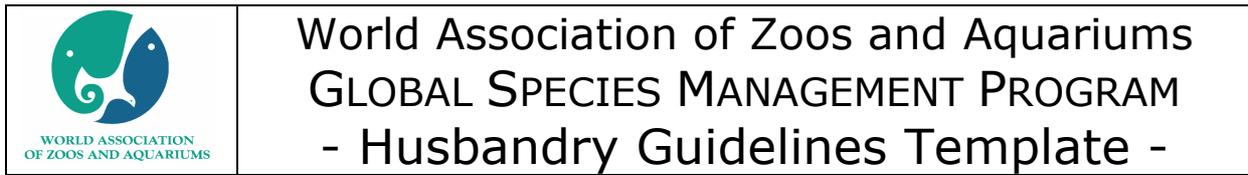


## Attachment 7: GSMP Template – Husbandry Guidelines



### Introduction

Global Species Management Programs are directed at sustaining populations of priority species as a resource for conservation. Maximising the conservation value of populations requires close management of genetics and demography. This is only possible where the target species lives and reproduces reliably in captivity. Good animal husbandry is therefore a pre-requisite for good population management.

WAZA recommends that, in addition to a plan for long-term population management, all WAZA Global Species Management Programs have an associated husbandry document that provides good advice and information to institutions participating in the program. This document should, at the very least, include those areas of husbandry that impact directly on population management. In summary, those areas relate to:

- Feeding and housing
- Breeding management
- Transport protocols
- Basic health care
- Animal identification

The following recommended format for husbandry guidelines highlights those priority areas.

In addition, **where specific husbandry protocols are a requirement of participation in a global program**, those protocols should be detailed in the relevant population management plan.

### Protocol for creating Husbandry Guidelines

The production of Husbandry Guidelines should include:

- 1) A review of relevant published material, including any existing regional husbandry guidelines for the taxon.
- 2) The identification of husbandry and management challenges for the taxon and a plan for addressing these.
- 3) A document that draws these elements together.
- 4) Review and editing of this document by an appointed editor/editors.
- 5) Approval of the final document through the WAZA Committee on Inter-regional Conservation Cooperation.
- 6) Circulation of the final document through the WAZA Secretariat.

To expedite the circulation of information crucial to population management, documents may proceed to step 4) as soon as the “critical sections” are complete. A second round of review can be instigated when other sections are finalised.

In some instances a comprehensive, regionally generated husbandry document will already be available for the taxon. Where such a document exists, and is considered to contain much of the required information, permission should be sought from the author/publisher to amend the text for global use. Once amended the process may proceed directly to step 4).

**Regional zoo associations are strongly encouraged to make available their regional husbandry documents for global application.**

### **General notes for authors**

Where information is unavailable for a particular species this should be stated under the relevant heading. **Understanding what is known is an important part of the process.**

Whilst the emphasis is on maintaining a standard structure for ease of reference, authors should add or remove headings as appropriate for the taxon.

Common names may be used throughout the text if preferred, though should be standardised to avoid confusion. On the first occasion a species (or sub-species) is mentioned, the generic name should be given in brackets. Where more than one species is covered by the Guidelines, species names should appear in bold within the text where data refer to one species only; it may be appropriate in some sections, to include a separate paragraph for each of the species covered.

Sections to be completed as a priority are denoted by \*\*\*



# World Association of Zoos and Aquariums GLOBAL SPECIES MANAGEMENT PROGRAM - Husbandry Guidelines Template -

The following template is intended to help with documenting husbandry guidelines for a species being managed under a GSMP. It is not intended to be either prescriptive or exclusive, but rather to provide prompts for the information relevant to managing conservation breeding programs.

Global Species Management Teams should include any additional material of relevance to the program.

Sections marked with \*\*\* should generally be considered as a priority. These sections alone can often provide the basis for a useful body of husbandry information.

## *WAZA Husbandry Guidelines for*

*[ Common Name (Scientific name) ]*

### **SECTION 1. BIOLOGY AND FIELD DATA**

#### **BIOLOGY**

##### **1.1 Taxonomy\*\*\***

This section is fairly straight forward, though there may be some controversy regarding exact numbers of sub-species. Any such controversy is outlined. All known living species and sub-species are listed; any extinct recent species or sub-species are listed under section 1.5 below. A number of common names may be associated with a particular species, and as many as is reasonable are included.

ORDER

FAMILY

GENUS

SPECIES

SUB-SPECIES

COMMON NAME(S)

##### **1.2 Morphology**

All measurements are stated in metric units. Measurements for adult males, adult females and newborns are stated separately if data are available. Where certain measurements are unavailable, it should be stated why and what steps should be taken to gather this information. If appropriate, the exact method of measurement is stated. Unless otherwise stated, measurements of wild specimens are given. Anatomical information, and information about the senses, is provided under "DESCRIPTION"; any physical differences between sexes or sub-species are outlined, and vocalisations are described.

It is important to standardise the measurements taken and the method of taking these measurements to ensure consistency of data.

HEIGHT  
WEIGHT  
LENGTH  
COLOURATION  
DESCRIPTION

### **1.3 *Physiology***

Information such as heart rate, respiratory rate and body temperature are included if available, indicating whether data are from wild or captive individuals. Method of measurement should also be stated if appropriate.

BODY TEMPERATURE  
HEART RATE  
RESPIRATORY RATE

### **1.4 *Longevity***

The typical longevity, or longevity records, should be stated. This allows for long term collection planning to be carried out. There is often a difference in expected longevity for a wild as opposed to a captive specimen. Where possible, estimates are given for both. Longevity figures for captivity are also provided in the population management plan for the species.

## **FIELD DATA**

### **1.5 *Zoogeography/Ecology***

This section provides information about geographical distribution of the species, including details on habitat type, other species within that habitat and seasonal climatic changes. Results of population surveys are given and, where available an estimation of population status is provided. Where at all possible, the CITES Appendix and IUCN or other recognised classification code is given. Historical distribution and subsequent population trends, are examined, with reference to any extinct species or sub-species. Threats to the wild population should be outlined.

DISTRIBUTION  
HABITAT  
POPULATION  
CONSERVATION STATUS

### **1.6 *Diet and Feeding Behaviour***

Food sources and preferred food items should be listed. Feeding method, including daily and seasonal variations, water intake and other information relating to the digestive process, should be outlined. Research relating to species specific dietary requirements should be included. Specific behaviours used in the feeding biology of a particular species should be outlined so these can be encouraged in captivity. Distance travelled in search of food in the wild should also be mentioned to allow for say, seasonal changes in behaviour of captive animals.

FOOD PREFERENCE  
FEEDING

### **1.7 Reproduction**

This section details the physiological aspects of the reproductive cycle. Courtship and mating behaviour are detailed in section 1.8 "Sexual Behaviour" below. The developmental stages of juveniles to sexual maturity is outlined, stating typical age at sexual maturity and physical signs thereof. The sub-headings included in this section will vary according to the class of the species, thus slightly different versions of the Guidelines format exist for birds and mammals. All sub-headings are shown below.

DEVELOPMENTAL STAGES TO SEXUAL MATURITY

AGE OF SEXUAL MATURITY

SEASONALITY OF CYCLING

GESTATION PERIOD/INCUBATION

CLUTCH/LITTER SIZE

BIRTH/HATCHING DETAILS AND SEASONS

Data calculated for captive populations are provided in the population management plan.

### **1.8 Behaviour**

Daily and seasonal variations in activity are detailed, means of locomotion outlined and wild activity budget provided where possible. Predator/prey interactions involving the species are described. "Social Behaviour" details intra-specific and inter-specific social interaction, including such aspects as social structure, territoriality, social development, dispersal of young and intra-specific communication. "Sexual Behaviour" outlines the physiology of reproduction and describes courtship behaviour, competition and copulation.

ACTIVITY

LOCOMOTION

PREDATION

SOCIAL BEHAVIOUR

SEXUAL BEHAVIOUR

## **SECTION 2. MANAGEMENT IN ZOOS OR AQUARIUMS**

Section 2 provides a brief, yet comprehensive, overview of general husbandry practices with particular attention to species specific welfare considerations. It covers all aspects of animal husbandry, though it should be noted that only specific veterinary information, relevant to everyday husbandry, is included. The guidelines are concerned with the practical rather than medical issues of animal management. Thus, whilst details of handling and restraint during a medical procedure may be provided, details of the treatment itself, of drugs used or surgical procedure, will not be provided. Typical species specific veterinary complaints should be listed with methods of avoiding/dealing with the complaints explained.

### **2.1 ENCLOSURE\*\*\***

Section 2.1 provides a general guide as to what has been used and found to be appropriate for a particular species without suggesting that these are the only suitable options.

#### **2.1.1 Boundary\*\*\***

Details of primary barriers, barriers between adjacent enclosures and holding pens as well as indoor partitions. Where appropriate details of additional public

barriers can be given. The wattage of electric barriers needs to be standardised per taxon and provided in the guidelines.

### **2.1.2 Substrate\*\*\***

Includes details of topography of outdoor enclosure (natural vegetation, bare earth etc.) and floor materials used in indoor areas (wood, concrete). Also includes details of any additional substrate such as sand or peat in outdoor enclosures, or bedding materials in indoor quarters or dens. Specific substrates that are not suitable for particular species need to be mentioned.

### **2.1.3 Furnishings and Maintenance\*\*\***

Includes details of fixtures and furnishings within outdoor and indoor enclosures (eg: climbing apparatus, hiding places, shelter, shade, bushes, trees, ponds, water and feeding troughs, dens, nesting boxes, partitions, electrical points, observation facilities; also includes information concerning number of dens/nests per animal). The type of enrichment furnishings used should be dictated by species specific needs and the physical build of the animals.

Maintenance procedures may be facilitated by certain furnishings, thus maintenance is also included in this section. Includes details of cleaning indoor and outdoor quarters, drainage and sewerage disposal, crowding gates, service corridors, keeper exits and any other furnishing designed to facilitate maintenance.

### **2.1.4 Environment\*\*\***

Both the indoor and the outdoor environment are considered. Appropriate methods of heating, lighting and ventilation for indoor quarters, and details of optimum temperatures, light intensity and humidity are suggested. Special husbandry considerations during particularly hot or cold weather, heavy rain, ice or snow, are outlined.

### **2.1.5 Dimensions\*\*\***

This section serves to outline the optimum conditions and dimensions for that species, to which individual collections can aspire. It may also be helpful to indicate spatial density (No. individuals/m<sup>2</sup>). In the absence of systematic research, it is impossible at this stage to make specific recommendations, though Phase II and III may begin to address this issue. A range of indoor and outdoor enclosure sizes are given, including sizes of individual stalls.

## **2.2 FEEDING\*\*\***

As well as outlining basic dietary needs, including supplementary vitamin and mineral requirements, this section considers special dietary requirements for young, pregnant or lactating individuals, for birds during the egg laying season and for species with specific feeding behaviours. In recent years it has become increasingly obvious that not only what is fed, but also how it is fed, is important in terms of animal health and welfare. Special consideration is accordingly given to "non-nutritional" aspects of the diet and to appropriate methods of feeding. Other factors influencing feeding methods, such as hygiene, practicality and social considerations, are also acknowledged.

The software programme; *Zootrition*<sup>®</sup>; should be consulted where possible to analyse nutritional quality and quantity of food consumed and wasted.

### **2.2.1 Basic Diet\*\*\***

Individual food items and nutritional content should be specified. Quantity and quality fed per individual is outlined. Where appropriate, this section should

include information on browse and forage (suitable plant species). It is appropriate here to mention any diets that have caused problems.

Vitamins, minerals and other supplements should be listed with a source provided for each product.

The use of feeding as a form of environmental enrichment, the texture of food for example or its presentation and any other considerations not directly related to nutritional value need to be outlined. Any particular 'likes' of that species should be mentioned as these food types are very useful in administering medication.

### **2.2.2 Special Dietary Requirements\*\*\***

For young, breeding animals, lactating mammals, convalescent animals and due to seasonal variations or physiological intolerance.

### **2.2.3 Method of Feeding\*\*\***

How often and where (indoors, outdoors, in troughs, on floor) feeding occurs. Also how food is presented (whole, chopped, in an enrichment device etc.).

### **2.2.4 Water\*\*\***

Details how fresh drinking water is made available within outdoor and indoor enclosures.

## **2.3 SOCIAL STRUCTURE\*\*\***

This section outlines a suitable social structure with details of intra-specific and inter-specific associations. Data from wild populations describing wild structures should be referred to here.

### **2.3.1 Basic Social Structure\*\*\***

Wild social unit including details of age and sex structure. Animal managers can then try to emulate this structure in their collections. Section 1 may be referred to for details of social structure in wild.

### **2.3.2 Changing Group Structure\*\*\***

Primarily details the introduction or re-introduction of animals with an outline of measures to facilitate such changes. Also considerations concerning the removal of animals from a social group.

### **2.3.3 Sharing Enclosure With Other Species\*\*\***

Appropriate species with whom the enclosure might be shared are suggested, and any associated advantages or disadvantages outlined. (As with all species names, generic name should be included in the first instance.)

## **2.4 BREEDING\*\*\***

Outlines appropriate breeding techniques such as adding new birds to a flock to stimulate breeding displays or removing males from primate groups. Where appropriate, artificial breeding techniques (eg: AI, implants, double clutching) are described.

### **2.4.1 Mating\*\*\***

Details the introduction and segregation of the breeding pair, special enclosure modifications and appropriate male:female ratios. Courtship and copulation are described with details of oestrus behaviour and any changes in behaviour associated with the period of sexual activity (eg: increased aggression). Any evidence of seasonality is assessed.

#### **2.4.2 Pregnancy/Egg Laying and Incubation\*\*\***

Details of gestation period, physical, physiological and behavioural indicators of pregnancy are given for mammals, and for birds details of nest building behaviour, numbers of eggs laid and incubation procedure. Special husbandry considerations during pregnancy or incubation, and details of artificial incubation procedures are outlined.

#### **2.4.3 Birth/Hatching\*\*\***

The birth or hatching process is described, specifying pre-partum behavioural indicators and usual duration, with some indication as to common problems encountered and a brief summary of solutions and/or references to such.

#### **2.4.4 Development and Care of Young\*\*\***

The physical and behavioural development of the young is outlined with details of parental care, age at weaning/fledging and separation from parent(s) included. Care of the young during the early stages of development is described, including details of the period of dependence, monitoring development, access and introduction to conspecifics. Any special husbandry requirements are outlined. Also includes details of neonatal mortality.

#### **2.4.5 Hand-Rearing\*\*\***

Hand-rearing may be necessary for a variety of reasons, such as rejection by the parent or the inability of some birds to incubate their own eggs. Consideration is given to why and when young should be removed, with details of initial care and subsequent rearing. The basic techniques are described and an assessment made of the associated success. The outline should include information on a suitable environment and feeding regime, health care, contact with keepers and conspecifics, independency and re-introduction to the social group. References to relevant published works should be given.

The hand-rearing procedure is advised against due to the high possibility of imprinting with the keeper and difficulties with future introduction back to its conspecifics. There is also the possibility of rejection by that individual of its own young in the future thus creating a cycle of keeper dependence. Any guidelines for hand-rearing should always be developed with a view to reintroducing the animal back to its own kind with the minimum of stress incurred to the animal.

### **2.6 HANDLING**

The difficulties associated with identification, sexing, handling, capture, restraint and transportation are examined and ways to facilitate these procedures suggested.

#### **2.6.1 Individual Identification and Sexing.**

Accurate sexing and individual identification are particularly important in breeding populations and for some species can be a difficult procedure. Appropriate techniques are described and assessed. The location and type of marker should be standardised per taxon e.g. age at which to band birds and the size and make of ring, or where in the ear to tattoo a bovid etc. Appendix A species need to be marked

#### **2.6.2 General Handling**

Outlines procedure for daily handling, suggesting appropriate precautions where necessary. Species specific adverse behaviours should be outlined to prevent injury to the keeper or the animal.

### **2.6.3 Catching/Restraining**

Methods of capture that cause least stress to the animal and offer greatest protection to the keeper are suggested. Physical and chemical restraint and associated risks are outlined.

### **2.6.4 Transportation**

Methods of crating and transporting are outlined. Includes information on container specifications (rather than reproducing diagrams, IATA's specifications for air transportation can be referred to). Detailed transportation legislation can be obtained from the 2000, IATA '*Live Animal Regulations; 27<sup>th</sup> Ed.*'.

### **2.6.5 Safety**

General consideration for the safety of keepers and other humans, including members of the public, are outlined. Any reported human injuries or deaths are noted. Action to be taken in the event of an escape, or an attack, may be appropriate here.

## **2.8 SPECIFIC PROBLEMS: Considerations for Health and Welfare**

This section briefly outlines any physical conditions or complaints commonly associated with the species. Requirements for behavioural as well as physical well being are considered.

Symptoms, treatment and prevention of common diseases/conditions are outlined. Required vaccines may be specified, though the appropriate inoculation schedule should be left to the discretion of each collection's veterinary surgeon and not specified here. Common parasites, screening and treatments are outlined (again detailed information on medical procedures not included). Information on causes of adult mortality are also included.

## **2.9 RECOMMENDED RESEARCH**

The aim of collating information into the Guidelines format is as much to highlight what information is not available as to present that which is. Additional information is required in a number of areas to fill in obvious gaps or validate existing data, particularly where there are contradictory viewpoints. Section 2.9 highlights this, indicating appropriate areas for further research. Some of the questions raised may be addressed through the use of husbandry questionnaires, with a more in depth assessment of specific aspects carried out through research programmes.

## **SECTION 3. REFERENCES**

Each of the Husbandry Guidelines is referenced throughout and accompanied by a complete reference list together with suggested readings, highlighting works of particular use or interest. All information in the text should be referenced to one of the works included in this list, or referenced as pers. comm. and attributed to a specified individual. This will ensure that, should questions arise, all data can be checked and validated. It also enables the interested reader to investigate specific aspects in more detail.

## **Attachment 8: CIRCC issues paper 2005 - regional mentoring programs**

### **Development of Mentoring Programs to Encourage and Assist Regional Zoo Association Collaborations**

Mark Craig Director, Adelaide Zoo  
Onnie Byers Executive Officer, Conservation Breeding Specialist Group  
Sally Walker Founder and Director, Zoo Outreach Organization  
April 2005

#### **Introduction**

In order to better facilitate support to zoos in developing areas from within the Zoo Association community, a system of 'mentoring' is proposed. Such a mechanism will provide support, liaison and training from specific zoo associations, towards zoo 'neighbours' in developing areas of the world zoo community.

This mentoring system should maintain the integrity of individual zoos in developing regions while allowing for exchange of knowledge and expertise in areas such as collection management, species management, education and related areas of core zoo business.

The mentoring relationship between two regions will in no way preclude those regions from contribution of other regions. It is recognized that not all needs can be met through this mentoring system and aid from institutions; agencies and other regional associations will remain needed and welcome.

The intent of the mentoring relationship is to also acknowledge and accept cultural diversity thereby strengthening the global culture of zoos.

#### **Key elements of the system include:**

##### **1) Establishment /enhancement of relationships between partnering zoo associations**

The first step is to recognize existing linkages and partnerships at both the Association and Institutional levels and begin to actively enhance those and establish these relationships where they do not currently exist.

##### **2) Identification of need and implementation of communication/collaboration process**

Next there will be a systematic evaluation conducted by the partnering Associations of what each needs and what each has to offer.

##### **3) On-going evaluation and support**

The sustainability of these partnerships is essential to their success. Therefore built into the system is a process for continual evaluation and development of the model.

Below is an example of the application of this mentoring system. It describes ARAZPA's link with its closest zoo association neighbour, SEAZA. Based on the history between these two regions both at an Association and Institutional level (as outlined below), the following model outlines how the mentoring system works and what it can achieve.

*The authors recognize that there are gaps in this model. We present this as a first step in the development of a functional, effective mentoring system and look forward to obtaining broad input and elaborating on this draft version.*

#### **ARAZPA/SEAZA Mentoring Program**

##### **1. Establishment /enhancement of relationships between partnering zoo associations**

###### **1.1. Current ARAZPA/SEAZA Relationships**

ARAZPA has had a close relationship with SEAZA for many years based on:

- Geographic proximity;
- A shared recognition of the problems facing the South East Asian region as relates to the conservation of biodiversity and the rapid acceleration of habitat loss; recognition of the region as a global conservation 'hot spot';
- Shared priorities for in-situ conservation programs within the South East Asian region;
- ARAZPA institutional support towards specific countries within SEAZA;
- Personal relationships fostered between individual staff members within ARAZPA and SEAZA;
- A close relationship between individuals on the Boards of ARAZPA and SEAZA;
- A history of support from ARAZPA institutions towards SEAZA zoos, based on staff exchange, funding support and exchange of knowledge;
- Participation by ARAZPA institutions at SEAZA Annual Conferences and visa versa;
- A shared recognition of conservation stewardship through expertise and experience of organizations such as CBSG and the IUCN;
- The initiation and implementation of a joint regional ARAZPA/SEAZA association conference.

### **1.2. Current Institutional Relationships**

A number of ARAZPA institutions have fostered a 'special relationship' with SEAZA countries and individual institutions. This relationship involves:

- Exchange of animals.
- Exchange of staff.
- Invitation to regional zoo association conferences.
- Visits by staff over a long period of time.
- Trust in each institution's priorities and Government liaison.
- Individual friendships.
- Joint participation in conservation and education programs.

### **1.3 Process for establishment of ARAZPA/SEAZA mentoring relationship**

Based on the history between these regions both at Association and Institutional level an environment currently exists that can further develop towards a mentoring relationship based on the following model:

- Respective Association Boards recognize the need for a mentoring process.  
Action: Respective Board chairs present discussion paper to their Boards.
- Key individuals from respective Boards identified to progress mentoring relationship towards implementation.
- The topic/subject of mentoring is a specific agenda item at each meeting.
- Full support of the ARAZPA office to be offered to SEAZA for implementation. This includes-  
- lines of communication,  
- availability of program support material at no cost.
- Key SEAZA institutions and individuals identified in each county to progress the implementation of the mentoring relationship.
- Meeting of key individuals of ARAZPA and SEAZA held to establish implementation plan.

## **2. Identification of need and implementation of communication/collaboration process**

- Communication of 'what is available' from ARAZPA to SEAZA delegates at annual conferences and through direct communication.
- Availability of ARAZPA information on species management programs, record keeping, studbook design, associated business etc., through
  - websites
  - CD ROMs
  - hard copy documents
- Identify, over a period of time, what is required for various SEAZA countries. This must come from within SEAZA.
- Regular electronic communication among key individuals that form part of a 'mentoring list serve' from ARAZPA and SEAZA.
- Training workshops within SEAZA facilitated by ARAZPA staff. Funds made available through WAZA conservation / training grant scheme and other sources.

### **3. Ongoing Support**

- Review system after 12 months of implementation and identify any weakness in the model.
- Continue regular communication between key individuals in ARAZPA and SEAZA.
- Regular updates will be communicated in the,
  - ARAZPA Newsletter,
  - SEAZA Newsletter,
  - ARAZPA Website,
  - SEAZA Website.
- Regular presentation of 'shared programs' at association conferences.
- Identification and sharing of all sources of funding. SEAZA and ARAZPA representatives to collaborate on fund raising efforts.

To date, the ARAZPA/SEAZA relationship has resulted in the following:

- Two joint ARAZPA/SEAZA conferences have been held (the second is to be hosted by ARAZPA in Melbourne in May, 2005). Shared participation in workshops, TAG meetings and associated programs.
- A number of ARAZPA institutions have financially supported the sponsorship of SEAZA delegates to attend the joint ARAZPA/SEAZA conference in 2005.
- Experience of good working relationships between individuals from both Associations. This has resulted in exchange of staff and facilitation of workshops/training programs associated with specific species or conservation support.
- Ongoing communication of ARAZPA initiated programs within SEAZA in newsletters and website

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