Wild Chronicles

Exploring the Diversity of Birds and Animals in the Digital Realm

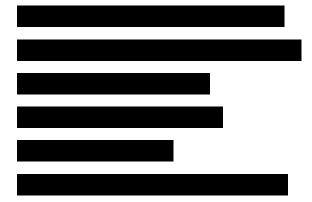# CONTENT

INTRODUCTION TO RESEARCH USING ZOO RECORD

Effective management of species in zoos and aquariums requires considerable knowledge of the biology of each species including reproduction, behaviour, group dynamics, husbandry, nutrition, medical needs and so forth. Scientific investigations are the basis for understanding the animals in a zoo and assessing the way they are cared for. Through careful observations and well-planned studies, much can be learned about, for example, reproductive and social behaviour, growth and development, basic nutrition and dietary preferences and interactions with the physical environment.

Fundamental research analysing animal records is conducted much less frequently, yet due to the limited sample sizes in 'living' collections, adding a historical perspective has the potential to test more robust hypotheses. Basic and advanced biological data on up to two million individual animals and 10,000 taxa have already been gathered and recorded in scientifically sound ways in zoos and aquaria and entered into custom-built, dedicated electronic databases. Such large data sets allow studies of reproductive patterns, infant or adult mortality, and many other components of species' life history, at both an institutional or population level. These guidelines form part of a series designed to clarify the series of steps that are

discuss challenges which are characteristic for zoo research projects which may differ from those encountered in laboratory or field studies. Rather than repeat relevant advice offered elsewhere, the authors suggest reading this document in conjunction with:

• Project Planning and Behavioural Observations (Wehnelt et al., 2003)

• Statistics for typical zoo datasets (Plowman (ed.), 2006)

• Research by questionnaire (Plowman et al., 2006)

The Research using Zoo Records Guidelines are divided into the following headings and it is advisable to read all sections before beginning a project:

WHAT DO WE MEAN BY ZOO RECORDS

Types of information Zoos initially stored records of animal arrivals, departures, births and deaths as notes in diaries, ledgers or stock books. At minimum, the information contained within these volumes formed a current stock list and record of 'transactions' for each collection. A later development was the use of cards for individual animals, to note their date of arrival, place of origin, sex and name and species. The cards were updated when the animal died or departed. Currently in the UK, the Secretary of State's Standards for Modern Zoo Practice (SSSMZP) are designed to ensure that the welfare of animals in zoos is protected, that zoos are safe places for the public to visit and that zoos participate in appropriate conservation and public education measures. The Standards recommend best practice by which zoos are inspected and granted licenses by local authorities. Under Section 9 'Stock Records' it is compulsory that an annual stocklist of all animals must be kept. All zoological collections in the UK are required to also keep and maintain records for all individually recognisable animals and groups. The records should provide (wherever possible) the following information: • identification and scientific name; • origin (i.e. whether wild or captive-born, including identification of parents, where known, and previous location/s, if any); • dates of entry into, and disposal from, the collection and to whom; • date, or estimated date, of birth or hatching; • sex (where known); • any distinctive markings, including tattoos, freeze-brands, rings or microchips; • clinical data, including details of and dates of any treatment given; • behavioural and life history data; • date of death and the result of any post-mortem examination and laboratory investigations; • where an escape has taken place, or damage or injury has been caused to, or by, an animal to persons or property, the reason for such escape, damage or injury must be recorded and a summary of remedial measures taken to prevent recurrence should be provided; • food and diets. The SSMZP also stipulates that records must be kept up to date, and must be available on site for six years. After this time, provision should be made to archive the records in a secure format on a long-term basis. This means that every collection in this country holding a zoo licence should have up to date, detailed animal records for both individuals and groups, available on site going back at least six years. Recording details for individual animals such as tigers is relatively straight forward, but becomes more complicated for group-living animals such as leaf cutter ant colonies, which can be made up of up to 40,000 inhabitants. In this instance a 'colony' would be recorded; similarly for some invertebrate and fish species a group record is kept. - 2 - Research Using Zoo Records Having information in one place can assist the management of an individual animal and also provides insight into a species in general.

Depending on the species concerned, many different levels of data are collected at each institution. Furthermore this information is rarely managed independently, but forms the basis of managed conservation breeding programmes for species at a national, regional or international level.

METHODS FOR RECORDING/STORING INFORMATION

Data may be recorded by many zoo staff including keepers, curators, and veterinarians. The information they generate is generally collated by one person, sometimes called a Record Keeper or Registrar, to a centralised records system. Note that for some collections, an alternative title may be 'ISIS Representative', for reasons which will become clear. Originally all zoo records were paper-based using diaries, ledgers, stockbooks or index cards, which were stored in a secure place (e.g. a filing cabinet). Prior to the International Species Information System (ISIS) however, standards of record keeping were quite varied because there were no uniform record-keeping procedures among zoos. Recognising that a system pooling all animal records in standardised format would enable more effective management of species, ISIS was founded in 1973 and continues to function as an international database to help zoos and aquariums accomplish long-term conservation management goals.

To date (June 08) there are currently 760 ISIS member institutions in 76 countries on six continents and the ISIS central database contains information on 2 million animals – almost 15,000 taxa/10,000 species – held in zoological institutions, plus some animals in the wild. ISIS members use the basic biologic information (age, sex, parentage, place of birth, circumstance of death, etc.) collected in the ISIS system to manage genetic and demographic programs for their animal collections. Initially data was submitted on paper, using duplicate pads (i.e. including carbon paper); one copy was sent to ISIS while the zoo kept the other on file.

████████████████████ to standardise the information being submitted. From 1985 an alternative to paper forms became available, namely the suite of software programmes now most widely used for records management within the zoo community. These guidelines are strongly biased towards records maintained using these programmes (ARKS, SPARKS, MedARKS etc.), therefore some explanation is necessary.

ARKS - ANIMAL RECORDS KEEPING SYSTEM

Report name	Explanation
SPECIMEN REPORT	Individual specimen or group record
TAXON REPORT	All specimens of a selected taxonomic group during a selected time span
TRANSACTION REPORT	The number of transfers in/out of collection for a selected taxonomic group
COLLECTION INVENTORY	The number of transactions (births, deaths, transfer into/out of institution for a selected taxonomic group.
ENCLOSURE REPORT	Details of specimens maintained in a specified enclosure at the institution
PEAK HOLDING	The maximum number of specimens held by the institution
CENSUS REPORT	The number of specimen at the beginning of each year of a selected species over a selected date span
WEIGHT AND LENGTH	Recorded weights/lengths for a selected specimen
Additional data can be obtained relating to reproduction and demographics:	
AGE PYRAMID	Age of current population of selected taxonomic group
RELATIONSHIP REPORT	Ancestors, siblings and descendants of selected specimen

ARKS is the main computer program used by institutions in the UK to maintain animal records. All living specimens currently housed at an institution should be recorded (technically referred to as accessioned) and if historic data is available this may also be included in the ARKS database. The ARKS database is capable of rapidly retrieving data enabling an institution to review the overall management of an individual, group or species.

SPARKS

SINGLE POPULATION ANIMAL RECORDS KEEPING SYSTEM

Studbooks are a positive exception to zoos' otherwise historically patchy record keeping. Some were initiated as early as the 1930's (for a subspecies of European bison) and from 1965 studbooks became an integral part of managing endangered species living in zoos. Studbook keeping involves compiling genealogical and demographic data covering a species' history in captivity, typically across an entire region (e.g. Europe) rather than just at a national level. This includes numerically identifying individual specimens so as to record permanently data on their origins, parentage, date of birth, gender, locally-assigned identifiers, dates of transfers to another collection. Captive population sizes and fecundity rates vary across ███████████████ ███ SPARKS is DOS-based software used by hundreds of studbook keepers worldwide which supports studbook management and species analysis. Examples of data that can be compiled in SPARKS reports are given below:

Report name	Explanation
LIVING ANIMALS	All individuals living at date criteria set (either during or at the end of a date span). Report can be ordered by studbook number or location
HISTORICAL	All individuals living or dead within the time the studbook data runs. Report can be ordered by studbook number or location
BIRTHS	Births over a selected date span
DEATHS	Deaths with death notes over a selected date span

TRANSFERS	Transfers between zoos over a selected date span
MORTALITY (Qx)	Age specific mortality. The average proportion of animals that are expected to die within an age-class
SURVIVORSHIP (Lx)	Age specific survivorship. The probability of a newborn surviving to the beginning of age class x
REPRODUCTION	Details youngest parents, oldest parents, interbirth intervals, birth seasonality etc for both sires and dams. Reports on reproduction history for individuals can also be generated
AGE REPORT	Details oldest animals (living and dead)
PEDIGREE CHARTS	Details the sires and dams of individuals back to the population founders
DESCENDANT LISTS	Details offspring of an individual through all known generations (living and dead)

SPARKS records are kept by the studbook keeper or studbook coordinator. Details of the European studbook programmes (EEPs / ESBs) can be found on the EAZA website (www.eaza.net), along with the studbook keeper / coordinator's information.

FURTHER READING AND RESOURCES

This section contains a selection of relevant references, but the main resources are online. A short guide to using the ISIS Species Holding tool is also provided.

References :

1. Boakes, E. and J. Wang. (2006). Searching for heroes: Investigating purging in zoo populations. In: 8th Annual Symposium on Zoo Research (2006). Dow. S. and Clark,F. (Eds). British and Irish Association of Zoos and Aquariums

2. Faust, L.J. and S.D. Thompson. (2000). Birth sex ratio in captive mammals: Patterns,biases, and the implications for management and conservation. Zoo Biology 19:11–25.

3. Flesness, N.R. (2003). International Species Information System (ISIS): over 25 years of compiling global animal data to facilitate collection and population management. International Zoo Yearbook 38:53–61.

4. Masters, N.J., F.M. Burns and J.C.M. Lewis. (2005). Peri-anaesthatic and anaestheticrelated mortality risks in great apes (Hominidae) in zoological collections in the UK and Ireland. In: 8th Annual Symposium on Zoo Research (2006). Dow. S. and Clark, F. (Eds). British and Irish Association of Zoos and Aquariums.

5. Mitchell, H and C. Nevison. (2006). The effect of inter-zoo transport on reproductive success of three felid species. In: 8th Annual Symposium on Zoo Research (2006). Dow. S. and Clark. F. (Eds) British and Irish Association of Zoos and Aquariums.

6. Pullen, P.K. (2004). The EEP studbook for the white faced saki monkey (Pithecia pithecia): a tool for interpreting minimum standards of welfare in zoological parks. Folia Primatologica 75(supplement): 214

FINAL CONSIDERATIONS

Multi zoo research

For research that is done across a number of BIAZA collections, BRG suggests that you get support in the form of a letter from BIAZA. In order to get this support, please see the BRG home page (for web page see section 6. Further reading and resources).

Publications

More people can benefit from the hard work that researchers have done if it is published, even in grey literature. The BIAZA Annual Zoo Research Symposium is a good, friendly place to present papers, and the Research Newsletter publishes abstracts and gets sent to zoo professionals and academics around the world. For a list of peer reviewed publications that have publish zoo-based research and Guidelines on how to publish zoo research see the BIAZA Research Group home page.

Acknowledgements

This is where researchers get the opportunity to thank all the people that facilitated or contributed to the research. Acknowledgements should be no longer than half a page and more in depth lists could be put in an appendix if need be.

Say thank you!!!!

███ input from zoo staff. Saying 'Thank You' to those who have taken time out of their already busy jobs to give information or data to a research project is very important and means you are more than likely to get the help you want.

ISIS SPECIES HOLDINGS

This tool will help you find out how many animals of each type are currently living in ISIS member institutions. From the ISIS home page (www.isis.org) click on 'animals' then 'find animals' (see screenshot below): This takes you to the ISIS Species Holdings page. To use this tool: On the left side of the screen, click to expand the category of the animal for which you would like to search. • Mammalia – mammals (e.g. elephants, tigers, dolphins) • Aves – birds (e.g. doves, owls, hawks) • Reptilia – reptiles (e.g. snakes, lizards, turtles) • Amphibia – amphibians (e.g. frogs, salamanders, newts) • Other – everything else (e.g. fish, sealife, insects) After the selected category expands, click to expand the appropriate subcategory to search by "common" or "taxonomic"* name. (Note: if you are not able to find the animal for which you are searching by common name, use this tool: http://www.itis.gov to find the taxonomic name for that animal.) Choose the letter with which the name of the animal for which you are searching begins (e.g. choose "T" for "tiger). Now you can select your animal from the alphabetical list displayed in the right column. (Both the common name and the scientific name for each animal are displayed.) Clicking on the name of the animal will display tables, which are divided by different types of that animal. For example, clicking on "tiger" will display separate tables for ████████ ████████████████████████. In these tables, clicking on the blue text will show you the name of the institution that cares for those animals. Note: to obtain the full count of a particular species held by all ISIS members, you must add the totals from each table.