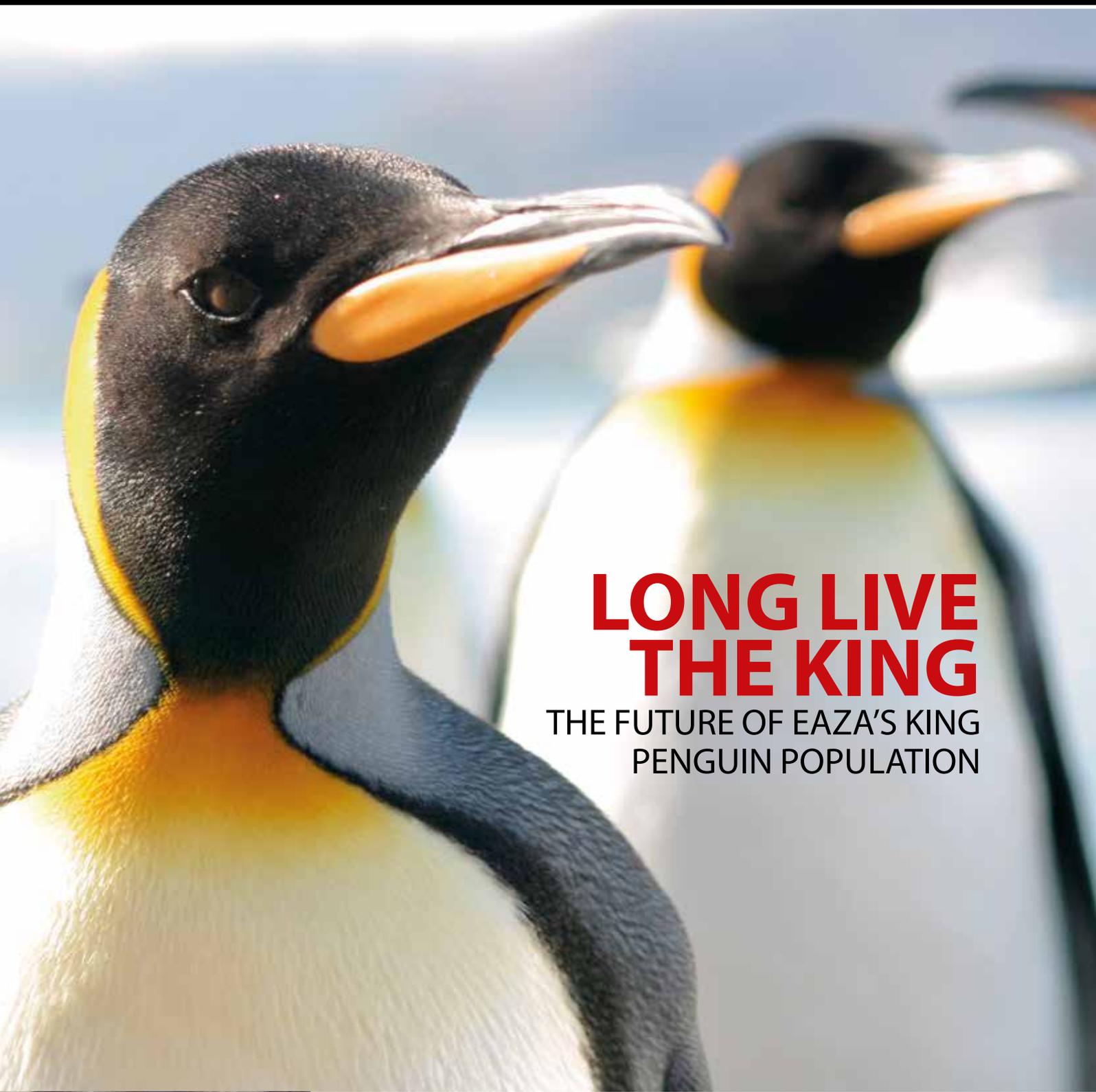


QUARTERLY PUBLICATION OF THE EUROPEAN ASSOCIATION OF ZOOS AND AQUARIA

ZOOQUARIA

WINTER 2013/14

ISSUE 84



LONG LIVE THE KING

THE FUTURE OF EAZA'S KING
PENGUIN POPULATION



Gene genius

HOW GENETIC STUDIES CAN BENEFIT THE GREAT APES

Age of aquariums

MEET JOAO FALCATO, CHAIR OF EAZA'S AQUARIUM COMMITTEE



MARINE

nutrition

sustaining life

HERRING	<i>Clupea harengus</i>
SPRAT	<i>Sprattus sprattus</i>
MACKEREL	<i>Scomber scomber</i>
WHITING	<i>Merlangius merlangus</i>
TREVALLY	<i>Pseudocaranx dentex</i>
SANDEEL	<i>Ammodytes marinus</i>
POUTING	<i>Gadus luscus</i>
PACIFIC SAURY	<i>Cololabi Saira</i>
CAPELIN	<i>Mallotus villosus</i>
ROACH	<i>Rutilus rutilus</i>
TROUT	<i>Oncorhynchus mykiss</i>
PANGASIU	<i>Pangasius Pangasius</i>
TILAPIA	<i>Oreochromis Niloticus</i>
SIGNAL CRAYFISH	<i>Pacifastacus leniusculus</i>
SHRIMP	<i>Crangon crangon</i>
KRILL	<i>Euphausia superba</i>
KRILL	<i>Euphausia pacifica</i>
ARTEMIA	<i>Artemia Salina</i>
MYSIS	<i>Mysis relicta</i>
PEELER CRAB	<i>Portinus pelagicus</i>
HERMIT CRAB	<i>Pagurus bernhardus</i>
EDIBLE CRAB	<i>Cancer pagurus</i>
SHORE CRAB	<i>Carcinus naenas</i>
CLAM	<i>Paphia undulate</i>
MUSSELL	<i>Mytilus edulis</i>
COCKLES	<i>Erastoderma edule</i>
RAZOR	<i>Ensis ensis</i>
DAY OLD CHICKS	<i>Gallu gallus domesticus</i>
HORSE	<i>Equus</i>
RABBIT	<i>Cuniculus</i>
MICE	<i>Mus, Muris</i>
RATS	<i>Rattus</i>
OCTOPUS	<i>Octopus vulgaris</i>
SQUID	<i>Loligo Opalescens</i>
BLOODWORM	<i>Chironomus sp</i>
CYCLOPS	<i>Cyclops cyclops</i>
POLYCHAETES	<i>Perinereis aibuhitensis</i>
LUGWORMS	<i>Arenicola defodiens</i>
SALMON	<i>Salmo salar</i>
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Zooquaria

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From the Director's Chair

We live in a digitally democratised age. We can post on Facebook, tweet, and upload videos onto YouTube and other social networking sites. Our online presence is increasing, leaving a trail of who we are and what we believe behind us, like the wake of a powerboat. We also have access to more and more information from tens of thousands, if not millions, of organisations all vying for attention for their messages.

Conservation organisations have been trying to make good use of these various tools to get out the message that the natural world is under attack and that it is at our peril if we continue to let nature be destroyed. As conservation professionals we know that the rate of decline of species and their habitats is frightening. We also know what we don't know, that as we slowly break down our natural world we have no idea of how nature will respond – but respond she will. There are still arguments about whether the increase in extreme weather events such as heatwaves, droughts and tropical storms is really down to human activity changing our climate, but given that they are increasing shouldn't we apply the precautionary principle? So in our commitment to asking for change and action we highlight the issues, we show the frightening pictures, we state repeatedly that nature, species and individuals are declining and that they will soon be gone.

But are we going about this the right way? What if we are actually putting out a message that there is no hope, that of course species are going extinct? What if we have created a giant 'social norm', that this is the normal state of affairs? It's depressing to read about poaching, falling trees, mistreated animals and so on. Social science in conservation issues is still in its relatively early days but the social sciences have long demonstrated that social norms are powerful tools and that we need to think more about the language we use if our messages are to move from simple information that charts a decline to real social change.

There are signs in the last few years that more organisations are trying to make that shift from gloom and doom to wonder and awe. The IUCN 'Love not Loss' video went some of the way to talking about the great things about nature but was more of a message to the conservation community itself, not the wider public. Personally, the conservationists I know are amazingly optimistic people – how could you be anything else, knowing in depth what they know about nature loss, yet still ploughing on every day, doing their best to solve the problems, devoting their lives to a cause. They also, unsurprisingly, tend to be the people who are most joyful about nature, who find animals amazing, who smile when they hear that a saola has been camera trapped for the first

time in 15 years (see page 25).

They also tend to be funny people, inventive people, people who are good fun to be with – but this is not the image that the general public would get from watching our gloomy messages. Who wants to join the club of those people? If we just compare the 'hits' on serious videos about nature decline to the 40 million hits and rising of those who watch the 'dramatic chipmunk' on YouTube it's self evident that our messages are challenging and not of sufficient interest. They also are not 'funny' – I don't use that word lightly, because if something makes you smile you may just feel more positive about doing something about it. Go to this link (<http://bit.ly/1iRdyJW>) and see a great video about single use plastic bags that is funny, uses popular culture and has a serious message. Being 'green' shouldn't mean being boring.

So how do we create engaging messages, without them becoming banal and meaningless? I believe we have lots of material to do just that. We have a rich research pool in social sciences and we can start supporting more social science research in our facilities related to changing behaviours for the benefit of nature. We have a network of committed, knowledgeable, funny, engaging people, whose skills could be channeled in non-traditional ways and messages to reach new audiences.

A final thought. Confucius said '*it's better to light one small candle than to curse the darkness*'. Conservationists are by definition 'candle lighters' but our messages are cursing the darkness. Let's try and light a few candles in everything that we do and say.



Dr Lesley Dickie
Executive Director, EAZA

NOTICEBOARD



CAIMAN OUT IN STYLE

THE FIRST BLACK CAIMANS TO BE bred in captivity outside their natural home countries were hatched in Aalborg Zoo on 1 May 2013, writes *Trine H Jensen, Jens Sigsgaard, Aalborg Zoo, Denmark.*

Interest in the nest had been noted for a long period and one day the female was on guard just outside the nest area looking very slim. It turned out that 26 eggs had been laid in a mound made of leaves and sand, and they were removed by keepers and placed in an incubator in plastic boxes with vermiculite and water (1:1) at 31-32°C. Of the 26, 24 were fertilised and the first hatched after 89 days, a 30cm long black caiman emerging.

A further 22 successfully hatched, too. The young caimans were fed earthworms regularly from day five after hatching. As they grew older they also received mice.

The parents have been in Aalborg Zoo since February 2011 on loan from Krokodille Zoo, Denmark. The black caimans were both wild collected as new hatched babies in 1997 and 1998 in Ecuador by Krokodille Zoo's extensive involvement in crocodylian conservation projects. Aalborg Zoo started out with 1,2 individuals and after 18 months the smaller female was returned to Krokodille Zoo as the other female became too aggressive.



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REGISTRATIONS FOR EAZA CONFERENCES

REGISTRATION IS NOW OPEN FOR THE **2014 EAZA CONSERVATION FORUM** which will be held at Leipzig Zoo. The forum, which is based on the theme 'One Species, One Plan' will take place in the first week of May – for more information and to register, visit www.eaza.net/NEWS/Pages/ConservationForum.aspx.

Registration is also open for the Joint TAG chairs meeting organised by EAZA on behalf of the WAZA Committee for Population Management (CPM). The Joint TAG Chairs meeting is by invitation only and will draw together TAG leaders or their equivalents from across the world to discuss the global integration of efforts to safeguard the future of vulnerable species. The meeting will take place from 1-3 June at Vogelpark Avifauna in Alphen aan de Rijn in

the Netherlands.

The EAZA Mid Year TAG meetings will take place at Vogelpark Avifauna directly after the Joint TAG Chairs Meeting, from 4-6 June. Registration is open to all TAG members from EAZA, and participants in the Joint TAG Chairs Meeting. In addition to the working meetings, there will be opportunities to discuss the involvement of EAZA TAGs in the global initiatives discussed at the Joint TAG Chairs Meeting. Please be careful to register for the EAZA Mid Year TAGs Meeting only unless you have received an invitation to register for the Joint TAG Chairs meeting. For more details on these events, please visit <http://www.eaza.net/News/Pages/Alphen2014.aspx>.

NOTICEBOARD

GORILLA GOES SOUTH

A PAIGNTON ZOO GORILLA HAS JOINED the Royal Navy on a voyage to the Antarctic. The adventurous ape, named PEG (Polar Explorer Gorilla) has sailed on board *HMS Protector*, the Royal Navy's ice patrol ship. Fittingly, this plastic Paignton Zoo gorilla will be painted with an image of a Living Coasts' macaroni penguin, alongside a number of other penguin species.

The curious arrangement came about after the Executive Director of Paignton Zoo and Living Coasts, Simon Tonge, was invited to lunch on board ship with other dignitaries. 'During conversation the Great Gorillas Project came up and I think it was Captain Hatcher who suggested, in jest, that they could take a gorilla to the Antarctic and photograph it on an iceberg,' he says. 'As it happens, EAZA has just launched its major new climate change campaign Pole to Pole. And I realised that we had an unpainted gorilla that was perfect for the job. After that it all fell into place very easily!'

Artist Jackie Kidd was invited to paint PEG because the zoo was so pleased with her work on interpretation panels for the new coati enclosure. The task took her a week and was completed in



her kitchen studio. She used ordinary acrylic paint; the model – which is 77cm tall and 76cm long – was then varnished at the zoo before setting sail.

'This has been a fabulous opportunity for me to create a piece of artwork to showcase Living Coasts and highlight the EAZA Pole to Pole campaign,' says Jackie. 'I made her a member of the exploration team. PEG became one of the crew of *HMS Protector* and will encounter many adventures on her journey along with her shipmates.'

'The artwork also features the many penguins that inhabit the Antarctic region, some of which are struggling with changes to climate that are affecting the environment they rely on. I hope that this inspirational and unusual piece of work will aid the EAZA campaign to protect biodiversity and generate collective action in Zoo visitors.' The deployment, including a round trip of almost 20,000 miles, lasts for 20 months.

For more information go to www.livingcoasts.org.uk or ring 0844 474 3366.

POLAR EXPANSION

As the gorilla tracks further south, there is more good news for Pole to Pole and the movement to reduce emissions: ALPZA, the Latin American Association of Zoos and Aquariums has joined the campaign, bringing another 20 million potential visitors into the community.

VULTURE SUCCESS

THE RED-HEADED VULTURE (*SARCOGYPS CALVUS*) WAS ONCE widespread in India and SE Asia, but is today Critically Endangered due to an extremely rapid range and population decline. Feeding on carcasses of livestock treated with the veterinary drug Diclofenac is presumed to be one of the major causes of this massive decline, and conservation breeding efforts are urgently needed for this bird.

Parco Natura Viva has been putting great effort and energy

into this goal. In collaboration with raptor expert Alberto Fagan, the zoo has worked with two pairs of the vulture, with success in early 2013. An egg was laid on 16 February and put into an incubator nine days later, and a second egg was laid on 29 March and put into the incubator after 17 days. The zoo discovered that the eggs required a longer incubation period – 55 days – than had previously been reported in the literature, and the chicks were born in March and April and hand-reared.



NEW AND REACCREDITED MEMBERS

EAZA welcomes the new members approved by Council in September 2013 and commends members newly accredited under the EAZA Accreditation Programme (EAP).

BIOPARC ZOOM TORINO Full



Description: Starting in the 1960s as a nature park where families would gather in the weekend, Giuseppe Casetta transformed the park over the next 20 years into a park where rescued and confiscated animals were kept. In 2005, his son Gian Luigi Casetta took over and transformed the park into what it is today; the first Italian immersive biopark which takes visitors on a journey to discover two continents, Africa and Asia. In April 2013, the African savannah opened in which visitors can participate in a safari adventure and discover giraffes, zebras, ostriches and many others on foot.

Country: Italy
 Director: **Daniel Sanchez**
 Contact: **Leslie Baxter**
 Tel: **+390119070878**
 Email: **info@zoomtorino.it**
 Website: **www.zoomtorino.it**
 Short name: **Torino**
 Date of opening: **2009**
 Size (ha): **21**
 Staff: **19.5**
 Number of species: **21**
 Number of visitors: **136,000**
 Organisational type: **Company**

WILDLIFE HERITAGE FOUNDATION Associate



Description: Wildlife Heritage Foundation (WHF) is home to the Big Cat Sanctuary in Kent, UK and is established in 2000 by the Sampson family who needed room to expand for their successful breeding of big cats in Paradise Wildlife Park (EAZA full member since 2000). It has one of the most important collections of big cats in the world. The Sanctuary has an excellent track record for breeding highly endangered felines including Amur leopards, Sumatran tigers and Amur tigers. The charity supports global conservation efforts to protect big cats and their habitats. The sanctuary is not open to the public but is available for private big cat experiences, functions, product launches and has four luxury wooden lodges for a unique overnight stay.

Country: **UK**
 Director: **Peter Sampson**
 Contact: **Lynn Withnall**
 Tel: **+44 123771915**
 Email: **enquires@whf.org.uk**
 Website: **www.whf.org.uk**
 Short name: **Ashford**
 Date of opening: **n/a**
 Size: **13**
 Staff: **7.5**
 Number of species: **18**
 Number of visitors: **n/a**
 Organisational type: **Non-profit organisation**

ZOOLOGICAL SOCIETY FOR THE CONSERVATION OF SPECIES AND POPULATIONS Associate



Description: The Zoological Society for the Conservation of Species and Populations (ZGAP) was founded in 1982 by a small group of committed conservationists in Munich, Germany, and was soon registered as a non-profit, tax deductible organisation. The main goal of the society is to contribute to the conservation of little-known endangered species. Thousands of highly endangered species exist, whose names are often not even known by specialists and many of these species have already disappeared during recent decades, because of lack of knowledge. Currently the ZGAP supports over 30 projects in, amongst others, the Philippines, Indonesia, Peru, Ethiopia and Madagascar.

Country: **Germany**
 Director: **Jens-Ove Heckel**
 Contact: **Jens-Ove Heckel**
 Tel: **+49 57257019912**
 Email: **info@zgap.de**
 Website: **www.zgap.de**
 Short name: **FED-ZGAP**
 Date of opening: **n/a**
 Size: **n/a**
 Staff: **n/a**
 Number of species: **n/a**
 Number of visitors: **n/a**
 Organisational type: **Private/Commercial**

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Country: **France**
 Contact: **Baudouin Vidalin**
 Tel: **+33 251 56 10 40**
 Email: **Baudouin.VIDALIN@marchegay.fr**
 Website: **www.marchegay.com**

MARINE NUTRITION Corporate



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Country: **UK**
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Accredited members

Planckendael, Boras Djurpark, Nordens Ark, Zoologicka zahrada mesta Brno, Zoologicka zahrada Ostrava, ZOO a zamek Zlin-Lesna, Tiergarten Schonbrunn, Helsinki Zoo, Ogrod Zoologiczny w Opolu, Wroclaw Zoo, Givskud Zoo, Koelner Zoo, ZSL London Zoo, ZSL Whipsnade Zoo, Budapest Fovaros Allat-Es Novenykertje, Odense Zoo, Zivalski vrt Ljubljana, Parken Zoo, Westfalischer Zoologischer Garten Munster.

Temporary members

New – Parc Animalier des Pyrénées, Al Ain Wildlife Park and Resort, Planète Sauvage.

Downgraded from Full to Temporary – Ranua Wildlife Park, Akvariet I Bergen, Hai Park Zoo, Haifa Educational Zoo and Biological Institute, Tierwelt Herberstein.

Temporary Associate Membership

Downgraded from Associate to Temporary Associate – H.E. Sheikh Butti Maktoum's Wildlife Center, Ed Palmieri.

Temporary Member Under Construction

Zoo de Martinique

Joining the candidacy for Membership programme:

Lietuvos Zoologijos Sodas (Kaunas Zoo), Zoologika Zarada Kosice Kaveca, Palic Zoo.

Terminated from membership:

Pheasant Foundation (Harehatch), Hammerton Zoo Park.

NOTICEBOARD

TECHNICAL ASSISTANCE UPDATE

WIM VERBERKMOES HAS RETIRED AS Chair of EAZA's Technical Assistance (TA) Committee after four years at the helm. Wim chaired the committee with great commitment and dedication and was instrumental in building EAZA's capability to help existing and new members reach the association's standards.

Wim officially retired during the Annual Conference in Edinburgh where he was awarded an EAZA lifetime achievement award for all his hard work with the committee and for EAZA as a whole. He will stay active in the TA Committee as a mentor for Sofia Zoo in Bulgaria.

Wim has handed over the reins to Mark Challis, Zoo Manager of Belfast Zoological Gardens in Northern Ireland. 'I am excited to take over the reins after four years of exemplary leadership from Wim,' he says. 'I look forward to continuing his great work and meeting the challenges of an ever-expanding membership, and the ever-evolving role of the modern zoo.'

Mark has been Zoo Manager for Belfast Zoo for many years now and is a member of the BIAZA Membership and Licensing Committee. He brings a wealth of experience to his new role and will be a key player in the continued development of the EAZA membership.

One of the first items on the committee's agenda under Mark's chairmanship is the release of a new edition of the Technical Assistance Manual. Entitled *Foundations for a modern zoo – strategies for management & development*, the manual is the result of several years' work. Developed in 2008 by Marco Snijder

(a student from the Van Hall Larenstein University of Applied Sciences) and updated and revised by the TA Committee in 2013, the manual is designed as a tool for institutions that are in the process of joining EAZA to assist them towards compliance with EAZA standards.

The manual gives a concise but complete overview of the basics of zoo management and all aspects involved in running a zoo. It describes in short all the considerations that directors, curators and other managers need to keep in mind when managing and reconstructing a zoo, including new enclosure development or improvement of animal record-keeping systems. Based upon the combined knowledge of several renowned zoo experts, it is the definitive starting point for zoo managers committed to reaching EAZA standards.

Used in conjunction with the advice offered by a dedicated Technical Assistance Committee mentor who can identify priorities, the manual can help EAZA Candidates for Membership follow a step-by-step approach towards better animal welfare, more efficient business practice and improved management systems.

EAZA currently has 15 Candidate for Membership institutions in 12 countries, all of whom will receive the new manual in hard copy. A digital version will be made available on the EAZA website. If you wish to receive a printed copy, but your institution is not an EAZA Candidate for Membership, then please contact the EAZA Executive Office.

LANDAU CATCH-UP

LACK OF SPACE IN RECENT ISSUES of *Zooquaria* has meant that some births and hatchings haven't found room in these pages, but their importance is such that, despite several months having gone by, they need to be recorded. Zoo Landau has had two of them.

After numerous trials over several years, on 24 October 2012 Zoo Landau welcomed a much longed-for first ever litter of 2.3 northern cheetahs (*Acinonyx jubatus soemmeringii*). This is also the first successful breeding of this subspecies in a German zoo. The northern cheetah has been held at Landau since 2006, but various pairings had turned out to be fruitless. In November 2011 Landau received the female Shaina (born 2008 at Zoo de la Palmyre) within the scope of the EEP. She was paired with male Fareed (born 2006 at Safaripark Beekse Bergen) and mating proved successful. Two female pups, who turned out to be smaller and weaker than their siblings, died at days three and four after birth.



The other three however developed very well with a caring and extremely relaxed mother.

Another long expected and special birth has been of a female white-naped mangabey (*Cercocebus atys lunulatus*) on 23 February 2013 at Landau. Her mother Pirina (born 2008 at Bioparc Valencia) came to Landau in April 2012 to be paired with Charles, a wild-born confiscated male, who came to Landau in October 2010 from the rescue and breeding centre for endangered primates run by NGO WAPCA (West African Primate Conservation Action) in

Ghana. Little Ivy is being raised by her mother without any problems, and it is encouraging to see the other females also taking care of the youngster. This was the second birth of this subspecies in Landau, after the female Leonie was born at the zoo in 2001. She was transferred to London Zoo in 2006 and Leonie's daughter Conchita came back to Landau in October 2011. Being the second 'favourite' female of Charles we may hope for more offspring of this rare subspecies in the future. A further mangabey was born at Landau on 23 November.

Saving the saola

SO VERY LITTLE IS KNOWN ABOUT THE SAOLA, BUT A CONSERVATION BREEDING PROGRAMME, WITH SUPPORT FROM ZOOS, MIGHT HELP US FIND ANSWERS

Terry Hornsey, Animal Manager, Africa Alive!, Chair of the European Cattle & Camelid TAG, Coordinator for the EAZA Cattle & Camelid TAG 'Intensive Management of Saola Advisory Group'

More than two decades after its discovery, we still know very little about the saola. It is by far the largest terrestrial animal of undisputed existence in the world that has yet to be seen in the wild by a biologist. We know the saola only through information from local people, examination of some saola remains, observations of a few short-lived captives (most recently in 2010), and we were all very excited to learn when it was announced in November that a Saola had been camera-trapped – the first in nearly 15 years.

Few species match the saola's need for urgent conservation intervention. With just a few dozen possibly left in the wild (and, at most, a few hundred), the animal is Critically Endangered on the IUCN



Red List. The saola was already rare when discovered, and its population has continued to decline, with illegal hunting being the principal threat. Southeast Asia is home to the greatest extinction crisis in the world today, driven by the demand for animals for traditional Asian medicine and bushmeat, a demand intensified by newly emerging wealth

in the rapidly expanding economies of countries such as China and Vietnam. Paradoxically, saola seem to be among the few mammals in the region without a high price on their head, as they do not appear in traditional Chinese medicine, yet they still fall victim to wire snares set in their thousands by commercial poachers, targeting other species.

The Saola Working Group (SWG) was established in 2006 by the IUCN Species Survival Commission's Asian Wild Cattle Specialist Group, in recognition of the critical status of saola. It comprises more than 20 conservation professionals with broad expertise and deep connections in Laos and Vietnam. The SWG's Coordinator, William Robichaud, has worked on wildlife conservation in Laos



SAOLA IMAGES: WILLIAM ROBICHAUD

and Vietnam for 20 years.

The SWG, having already carried out some field work in the region, has therefore been in need of the assistance of the wider world's zoo community, as from the small amount of first-hand knowledge that we have of the saola, it is clear that, if it is to be saved from extinction, urgent captive husbandry skills and knowledge is necessary. As Chair of the European Cattle & Camelid TAG, I was contacted by Bill Robichaud, asking if he could attend and give a presentation at the TAG's meeting held during the conference in Innsbruck last year. Bill's presentation

was more about setting the scene for a possible collaboration with the TAG, than merely being a very interesting talk. Basically, he was asking if we would be willing for our knowledge and expertise to be used in helping to try and save this incredible animal.

At the end of the meeting we formed a small group of experts from all over Europe and the US who, as members of the TAG, wanted to be involved in the project. We held an impromptu meeting which, some 12 months on, has become known as the EAZA Cattle & Camelid TAG 'Intensive Management Saola Advisory Group' (IMSAG).

The role of the group is to formulate and instigate, in partnership with the SWG, protocols that will allow any saola coming into a 'captive' situation, either planned or unplanned, to be managed *in situ*, within a 'captive/semi-captive environment' and in a controlled and professional manner.

However, some members of the SWG still needed to be convinced that intensive captive management was now the only realistic option of conserving this species and if we were able to convince them, there was then an even bigger mountain to climb in doing the same with both the Laos and Vietnamese governments.

The SWG held its third bi-annual meeting in June of this year in Vientiane, Laos PDR and a small representation from IMSAG, The Wildlife Conservation Society (WCS) and San Diego Zoo Safari Park was invited to attend the meeting. This group comprised myself, Nick Lindsay (Senior Curator & Conservation Breeding and Reintroduction Programme Manager, ZSL Whipsnade Zoo), Doug Richardson (Head of Living Collections, Highland Wildlife





CLOCKWISE FROM LEFT: SWG MEETING; HABITAT; SAOLA; SWG MEETING GROUP PHOTO

Park, The Royal Zoological Society of Scotland), Pat Thomas (Vice President & General Curator and Associate Director, Bronx Zoo, Wildlife Conservation Society) and Andy Blue (Associate Curator of Mammals, San Diego Zoo Safari Park).

Throughout the week, we met with a variety of key government officials and a variety of meetings were held both between ourselves, Zoe Greateorex (Wildlife Conservation Society field veterinarian, Lao PDR), Ben Swanepoel (Site Manager of the Nam Kading National Protected Area for the Wildlife Conservation Society/ Provincial Agriculture & Forestry Office of Bolikhamxay), Zainal Zahari Zainuddin (Veterinarian, Borneo Rhino Alliance, Malaysia) who has a lot of experience carrying out work on serow and Sumatran rhino in the field and Widodo Ramono (Executive Director of Rhino Foundation of Indonesia) to discuss the possibilities and logistics of intensive captive management of saola and with the SWG, to show them why we feel that, in our opinion, the time has come to go down the 'intensive captive management' route where the saola is concerned. I'm pleased to say that by the end of the week, after giving presentations and engaging in a great deal of debate, the SWG were unanimous in their decision that intensive captive management was the only option left, if the saola is to stand any chance of being saved from extinction and they endorsed the need for a conservation breeding plan for the animal. We also went on a weekend field

trip to look at saola habitat and possible sites for a holding facility/breeding centre and this really brought home the reality of the situation as, whilst the forest areas that are home to the saola are stunning in their beauty, the logistics of building a breeding facility and providing access to it, whilst at the same time ensuring it is secure, will be a real challenge. Further site visits in the near future to both Laos and Vietnam will be necessary.

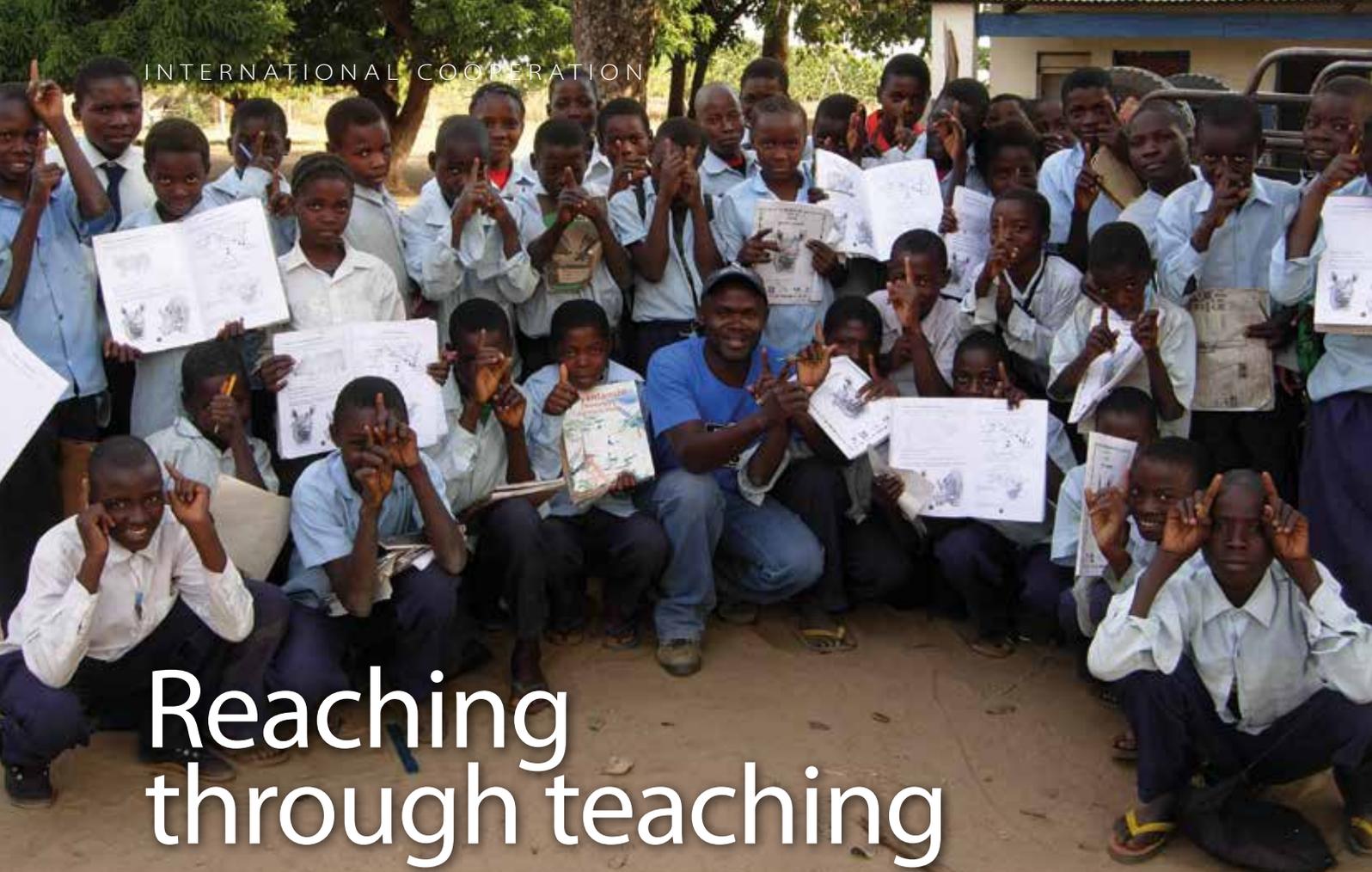
Having taken the decision to back our proposal for an intensive breeding management programme, the SWG has asked us to activate the second draft of the EAZA 'Saola Intensive Captive Management Action Plan', which has been put together gradually by IMSAG since its formation in Innsbruck in 2012. The Action Plan is a living document and will continue to evolve, so that it stays relevant to both the aims and objectives of the SWG and the on-going situation on the ground. Consequently, a third draft has just been completed and is in the process of being ratified by members of both IMSAG and the SWG. It is a far more specific document than the previous draft, in that it goes into far more detail with regards to the husbandry, dietary, veterinary and management requirements that would be needed to deal with saola in a captive environment. However, this document is a starting point and will need to be updated on a regular basis, as and when our practical knowledge and experience of the saola increases.

One of the most important prerequisites at the moment is the need

to identify and obtain the long-term commitment of a stable and qualified zoological institution (or consortium of institutions), to provide the necessary long-term funding, that will not only cover the construction costs of a rescue/breeding centre for saola (and possibly other endangered species such as large antlered muntjac), but will also meet the centre's long-term day-to-day running costs, as well as areas such as staff training, transport and equipment, veterinary, nutrition and conservation research requirement costs, etc.

Due to the saola's critical situation, 'long-term' may mean decades of continual involvement, especially as we have no idea as to how long it may take for partners in Laos or Vietnam, such as national and local governments, to develop enough expertise and interest to take over the day-to-day running of such a facility (using a local, well-trained, long-term husbandry team). Therefore, it is probably unrealistic to expect one institution to carry such a cost and, therefore, the reality is that we need to put together a consortium of zoos to work together for the good of the species.

Whilst there is still a long way to go, we are hopefully on the right path and we can only hope that it will also be seen that way by both the Laos and Vietnam governments in the near future as well. It was a real pleasure to meet and be involved with such a committed and passionate group of people and I look forward to continuing my involvement, on behalf of EAZA, in what has now become a race against time to save this globally acclaimed species, the mysterious and beautiful modern day unicorn known as the saola.



Reaching through teaching

HOW CAN EDUCATORS AT THE ZOOLOGICAL SOCIETY OF LONDON (ZSL) HELP TACKLE A RHINO POACHING THREAT 8,000KM AWAY IN ZAMBIA? IT ALL BEGAN WITH AN EAZA CAMPAIGN

Kate Oliver, Education Officer, Zoological Society of London and Cathy Dean, Director, Save the Rhino International

In North Luangwa National Park, in the spectacular Luangwa Valley of northern Zambia, a conservation education project is ambitiously attempting to change the hearts, minds and, ultimately, behaviour of local communities. The park contains a wide variety of species including elephants, buffalo, hippo, zebra, lion and wild dog; more recently, it has become home to a population of reintroduced black rhino. Technical support for running the park is provided by the North Luangwa Conservation Programme (NLCP), a partnership between Frankfurt Zoological Society and the Zambian Wildlife Authority. These organisations work together to protect the park's impressive biodiversity, from training wildlife officers to developing road access to remote areas of the park.

In the 1970s, Zambia had Africa's third largest black rhino population, estimated at 12,000. Approximately 4,000 lived in the Luangwa Valley and about 2,000 of those were found in North Luangwa National Park. By 1990, these had been virtually

exterminated and black rhino were declared nationally extinct in 1998.

NLCP was originally set up to bring elephant poaching under control. The success of the law enforcement and community outreach programmes led to a proposal being put forward in 2001 to reintroduce a founder population of black rhinos. Translocations took place in 2003, 2006, 2008 and 2010 bringing a total of 25 black rhino to NLNP to establish a viable population of black rhino; the ongoing challenge is to ensure that they have sufficiently adapted and are protected from poaching.

Traditional measures focused on security: anti-poaching patrols, observation posts, aerial surveillance, telemetry and so on all play a vital part in protecting North Luangwa's rhinos. But community engagement was key, and a fledgling education strand was launched in 2001 – now named Lolesha Luangwa, meaning 'Look after Luangwa'.

After 2008, following EAZA members' fundraising for the 'Save the

Rhinos' 2005-6 campaign from which NLCP benefited, Lolesha Luangwa expanded considerably. A Lolesha Luangwa Officer (LLO), Sylvester Kampamba, made regular visits to 22 schools in the Game Management Areas (GMAs) around the National Park, usually involving around 1,400 children per year in Grade 5 (around 11 years old). The communities in these GMAs are acutely involved in conservation issues facing the park, from poaching to destructive farming practices, and so were key audiences for the programme's conservation messages. Save the Rhino International (SRI), a UK-based NGO, continued to support NLCP's black rhino work and education programme after the EAZA Rhino Campaign and, by 2012, Lolesha Luangwa had become a popular and informative part of school life for children in North Luangwa, but Claire Lewis, Technical Advisor for NLCP, knew it could achieve so much more. Through SRI, she sought education expertise to develop and expand the programme, to evaluate its impact,



CLOCKWISE FROM FAR LEFT: MANGWERE SCHOOL PUPILS PROUDLY SHOWING OFF THEIR ACTIVITY BOOKLETS; IN THE CENTRE IS MICHAEL ELIKO, THE LLA, IN THE BRIGHT BLUE T-SHIRT. THEY ARE ALL IMITATING A RHINO WITH THEIR HAND SIGNALS! © NLCP; MANGWERE SCHOOL CAME FIRST IN THE 2012 CONSERVATION CELEBRATION DAY IN CHAMA DISTRICT. AS PART OF ITS PRIZE, THE SCHOOL WAS GIVEN A SIGN, WHICH IS BEING HELD ON THE LEFT BY SYLVESTER KAMPAMBA, LLO, AND ON THE RIGHT BY MICHAEL ELIKO, LLA © NLCP; FAR LEFT, BACK ROW, PAUL BAMFORD FROM ZSL, AND NEXT TO HIM MICHAEL ELIKO, LLA AT LOLESHA LUANGWA. FAR RIGHT, BACK ROW, CLAIRE LEWIS, TECHNICAL ADVISOR TO NLCP, AND NEXT TO HER, KATE OLIVER FROM ZSL. IN BETWEEN ARE THE CONSERVATION TEACHERS FROM ONE OF THE FIRST TWO WORKSHOPS HELD IN MARCH 2013 AT BACHELORS CAMP IN NORTH LUANGWA NATIONAL PARK, ZAMBIA © ZSL; ONE OF THE PERFORMANCES AT THE MUKUNGULE CONSERVATION CELEBRATION DAY IN OCTOBER 2013. IN THIS SCENE, THE POACHERS ARE STANDING TRIAL IN A COURTROOM DECORATED WITH A PICTURE OF THE ZAMBIAN PRESIDENT. THE JUDGE IS ABOUT TO PRONOUNCE SENTENCE © NLCP



and to take its aims beyond the level of just teaching children knowledge about their environment; she wanted to affect their attitudes and behaviours as well.

Enter ZSL. In May 2012, ZSL signed a three-way agreement with SRI and NLCP to become the education mentor to the programme. Paul Bamford from ZSL and Susie Offord from SRI visited the project in July 2012 and began a major review of the programme's curriculum – changing objectives to reflect attitudinal and behavioural goals, and creating new resources for both teachers and pupils. The curriculum was given a clearer narrative structure: at the start of the year the children learn life-science topics (lessons on plants, birds and reptiles), then link them into ecological processes like food chains, and they finally identify conservation problems and solutions in their local area. All the examples used in lessons are tailored to life in North Luangwa – in a lesson on water, classes make a plan to clear up a polluted water source in their area, and in another they write stories about how other animals would be affected if rhinos in Luangwa were to disappear.

Zambian school timetables are

wonderful in providing space for local extra-curricular programmes, so children in participating schools have a special Lolesha Luangwa lesson once a week, led by their Conservation Teacher (a volunteer from the schools' teaching staff). Sylvester and his Assistant (LLA), Michael Eliko, visit every school five times a year to deliver additional presentations, using black rhino conservation as an example to build on the content that the weekly lessons deliver.

The new curriculum hit desks in January 2013 and is just coming to the end of its first academic year of use. In March 2013, Paul and Kate Oliver (another educator from ZSL) travelled back to Luangwa to run training workshops for all the Conservation Teachers and Head Teachers, to fully embed the new curriculum, identify any issues and to learn as much as possible about how the schools were using it.

Sylvester and Michael also benefited from ZSL educators' mentorship during the trip. Although they are highly skilled presenters, they have no formal teaching background, and so have been hungry for information from Paul and Kate on learning styles, types of learning evaluation and much

more; this has raised their confidence in their work. Sylvester and Michael write regular reflective evaluations on their lessons and email them to Kate in the UK, who can offer suggestions and tips to continue their ongoing development.

A final key contribution by ZSL has been to update the monitoring and evaluation methods of Lolesha Luangwa. For many years, this has been based on feedback letters from teachers and outputs at annual Conservation Celebration Days, when children from each school travel to a central location to perform plays about rhino conservation, sing songs and display poems and pictures they've worked on throughout the year. The children look forward to these exciting days all year, and families and local people come to watch the performances – for some their only source of conservation information.

With the new aims of changing local attitudes and behaviours, deeper evaluation methods were needed. But how can you measure a person's feelings? In Zambia there is a strong culture of politeness that often gets in the way of finding out people's honest opinions – especially if they are negative! New Activity Books for



the children to use in lessons were designed with this in mind, including drawing and writing tasks about their local environment that can later be analysed. And last month, the first interviews with families and adult members of the community were undertaken at Conservation Celebration Days – year on year these will build up a picture of if and how local feelings have changed.

What's next for Lolesha Luangwa? A recent generous grant from USFWS has enabled the purchase of a truck to transport children into the National Park itself, to experience their local protected wildlife and habitats for the first time. These bus visits will start in 2014.

One of the best things about the programme, however, is how it has spread. All the organisations involved, from NLCP to ZSL, SRI and funders, agreed to share the new learning resources for teachers and children with other organisations. As a result, the curriculum is being used by environmental education programmes across Zambia and Africa, and is being adapted for possible use on an elephant

ABOVE: ONE OF THE PERFORMANCES AT THE MUKUNGULE CONSERVATION CELEBRATION DAY IN OCTOBER 2013. THE BLACK RHINOS ARE BROWSING ON SHRUBBERY © NLCP **BELOW:** CHILDREN FROM ONE OF THE 22 SCHOOLS AROUND THE BOUNDARIES OF NORTH LUANGWA NATIONAL PARK THAT PARTICIPATE IN LOLESHA LUANGWA ("LOOK AFTER LUANGWA"). THEY ARE EACH HOLDING AN ACTIVITY BOOKLET, DESIGNED IN LATE 2012 AND LAUNCHED IN JANUARY 2013 © ZSL



protection project in Thailand. Local dignitaries in Zambia have been impressed by the programme's wide-ranging success, and the ultimate dream of including environmental education into the Zambian National Curriculum seems a little closer to reality.

We hope that the example of

Lolesha Luangwa shows that donating time and expertise from zoo educators (just a couple of days a month in this case) can result in huge benefits to *in situ* conservation programmes. Is it working? Well, to date – touch wood – no rhinos have been poached in North Luangwa since the reintroductions. Long may that continue!

The building of Brazil

A REVAMPED BRAZILIAN ASSOCIATION IS PLANNING TO PUT THE COUNTRY BACK ON THE INTERNATIONAL ZOOLOGICAL MAP



Yara de Melo Barros, President, Brazilian Society of Zoos and Aquariums (yarambarros@yahoo.com.br)

Across the nation, Brazil has 106 zoos plus 10 aquariums, and between them they hold approximately 50,000 animals. Sadly, however, many of these zoological institutions struggle are of low quality, with outdated physical structures, bad management and no record-keeping. There are currently few capacity-building opportunities to train the staff and improve their performance.

The majority of the institutions (54%) are public and funded by municipalities, and 81% of them are not allowed to charge entrance fees, being entirely dependent on their current Mayor's political interests.

Many animals in Brazilian collections come from confiscations from illegal trafficking, and the number of animals apprehended certainly represents only a small portion of the actual number of animals illegally captured in the wild.

The Brazilian Society of Zoos and Aquariums (SZB) was created 35 years ago. Its new mission is to aggregate zoos and aquariums in Brazil, seeking their full development, improvement and strengthening. The Society wishes to become a reference for

ex situ conservation in the country, participating in official breeding programmes for endangered species, and coordinating the exchange of animals with international breeding programmes.

However, SZB faces many difficulties and challenges, such as the lack of participation from zoos and aquariums, inefficient organisation or structure, and lack of clear objectives. All these issues contribute to SZB's inefficiency as an organisation, resulting in the loss of most of its members and its credibility. So, on March 2013 the SZB elected a new board of directors, which is now working tirelessly to reverse this situation and make the organisation strong and efficient.

A key activity towards reaching this goal is to carry out a CBSG Workshop for the generation of a five-year Action Plan for SZB. Its aim will be to strengthen the institution and promote the participation of all Brazilian zoos and aquariums by identifying and prioritising actions that will assist SZB in becoming internally organised, enabling the institution to

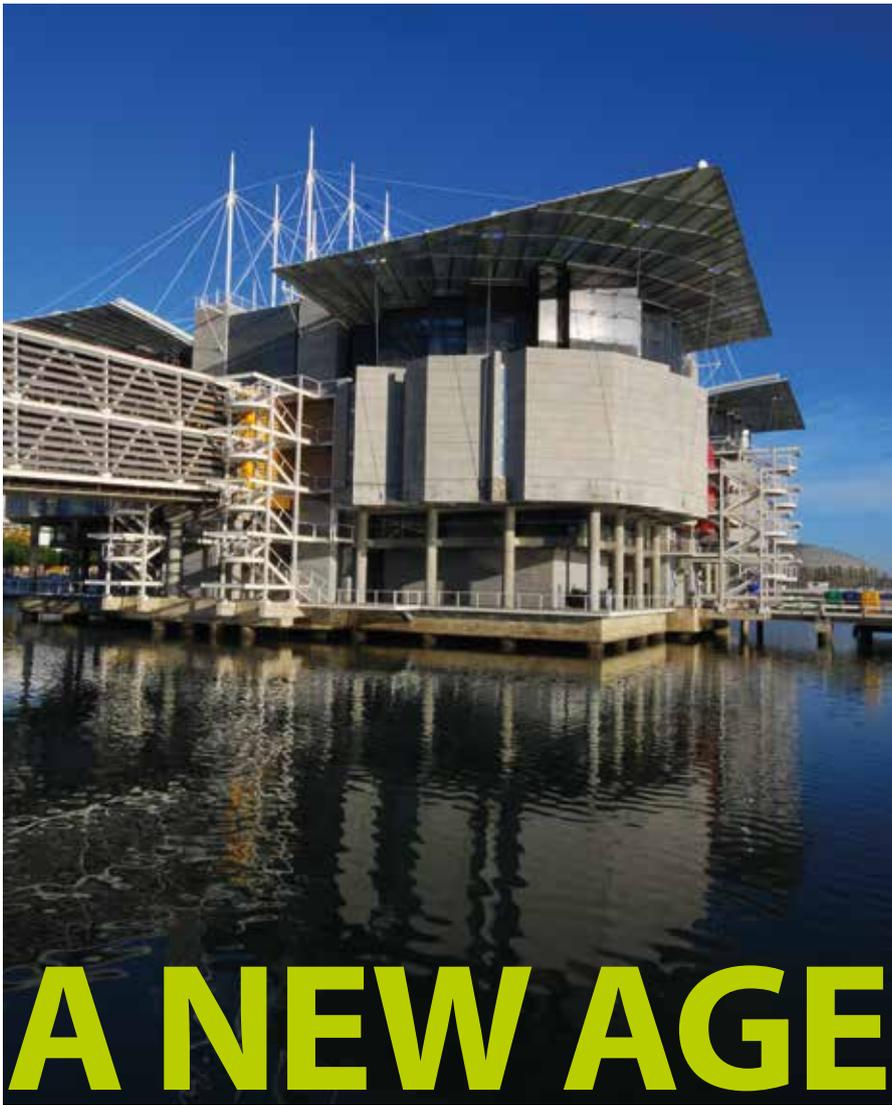
work efficiently towards improvement of standards and quality of Brazilian zoos and aquariums. Thanks to this workshop we will integrate Brazilian zoos in the international zoo community for the development of cooperative breeding conservation programmes with the aim of working with zoos in the EAZA community.

The process will include experienced facilitators from the IUCN/SSC Conservation Breeding Specialist Group: Arnaud Desbiez of CBSG Brazil, and Kristin Leus of CBSG Europe. Bengt Holst will be sharing his experience from EAZA as will Anne Baker from AZA.

Considering the lack of funds of SZB, we are currently fundraising to help pay for the costs of the workshop, and any support from the EAZA zoo community will be more than welcome! Please consider helping SZB zoos and aquariums become an active participants in the global ex-situ community.

To find out more, please contact the author, Yara de Melo Barros, at yarambarros@yahoo.com.br.





A NEW AGE

OF AQ

JOAO FALCATO IS CEO OF THE OCEANARIO DE LISBOA, ONE OF THE LARGEST STAND-ALONE AQUARIUMS IN EUROPE, AND HE HAS RECENTLY BEEN APPOINTED AS CHAIR OF EAZA'S AQUARIUM COMMITTEE. ZOOQUARIA CAUGHT UP WITH HIM TO FIND OUT MORE ABOUT HIM AND HIS THOUGHTS ON THE FUTURE OF AQUARIUMS IN EUROPE AND BEYOND

ZQ: Joao, when did you become CEO of the Oceanarium, and what was your previous position?

JF: I became CEO of Oceanário in 2006. I started as an aquarist in 1997 and since then occupied several positions – Galleries supervisor, Habitats supervisor, Curator of Exhibits, General Curator, Biology Director and finally CEO. After 16 years serving this institution I still feel that it is a privilege to work in organisations that have the potential to contribute to a better planet and that it is the responsibility of each one of us to give our best in order for our institutions to achieve it.

ZQ: What led you to work with aquatic species and, more specifically, why in a public aquarium?

JF: I consider myself very lucky as I knew very early in life what I wanted to do professionally. I had my first aquarium when I was 5 years old, and started breeding fishes and gardening planted aquariums at a very early age. I went to university, where I graduated in Aquatic Sciences, already knowing I

wanted to work with aquariums, but it was only in my second year that I realised that huge public aquariums were being built around the world. It was really fortunate that an amazing public aquarium opened in Lisbon five years after I finished university, and even more incredible was the fact that I was hired to be an aquarist.

Today I am the CEO, something I really never dreamed could happen to me.

ZQ: In your view, what are the greatest challenges facing the European and global aquarium community?

JF: In my view one of the main challenges, not only for aquariums but for many other organisations as well, is how to stay relevant in the 21st century. The world is changing so fast that if you are not careful you may become irrelevant very easily. I truly believe that conservation is a strategic approach for zoos and aquariums, not only because it is the right and ethical thing to do, but also because it has the potential to

OCEANARIO SCENARIO

The Oceanario de Lisboa, or Oceanarium, which opened in 1998 as part of the Lisbon World's Fair, is one of the country's leading attractions; with over a million visitors a year coming to learn about ocean life and conservation.

As a state of the art facility that thoroughly reflects the EAZA ethos, the Oceanario de Lisboa is at the forefront of aquarium development in Europe, and its CEO a perfect choice for this important position.



AQUARIUMS

ensure you are even more relevant in the future. Financial sustainability is much easier to achieve when you are relevant and you can develop much more conservation work if you are financially sustainable, so I think this is a virtuous cycle that every aquarium should try and jump into.

ZQ: What changes have you seen in the aquarium community in the past 20 years and what changes do you foresee in the next 20 years?

JF: A lot has changed in the aquarium world over the last 20 years. The last generation of aquariums only started appearing in the 70s/80s and the technology advances that allow us to maintain aquatic animals healthy in captivity have been progressing ever since. I remember when we opened Oceanário that maintaining a thriving coral reef tank was a huge challenge that only a few could achieve. Today we reproduce corals, asexually, sexually and know how to maintain and breed these animals. This is only one example of many in relation to

the amazing developments that have been occurring in public aquariums. Today, the technical challenges are decreasing, although they still exist for many species, but for most of them the know-how exists – it is clearly a complex know-how, but if you look for the information in the right places you will find it, which did not happen in the past.

For that reason I believe that in the near future the focus will shift to other issues like collection sustainability and conservation. In relation to education many aquariums already lead the industry in terms of the quality of their programmes. I would hope that aquariums become conservation and education institutions that have an amazing communication and engagement tool to work with – a magnificent exhibit of the underwater world.

ZQ: What do you think of the significant monies being spent on new aquariums and do you think these will ever supply 'conservation payback'?

JF: I think it would be presumptuous of me to answer this question for two main reasons. It is impossible to know what an institution will deliver in the future; it really depends on the people that run it, more than the institution itself, and I would not dare to put a financial value in relation to saving one animal or contributing to the survival of a species. It is a question that it is impossible to have an opinion about.

ZQ: What aquatic species or group of species do you think should be of the highest conservation focus for EAZA and why?

JF: I prefer to look at ecosystems instead of individual species. If we were able to save the coral reefs we would certainly be saving the biggest number of species, but the threats to them are so huge, when you look into climate change and the acidification of the oceans, that it is hard to imagine that public aquariums will be able to change the world in order for them to survive. We need to work on individual behavioural change in order to achieve it, with all the challenges that come with it. I would say freshwater ecosystems are the ones where aquariums can really have an important impact, but unfortunately many aquariums, like Oceanário, focus only on saltwater and many of the freshwater animals are not considered as attractive for the public. I really believe that we could have a serious impact if we dedicate work to this environment and associated species.

ZQ: How do you see coordinated breeding programmes progressing for aquatic species in EAZA?

JF: As I said before, for many years aquariums focused on delivering the best environmental conditions for the animals that were under their responsibility to care for, which was a huge challenge. I really believe this is one of the main differences between zoos and aquariums: the technical challenges to keep animals healthy were mastered many years ago by zoos and that was not the case for aquariums. Like every other activity or product, you always have the early adopters and need to struggle a little bit, for a tipping point to be reached so the activity or product becomes mainstream. I think that is what happened to the breeding programmes of aquatic species.

After some years where breeding programmes struggled to move ahead, with many of the aquariums focused on the technical challenges of animal welfare, the tipping point was probably reached two or three years ago, so I would predict an exponential growth over the next few years with more and more aquariums involved, until the number of managed species stabilises again. For that to happen we will certainly need to improve a few tools so we can manage very fecund species which is still an unsolved challenge.

ZQ: The IUCN recently announced an increase in the number of protected marine environments worldwide. Do you believe that marine reserves such as these can play a significant role in maintaining ocean biodiversity? Can aquariums help with this?

JF: I am a firm believer that marine protected areas are one of the main solutions for preserving biodiversity in the ocean, although they are not immune to many threats like climate change or ocean pollution which is a huge challenge. The places that should be protected may move with the increase of

water temperature in the oceans as well which does not help.

The last figures I read reported that if we protected between 20 and 30% of the oceans, their productivity would increase by 20 to 30%, making much more food available for fishing with a lot less effort and much more financial profit, which certainly is a win-win situation. It is hard to understand why it is not yet implemented.

Aquariums can certainly play a role in this area by informing the public about the issue, making it easier for the protected areas to be implemented and accepted (lots of conflicts normally arise). They can also get involved in several projects of research and conservation like the monitoring of the evolution of the protected area, and the measurement of the financial impact over time among many other possibilities. Oceanário de Lisboa financed a project (€100.000) to develop collaborative governance on the only no-take marine reserve in continental Portugal with great results and knowledge development for our country. Many aquariums already help in many aspects of MPAs around the world, but I am sure much more can be done.

ZQ: With over-fishing a constant theme of reporting in the media, do you believe that aquariums can play a part in reducing the pressure on fish populations and, if so, how?

JF: It is certainly one of the fields where aquariums have been working for a long time. We must realise that most of us still eat the lions and tigers of the sea. Agriculture and animal production in the oceans is still in its early stages and bring many sustainability challenges that often make eating a wild fish more sustainable than eating a farmed one. This also puts in perspective the fact that aquariums still rely on nature as a source of animals where zoos largely do not. We do not eat tigers, but we eat the top predators of the ocean and will continue to do so for a long time in the future. Having said that, many public aquariums have led the way in helping people make the right choice in relation to the fish they eat. The biggest impact we can have is by influencing the final customer to choose the right fish to eat and to avoid the most susceptible ones. There is a large number of sustainable seafood projects developed by aquariums as they are often developed locally because the lists of susceptible species vary according to the region you are in.

ZQ: How do you like to relax when you are not running the Oceanarium, or the EAZA committee?

JF: My main hobby is my wife and children. They allow me to completely shut off from my professional life and to be a part of the pure joy of having fun and being a child again. I also have a lot of fun taking care of my plants, but if I had to choose an idyllic situation, I see a big table with great food and wine on a sunny day, a lot of friends talking over the meal, and all the children having fun together nearby.

ZQ: When did you last travel abroad? And where is your favourite place to visit?

JF: I travel mainly for work and must admit that in my personal life I value the company more than the place. So I normally have my vacation in Portugal on the beach or in the mountains, always with the family, many friends, good food, good wine and lots of fun.



Integrated conservation – pure pride

The article ‘Pure Pride’ in the breeding programme section of *Zooquaria* 83 describes how a group of EAZA member zoos work together with the EAZA Felid TAG and other partners towards creating a studbook for purebred African lions. So as to elaborate on how this work ties in with field conservation, EAZA invited felid conservation experts Urs Breitenmoser and Christine Breitenmoser-Würsten, as chairs of the IUCN SCC Cat Specialist Group, to present their views in relation to this ongoing quest. Here’s what they said.

Identifying the ‘purebred African lion’ is like the quest for the Holy Grail: we will never find it, but the important issue is the search itself. Lions are widespread in Africa and live under diverse ecological conditions, which have resulted in evolutionary local adaptation. Furthermore, the phylogenetic history of the lion, eg its distribution during the last ice age, has considerably shaped the genetic patterns we see today. Dubach *et al* (2013: Genetic perspectives on ‘Lion Conservation Units’ in Eastern and Southern Africa, *Conservation Genetics* 14: 741–755) have confirmed that the central and western African lions are genetically distinct from other lions in Africa, that there is however also differentiation within the east and south African distribution range. To complicate the picture, local lion populations can be morphologically different, but the morphological and the genetic pattern do not always concur. Over the past 60 years, human activities have increasingly shaped the distribution of the lion in Africa and have led to reduced or interrupted gene flow between subpopulations.

STEPHEN ALLISON

The result of such isolation may be seen in the phenotypical or genotypical patterns, and they must be carefully interpreted and not be confounded with evolutionary adaptation! On the other hand, recent translocations of lions within Africa have already blurred the original (genetic) arrangement.

So the crucial question for the conservationist is: What is the evolutionary significant unit (population) that we would like to conserve? The challenge is to identify phylogenetic differences that are important for the maintenance of the biodiversity, but then, within such ‘ESUs’ to maintain the optimal gene-pool. ‘Optimal’ may not imply a total mix of all individuals within a population. Populations spreading over very large (and ecologically distinct) areas may have to be maintained as metapopulations with limited (but not zero) gene-flow between subpopulations. Under captive conditions, the crucial question will be how to balance between the risks of inbreeding and outbreeding of a designated ‘pure population’.

To identify ESUs in the wild is a considerable challenge, and then to transfer it into a meaningful conservation breeding programme is another one. Nevertheless, we must tackle these questions, and the IUCN/SSC Cat Specialist Group welcomes the initiative of EAZA to support the genetic research of the wild lions as well as the intention to improve the breeding programme of African lions. Our present knowledge suggests that there is not one ‘purebred African lion’, but that there are several distinct units or populations that we should consider as ESUs.

The top priority is clearly the lion of central and western Africa, proposed as a distinct subspecies and highly endangered. But also the large lion metapopulation in east, south and south-west Africa is probably too diverse to consider it a single ESU. As long as we are not having all the answers from the genetic research, we would recommend starting breeding according to identified subspecies and, within the large group of *Panthera leo leo*, according to zoogeographical regions.

LONG LIVE THE KING

KING PENGUINS ARE ONE OF THE AMBASSADOR SPECIES FOR EAZA'S POLE TO POLE CAMPAIGN, SO HOW ARE THEY FARING IN ZOOS ACROSS THE CONTINENT?

Lynda Burrill, Zoo Registrar & ESB Keeper for the king penguin, Royal Zoological Society of Scotland

King penguins (*Aptenodytes patagonicus*) are probably one of the most charismatic penguin species and, with the absence of any emperor penguins in captivity in Europe, the largest penguin species held within EAZA zoos. In the wild they inhabit large colonies of several tens of thousands of pairs during their breeding season and have the longest breeding cycle of any bird, taking 14 – 16 months to fledge a single chick. King penguin breeding colonies are found on the islands of South Georgia, Crozet, Prince Edward, Kerguelen, Macquarie and Heard, which all lie close to the Antarctic Convergence. There is also a small breeding colony on the Falkland Islands. Although IUCN currently classifies this species as being of Least Concern with an increasing population, king penguins are still a species that is susceptible to climate change and as such, they are one of the ambassador species for EAZA's Pole to Pole campaign.

There are currently 18 institutions in the King penguin ESB holding a total of 265 birds as at the end of 2012. There is a constant high demand for birds with several EAZA institutions keen to add the ever popular and colourful king penguins to their colonies. However, within the last five years the captive population in Europe was highlighted as being not self-sustaining without some relatively significant interventions. In recognition of the need to start addressing this issue, a king penguin workshop was held during the EAZA conference in Verona in 2010. Since then progress has been made on addressing some of the issues identified and 2012 was the first year since 2007 that there were more hatches than deaths.

Complete data for 2013 has not yet been collated but the news so far from the various collections holding king penguins is looking good with nine



chicks hatching in Basel, Odense, Rotterdam, Vienna and Zurich. Special congratulations are due to Vienna who have had their first king chick in six years. There has also been promising breeding behaviour and egg laying among some of the other collections holding king penguins so hopefully we will start to see more chicks join the population in the next few years.

Historically the king penguin population has been made up of a number of relatively large imports of either eggs or birds of a similar age and therefore there are a disproportionately large number of birds in the 15–22 year old category. Unfortunately a lot of the birds in this age range have never bred and are now starting to die off so, excluding imports, the total population decreased by 30 birds in the period 2002 – 2012. In a population of approximately 260 birds, this is a high population decline. In addition, the current population is heavily skewed towards males and this is reflected in the group composition at each institution.

Prior to the workshop in Verona

in 2010 a detailed questionnaire on husbandry and veterinary issues was distributed to all king penguin holders. The results of this questionnaire were presented at the workshop and the way forward was agreed as follows:

- All participants were to be rated in terms of their previous breeding success against the number of deaths per collection. This would then allow each participating collection to be rated as either core to the programme, one of the experienced breeding colonies, collections with previous breeding experience which have not had any success recently or new collections with no breeding experience.
- Priority was then to be given to ensure that core institutions had the maximum number of birds they could hold in even-sex ratios whenever possible as it had been established that both these factors were key to breeding success.
- Efforts would be made to identify institutions that were willing to hold bachelor groups of birds.
- A standing recommendation was put



in place that institutions should hold a minimum of six birds in a bachelor group and preferably more than six pairs for breeding

- Institutions were encouraged to sex and individually identify all birds to allow full population analysis and individual transfer recommendations.

Historical information for each collection was collated to allow each institution to be rated and these ratings were then communicated to the holding institutions. A first set of transfer recommendations were distributed in May 2013 following extensive consultation with the parties involved and the number of unsexed birds in the studbook has reduced dramatically from nearly 13% at the end of 2011 to 5% at the end of 2012. In addition Simone Schweizer from the University of Basel has produced a study entitled 'Recipe for Success in Captive King Penguin Breeding: A Comparison of Husbandry Practices and Breeding Success among Zoos'

with the support of the king penguin holders in Europe and especially Basel Zoo. This study will be published shortly and provides some good insights into the issues faced by institutions holding king penguins as well as highlighting the importance of maximising the number of birds in each colony and the importance of equal sex ratios – as discussed during the 2010 workshop.

The future of the captive king penguin population within EAZA institutions is still not assured but considerable progress has been made to date and the majority of institutions holding king penguins have shown that they are willing to co-operate for the good of the species. Attention can now be focused on the opportunities to increase the total population size with increasing breeding success through improved husbandry practices and active studbook management as well as investigating opportunities for transfers into the ESB (both birds

and eggs) from other regions. Contact has recently been established with the AZA Penguin TAG within the context of the wider EAZA Penguin TAG and discussion has been focused on possible future cooperation in terms of best practice guidelines and the application of the recently innovated penguin artificial insemination techniques within the European king penguin population. Work is currently also being undertaken on a proposal to make the species into an EEP in the future to allow the level of management required to address the declining population.

My profound thanks go to the ESB participants who have been willing to co-operate throughout this exercise and who appreciate the importance of considering the future of the overall population over the needs of their individual institutions. I have appreciated your prompt responses, feedback and encouragement throughout the process.

DEVELOPING A CLIMATE OF CHANGE

FOCUSING THE ENERGY OF THE CBSG COMMUNITY ON SOLUTIONS TO CLIMATE CHANGE

Onnie Byers, Chair of the Conservation Breeding Specialist Group of the IUCN and Emily Wick, Communications and Technology Administrator, Conservation Breeding Specialist Group of the IUCN

For a number of years, the Conservation Breeding Specialist Group (CBSG) has worked to find a solution or an action that matches both the skills of our community and the scope of the problem we face in climate change. Last year, we brought to our 2012 CBSG Annual Meeting in Melbourne the pressing question: How can we best focus the energy of the CBSG community on solutions to the growing threat of climate change?

Among the things the meeting participants tasked us with was catalysing action to create a movement with the express goal of seeing that ‘no government on the planet can ignore the danger of climate change and all must be actively working to realise “safe” CO₂ atmospheric concentration levels of 350 parts per million (ppm). The people need to tell governments that we will not stand for inaction anymore.’

We immediately began researching existing climate change groups. We found many groups dedicated to climate change action, and some even call themselves movements. The great majority were sector-based, focusing on women, youth, people of the southern hemisphere, and others.

Then we found 350.org.

350.org is an organisation aiming to solve the climate crisis by addressing systemic barriers to climate solutions. They do this through grassroots organising, direct actions, and online campaigns. We studied their website, read articles and books by and about them, investigated their critics, and met with their leaders in Washington DC and Minnesota. The more we learned about 350.org, the more we realised that CBSG didn’t need to start a movement... we needed to join one.

So in October at our 2013 CBSG Annual Meeting, we were proud to announce the launch of our climate change initiative, Zoos and Aquariums for 350. Zoos and Aquariums for 350 links to the 350.org movement and

includes several components that offer an opportunity for all zoos, aquariums, and individuals to join.

Zoos and aquariums and the 350.org movement make a perfect partnership. 350.org is a movement dedicated to bringing atmospheric levels of CO₂ back to 350 ppm — which is precisely what we were tasked with creating. They are also dedicated to improving life on a changed planet. What could be more closely aligned with the core zoo and aquarium mission to conserve nature and teach children about its wonder?

The first part of the movement is divestment from fossil fuel companies. Divestment is the opposite of investment — it means getting out of stocks, bonds, investment funds, or banks whose investments are inconsistent with your personal or institutional values. Any zoo that invests money, whether in stocks, mutual funds, or in an investment bank, can choose to divest from fossil fuel companies and reinvest in solutions that align with your mission of conservation. And there is an increasing body of evidence that this can be done without increasing risk or decreasing returns.

Divestment takes the fight for climate action into a different level. Though work on reducing demand for fossil fuels must continue by reducing personal and institutional carbon emissions, something bigger is at play. The most recent IPCC report states that in order to stop runaway climate change from happening, we must quickly scale back our use of fossil fuels. However, the sizeable income of fossil fuel companies relies upon our dependence on their product. These companies profit from denying climate change and stalling necessary government action.

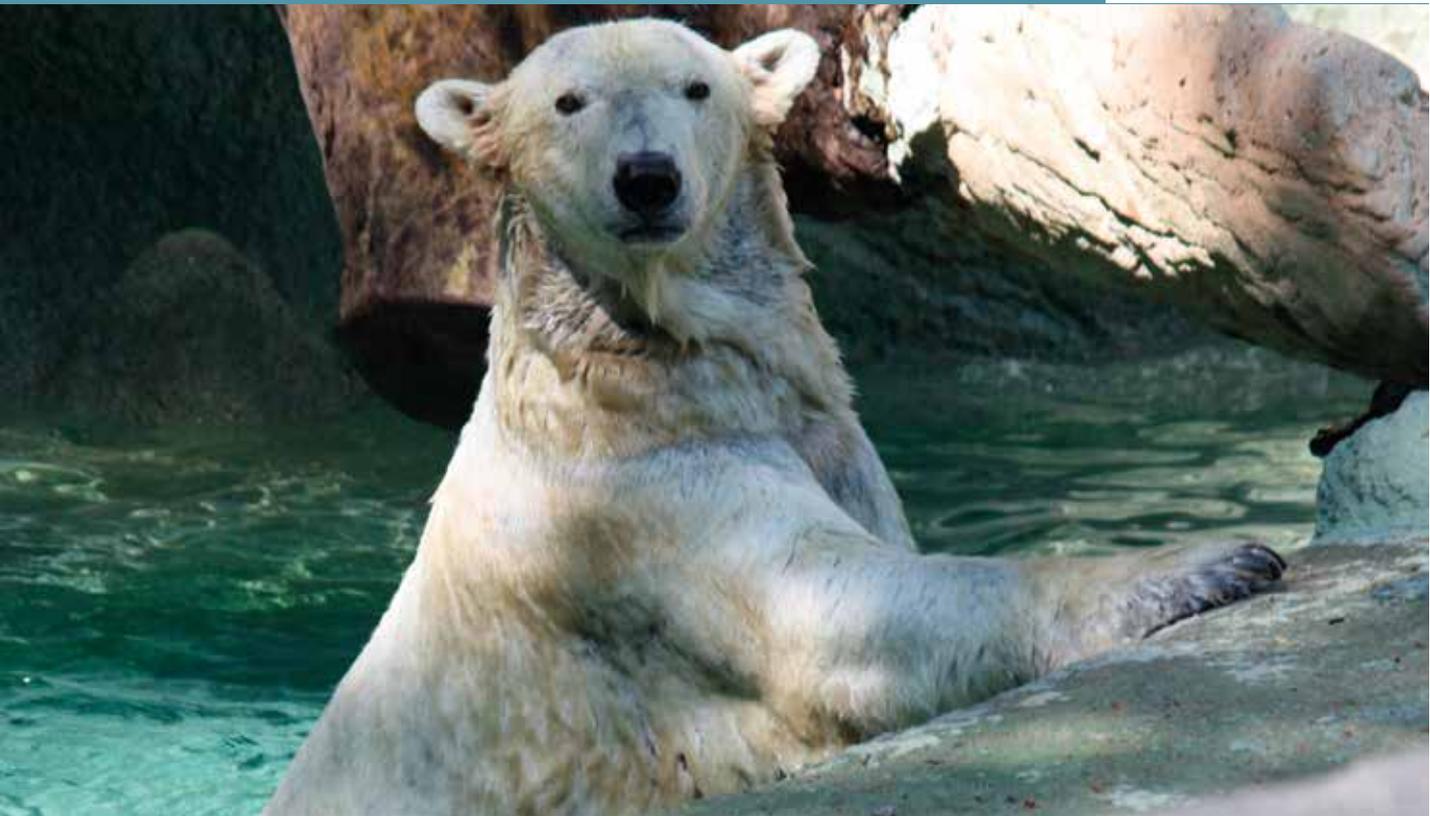
Divestment is a way of calling these companies out on this behaviour and drawing attention to the moral problem with investing in them at the expense of current and future generations. It tells governments, the financial sector, and the public that zoos and aquariums

are concerned about climate change and the role of the fossil fuel business plan in perpetuating it. We should stop investing in companies that forge ahead in extracting and burning fossil fuels when what we need is a collective movement toward greatly reducing our dependence on fossil fuels.

LEADING BY EXAMPLE

Before CBSG could ask anyone else to take this step, we had to be willing to do it ourselves.

So in January we brought this request to the Board of the Global Conservation Network, the non-profit organisation established to support the work of CBSG. They made the bold decision to divest CBSG’s reserve funds from fossil fuel companies. As of that day, we have not made any additional investment in funds supporting fossil fuel companies and we are working on our plan to be fully divested within five years. We have very little money in our reserve account and our move towards divestment would be purely symbolic if we were doing it alone. But we are not. We added our voice to those of many other institutions – six colleges, 17 cities, and other foundations and institutions – making the same bold decision. This is the power of the movement and this is how change will happen. Zoos and Aquariums for 350 calls on zoos and aquariums to immediately freeze any new investment in 200 fossil fuel companies that hold the greatest amount of unburned fossil fuel reserves and to create a plan for fully divesting within five years. In addition to shining a light on the importance of where our money is invested, Zoos and Aquariums for 350 also provides an avenue for carbon offsetting. A carbon offset is a reduction in emissions of carbon dioxide made in order to compensate an emission made elsewhere. In other words, it is a payment made in support of a project resulting in reduced carbon emissions, in order



to compensate for the unavoidable carbon emissions of your institution. Many zoos already reduce and offset their emissions, and some are even certified as carbon neutral. Zoos and Aquariums for 350 calls on all zoos and aquariums to reduce their emissions as much as possible and then to commit to offsetting the remainder. This part of the movement is still in the process of being developed, but we're working to identify an excellent carbon offset provider to work with interested zoos and aquariums. Using this universal provider will help us unite our efforts in becoming carbon neutral. Those who have already made progress in this area can report on their successes in this area and be acknowledged for their efforts.

SHOW YOUR FACE

Finally, it is important to visually connect our focus on climate change back to the endangered species that it will affect. Zoos and Aquariums for 350 calls on all zoos and aquariums to 'Show the Wild Face of Climate Change' by submitting photos of one or more species in their collection that are specifically climate-threatened. The

photos should contain a sign with the Zoos and Aquariums for 350 logo on it, along with any other words or phrases including the name of the species and your zoo. Finally, Zoos and Aquariums for 350 calls on all zoos and aquariums to support the EAZA and AZA Pole to Pole campaign. Pole to Pole highlights the effectiveness of collective action in reducing energy use. It provides advice and materials to zoo and aquarium visitors and the wider public to help them take individual steps that can make a huge collective difference to endangered species and ecosystems impacted by climate change. When we introduced Zoos and Aquariums for 350 at our meeting in Orlando, the participants responded with great enthusiasm. At the end of the meeting, many stood and voiced their plans to carry this momentum onward and back to their home institutions. We congratulate all these 'founding members' and special thanks go to our first three committed divesters: Lena Linden on behalf of Nordens Ark, Lesley Dickie for EAZA, and Sally Walker.

Other EAZA members who stood and committed to taking action include

Andrea Fidgett (Chester Zoo), Bengt Holst (Copenhagen Zoo), Bryan Carroll (Bristol Zoo Gardens), Frands Carlsen (Copenhagen Zoo), Jo Gipps, John Fa (Durrell Conservation Trust), Kirsten Pullen (BIAZA), Kristin Leus (Copenhagen Zoo), Mark Pilgrim (Chester Zoo), Mark Craig (Al Ain Zoo), and Paul Pearce-Kelly (ZSL).

By joining the movement, greening your institution and your portfolio, and sharing information, passion, and calls for action with your colleagues and visitors, you will make an investment in a liveable future for children and for wildlife. We feel that now is the time for our community to join the 350 movement, which is gaining momentum across the globe.

Together we have the opportunity to take a leadership role in responding to the global crisis of climate change. We have the chance to tackle the source of the problem that, if left unaddressed, will continue to undermine all our conservation efforts. Opportunity to create change is knocking on our door. Will you be next to stand up and answer?

Go to www.cbsg.org/zoos-aquariums-350 and join the movement.

Partnerships for the future

REFLECTIONS ON THE IUCN SSC SOUTH-EAST ASIA CAMPAIGN

Will Duckworth, SSC and Asian Species Action Partnership, Bill Robichaud, Saola Working Group

After over two years of planning, creative thinking, and sheer hard work, the EAZA IUCN SSC South-east Asia Campaign closed at the Edinburgh EAZA annual meeting in Sept 2013. As the first EAZA campaign with a formal external partner, its close is an opportunity for reflection – here, from the SSC viewpoint.

IUCN, the International Union for the Conservation of Nature, was founded in 1948 and is a unique conservation body, being the union of over 1,200 state and non-government organisations across the world. Much of IUCN's programme is informed technically by its six commissions. These commissions harness the global expertise in six areas vital to IUCN's mission, mostly through a volunteer framework. SSC, the Species Survival Commission, is the largest and one of the oldest. Species are building blocks of biodiversity and while the consequences of the loss of any given species are rarely clear, agreement is almost universal that the colossal acceleration in rate of species loss, from ever-expanding human pressures, threatens humanity. Zoos and aquariums, which share a central currency of species with SSC, are a natural partner for it.

The South-east Asia Campaign was selected because South-east Asia is at the global forefront of species loss. Almost half the world's people live in South-east Asia or neighbouring countries, in less than an eighth of the world's land. Many of these people use, or aspire to use, consumption and display of wildlife meat and products as a show of social status, which is rooted in millennia-old beliefs that consumers of wild animals absorb their vitality. The region's rapid economic growth allows ever more people to purchase wildlife, provides the technology of mass harvest (notably wire snares), and makes transport networks to urban markets ever faster and spatially pervasive. During the last couple of decades' meteoric growth in consumer base and

supply systems, wild habitat, and thus the supply of these animals, has shrunk faster than ever before. No continental region of the world has ever faced such deep and rapidly intensifying threats to its harvested fauna.

The campaign's several, somewhat linked, aims fell into the categories of raising money for immediate action, raising awareness in Europe of the South-east Asian crisis, and expanding durable partnerships between the EAZA zoo community and the *in situ* conservation bodies.

MONEY

The financial demands of preventing species extinction seem daunting (although they are dwarfed by, say, European defence spending) and consistent shortfall stunts conservation success in the region. Some aspects of funding are consistently challenging. For example, repetitive funding of essentially the same thing deters many conventional donors. Yet vital to many species projects is long-term support to law enforcement, and associated public awareness, to prevent individuals thieving society's biodiversity. A few years' experimentation with a demonstration pilot project is no more likely to 'solve' poaching than it is any other high-income crime. But the zoo community recognises the vital role of ongoing basic security. Similarly, while funding conservation of species with a high public profile is easy, little-known species, even if considerably more threatened than the better known ones, appeal to few donors. The campaign preselected six projects for assured funding, all focused around highly threatened low-profile species and/or with basic repetitive needs; most were both. The balance of campaign money will be disbursed in early 2014 to up to a dozen other projects tackling highly threatened 'forgotten' species. Additionally, a sizeable Campaign grant has allowed SSC to contract a half-time director for the emerging Asian Species

Action Partnership (ASAP), a broad-based coalition to continue catalysing action for South-east Asia's most threatened species.

AWARENESS

Most conservation projects in tropical Asia are handicapped by low awareness in one or more (usually more!) key constituencies. Firstly, globally there is limited understanding of the region's desperate conservation situation. Secondly, most people's thoughts of South-east Asian animals needing action rarely include species closest to extinction (those categorised as Critically Endangered by *The IUCN Red List of Threatened Species*). This is not an argument against conservation attention to the likes of Asian elephant and tiger – conservation, like most things, works better when it has the luxury of orderly planning than when it is emergency fire-fighting – but sadly the proximate cause of impending extinction for most of the 154 non-marine vertebrates of SE Asia is ignorance and apathy. Only a handful of these 154 species have any specific conservation action in place; a couple of dozen more inhabit meaningfully managed protected areas albeit unshaped by any specific needs these species may have; and the rest receive almost nothing from the conservation machine. Yet the species on the verge of extinction, while admittedly including various small grey fish broadly resembling other small grey fish, include some of the earth's most distinctive (visually as well as phylogenetically) animals, from giant freshwater fish (including the wondrously, and aptly, named dog-eating catfish) to the highly distinctive and beautiful saola. From SSC's viewpoint, among the biggest benefits of Campaign partnership was EAZA institutions' reach to Europe's general public, including decision-makers, of all generations. EAZA zoos speak directly to 140 million of the European public annually. No field project can even approach this,



and nor can any of their other typical partners (eg mainstream institutional donors). The SE Asia campaign offered a remarkable opportunity to put hitherto little-known species firmly in the European public's perception.

LONGER-TERM PARTNERSHIPS

Most field practitioners conserving highly imperilled South-east Asian species expect that averting the species's extinction will require several decades' work, at least. But the campaign lasted only two years. Some EAZA institutions have a laudable history of unbroken, multi-year support to conservation of high-priority species. Generally, these involve provision of essential funding; but as ever more species' populations shrink, even more vital is zoos' hands-on expertise in intensive management, both husbandry and demographic – something which most implementing organisations and other donors lack. Several partnerships for such technical support were cemented during the campaign.

One South-east Asian species typified these needs to perfection: highly charismatic yet almost unknown in

the west, chronically underfunded, and in such a plight that intensive management may be its last hope, the saola was selected for the campaign logo. Whilst an unfamiliar animal on a logo, kept in no zoo, might deter some potential campaign participants, the campaign objectives warranted taking this risk.

The saola, discovered to the western world only in 1992 and confined to Laos and Vietnam, is among the world's most threatened species. Efforts to conserve it have suffered precisely because it is so little known – off the radar of donors, the public and even conservation organisations' decision-makers. In short, saola conservation has suffered from a lack of constituency. Making the saola a campaign focus filled, therefore, both a pressing need of saola conservation, and a campaign aim – to raise funds and awareness for neglected but urgent issues of global wildlife conservation.

The Campaign contributed €0,000 to saola projects, a significant boost to the fortunes of saola conservation. But other campaign accomplishments will benefit saola conservation far past the life of those funds. It connected the

Saola Working Group (SWG) of IUCN SSC's Asian Wild Cattle Specialist Group with several individual zoos in Europe, which now provide the SWG with financial and/or technical support. ZooParc de Beauval, for example, supports the salary of a national Saola Projects Manager in Laos. Three EAZA member zoos (Chester, Fota and London) quickly established an additional €0,000 emergency fund, for SWG use should a saola be caught by villagers or otherwise appear captive unexpectedly.

The Campaign also resulted in the establishment of an EAZA 'Intensive Management of Saola Advisory Group' (IMSAG) (see p9), headed by Terry Hornsey, Chair of the EAZA Cattle and Camelid TAG. Three IMSAG members (Terry, Nick Lindsay and Douglas Richardson) travelled to Laos in June 2013 to participate in the SWG's third biennial meeting – which some EAZA member institutions helped fund. Their input helped define the parameters under which the SWG took the step of endorsing establishment of a captive 'insurance' saola population. The IMSAG is now finalising, with the SWG, an action plan for establishment of a saola conservation breeding centre in Laos or Vietnam.

Lastly, among several poignant indications of the campaign's impact, Zoo Ostrava in the Czech Republic named their zoo's new eatery the 'Saola Restaurant'. Before the campaign, few if any members of the SWG had heard of Zoo Ostrava, and few if any staff of the zoo (or its visitors) knew anything substantial about Saola. They now know more about each other, and another relationship has been born. And it is relationships, perhaps more than any other factor, that propel the success of conservation.

SSC warmly thanks EAZA for the invitation to partner in the South-east Asia Campaign. We hope sincerely that EAZA and its member institutions feel the joint venture was as productive as SSC does.

From Red List to read list

INTRODUCING THE IUCN RED LIST TO A WIDER AUDIENCE

Jeremy Harris, Development Director, IUCN SSC

As most of us go through life, there are certain things that we pretend to understand, but that we really don't. Things that, if someone asked us about them at a dinner party, we would probably need to turn to Google to provide any real detail about: the Higgs Boson; investment banking; the Bern convention; pretty much anything 'quantum'; the Convention on Biological Diversity; perhaps even climate change. We're aware that these things are hugely important but, for a variety of reasons, for the great majority of people, they have never really come into focus.

Growing up around conservationists and biologists in a field study centre in the south of Portugal, the IUCN Red List of Threatened Species was on my list of things that were important, but that I didn't properly understand. Years later, in 2008, as I prepared for an interview with the Chair of the IUCN Species Survival Commission and the Director of IUCN's Global Species Programme, my time to Google the IUCN Red List had come. I had no idea what I was getting into.

Even in 2008, finding the IUCN Red List online wasn't too hard. It wasn't easy, but if you searched for 'species' and 'red list' it was certainly a first page result, if not the top of the bill. When I clicked www.iucnredlist.org, I felt as though I had stumbled upon the intranet of an academic facility – bewildered. The layout made it very clear that this was a website developed by scientists and academics, and was largely for the use of scientists and academics. As a non-scientist I felt as though I were trespassing.

Within a few minutes, I was becoming frustrated, but I persevered. After a couple of hours, I had page upon page of notes and my head was spinning. Suddenly, my impending interview was a whole lot more intimidating.

In 2008, the IUCN Red List contained scientific accounts of the conservation status of just under 40,000 species. It took me a while to discover that not all of the species on the list were actually 'Threatened'. Rather, the

records displayed on the website related to large and in some cases complete, taxonomic groups of species sorted into eight categories: Data Deficient; Least Concern; Near Threatened; Vulnerable; Endangered; Critically Endangered; Extinct in the Wild; and Extinct. The term 'Threatened' referred to a subset of species in the categories above Near Threatened, but below Extinct in the Wild.

Somehow I landed the job. As I applied myself to my new role, I thought a lot about my first close encounter with the IUCN Red List. Since 2008, the intimidating academic demeanour and almost unfriendly public face has softened slightly. It is now pretty well known, if poorly understood, and visited regularly by hundreds of thousands of individuals around the world.

Despite some usability limitations, it has for many years had an unbelievable impact, influencing government policy, multi-lateral agreements, and international conventions and funding mechanisms. It's also used to help set species-related priorities across a wide array of organisations in the conservation, zoo, and aquarium communities.

The work that goes into the IUCN Red List is remarkable. A network of some 8,000 individuals provides the bulk of the information. These individuals are distributed among more than 140 Specialist Groups, Task-Forces and Sub-Committees each of which is led by an appointed Chair. Perhaps even more extraordinary is the fact that the vast majority of those involved make their contributions on a voluntary basis or are independently supported by host institutions. That an authoritative resource of such importance to the planet is maintained by the passion of volunteers is astonishing.

As we thought about how to share the story of the extinction crisis unfolding on the IUCN Red List, it became clear that something had to be done to the public face of this deep compendium of interesting information. We shared our vision with a donor who provided a

little funding (thank you Rolex) and we were off.

In the months that followed, we gradually realised the complexity and scale of the task we had set ourselves. The IUCN Red List is created by, and belongs to, almost the entire conservation world and they feel very strongly about it. We were proposing to adjust it to make it suitable not just for the scientists, but also for the curious internaut or parent helping out with homework. It was a delicate task.

It became clear that accommodating both the specialist and the general interest user on one solution was simply going to be too hard and too expensive. And so Red List Discover – a user friendly window onto the IUCN Red List – was born.

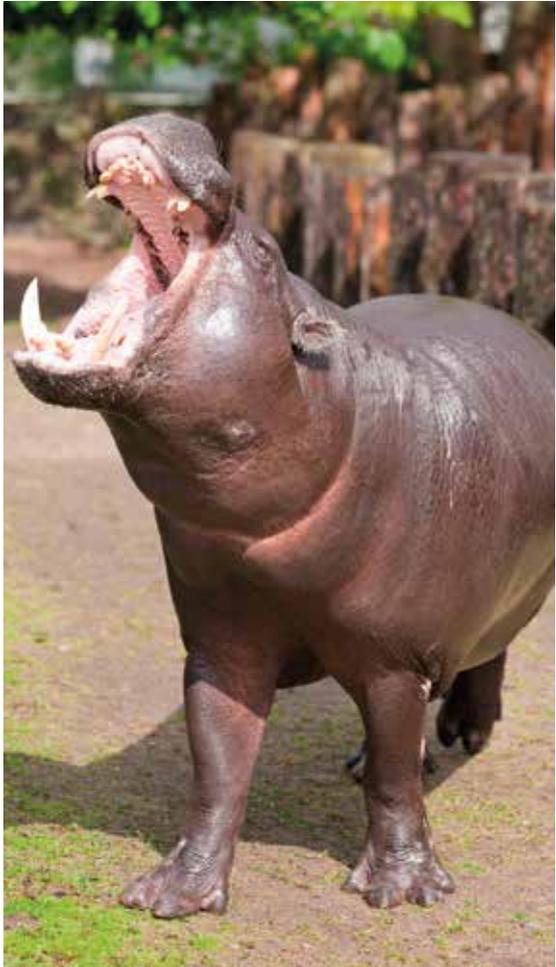
Red List Discover (<http://discover.iucnredlist.org>) provides users with the option of browsing the IUCN Red List in an entirely different way. There are more pictures, drop down lists with predefined search options, a powerful autocomplete search box, and summarised statistics delivered as you click. If you want to know how many species are Critically Endangered in your country, it's now pretty quick and easy to find out – just a few clicks in fact. Narrow the search further and you can look at just the mammals, birds, amphibians or any other group.

There are options to link it to your social media accounts and build your own customised lists – 'things I saw at Chester Zoo' for example – and share these with your friends. All of these additional features have been developed while keeping the authoritative status of the IUCN Red List firmly in mind, and making the site aesthetically pleasing and easy to navigate.

Red List Discover has removed some of the mystery surrounding the IUCN Red List, which holds accounts for more than 70,000 species, maps for 30,000 of them, and more and more photos all the time. It belongs to all of us who care for the wild things that share our planet – and the best part is that you no longer have to be an expert to explore it!



CLOCKWISE FROM ABOVE: MOUNTAIN CHICKEN FROG (*LEPTODACTYLUS FALLAX*); PYGMY HIPPOPOTAMUS (*CHOEROPSIS LIBERIENSIS*); LESSER FLAMINGO (*PHOENICOPTERUS MINOR*); BASKING SHARK (*CETORHINUS MAXIMUS*)



CHRIS GOTSCHALK



NIKUNJ VASOYA

Where have all the mustelids gone?

WITH CARE AND ATTENTION, MANY MEMBERS OF THE WEASEL FAMILY CAN MAKE A WELCOME AND SUCCESSFUL RETURN TO ZOOS

Leif Blomqvist, EEP Coordinator for wolverines, Nordens Ark, Hunnebostrand, Sweden (leif.blomqvist@nordensark.se); Tiit Maran, EEP Coordinator for European mink, Tallinn Zoo, Tallinn, Estonia (tiit.maran@tallinnzoo.ee)

Mustelids have been assessed three times in Europe. The first collection plan was published in 2000 (Blomqvist and Maran 2000), followed by a second survey six years later (Blomqvist and Maran 2007). The initial results of the last survey, conducted in 2012, were presented by Blomqvist at the Small carnivore TAG meeting during EAZA's Annual Conference 2012 in Innsbruck. These three assessments will provide us with an opportunity to analyse the changes in the status of mustelids in European zoo collections and describe the ongoing trends on the continent.

A revision of Red Data Book 2012, reveals that only six mustelid species are designated as facing varying degrees of extinction threats and are collectively referred to as 'threatened'. The vast majority of mustelids (81%) are classified as Least Concern. Since the previous EAZA assessment (Blomqvist and Maran 2007), three species have been re-classified as follows:

- South-east Asian hog badger (*Arctonyx collaris*) has been upgraded from LC to NT
- European mink (*Mustela lutreola*) has been upgraded from EN to CR.
- Black-footed ferret (*Mustela nigripes*) has been downgraded from CR to EN.

Of 23 taxa maintained in European collections in 2012, 20 species are classified as LC, one as NT and only European mink and marbled polecat (*Vormela peregusna*) fall into the threatened species categories in IUCN's Red List. Of those species, the most endangered mustelid, the European mink, is managed at the most intensive level (EEP) in the European zoo community.

A total of 29 mustelid species have been kept in the region during this century. The number of taxa has remained stable, ranging from 20 to 23, but most of them have been maintained in small, unviable numbers and only nine

FAMILY FORTUNES

Mustelidae is the largest and by far the most diverse family within Carnivora and can be found on all continents except Antarctica. It is therefore not surprising that the members of this family are adapted to a variety of habitats. In our own region, mustelids are the most common carnivores and one of their members, the least weasel (*Mustela nivalis*), is in fact the smallest carnivore in the world. Although many mustelids have played a prominent role in man's culture as important fur animals, and many of them are fairly common, they still belong to the least known carnivores and some of the species have not even been properly described. Considering the large number of mustelids, some of which exist in our own backyard, one might assume that they are commonly kept at least for educational purposes in zoos. This does not, however, reflect the current situation, and the majority of zoos do not include a single representative of this miscellaneous group of animals.

species are currently kept in populations exceeding 25 individuals. Since the last assessment, four new species have appeared in European collections: Japanese badger (*Meles anakuma*), striped hog-nosed skunk (*Conepatus semistriatus*), hooded skunk (*Mephitis macroura*) and Altai weasel (*Mustela altaica*). These species are, however, kept in small numbers only. Following the recommendations of 2006, four species – Javan ferret badger (*Melogale orientalis*), lesser grison (*Galictis cuja*), American marten (*Martes americana*) and American mink (*Neovison vison*) – have been phased out from European collections. Among the taxa kept in larger numbers, the populations of six species have declined by more than half since the first assessment in 2000: Eurasian badger (*Meles meles*), stone- and pine marten (*Martes foina* & *M. martes*), European and steppe polecat (*Mustela putorius* & *M. eversmannii*) and American mink (*Neovison vison*). Simultaneously, populations managed within the framework of jointly managed species (EEP and ESB) have increased in numbers and there seems to be a correlation between such species and the zoos' disposition to keep them. Currently, European mink and the nominate form of wolverine (*Gulo g.*

gulo) are managed at EEP-level and yellow-throated marten (*Martes flavigula aterrima/borealis*) and marbled polecat as ESB-species. Upgrading of a species to an EEP- or ESB-status seems, therefore, to have a clear and positive impact on its management. A population increase can also be observed in a non-managed species, the striped skunk (*Mephitis mephitis*), which might be attributed to the high educational value of the species.

THE IMPORTANCE OF ZOOS

Zoos are playing an increasing role in species conservation. The number of species included in breeding programmes is expanding, and this demonstrates a continuing need for *ex situ* support. The recent changes in EAZA collections of mustelids seem to have contrasting effects. The positive side is that the sustainability and size of ESB- and EEP-populations seem to be increasing due to species being phased out. However, phasing out a number of species also results in a loss of previously existing management skills. This, in turn, results in a false belief that mustelids are difficult to keep and easily exhibit abnormal stereotypical behavioural patterns. Growing awareness among zoo visitors of animal

welfare issues supports the avoidance of species in zoos which might display abnormal behavioural patterns. This arises not so much because of mustelids' exceptional proneness to display stereotypical behaviour, but because they are kept in inadequate facilities where their basic requirements are seldom fulfilled.

Modern developments in animal husbandry underline the importance of enhancing the quality of captive-animal care by providing animals with environmental stimuli necessary for their optimal behavioural well-being. Maintaining species in physically enriched environments releases normal species-specific behaviours, increases their activity and exploration and reduces aggressiveness. Enrichment provides animals with behavioural options to respond to their environmental stimuli.

Today we are aware of a multitude of environmental variables that contribute to the well-being of our captive animals. An important source of enrichment is 'enclosure furnishing', which can be utilised to improve the quality of life in captivity. Providing movable objects and toy items gives mustelids sources of novelty, variability and stimulus change. In naturalistic surroundings and complex environments, species-typical behaviour flourishes and captive animals breed well and rear their offspring.

Like most wild animals, mustelids spend much of their time searching for food. An important means of enrichment is therefore to increase the time spent in food acquisition. More frequent feeding in smaller quantities by scattering food items throughout the enclosure provides excellent diversion for mustelids (Blomqvist 2012). Unfortunately, many of today's mustelid exhibits are devoid of anything that could interest an alert animal. As a result, the animal squats apathetically in its nest box or paces up and down its enclosure. With the application of adequate skills in management and enclosure design, mustelids can be unique public attractions that are cheaper to maintain than the majority of larger animals. By combining our efforts from *ex situ* and *in situ* work, the ecological requirements for long-term conservation measures for this family can also be determined.

MOVABLE OBJECTS AND TOYS GIVE
MUSTELIDS STIMULUS CHANGE



The Da Vinci code



AN EU FUND CALLED LEONARDO DA VINCI HAS ENABLED WROCŁAW ZOO GAIN PROFESSIONAL INTERNSHIPS ABROAD

Radosław Ratajszczak, President of the Management Board and Marta Zając-Ossowska, Project Coordinator/Marketing and Education Manager (m.zajac@zoo.wroc.pl), Wrocław Zoo

Staff training is identified in Wrocław Zoo as one of the most important issues. Years of negative selection had left deep scars and there was a need to provide training for both newcomers and ‘old’ staff. Although new members of the crew are usually selected to have at least some background in animal management, preferably an MSc, this doesn’t solve all the problems. The current curriculum doesn’t prepare students for zoo work and there is no special school in Poland that prepares people for many zoo roles.

As funds for training are quite scarce in every zoo we tried to find some external funding and did so in a EU fund called Leonardo da Vinci. What is it? The best way to explain it is perhaps the following description from their web page:

‘The Leonardo da Vinci Programme is one of the four sectorial programmes of the European Union Lifelong Learning Programme. It promotes actions aimed at improving the quality, attractiveness and effectiveness of vocational education and training, and adapting the education system to the labour market’s requirements. By helping European citizens to acquire new skills, knowledge and qualifications, the programme aims at improving the competitiveness of the European labour market. It also promotes innovations and improvements in vocational education and training systems along with efforts aimed at making them more attractive to

prospective users. It promotes the exchange of knowledge, innovations and experiences between members of the vocational education and training sector.’

So, we decided to give it a try. First of all, we had to find potential partners in EU zoos. And it is here where the ‘EAZA Spirit’ came to life. Almost all institutions approached agreed to act as partners. We are especially grateful to directors and employees of the following institutions: Bristol Zoo Gardens, Zoo Praha, Zoo Plzen, Zoo Ostrava, Zoo Leipzig, Rotterdam Zoo, Copenhagen Zoo, Chester Zoo, ZSL London Zoo and Munster Zoo. They all sent back the necessary documents, became partners of our project and hosted our staff for two weeks of training. The project started in July 2012.

The main aim of the project was to improve professional competences of Wrocław Zoo’s staff through gaining

WIDE SPREAD Under the project, 41 employees of the WROCŁAW ZOO went on internships abroad, including 29 animal keepers from individual departments. Twenty-one employees went on internships to Czech zoos, nine to British zoos, four to German zoos, two to Rotterdam Zoo and four to Copenhagen Zoo.



CLOCKWISE FROM FAR LEFT: PAWEŁ BORECKI WITH FUR SEAL AT BRISTOL ZOO; MARCIN MATUSZAK WITH ASIAN ELEPHANT AT ROTTERDAM ZOO; MARCIN MATUSZAK WITH KING PENGUINS AT ROTTERDAM ZOO; MARCIN RADOMSKI WITH BONGO AT MUNSTER ZOO; PIOTR WAWRZYŃIAK WITH RING TAILED LEMURS AT PRAHA ZOO; MARIAN BANDZARZEWSKI WITH TAMANDUA AT LEIPZIG ZOO; JUSTYNA GRZEGOREK WITH MALAYAN TAPIR AT LEIPZIG ZOO



experience in new working environments, which would contribute to the better functioning of the zoo across the disciplines of zookeeping, education and marketing. The specificity of this business requires constant improvement and exchange of experience between the zoos, and the European zoos that took part in the project were selected to provide the best possible chance of reaching the set objectives.

The aim was not only an improvement in the running of Wrocław Zoo, but personal development of staff. Having returned home from the internships, everyone was eager to share their new experience. The staff learnt to work and live in an international environment, and picked up a number of useful approaches which they now are implementing at our zoo.

Before leaving for the internship, each person took part in an intensive language course (41 hours in total) run by Yellow language centre. Three different courses were organised, depending on the target country: English, German and English with elements of the Czech language. The language courses were of significant help in overcoming cultural and linguistic barriers. Each person received the following certificates: certificate of participation in the project, certificate of internship completion, certificate of language course completion, as well as Europass Mobility.

• All the above-mentioned aspects made the internship
 • abroad a very valuable experience for all participants and
 • a unique chance to upgrade qualifications. Motivated and
 • inspired staff make a huge difference to improvements in the
 • workplace, in terms of efficiency and care for animals, as well
 • as marketing and educational operations; and in consequence
 • to the quality of the zoo as a whole, dynamically growing
 • institution.

• The project value cost over 84,000 euro and the fund
 • covered all the incurred costs, including travel, hotels and
 • daily expenses.

• The project has been of great significance to the
 • professional and personal competences of its participants. In
 • addition, Wrocław Zoo has also gained many new contacts
 • abroad, fostering relationships with other European zoos, and
 • opening up opportunities for cooperation on further projects.

• We would like to warmly thank all the partners on
 • this project, as their commitment proved that the idea of
 • cooperation under EAZA is the right one. We hope that
 • participating in the project has been a valuable experience
 • for the partners, too, and that they remember us when
 • planning similar initiatives in the future. We would love to
 • share our own achievements with other zoos, as well as gain
 • knowledge from them.

PLANNING FOR THE APES

HOW GENETICS CAN AID THE CONSERVATION OF GREAT APES

Christina Hvilsom, Copenhagen Zoo; Tomàs Marquès-Bonet, Institut de Biologia Evolutiva (University Pompeu Fabra-CSIC); M^a Teresa Abelló, Vice chair of Great Ape TAG, Barcelona Zoo and Tom de Jongh, Chair of Great Ape TAG, Burgers Zoo.

For decades, humans have been drawn to the charismatic ape species, our closest living relatives. Despite our fascination, our own species' behaviour has led to serious reductions in population sizes of the great apes, which are all categorised as Endangered or Critically Endangered by the IUCN. Within EAZA, we care for more than 1,700 individuals and management efforts are undertaken to ensure that they retain as much as possible of the genetic diversity of their wild counterparts.

The first European Endangered species Programmes (EEP) for great apes saw light in the late '80s – the gorilla EEP. Chair of the Great Ape TAG, Tom de Jongh, says that 'good management progress has been made since then, but changing taxonomy and the unknown provenance as well as relatedness of (key) individuals still challenges the management

planning of several of the great ape species'. Traditional taxonomy of the great apes considered a total of five species: besides humans and our two closest relatives, the chimpanzee (*Pan troglodytes*) and the bonobo (*Pan paniscus*), we had the gorilla (*Gorilla gorilla*) and the orangutan (*Pongo pygmaeus*). Primate taxonomy – like others – has been revised according to the Phylogenetic Species Concept (PSC) and remains contentious. The PSC is known to inflate species taxonomy, and has resulted in the splitting of the gorilla and the orangutan into two species each (C. Groves, *Primate Taxonomy*, Smithsonian Institution Press, 2001) with a further subdivision of the Bornean orangutan and Eastern and Western gorilla. The consequences of a repeatedly changing taxonomy impose requirements on the EEP coordinator's management plans for

their programmes and considerations whether to lump or split studbooks will inevitably arise.

Many studies have been undertaken to gain deeper understanding of great ape genetics, but up until 2013 our genetic knowledge was still incomplete, in part because of limitations in technology. But in the last decade, a complete revolution in the way we 'read' the chemical components that make up our genomes has happened. Taking advantage of the new technology, the largest and most comprehensive genetic study on great apes to date was published in July this year in *Nature*. The study gives the hitherto most detailed account of genetic diversity and population history of the world's rapidly dwindling great apes – based on complete genomes of 79 sampled individuals from all six currently recognized extant species.

The study provides the first complete genomic map of all extant species of great ape and outlines the unique variation within each species and subspecies. An international team of researchers with strong ties to the zoo community has been key to the success of this study. Dr Christina Hvilsom from Copenhagen Zoo explains: 'We originally teamed up with the leading scientist Dr Tomas Marques-Bonet because we believed in the great opportunities this study would bring to the zoo community and great ape conservation efforts worldwide'.

The study was only possible because of two important events: to begin with, many European zoos and African sanctuaries have supported the study by providing samples, so the study is truly their achievement. Second, the generous funding from the European Union (ERC Starting Grant) to Dr Tomas Marques-Bonet provided the necessary support for the sequencing of the genomes of the many sampled individuals.

Currently, the list of coordinated EAZA programmes for great apes consists of three EEPs managed at the species level (Bornean orangutan (*Pongo pygmaeus*) and Sumatran orangutan (*Pongo abelii*) established in 1990; bonobo in 1991) and two on the subspecies level (Western chimpanzee (*P. t. verus*) in 2002 and Western lowland gorilla (*G. g. gorilla*) in 1988). The only ESB is managed on the species level (common chimpanzee in 2007). From a genomic standpoint, the newly generated data allows for a clear genetic differentiation between all populations of great apes. Nonetheless, when comparing population split times, the data prompts no arguments for the current elevation to species

MATERIAL GAINS

The biomaterial stored at Copenhagen Zoo will be stored and made available for future research projects to improve the management and conservation of great apes. In order to secure this, the institution owning the individual, from which the material is sent, will legally own the sample and may decide who will be granted access to the sample. The usage right can be transferred to the species committee or the Great Ape TAG, if the institutions wish so. If a researcher seeks permission to access samples, he or she will be requested to fill a sample agreement form, which is to be approved by the institution owning the sample or the Great Ape TAG – if rights have been transferred.

level in the gorilla and orangutan genera. Taxonomy is based on data informative about the speciation process (eg ecological, behavioural, morphological or genetic) and as such the newly generated genomic evidence should be taken into account when revising the great ape taxonomy. The genomic evidence would entail a management strategy striving to preserve subspecies only of gorilla and orangutan.

With the complete great ape genetic map in hand we are now able to assist the EEPs and ESB by genetically identifying the origin of individuals and therefore set up the correct breeding groups. By reviewing the programmes genetically the chance of success with the breeding programmes will also increase. 'The mission of

the Great Ape TAG is to maintain self-sustaining populations of all the taxa of great apes to sub specific level, where possible, and to encourage and promote their conservation in the wild,' says Tom de Jongh, chair of the Great Ape TAG. 'So, for us, this genetic breakthrough is of great importance for future management and conservation planning for these endangered species.'

The work is under way for the largest management programme globally, the combined Chimpanzee ESB and EEP. Although 33% of the population has already been genetically determined and a new EEP for the Central African chimpanzee (*P. t. troglodytes*) can likely be established in a not too distant future, there is still a long way to reach the goal. 'But with the recent advances we might be closer to this goal,' says Dr Hvilsom.

The new study has enabled scientists to pinpoint the exact subspecies specific areas of the genome, which will be genotyped in individuals of unknown origin and will reveal the geographical origin. The genetic foundation and technology is already present, but funds and samples are lacking. While funding sources are being explored, the genetic determination of the EEPs and the ESB are only successful if European zoos continue to support the project and prioritise sending samples.

Emerging from the growing sample collection, a decision has been taken in the Great Ape TAG to establish the first coordinated great ape biobank within EAZA. Copenhagen Zoo has provided housing and storage facilities to ensure optimal and long term storage of the samples they receive. The vision is to store biomaterial



THEO KRUIZE AT BURGERS' ZOO



TOM DE JONGH AT LEIPZIG



(blood, serum, tissue, DNA, hair etc) collected from the captive great apes in Europe as well as other regions and from the wild (see box).

It is not only the zoo community that will benefit from the genomic knowledge. Illegal trade still poses a big risk for the different species, where a considerable number of illegally held animals are continually being confiscated. Without knowledge about their geographical origin they cannot be returned to their country of origin and released back into the wild nor can suitable management efforts be undertaken. A new project is therefore underway with the aim of creating geo-referenced genetic profiles that can

help determine the geographical origin of confiscated individuals. With such a tool in hand, apes arriving at rescue centres in Africa can now be assigned and, if possible, returned to their country of origin. This effort will help sanctuaries as well as conservation organisations worldwide in their efforts to understand and break trafficking routes, thereby reducing the illegal trade.

Management and taxonomic problems are not unique to the great apes. To date, only a limited number of the taxa kept in zoos are managed by studbooks guided by genetics. With the rapidly evolving genetic field, new taxa are continuously being genome-sequenced, enlightening us

about species diversity, adaptations, relationships and more. In the new era of genomics, we are given a unique tool that can help us guide future conservation management programmes.

Experience from the great ape genomic project highlights the application of extensive genetic surveys. Thus, by adding a genetic layer to studbooks we can revise programmes and add information such as origin and relatedness of founders which was previously built upon assumptions, as well as resolve paternity issues. These efforts will ensure a solid foundation upon which we can build our future management planning.





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