



QUARTERLY PUBLICATION OF THE EUROPEAN ASSOCIATION OF ZOOS AND AQUARIA

ZOOQUARIA

AUTUMN 2016

ISSUE 94

OUT OF AFRICA

THE BATTLE TO SAVE THE AFRICAN VULTURE



In the bank

WHY EAZA'S NEW BIOBANK COULD TRANSFORM OUR CONSERVATION WORK



Back from the brink

THE MESOPOTAMIAN FALLOW DEER RETURNS TO ISRAEL



St Laurent



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- Rodents



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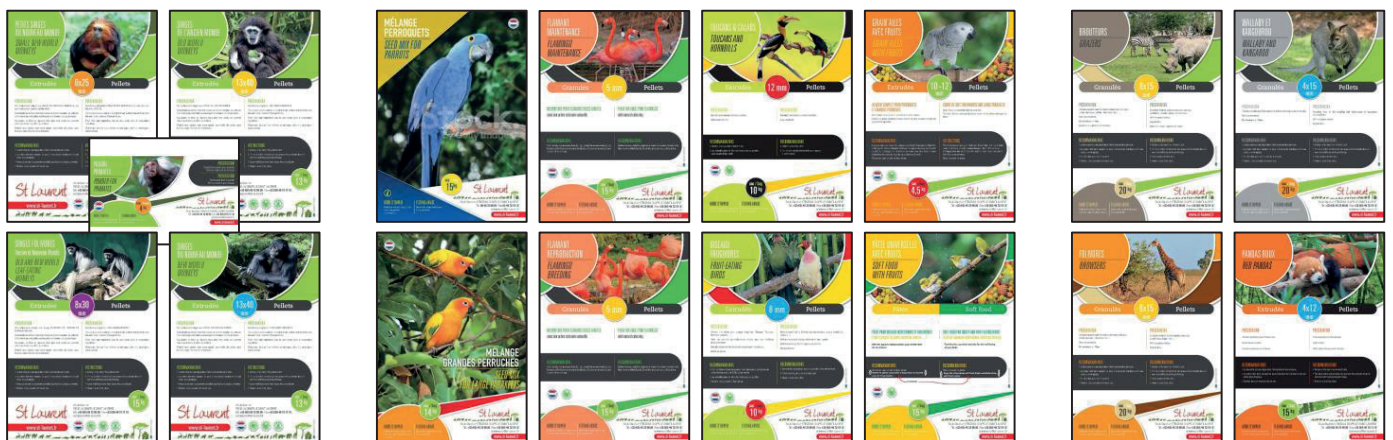


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Zooquaria

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FROM THE DIRECTOR'S CHAIR

When sitting down to write these pieces, I usually start by considering which recent events have had, or are likely to have, an impact on EAZA and our members. Whether these events are positive or negative, they should always make us think and reassess our current situation and the trajectory to where we want to be. From legislative developments such as the start of the EU Zoos Directive REFIT process and the release of the Invasive Alien Species list to terrorist attacks in many European cities and even the Pokémon Go craze, whereby people seem more engaged in chasing imaginary animals than caring about endangered species, there is certainly a lot to choose from.

Arguably the event that has caused the greatest discussion recently has been the 'Brexit' from the European Union. We all know that the exit process will take a number of years, but what is less clear is the impact, if any, this will have on EAZA, our British members and collaborative community activities. Whatever the outcome, I am confident that all EAZA Members will continue to be able to work together to achieve effective population management and our conservation mission.

Irrespective of your viewpoint on the Brexit result, it cannot be denied that communication – or, some might argue, miscommunication – played a big part. Facts were replaced by fear, real examples by emotional statements. During the Brexit campaigning I was reminded of some leadership training where one of the messages was that 'perception is reality'. It didn't matter whether, for example, staff had the same working conditions and opportunities as others; if their perception was that they were worse off, then that was their reality. As a leader you need to deal with this disconnect and bring perception closer to whatever the reality is. I saw this disconnect happening in the Brexit debate, but believe strongly that we are also facing a 'perception vs reality' challenge in the zoo and aquarium community today. This is happening both internally in EAZA and externally amongst our visitors, politicians and the media.

We cannot afford to disregard the incorrect perceptions that people have of us as individuals and institutions, of our work, or of EAZA as an association. It is not enough to say that these perceptions are wrong and that 'our' reality is correct. We need to understand where these perceptions come from and why they are strongly held. The importance of listening to people and investigating the reasons for their perceptions cannot be stressed enough. Nevertheless, it is also essential to question our own perception of reality and the basis for it. In reality, is EAZA a membership organisation or a conservation organisation? How are we perceived by our Members and external audiences, and what evidence is being used to make these decisions? Our vision to be *'the most dynamic, innovative and effective zoo and aquarium*

membership organisation in Europe and the Middle East' might seem to suggest that a membership organisation is the reality. However, our progressive work in population management, continuing leadership in diverse conservation activities and positioning as the trusted centres for biodiversity and nature engagement within the heart of our communities, as well as involvement in conservation on a local, regional and global scale, all strongly point to the reality that EAZA is a conservation organisation. My personal feeling is that this is not the way that many people currently perceive EAZA and that our work going forwards needs to change this.

Changing perceptions is difficult and cannot be done with facts alone. It takes diverse and repeated communications and actions to demonstrate the conservation-based reality that is encompassed by EAZA. Internally we aim to deliver varied communications about what activities EAZA is involved in and how, as Members, you can inform yourselves about them and get involved. We need to continue to work on embedding the core values of our Association (Sustainability, Solidarity, Stewardship, Professionalism and Transparency) throughout EAZA and in the actions of each and every Member in their daily work and when representing EAZA on a national, regional or international scale. Every opportunity should be taken to present a united, consistent message, demonstrating the actions that support our reality.

I would like to finish on a quote from Johnnie Dent Jr:
'There is the truth, the perception of truth, and versions that don't even come close; but it's the perception that creates the most conflict every time.'

I am confident that through our continuing cooperative work we will be able to minimise conflict and bring perceptions close to the reality we seek. I look forward to meeting as many of you as possible during the autumn conference season to discuss our perceptions on the reality that is the role of modern, progressive zoos and aquariums.

Myfanwy Griffith
Executive Director, EAZA

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NOTICEBOARD

EAZA WEBSITE MEMBER AREA The new EAZA Member Area is up and running. Launched at the beginning of August, the new site is based on the Microsoft SharePoint 2013 platform, and replaces the old site, which dates back to 2007. The new platform contains significantly more functionality but retains the basic structures of the old site, making it easy to use for existing users while expanding the possibilities for collaborative work, filing and publication of documents as well as communication between Members. The site is hosted in the Microsoft Cloud and will no longer be hosted by Species360's servers in the United States. EAZA would like to extend its thanks to Species360 for their hosting of the site over many years. If you do not yet have a user name and password for the site (please note all users must be EAZA Members of any category), please contact Mirko Marseille at the EAZA Executive Office.

EU ZOOS DIRECTIVE REFIT The European Commission initiated the REFIT process for the EU Zoos Directive in August. Working with Milieu, a contractor based in Brussels, the Commission aims to review the effectiveness of the EU Zoos Directive through targeted research in 14 countries. EAZA strongly supports both the process and the Directive itself; the Association's position is that the Directive is an effective mechanism for the continual improvement of practice in animal husbandry and welfare, conservation, education and research. If Members require any information regarding the REFIT research and process, they should contact the EAZA Executive Office.

TAG MIDYEAR MEETINGS

TAXON ADVISORY GROUPS met over the summer to discuss strategy, Regional Collection Planning progress, EEP/ESB programme developments, husbandry issues, conservation projects and the new EEP structure. With the proposed EEP restructuring there has been a lot to discuss in terms of setting programme goals and working out how they can be tailor-made to suit the needs of each species. Meetings were held as follows:

- Reptile TAG meeting, Zagreb
- Bird TAGS meeting, Lagos
- Great Ape TAG meeting, Barcelona
- Small Mammal TAG meeting, Jihlava
- Bear TAG meeting, Mulhouse
- Felid TAG meeting, Wuppertal
- Small Carnivore TAG meeting, Rotterdam
- Elephant TAG meeting, Chester
- Deer TAG meeting, Whipsnade
- Antelope and Giraffe TAG meeting, Dvur Kralove
- Callitrichid TAG meeting, Beauval
- Fish and Aquatic Invertebrate TAG meeting, Oceanaria Lisboa
- Joint TAG Chairs meeting in Omaha, USA (see pp. 18-19)

A great deal of work was done at these meetings and EAZA would like to thank all TAG members who took part. The Association and the TAGS would also like to thank the hosts of the meetings.

MARINE MAMMAL WELFARE INDICATORS WORKSHOP, NUREMBURG

FROM 3-5 MAY, NUREMBURG ZOO hosted and co-sponsored an animal welfare indicators workshop for marine mammals. The co-sponsors were EAZA and EAAM (the European Association for Marine Mammals, our MoU partner), with financial assistance from WAZA, AAMPA (the Alliance for Marine Mammal Parks and Aquariums) and the City of Nuremburg. The workshop invited welfare scientists, marine mammal holders, veterinarians and animal rights groups to work together to move the often emotional debate over marine mammals in human care into a more scientific context.

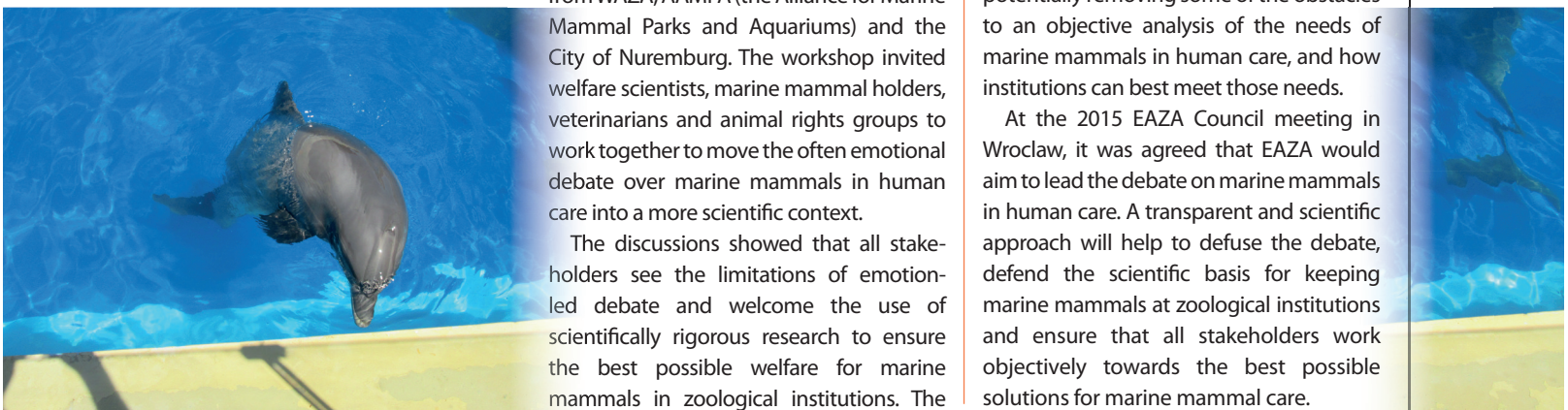
The discussions showed that all stakeholders see the limitations of emotion-led debate and welcome the use of scientifically rigorous research to ensure the best possible welfare for marine mammals in zoological institutions. The



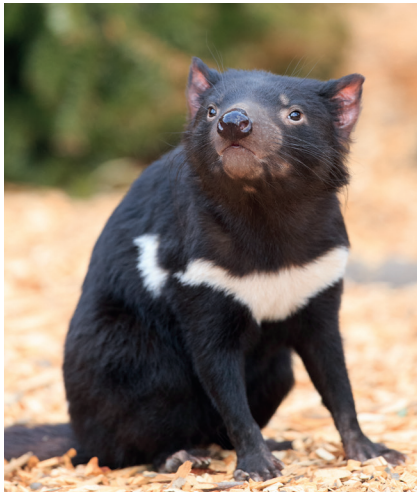
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workshop identified the need for greater research collaboration between marine mammal holders, particularly as the high-quality research could positively influence welfare. Attendees also did much to explain the basis of animal welfare science, potentially removing some of the obstacles to an objective analysis of the needs of marine mammals in human care, and how institutions can best meet those needs.

At the 2015 EAZA Council meeting in Wroclaw, it was agreed that EAZA would aim to lead the debate on marine mammals in human care. A transparent and scientific approach will help to defuse the debate, defend the scientific basis for keeping marine mammals at zoological institutions and ensure that all stakeholders work objectively towards the best possible solutions for marine mammal care.



NEW ARRIVALS



10 YEARS OF TASMANIAN DEVILS IN COPENHAGEN ZOO AND EAZA

ON 6 APRIL 2006, two pairs of Tasmanian devils arrived in Copenhagen Zoo, writes *Flemming Nielsen, EEP Coordinator for Tasmanian Devils*. This was a gift from the people of Tasmania to the firstborn son of the Crown Princess of Denmark. However, all four died from related health issues at the age of seven years and six months

In October 2012 two more pairs arrived as a replacement gift from the Tasmanian government. They arrived at the right time of year for a smooth transferral to the northern hemisphere from their native southern hemisphere. After keeping them on Tasmanian time by manipulating the light and temperature settings, we kept them stable into the first breeding season, which ran from December 2012 until April 2013. At this time both females had been mated with both males and settled down in their own indoor dens for birthing, which occurs after a short gestation period – just 21 days. After waiting for 60 days, we decided to check the pouches of both females and discovered three joeys in one pouch and four joeys in the other. These five males and two females were a fantastic achievement, as normally only 25 per cent of matings succeed in producing young. This is the first documented breeding with both mating and birthing to be achieved outside Australia.

Since this happy event, breeding has taken place every year. In 2014 we saw the first signs of the devils' hormonal schedule shifting from the southern hemisphere to the northern hemisphere as the breeding

season changed from August to December. This is a full five-month turnaround. Some of our young Copenhagen-bred females are now breeding themselves; in 2016 we will have three females ready for mating and in 2017 we will have five females ready. Now is the time to start working with the Australian Breeding Programme to bring fresh blood to the Copenhagen population. Currently Copenhagen holds 16 devils; the two original imported pairs from 2012 are still in good health and the rest of our population has been bred by us; in total, eight pairs have been established.

Since 2009 I have been working towards a more EAZA-orientated agreement with the Tasmanian government and the Australian Breeding Programme to make devils available for other EAZA institutions. The creation of an EEP for Tasmanian devils – under the EAZA Monotreme and Marsupial TAG – was the first step in this direction. In all aspects, 2016 was a milestone in the effort to establish devils in Europe. Copenhagen Zoo conducted the first European Tasmanian Devil Workshop with 16 people participating from 12 EAZA zoos, all of whom worked professionally with animal

husbandry and management, a very important step towards getting approved as a new holder of devils. The new Tasmanian devil facility at Copenhagen Zoo has been approved by the Tasmanian government as the official training centre in Europe for husbandry and management of Tasmanian devils.

In May this year, the bi-annual conference of ZAA was held in Perth Zoo, and during this meeting an MoU between the ZAA and EAZA was finally signed, which makes it possible for EAZA zoos to join the Australian Ambassador Devil Programme to advocate and educate European zoo visitors in the life and conservation of this iconic marsupial species. For the next few years this is still a strictly non-breeding programme, and the only institution allowed to breed is Copenhagen. When the Australians approve of new holders in Europe, we will supply devils from our population to other EAZA zoos. At the time of writing, three new holders from within EAZA have been approved and they will receive non-breeding devils from Copenhagen when they are ready to do so. Two years later, the next round of applications for devils will be conducted and new EAZA holders approved.



FIRST AFRICAN ELEPHANT BIRTH FOR SAFARIPARK BEEKSE BERGEN



CHRISTIAN MEURENS

SAFARIPARK BEEKSE BERGEN, HILVARENBEEK has welcomed its first African elephant birth. It has been a long wait for the zoo; its first African elephant arrived in 1972. But only after the arrival of the bull Calimero, on 27 April 2004, did the chance for reproductive success become real.

Unfortunately the pregnancy was aborted after approximately 14 months in 2006, with only parts of the aborted calf born from the female, which was thereafter lost for breeding. Since several of the other herd members were flatlining females, a lot of effort was taken to introduce new potential breeding females, but none of the initiatives was successful.

It was only after an opportunity to receive a herd 'split off' from Wuppertal that the zoo's chances to have its firstborn African elephant improved. The matriarchal herd, consisting of mother Punda (1992) and daughters Bongi (2005), Pina-nessi (2013) and son Shawu (2011), arrived on 23 March 2015. The mother Punda was already pregnant with her fourth calf, mated by male Tusker in Wuppertal.

After 680 days of pregnancy (the average is 639 days), a beautiful female calf was born on 4 May in the group stable in the presence of both daughters Bongi and Pina-Nessi. The natural herd behaviour during the pregnancy was very interesting to observe, and provided a very important lesson for both daughters for future breeding.

The female calf, baptised with the house name 'Madiba', developed without any problems. At one day old she had already welcomed a record number of 12,770 visitors, and at three days old she confidently stepped into the outside exhibit, following both her sisters, while her mother Punda lagged behind a little nervously.

Safaripark Beekse Bergen is extremely proud of its first African elephant birth and of course acknowledges the cooperation of the African Elephant EEP; it would like to thank both the EEP coordinator and Wuppertal for their continuous assistance.

LORD HOWE ISLAND STICK INSECTS AT BRISTOL ZOO: AN UPDATE

ON 26 NOVEMBER 2015, the invertebrate keepers at Bristol Zoological Gardens received a very special parcel from Melbourne Zoo writes Mark Bushell, Curator of Invertebrates; inside were 300 precious eggs of the Lord Howe Island stick insect (*Dryococelus australis*). This species is classed as Critically Endangered by the IUCN Red List of Threatened Species and the eggs were sent to Bristol as part of an international programme to create additional populations outside Australia. Eggs were also sent to Toronto Zoo and San Diego Zoo. Three years of preparatory work at Bristol had led to this moment, including significant input from our horticultural department to grow the necessary food plant.

Since the first egg hatched on 28 December 2015, it has been a rocky road trying to get the species established. We were already aware that this was not the easiest species to rear and there were several tense moments, but we have had amazing support from Melbourne. It has also been helpful knowing there were two other collections going through the same experience as us!

To date we currently have six animals:



MALE



FEMALE

three males and three females. The first male to reach adult status did so on 29 May, and on 22 June we finally had an adult female, too. The other two females were a little behind her, but not by too much. The oldest individuals were paired in a new enclosure in August and we waited patiently for the first eggs to be

laid approximately a month later. We are hoping that when the next generation arrives we will be able to send some of them to other European collections and help to manage and maintain this species as well as spread the story of their amazing comeback from the brink of extinction.

MARK BUSHELL



Putting the animals first

DAVID WILLIAMS-MITCHELL TALKS TO EAZA'S NEW CHAIR, DR THOMAS KAUFFELS

You were elected Chair in Kronberg in April, following the end of Simon Tonge's term of office. Do you think he will be a hard act to follow?

Simon was our longest serving Chair, and he has left a big footprint on the Association. It's a very positive legacy that I am happy to honour, and I'd like to add my thanks again to Simon for everything he has done for the Association over the years.

Your manifesto for the Chair election showed clearly that you believe in more engagement with the European Union. Why do you think this is so important?

Most of the legal aspects of our work, not just in the veterinary sphere, but also more generally the legislation that affects how we keep animals in human care, comes from the European Commission. The policies they make, which are passed into law by the European Parliament, have an effect not only in the European Union, but also further afield. When the Commission proposes legislation, it's already too late for the zoo community to be able to affect it, which is why we need to be there right at the beginning of the process. It's vital to have good connections with the Commission for this reason, and with the Directorate

Generals who work most directly in the policy areas that affect our members. It may seem difficult sometimes to keep up a high level of engagement with the Parliament, because elections mean that from time to time we have to start again with the process; but here again, it's vital that we identify the right people to talk to, and provide them with the information they need to make a scientifically valid decision on zoo issues.

Where do you see EAZA at the end of your first term as Chair?

I think it is still too early to say. Of course we have certain goals, which



have been discussed with the Executive Committee. I think it's important to point out that the Committee includes a wide variety of opinions and areas of expertise; we want to include as many views as possible as we put together the new EAZA Strategy. Ideally we'd like to reach a consensus that everyone can agree with. In terms of immediate goals, I think it is important that we retain a strong focus on the animals we care for. This might seem obvious, but we have to remember that zoos and aquariums are not the same as other public attractions; the animals are everything to us.

This means that we need to guard strongly against making the context of zoos ever more restrictive and smaller – if we lose our animals, in the end we are nothing. So I want to make sure that we don't lose species from our

institutions if possible, or unless there are good reasons.

I think it's important to say as well that our facilities are, in effect, our business card. A great zoo with good enclosures and working practices will gain the support of the people who visit it.

This focus on animals and how we keep them is also a challenge to our community. We see many institutions employing directors who don't come up through the ranks of zoos, and while there's absolutely nothing wrong with this, it is EAZA's task to make sure that our members prioritise their animals and the good works that they themselves are capable of. We need to think long term, not just at shareholder returns. If share price is driving the decisions taken at the zoo, I think our mission will suffer and we will lose legitimacy over the long term.

Do you think that zoos and aquariums have lost legitimacy over the last few years?

We can't ever say that the position of zoos and aquariums is safe, so it is up to us to show clearly what it is that we do, and what it is that nobody else can do. Zoos can be a huge resource for IUCN, for example, in terms of providing support and expertise for field conservation. We have a very high level of diversity in the small populations we manage – again, something to be proud of and something that must inform conservation going forward. We are also the only ones who can provide knowledge of and delight in wildlife to the public. It's important that we retain the variety that comes with such a wide range of zoos, too.

In short, no, we haven't lost legitimacy, but we need to continue to show our strengths and not get tempted to make superficial changes that will open the door to the elimination, over the long term, of our institutions and the services they provide.

How do you feel about the job so far? It all seems rather daunting!

Actually, it is going very well and I am enjoying being able to do it. I have been on the Executive Committee in the past, so that part feels familiar. It's only been a few weeks since I was elected, however, so I think

there's still a lot to do just to see what the challenges are! We had the first meeting of the new Executive Committee in June, which was great. There aren't so many people on this Committee who were in the previous version, so the first challenge was to find out everyone's priorities and find a balance between them all – something I think we managed very well. We also all got to meet everyone in the Executive Office, so now everyone on both sides can put a name to a face. It's obvious that I can't go to every event and meeting I am invited to, but I will do my best to make sure that EAZA is very visible.

EAZA has had some fractious moments in the recent past. What do you think is the key to holding together such a diverse membership?

I don't agree that the membership is actually that diverse. We have so much in common that the differences between us are very small by comparison. We all keep wild animals in human care, something that makes us unique as a sector, and which binds us together. It's true that we have different views on some issues, but I believe that accountability and involvement are key to overcoming these. We need to make sure that members trust that their concerns will be given a full hearing, which will make sure that people see the discussion as transparent rather than frustrating. We know that some of these frustrations may take longer to work out, but the Executive Committee and I are committed to finding out which issues are causing the frustration. We'll make sure that the procedures we use to come to collective decisions give real opportunity for members to explain their position. In the end, I am optimistic that we will continue to succeed at this: our love of animals and our respect for each other means that we are not enemies, more like family.

When we know that we are all working for the same goal, I am hoping that we will see higher levels of involvement in EAZA work from staff at our member institutions. I should say to everyone that working on joint projects and collaborations is really one of the most rewarding things you can do, and that it benefits everyone – so please do get involved if you are not already!



As part of the ongoing EAZA strategy to promote the versatile work of the EAZA community, as well as maximise on partnerships and available resources, the EAZA Executive Office recently asked all EAZA Members to complete a sanctuary survey, which detailed the support they provided to sanctuaries and wildlife rescue centres in 2013 and 2014. The response was illuminating, demonstrating the considerable support that is offered by EAZA Members to wildlife projects around the world, often to their mutual benefit.

In many countries it is common practice to donate confiscated individuals to zoos or aquariums. However, this can become a problem when institutions are asked to receive a large number of animals that are confiscated all at once. Limited space, high veterinary costs and relevant expertise in caring for wild animals in such a way that they could be reintroduced to the wild after their successful rehabilitation (if possible) are only a few of the things that zoos and aquariums must consider before accepting confiscated animals.

Sanctuaries and wildlife rescue centres are often given responsibility for managing confiscated animals by the relevant authority, such as the national government. The majority of them are experienced in taking care of local wildlife, and when they are located in the natural habitat of the species in question, they are even in a suitable position for reintroducing the animal back into its natural habitat. EAZA Members are well aware of the important role that sanctuaries and wildlife rescue centres can play in saving wildlife *in situ*, and many of them offer help and support to such institutions, as the EAZA sanctuary survey has proved.

Support network

A RECENT SURVEY SHOWS THE VALUABLE SUPPORT THAT EAZA MEMBERS PROVIDE TO WILDLIFE SANCTUARIES AROUND THE WORLD

Katharina Hermann, EAZA Executive Office

SURVEYING THE FIELD

A total of 37 per cent of all Full EAZA Members replied to the survey. Of these, 62 per cent said that they supported sanctuaries/wildlife rescue centres in some way in 2013 and 2014. Furthermore, the results showed that the responding Members spent nearly €1.1 million annually directly on selected sanctuaries as well as providing high levels of non-financial support.

During 2013/2014, 113 projects were supported across 49 countries (18 countries in Europe, 16 in Africa, nine in Asia, five in America and one in Australia/New Zealand). Indonesia was the country with the highest number of supported projects (12), followed by the Philippines (eight projects) and the DR Congo and Italy (six projects each).

The project with the highest number of reported institutions (eight) supporting it is SANCCOBTM. The primary goal of SANCCOBTM is to work against the decline of seabird populations by caring for, for example, injured and oiled birds until they can be released back into their natural habitat. In second place came the Cikananga Wildlife Center, Indonesia, which is supported by seven institutions. This self-established foundation furthered the development of several wildlife rescue centres in Indonesia. In third place came the Kalaweit project, Indonesia, which focuses on the rescue and rehabilitation of illegally kept gibbons.

The survey also established that not all reported projects are outside the EAZA region. A total of 34 per cent



Overview of sanctuaries supported by EAZA members in 2013/2014



SUMMARY OF PROJECTS AND FINANCIAL SUPPORT SPLIT PER CONTINENT FOR 2013 AND 2014 BY EAZA MEMBERS

are situated within the EAZA region, covering 18 countries. The established and supported projects are as diverse as the EAZA membership, ranging from sanctuaries established on the grounds of EAZA Members to complex

transnational projects linking EAZA Members with each other.

FINANCIAL INPUT

In 84 per cent of the cases a project was given a financial contribution. The money was in most cases dedicated to finance specific aspects of the project, such as staff expenses and the acquisition of construction material and veterinary equipment. The estimated total amount of financial support for the two-year period 2013/2014 is over €2.2 million.

However it can be assumed that the actual amount of financial support is even higher. This is because in 34 per cent of the cases in which a financial contribution was made, no precise indication of the sum was given. Projects focused on Africa received the most financial support, followed by Asia and Europe (see diagram). The two projects that received the highest amount of financial support in 2013/2014 were Endangered Primate Rescue Center (EPRC), Vietnam and DECouvrier et Aider la Nature (DECAN), Djibouti.

MUTUAL SUPPORT

But financial support is not the only thing being offered; EAZA Members have also provided a great deal of non-financial support to projects caring for rescued wildlife. For example, a number of Members regularly sent staff to other projects to share their expertise, and they have also donated



veterinary equipment and provided housing materials. Many EAZA institutions said that the opportunity to send their own staff to visit the project was very beneficial. Most of these institutions received annual reports from the sanctuaries and wildlife rescue centres, which also was appreciated. The duration of the support ranged from a few one-year donations to more than 30 years of continuous support. The cases of continuous support clearly demonstrate the connection that EAZA Members strive to maintain with partners around the world.

VALUABLE FEEDBACK

In response to the survey, many EAZA Members shared valuable information on the support they provide to sanctuaries and wildlife rescue centres across the globe. But it is without doubt that there is more happening than was reported in the survey, so please share the projects that your institution supports with other EAZA Members by entering them in the EAZA Conservation Database. If you need inspiration, please also use the Conservation Database to see whom other EAZA Members support. An important part of the ongoing EAZA strategy is to advertise the versatile work of EAZA Members; the active involvement of every single EAZA Member not only benefits the institution itself, but also contributes to the bigger picture, which highlights the strength of the whole EAZA community.

We would like to thank all EAZA Members who took time to fill in the survey. The information derived from it will be used outside the EAZA community to highlight the great work that is happening within.



Join the biodiversity challenge

AS THE LET IT GROW CAMPAIGN GATHERS PACE, WE LOOK AT HOW EAZA MEMBERS CAN HELP TO PROMOTE BIODIVERSITY THROUGHOUT THEIR COMMUNITY

Daniëlle de Jong, EAZA Biodiversity Communications Coordinator

When discussing environmental issues, there are various terms that are often used and which are generally known to the public, even if their exact definitions are not clear; 'biodegradable', 'renewable' and 'sustainability' are good examples. 'Biodiversity' is another of these terms. The word has been used with increasing frequency over the last 10 years, as it has rightly become a major concern within nature conservation.

We are currently living in the UN Decade of Biodiversity, and many initiatives have been set up by EAZA Members and other institutions to raise awareness of the term. As many readers will know, the Let It Grow campaign aims to continue this trend by raising awareness of not only what biodiversity is, but also the importance of living within a healthy and functioning ecosystem and how biodiversity affects this. By combining forces, EAZA, Botanical Gardens Conservation International (BGCI) and Ecsite (the European Science Centres Network) members will be able to make a difference in the understanding of biodiversity and, perhaps more importantly, help people contribute to the conservation of their own, local biodiversity.

FIRST STEPS

The Let It Grow campaign kicked off for many EAZA Members on 26 March 2016. Over the Easter weekend many participants organised special hands-on activities for visitors that focused on biodiversity, such as building birdhouses and insect hotels. The campaign is all about promoting and conserving local biodiversity, so campaign participants are free to focus on topics and species that are relevant in their own area. As this campaign is a combined effort between different types of institution, this has led to a great diversity of initiatives around Europe. Members of the three associations are specialised in different areas and aspects of biodiversity, which has increased the reach of this campaign and offered visitors a more complete picture of the topic, as the participants have worked together and shared resources.

The International Day for Biological Diversity, 22 May, marked the start of the campaign for the BGCI and Ecsite members. However, some had been working on the campaign before this date. For example, the Natural Sciences Museum of Barcelona, in partnership with the Ecology, Urban Planning and Mobility Area of Barcelona Council and the Metropolitan Area of Barcelona, hosted the seventh edition of BioBlitzBcn from 15–17 April. Their guidelines and tips on hosting a 'bio blitz' were shared with the community of participants, several of whom hosted their own bio blitz on 22 May. Many other resources have been shared via the Let it Grow website <http://www.letitgrow.eu>, including translations in French, Italian, Spanish, Catalan and German.

Since the start of the campaign, more than 170 institutions have signed up and initiated a wide variety of creative and engaging activities to involve the public. There have been

updates on nest boxes, 'left spaces', plant and herb gardens, nature walks, children's art exhibitions, local collaborations between zoos and botanical gardens and biodiversity-themed sand sculptures. Participants have hosted 'bird days', 'turtle days', 'reptile days' and even complete biodiversity weekends. It is thrilling to see that the initiatives for this campaign are as diverse as the things that we are trying to protect.

Prague Zoo, for example, has used the robin as a champion for the Let It Grow campaign on its website, describing the bird as the 'epitome of optimism', which brightens everyone's day by hopping around and flying back and forth and which only needs a bit of space to liven up a garden. The zoo advises visitors not to over-cultivate their gardens, but to leave 'a little mess' with branches and bushes. The zoo itself does the same; it has a lot of greenery in the area to offer ample food and shelter for local wildlife, and in selected locations dead wood from the zoo grounds is left, in which rare beetle larvae can develop undisturbed. The importance of insects is also explained on the website, together with instructions on how to lure them to your garden and how to build an insect hotel. A list of 17 additional suggestions can also be found in the special online section for the campaign, and birdhouses are offered for sale in the web shop.

In the spring of 2016 the zoo also created a small pond area to attract various local species. The water provides space for insects to lay eggs in, whilst the rocks and cracks and crevices provide shelter for the lizards and amphibians that are attracted by the insects. Gulls and herons are quick to appear after that. By simply creating some space and monitoring what happens there, Prague Zoo has created a living exhibition, which will undoubtedly fascinate its visitors.

Copenhagen Zoo has chosen a slightly different approach by building an exhibition that focuses on what visitors can do to increase biodiversity in their own backyard. Whether you have access to a garden, rooftop terrace or simply a courtyard with window boxes, the zoo provides suggestions and visual examples of what you can do for local biodiversity in that space. Using information panels to describe the kinds of species that visitors might find in their gardens, the exhibit also contains a large insect hotel, a nest box and a pile of discarded branches, accompanied by signs to explain each item's function. The rooftop terrace example displays the various flowering plants and which insects they attract. It also includes an ingenious suggestion of how to use a teapot to create an underground burrow for bees.

In addition, Copenhagen Zoo demonstrates the effects of mono-cultures on biodiversity by creating three 'left spaces'. Left spaces are areas set aside to allow native species of living things to thrive. From window boxes and balconies to public parks and unused community spaces, they form mini-ecosystems that provide a home for organisms both large and small. The three patches in Copenhagen Zoo are meant for grass, weeds and wildflowers.



ROBIN (*ERITHACUS RUBECULA*),
SAXIFRAGA



PIET MUNSTERMAN

By exposing visitors to living exhibitions and hands-on examples of how to transform their living areas, this campaign becomes visible and feasible. These are just two of the many initiatives that participants have already undertaken for the campaign. We will showcase more in future issues of *Zooquaria* as well as on the Let It Grow Facebook page and in the campaign newsletter.

SPREADING THE WORD

Despite an array of varied and successful initiatives, participants in the Let It Grow campaign are still faced with communication challenges. Put more simply, it can be difficult to get people interested in biodiversity and the consequences of losing it. It is easy to inspire people when an exotic animal such as a lion or giraffe is the mascot of a campaign; many people find their local European species rather bland and uninspiring by comparison. But it is vital that the public understands that biodiversity loss is a worldwide problem and that ecosystems are threatened in their nearby area.

In recognition of this challenge, one of the aims of the Let It Grow campaign is to create and collect resources that focus on this communication challenge. At the end of the campaign the goal is to have created a resource that members can use to address the issue of biodiversity loss for many years to come. After all, the knowledge, experience and commitment to be found amongst EAZA, BGCI and Ecsite members is the key reason why this campaign will be a success.



One of the first steps taken to create this resource was at the EAZA Conservation Forum in Fuengirola, Spain in May this year. A workshop was hosted, focusing on the challenges of communication when it comes to biodiversity and 'less attractive' species. There are numerous resources available that discuss strategies for addressing such issues, and a few of these were presented and discussed by a small group of delegates from the zoo community. The Let It Grow campaign is not the first time that participants have had to communicate challenging and abstract topics. Drawing on the experience and expertise of those in the room, four approaches were established as stepping stones for communicating biodiversity in zoos, aquariums, botanical gardens and science centres. These were: astonish people; show them why this is important and what they can do; help them (re)connect; and be positive.

BE A PART OF LET IT GROW

The Let It Grow campaign has just begun to sprout, and there is still plenty of room for those who want to join. The main hub for information is the campaign website www.letitgrow.eu, where participating members have access to various educational and promotional resources. Joining the campaign is easy; just register your zoo or aquarium on the website and you will be given access to all the resources.

The campaign also has an active Facebook page, which can be found at www.facebook.com/LetItGrowCampaign. New initiatives as well as other resources are posted regularly. If you would like to feature the campaign on your institute's website or Facebook page, please add #letitgrowcampaign. Participants are encouraged to send updates and photos of their initiatives to be shared with the rest of the participants. To do so, simply send an email to info@letitgrow.eu.

The Let It Grow campaign is ambitious and challenging and, with your help, will be a great success. It will show people what is alive in their own backyard and how astonishing it is, and will help them to connect with it and help to conserve it.

Managing the numbers

THE USE OF CONTRACEPTION WITHIN ZOO COLLECTIONS HAS BEEN MADE EASIER BY EGZAC, WHOSE ONGOING RESEARCH IS BECOMING AN INVALUABLE RESOURCE FOR THE ENTIRE COMMUNITY

Sue Walker, Chester Zoo, Sarah Forsyth, Colchester Zoo, EGZAC Co-Chairs; Yedra Felter, Chester Zoo, Vice-Chair; Veronica Cowl, Chester Zoo, EGZAC Programme Coordinator; and Kristine Schad, EAZA Population Biologist

Since EGZAC (EAZA Group on Zoo Animal Contraception) was formed in 2008, it has grown steadily and has come to play an important role in the management of EAZA zoo and aquarium populations, having disseminated over 400 contraceptive guidelines to institutions and programme coordinators. At the beginning of 2016, members of our working group and advisory board met at ZSL London Zoo for our annual meeting, at which we identified several areas for development over the coming years.

A CAUTIONARY TALE

Prior to the use of contraception, animal managers had three options for managing their animal populations: separate males and females, cull unwanted young, or permanently sterilise the animals by surgical means. By using contraception, institutions are now able to manage their animals in cohesive groups, where they determine the best time to allow individuals to breed, ensuring available space and resources to care for the young.

However, given the remarkable differences in reproductive physiology among exotic wildlife species, choosing the right contraceptive that is both safe and effective can be a major challenge. This is especially true given that the majority of contraceptives have not been designed for use in exotic animals, but were designed for domestic animals, livestock and even humans. It is for this reason that we exist, and we encourage the informed use of contraception in wildlife species by collecting contraception data and by producing species guidelines.

Contraceptives that are safe and effective in one species may have extremely different effects in another species. A prime example is the effect of progestin-based contraceptives in carnivores. As a hormone, progesterone plays an important role in maintaining pregnancies in mammals, and use



EGZAC ONLINE

WEBSITE UPDATE

There have been a few changes to the EGZAC website, www.egzac.org, which we hope will be useful.

- Institutions are now able to transfer ongoing contraceptive records when they transfer their animals to new zoos.
- Taxon sheets are now available to all visitors to our website, not just registered members.
- We have added a Resources page on which you can find links to reviews on the reproductive physiology and gestation lengths of various species and information on spontaneous ovulators.
- The AZA RMC has now opened its online survey to its users.

EGZAC JOINS TWITTER

EGZAC now has a Twitter account, where you can find the newest publications on contraceptive use in wildlife species as well as general EGZAC updates. Our twitter handle is @EGZAC_1, and a live feed can also be found on our homepage.

of progestin-based contraceptives effectively maintains the reproductive tract in a state of pregnancy, preventing ovulation and preventing sperm from fertilising the egg. While contraceptives such as Implanon or Depo-Provera may work incredibly well in ungulates, use in canids has been associated with uterine pathology and infections, and mammary cancer in felids. These deleterious effects are a result of long-term continuous exposure to progestins without an intervening pregnancy, which can result in permanent infertility or death if used in long-term plans.

It was through research spearheaded by our American counterparts, the AZA RMC, that these findings came to light, and it will be through continued research that we will be able to fully assess the effects of contraceptives in exotic wildlife. We are keen to emphasise the need for a holistic approach to animal contraception; an approach that evaluates the behavioural, physiological, and pathological effects of contraception during and after the bout.

HOLISTIC APPROACH

EGZAC's aim is to highlight contraception as one of the many tools that can be used in zoo-bred animal population management. At EGZAC we do not promote the use of contraception; instead our aim is to ensure the informed and safe use of contraception in our animals, encouraging institutions to monitor the behaviour and health of their animals during and after contraception.

We would like to establish ourselves as a group that produces high-quality research in key areas of need. This includes supporting institutions in the monitoring of their animals during and after contraception as well as by collaborating with institutions and individuals that have an interest in wildlife contraception. Having recently added a veterinary pathologist to our list of advisors, we are also keen to begin research into the effects of contraception on reproductive tract pathology.

We are extremely interested in working with animal holders to further knowledge into animal contraception and welcome any interested parties to contact us through contraception@chesterzoo.org



chesterzoo.org to discuss potential collaborations. We would also like to encourage all holders using contraception in their animals to consult their relevant programme managers, given the potential for severe health and behavioural consequences associated with the incorrect application of contraception. In particular, we want to warn all holders using animal contraception that if progestin-based contraceptives are used in carnivore species, we strongly advise that use should be short-term (less than two years), and treatment should begin well before any signs of proestrus to avoid exacerbating progestin side effects.

INCREASING ACCESSIBILITY

Within the next year, our aim is to increase our presence within the EAZA community, and as a first step we are developing user manuals to be translated into German, French, and Spanish. We are also looking for representatives to join regional meetings, giving attendees EGZAC updates and gathering feedback for us. If you would like to become an EGZAC representative for your region please let us know.

We are proud to say that in the past year we have continued to support EAZA in its mission to use evidence-based science in its standards of animal management and care and population management; we have delivered more than 120 guidelines to various institutions, including 14 for inclusion in EEP Best Practice Guidelines, and have increased our user numbers by more than 10 per cent. We want to thank all of you for your continued support over the past years, and we hope to continue working closely with you in the future.

UPDATES FROM THE USA

At our annual meeting earlier this year, we also renewed our MoU with the AZA Reproductive Management Center (AZA RMC). Our vice-chair, Yedra Feltrer, travelled to the RMC Annual Advisory Board meeting in

April, at which a wide array of topics related to contraception were discussed, including the status of different contraception products, reversibility data for deslorelin and reversible vasectomies. EGZAC contributed to the debate by delivering a presentation on the efficacy of deslorelin implants placed in alternative sites. The RMC Reproductive Health Surveillance Program gave updates on their various research projects, including uterine biopsies for reproductive health surveillance.

This meeting also presented the opportunity to remember Jay Kirkpatrick, who very sadly passed away in December 2015. EGZAC would like to remember Jay for his incredible dedication to wildlife management and his pioneering research into PZP contraception. The exceptional work with which Jay was involved will continue to significantly impact the lives of the animals we work with.

EGZAC WORKSHOP

We will be hosting a workshop session on Friday 23 September at this year's EAZA Annual Conference and hope to answer any questions you may have. This workshop will also provide an opportunity to meet members of our working group and learn more about EGZAC as well as understand some common contraception dos and don'ts. You can also find out how we can produce bespoke contraceptive and reproductive health monitoring programmes to suit your species and situation. We look forward to meeting you there.

Even if you can't attend the workshop, we would love to hear from you. We are looking to improve the service that we deliver to you. Please contact us with any feedback you may have on our services, website or any other issue at contraception@chesterzoo.org.

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Population matters

THE SECOND JOINT TAG CHAIRS MEETING WENT TO THE HEART OF POPULATION MANAGEMENT MATTERS

Danny de Man, EAZA, Manager Collection Coordination and Conservation

Following the success of the first joint TAG Chairs meeting held in Avifauna, Alphen aan den Rijn, Netherlands in 2014, the regional associations represented on the WAZA Committee for Population Management (CPM) agreed to hold a second joint TAG Chairs meeting in 2016. Our AZA colleagues supported the organisation of the event, which was held back to back with the 2016 AZA mid-year meeting hosted by Omaha's Henry Doorly Zoo and Aquarium in Nebraska, USA (16–18 March 2016).

Right from the icebreaker held in the beautiful aquarium on the evening of 16 March there was a good atmosphere among the 164 delegates of the meeting, representing 24 countries. With some 46 colleagues from Europe and the Middle East, EAZA was well represented at the meeting. A mingling exercise, as was held in Alphen, was not necessary as colleagues from different regions quickly found each other. The representatives from the various bird TAGs flew into one corner while the ungulate folks gathered in one big herd in another. Primate taxon representatives socialised with their counterparts as well as with the many other delegates, who, in addition to TAG chairs and vice chairs, included IUCN staff and IUCN Specialist Group members, Species360 staff, regional association staff and representatives, population biologists, registrars, zoo directors and research biologists.

After the welcome of Dennis Pate, director of Omaha's Henry Doorly Zoo and Aquarium, the two-day meeting kicked off with an opening keynote address from Jenny Gray, parting chair of the WAZA CPM. Jenny highlighted the importance of cooperation among TAGs and zoos and aquariums across the world to support species conservation and, increasingly, to discuss animal behaviour, welfare and appropriate ethical standards and operations.

The first presentation session focused on setting priorities for global and regional collection planning. When is it a priority to work together, with what partners and in what shape or form? There was emphasis on the need for more global collection planning and cooperation to benefit sustainable demographic and genetic populations as well as a reminder of the importance of management through the programmes as run by the regional associations. Cooperation will range across a spectrum of different shapes and forms; from one zoo in one region joining a programme in another region, via a proactive International StudBook (ISB) catering for some occasional strategic animal transfers, all the way to full-blown Global Species Management Plans (GSMPs) bringing together multiple regional associations' programmes under one strategic management plan. It was impressive to hear regional collection planning updates from zoo and aquarium associations from all corners of the world as well as the progress made with cooperation between IUCN SSC specialist groups and TAGs and the wider zoo and aquarium community.

The second session continued the focus on global and

TRACY RHESE, PAAZA; SIMON TONGE, INCOMING CPM CHAIR; JENNY GRAY, OUTGOING CPM CHAIR



regional collection planning, this time highlighting a number of successful cooperations that were initiated at, or since, the first joint TAG Chairs meeting in Alphen. It was rewarding to see the impressive achievements made across a range of taxa as varied as Asian song birds, Indonesian ungulates, Madagascar prosimians and Canids and Hyaenids. EAZA TAGs and institutions have contributed a great deal to moving these cooperations forward, and I would especially like to thank Achim Johann, David Jeggo, James Burton and Raymond van der Meer for contributing to this excellent range of presentations.

After lunch, three workshops took place, the first of which aimed to define the top 10 priorities of global collection planning and management. The second focused on increasing the links between IUCN SSC Specialist Groups and TAGs, and the last explored the possibilities for integrating the Avian collection plans into one. Participants decided which workshop to attend, and five-minute reports were provided at the end to the entire audience by the workshop facilitators.

The third presentation session of the day focused on some of the realities of programming and logistics that population managers need to deal with when considering global cooperation. Population Biologists Kristine Schad (EAZA), Colleen Lynch (AZA) and Claire Ford (ZAA) teamed up to deliver the first of two presentations entitled 'Top 10 Misperceptions of Inter-regional Population Management' (see page 32). Updates from the Amur tiger (*Panthera tigris altaica*), Blue-crowned laughing thrush (*Dryonastes courtoisi*) and Goodfellow's tree kangaroo (*Dendrolagus goodfellowi*) GSMPs were provided and goals for the programme were set. ZAA TAG Chairs also introduced some of the tools the Association uses for regional collection planning.



CANID AND HYAENID INTEGRATED
COLLECTION ASSESSMENT AND
PLANNING (ICAP) PROCESS



JOINT TAG CHAIRS PARTICIPANTS



HENRY DOORLY ZOO DESERT DOME

A second workshop session including three new topics (setting strategic goals for collection plans, cost and benefits of GSMPs and the use of PMx as a tool for population management) followed by feedback reports completed the first full but fruitful day of the meeting.

On the second day Bob Lacy opened with a keynote address titled 'The What, Why, Who, Where and When of Sustainability'. In his thought-provoking presentation, Bob encouraged us all to think more carefully when using the buzz-word 'sustainability', as it can mean different things in different contexts for different audiences. Bob gave examples from, amongst others, the AZA and WAZA websites where it was used correctly and – much more fun, of course – other examples where it was not. (Bob commented that he could not find any incorrect examples on the EAZA website, which made us Europeans really proud!)

The fourth presentation session continued the 'realities inter-regional cooperation' theme from the third session, but this time focused on the science. This session included the second part of the 'Top 10 Misperceptions' talk, and updates on the ZIMS population management tool, the Species Conservation Tool-kit Initiative (SCTI) and the AZA Reproductive Management Centre (RMC). Sarah Long from the AZA Population Management Centre (PMC) concluded the session by discussing the opportunities provided by data and tools, but reminded everyone that the quality of the data is important and that there are various data and knowledge gaps still eluding us. Improving data is important, but even with good data there is still a need for tough decisions to be made through the process of managing populations.

After another workshop session (on the ZIMS Population Management tool and the Top 10 Misperceptions) and updates from the Red panda (*Ailurus fulgens*), Amur leopard (*Panthera pardus orientalis*) and Sumatran tiger (*Panthera tigris sumatrae*) GSMPs provided by team EAZA champions Angela Glatston and Jo Cook, it was time to break for lunch.

The fifth and final presentation session was tailored towards developing partnerships for, and breaking down barriers in, population biology. As animal-transport related legislation is one of the main barriers to successful global collection planning, the talks in this session focused on this element, covering risk-assessment, CITES legislation, biosecurity legislation, the opportunities of exchanging biomaterials and ways to overcome the many hurdles along the way. Two reptile examples presented by Fabian Schmidt (another great EAZA contribution to the meeting) and Michael Ogle from AZA were excellent in showing that patience and persistence combined with the right doses of humour are the key to achieving success when it comes to exchanging animals internationally.

A final workshop session, which covered three topics – developing strategies to overcome barriers to successful global cooperation; troubleshooting permit and transport barriers; and planning the future of the Species Conservation Toolkit Initiative – completed the programme of the second day.

New WAZA CPM chair Simon Tonge (Paignton) provided an excellent summary of the results of this inspiring and productive meeting. Well-deserved applause for Candice Dorsey and the team at the AZA office ended the meeting, with only the farewell dinner left to enjoy. A good number of colleagues attended the AZA mid-year meeting as well, to continue more detailed TAG to TAG discussions.

This proved to be a productive series of meetings with much positive input from the EAZA region in giving presentations, leading workshops and providing thoughtful input. The success of the joint TAG meeting and the positive outcomes it produced is in large part due to the high number of dedicated individuals who attended the meeting and the support of their institutions in enabling their attendance. In this way EAZA is able not only to showcase the great population management work we do, but also to lead the way in continuing this cooperation in the future. Well done team EAZA!



CRITICALLY ENDANGERED VULTURES ON SALE AT A TRADITIONAL MEDICINE MARKET IN WEST AFRICA

African vultures in crisis

HALTING THE DECLINE OF THE AFRICAN VULTURE IS A COMPLEX CHALLENGE THAT NEEDS URGENT SOLUTIONS AND THE INVOLVEMENT OF THE WHOLE ZOO COMMUNITY

Ralph Buij, Alterra, IUCN SSC Vulture Specialist Group; Mark Habben, ZSL, Falconiformes TAG Chair; and Joost Lammers, Vogel-park Avifauna, White-headed vulture EEP coordinator

African vultures are facing an unprecedented crisis as their numbers plummet across the continent, mainly as a result of widespread poisoning of Africa's obligate scavengers by humans. In 2015 the first estimates of this 30-year decline were published in the journal *Conservation Letters* (Ogada *et al.* 2015) by a group of scientists working all over Africa. The researchers, led by Darcy Ogada of The Peregrine Fund and the National Museums of Kenya, amassed data covering nearly 60 per cent of Africa's surface area and 95 national vulture populations from within 22 nations. Their analyses of past and present vulture counts along roads and at nest sites confirmed that declines have occurred on a scale broadly comparable with those seen previously

in Asia. Populations of eight African species had declined by an average of 62 per cent, and seven had declined at a rate of 80 per cent or more over three generations, which is about five decades in vultures. Although declines were worst in unprotected landscapes, vultures are in trouble even in protected areas such as national parks and game reserves.

The article resulted in an update of the IUCN Red List status of all African endemic vultures in November 2015. Three of them, hooded vulture (*Necrosyrtes monachus*), white-backed vulture (*Gyps africanus*) and Rüppell's vulture (*Gyps rueppellii*), passed from globally Endangered to Critically Endangered. The white-headed vulture (*Trigonoceps occipitalis*) went from Vulnerable to Critically

Endangered. Cape vulture (*Gyps coprotheres*) and lappet-faced vulture (*Torgos tracheliotos*) – the latter also occurs in the Middle East – were uplisted from Vulnerable to globally Endangered. The Egyptian vulture (*Neophron percnopterus*) was already classified as Endangered, and bearded vulture (*Gypaetus barbatus*) as Near-Threatened. Another African species, the mainly vegetarian palm-nut vulture (*Gypohierax angolensis*), is still regarded as Least Concern.

CAUSES OF DECLINE

In Africa, the vulture decline is not attributable to a single issue, unlike in South Asia, where the three previously most common vulture species have seen numbers decline by 98 per cent in 15 years. Here, researchers found

the cause to be a veterinary drug, diclofenac, which was in widespread use as a painkiller in cattle and is lethal to the vultures that feed upon carcasses contaminated by even small amounts of this drug (Oaks *et al.* 2004).

More than 60 per cent of reported vulture deaths in Africa can be attributed to poisoning. Poisoning is often unintentional: vultures die after eating carcasses that have been baited with poison as a means of controlling livestock-raiding carnivores such as lions, hyenas or jackals. However, a few years ago, elephant and rhino poachers began to poison carcasses intentionally on a massive scale in East and southern Africa as a means of killing off vultures (Ogada *et al.* 2015). They do this because the birds' overhead circling can alert wildlife authorities to the location of a poached animal. Between 2012 and 2014, a total of 155 elephants and a staggering 2,044 vultures were killed in 11 incidents in seven African countries.

Another major issue is the use of vulture body parts in traditional medicine, and 29 per cent of reported vulture deaths could be attributed to this trade. These practices are widespread in West Africa, such as in Benin and Nigeria, where Critically Endangered vultures are often openly on display in traditional medicine markets, but also in South Africa. The trade is so intensive that Nigeria has hardly any vultures left, so poachers and traders are increasingly crossing international borders to collect carcasses. Estimates suggest that around 1000 hooded vultures are traded across West Africa alone each year (Buij *et al.* 2015). Besides their medicinal use, vultures in West and Central Africa are also being harvested for food.

The killing of mostly adult vultures for the reasons mentioned above is having a severe impact on populations, because for long-lived species such as vultures, it doesn't take many deaths to severely impact a population. Being long-lived slow breeders, vultures take several years to reach maturity and typically fledge only a single offspring every one or two years. This means that the loss of even a few adults can have a severe and long-lasting impact on a local vulture population. On top of this loss, the more 'regular threats' faced by African vultures include habitat loss, human disturbance and



collisions with wind turbines and electricity powerlines.

WIDER CONSEQUENCES

Scavengers such as vultures are essential to a healthy ecosystem. In the absence of vultures, carcasses are largely consumed by mammalian scavengers such as feral dogs, hyenas and jackals and this can increase levels of disease transmission, with possibly dire consequences for human health. When the vultures of Asia began to decline in the late 1990s, feral dogs suddenly had easy, predictable access to carcasses, and as a consequence their populations exploded, as did the number of bites by rabies-infected dogs. The 'Asian vulture crisis' saw India spend an additional \$34 billion US dollars on healthcare between 1993 and 2006 due to the loss of the key avian scavengers (Markandya *et al.* 2008). And there have been other social consequences. As the vultures vanished, India's Parsis turned to expensive cremations instead of offering the dead at their Towers of Silence. In Africa, the ecological and socio-economic consequences of local vulture extirpation has hardly been quantified.

A WAY FORWARD

Despite the catastrophic declines of vultures in Asia, the situation has started to improve slowly, thanks to awareness-raising and advocacy work. In 2006 veterinary diclofenac was banned in India, and similar bans followed soon after in Nepal and

Pakistan. Although challenges still persist, the vulture-safe alternative, meloxicam, is now in widespread use in Asia, and although the thousands of vultures in cities such as Delhi and Mumbai are no longer to be seen, some populations are just recovering from the brink of extinction.

In Africa, the vulture declines are happening at a slower rate compared to Asia, which means there might still be time to reverse the trend. However, governments need to take action now to regulate the use of the most frequently used poisons that kill vultures. Wildlife crime and illegal trade should also be combated more fiercely and African governments should commit to that. Emerging threats need to be tackled. All over Africa, vultures are routinely electrocuted when they fly into power lines or wind turbines, and such infrastructure is fast increasing. There are ways to generate electricity in a manner that does not kill vultures and other birds, both in terms of construction and placement.

In the meantime the African vulture crisis lingers on, as conservation efforts are hampered by a lack of funds and a lack of knowledge about vulture population status and major threats in many areas. More information on hotspots of African vulture occurrence, their connectivity, and threats over large areas of their distribution ranges is urgently needed. Filling such gaps will allow conservationists to draw up



MORE THAN 60 PER CENT OF AFRICAN VULTURE DEATHS ARE DUE TO CARCASS POISONING

a well-informed multi-species action plan, targeting with priority those areas where the situation is most critical.

WHAT IS THE FALCONIFORMES TAG DOING?

Taking into consideration that four species of African vulture became Critically Endangered in the wild and the threats to their survival are still prevalent and in recent years have increased, a captive breeding programme became very important and is endorsed by the IUCN Vulture Specialist Group. Having learnt from similar situations and the comparable decline of *Gyps* vultures that we have seen in Asia, we are taking proactive measures to ensure stable, genetically diverse and increasing numbers of the species within EAZA collections. Zoo-bred birds of a number of species of Asian and European vultures have been released through selective breeding, careful monitoring and the creation of safe environments. The breeding and close monitoring of African vultures is a significant step towards – should conditions become favourable – the potential release of birds.

Therefore the TAG decided to upgrade two ESBs to EEPs – the white-headed vulture and Rüppels vulture – and is now preparing proposals to establish breeding programmes for the other two Critically Endangered species, the white-backed vulture and hooded vulture, which are not yet covered by a breeding programme but

are held by a number of collections in numbers significant enough to warrant breeding programmes.

Furthermore the TAG is, in close cooperation with the IUCN Vulture Specialist Group, endorsing the conservation projects that are already in place for some species as well as existing conservation and research projects. The TAG will continue to promote these projects and encourage EAZA zoos to support funding. An example of this is where many zoos cooperate in the white-headed vulture breeding programme by co-funding a monitoring project for the species in Kenya, which is part of a larger research project called 'Identification of priority regions for conservation of critically endangered African vultures'.

As EAZA zoos we are also responsible for educating our visitors about current threats to vultures and raising awareness of the African vulture crisis. The TAG is already promoting the International Vulture Awareness day, which is traditionally held on the first Saturday in September. This has been increasingly successful over a number of years but it is vital that more EAZA zoos participate in this event to create more awareness of the critical role that vultures play in the environment. This event has for a long time highlighted the decline of Asiatic vultures, but given the similarities we now see with Africa's vultures, we need to build the momentum. We cannot afford to lose these magnificent birds.

WHAT CAN EAZA MEMBERS DO?

EAZA Members should hold vulture species wherever possible, ideally as part of recognised breeding programmes, but if this is not possible, other, non-breeding birds or birds of different species not directly affected should be held as ambassadors to highlight the plight of vultures across Africa and Asia.

Flight displays and aviaries must incorporate the vital messages relating to this crisis. The TAG is willing to support this by providing the latest key facts that we believe our public should hear. These facts can be incorporated into demonstrations and at aviaries even where vulture species not directly affected are managed. The same can be said of collections holding elephants and rhinoceros. There is a very clear link between the decline in African vultures and poaching for ivory and rhino horn. Every opportunity should be taken to highlight the extremely detrimental effect that poaching has had on vultures and, subsequently, on human health across Africa.

All zoological collections have a responsibility to educate, research and conserve. Vultures need our help, and EAZA zoos can play their part by taking every opportunity to breed vultures, talk about vultures, inspire our visitors and actively participate in supporting projects through funding and staff resources. Please get involved!

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SETTING THE STANDARD

THE NEW EAZA CONSERVATION STANDARDS HAVE NOW BEEN AGREED BY THE COUNCIL; HERE WE EXPLAIN HOW THESE NEW STANDARDS CAN HELP EVERY ZOO TO IMPROVE AND PERFECT THEIR VITAL CONSERVATION WORK

Bryan Carroll, EAZA Conservation Committee Chair

Ever since the visionary work of Gerald Durrell in pioneering the conservation role of zoos, the idea that zoos can and should be a strong force for nature conservation has grown and grown. Indeed, the amount of conservation work that EAZA zoos carry out has increased enormously over the years, and the conservation role of zoos is now enshrined in EU law through the EU Zoos Directive, as well as in zoo legislation in many countries outside the EU.

The EAZA mission statement explicitly talks about our contribution to the conservation of global biodiversity and that EAZA will stimulate, facilitate and coordinate the community's effort in education, research and conservation.

In order to fulfil this mission, two important documents have been produced over the last year or so. The first was the EAZA Guidelines on the Definition of a Direct Contribution to Conservation (reported on in *Zooquaria* issue 90). The second is the EAZA Conservation Standards, which were agreed at the most recent Council Meeting in Kronberg on 14 April this year. So what are they – and how do they affect what we do?

DEFINING TERMS

The first two sentences of the Introduction to the Standards clearly set the scene. 'The European Association of Zoos and Aquaria is a non-profit conservation organisation, with members across Europe and the Middle East. EAZA's mission is to facilitate cooperation within the European Zoo and Aquarium community towards the goals of education, research and conservation.' EAZA has defined through other standards what it expects of its members in terms of Education and Research; the Conservation Standards document does the same for conservation.

As we all know, the word 'conservation' can mean many different things, so what we mean by it in the context of EAZA zoos was spelled out in the EAZA Guidelines on the Definition of a Direct Contribution to Conservation. This recognises that the conservation work carried out by zoos includes conservation breeding, education, research, field activity and advocacy, and the Standards apply to this broad range of activity. Accordingly, the Standards are meant to be used by directors, curators, educators, field conservation staff, or indeed anyone else involved in these activities in the zoo.

WHAT DO THE STANDARDS REQUIRE?

The first point of the Standards says that we should all **undertake conservation activity in line with the EAZA Definition of Conservation**. There are then 11 further points to take note of.

The first of these is about **recording what we do** through the EAZA Conservation Database. It is so important to be able to demonstrate the magnitude and complexity of our

work. The vocal minority who criticise us say that we don't really carry out much conservation work at all. The Database gives us the evidence to answer those critics.

The Standards then refer to **collaboration and partnerships**. We should take note of and implement the WAZA Conservation Strategy and we should forge conservation partnerships with organisations such as IUCN, wildlife agencies, research institutions and NGOs. By working in partnership, not only will we be more effective, but also our voice will be louder.

The Standards give special prominence to working with native species. It is so important to work in our own backyards and not just on the plains of Africa or the forests of South America. However, wherever we work in the world we should always inform the regional zoo association. This is not only a gesture of courtesy; it will enable further partnerships to be made and avoid possible duplication of efforts.

We must also evaluate our work to demonstrate to ourselves, our supporters and our critics that we are effective conservationists. It is important that we work according to best practice, and therefore we should also take account of good conservation practice, as stated in various IUCN guidelines, and be endorsed by any relevant wildlife agencies. Again, this will ensure that any criticism can be avoided and answered.

The next three points concern how we **communicate our conservation programmes to a range of audiences**. We have a responsibility to communicate them to our staff, visitors and indeed the whole of society. It is essential that we engage our visitors as much as possible in our conservation programmes, whether through campaigns or simply in our communications. Participating in the EAZA campaigns, wherever possible, is part of the Standards. These campaigns are a really powerful way of engaging our guests; imaginative campaign activities not only help visitors to have fun, but also help them to become conservationists and advocates for their local zoo.

Lastly we have an obligation to **become more sustainable organisations** and, as part of the communications with visitors, promote sustainable living for the benefit of our world. It is, after all, our home, and both sustainable living and wildlife conservation are vital to the survival of our world.

These EAZA Conservation Standards apply to all members. Some zoos may think that they are difficult; others will know that they are already complying. Wherever you are on this spectrum, EAZA and its Conservation Committee are here to help and guide as well as to facilitate and promote not just more conservation programmes, but also more effective conservation of the species and habitats that are precious to us all.

Building bridges in Andalusia

THE 2016 EAZA CONSERVATION FORUM COMPRISED AN INSPIRING PROGRAMME OF SPEECHES AND PRESENTATIONS THAT ADDRESSED THE KEY CONSERVATION ISSUES OF THE DAY

Tania Gilbert, Marwell Wildlife; Bryan Carroll, Bristol Zoo Gardens and Wildplace; Friederike von Houwald, Basel Zoo; Scott Wilson, Chester Zoo; Frank Rietkerk, Apenheul Primate Park; Eric Ruivo, Zooparc Beauval; Andrew Terry, Durrell Wildlife; Myfawny Griffith, EAZA Executive Office; and Merel Zimmermann, EAZA Executive Office

From 10–13 May 2016 BioParc Fuengirola in Spain was the proud host of the very successful 2016 EAZA Conservation Forum. In total, 161 participants from more than 100 conservation organisations and zoos came from 30 countries spread over five continents to share their experiences in conservation and to continue building bridges between *in situ* and *ex situ* professionals. As well as more than 40 presentations and four workshops, 28 posters were submitted. Also, for the first time, participants had the opportunity to show short films illustrating different conservation projects, which is something that EAZA will want to repeat and expand upon during its next Forum in 2018.

Even before the Forum began, the EAZA Academy course 'Funding for *in situ* Conservation Projects' run by John Regan (John Regan Associates) and Neil Maddison (Head of Conservation Programmes at Bristol Zoological Society) proved so popular that tickets sold out. The course was designed to help conservation professionals find sources of funding, and explained the different techniques required to be successful in this task. A special thank you goes to Dan James, Director of Development at the Eden Project, who joined the session by Skype to talk about the power of crowdfunding.

The first day of the Forum began by highlighting conservation efforts in our host region, the Mediterranean. An inspirational keynote presentation was delivered by Ursula Höfle (Spanish National Research Council/University of Castilla – La Mancha) on the conservation and research for Iberian lynx, the Spanish Imperial Eagle, vultures, red-legged partridge and white stork. She detailed some of the complex challenges that conservationists face in the 21st century, and highlighted the important role that research plays in finding answers to these challenges. This session was followed by a variety



of speakers from outside the zoo community, beginning with the local Agency of Environment and Water, Ministry of Environment and Planning within the Mediterranean region, who spoke about their activities for the conservation of Spanish Imperial eagles and sea turtles. The IUCN Centre for Mediterranean Cooperation introduced us to their strategic approaches in North Africa, and Antonia Rives explained the pre-release protocols for Iberian lynx at El Acebuche Iberian Lynx Breeding Centre. In addition, presenters from the zoo world drew attention to the problems faced by Mediterranean species such as Cuvier's gazelle, northern bald ibis, Barbary macaque and even grasshoppers, and highlighted the action being taken by EAZA Members and others to ensure the species' survival.

Goutam Narayan introduced the session on conservation efforts in Asia in his speech and shared his dedication to the Pygmy Hog Conservation Programme. The pygmy hog is the most threatened mammal in India and Goutam is determined to save it from extinction with the help of captive breeding in the region. Goutam, as well as Sonja Luz from Asian Species Action Partnership, emphasised the need for collaboration and coordination with different partners with different expertise if conservation is to be successful and effective. Other presentations included *in situ* research on Javan leopards and the threat of fragmented sanctuaries for orangutans in Indonesia.

A session on local biodiversity showed the huge potential that exists for work to be done on European habitats, fauna and flora. The keynote speaker, Filipe Gonzalez Sanchez, described a campaign by SEO Birdlife Santander, which has many similarities to the EAZA Let it Grow Campaign; the creation of green areas in the city of Santander has resulted in huge benefits to local wildlife across a large area of the city. Many projects such as these involve citizen scientists, and Philip Riordan (Marwell Wildlife) discussed the reliability of data collected using amateur rather than professional scientists. Bob Lawrence told us how an important area of heathland had been restored in West Midlands Safari Park using a combination of clearance of scrub and grazing by large (sometimes exotic) herbivores, while Viktoria Koroknai from Budapest Zoo described efforts to prevent and mitigate the damage done to raptors due to persecution in Hungary. Finally, the remarkable life cycle of the greater Capricorn beetle and the success in breeding them for reintroduction at Nordens Ark was explained by Jimmy Helgesson. This inspiring and thought-provoking session was a great end to the first day.

On the second day of the Forum we explored the fact that conservation can often be about trying what we think is right and learning from the results, whether good or bad. In the keynote speech of this session, Jim Dietz showed that thorough and dedicated

conservation work can turn into a very effective way of conserving a critically endangered species such as golden lion tamarins. By building up the knowledge base piece by piece and addressing the issue in a very systematic way, a path was developed that produced one of the world's most successful conservation programmes – although he warned that the species is not yet safe. But, he argued, if we combine optimism with structured organisation and a thorough involvement of the local communities, then we have the right ingredients for success, based on sound science and true commitment. His speech was followed by a number of presentations, which shared some of the challenges to be found in setting up conservation efforts as well as evaluating or determining the impact in locations ranging from Europe and Africa to South America.

The afternoon featured three workshops that covered how to implement the new World Zoo and Aquarium Conservation Strategy; collecting feedback on Lincz, a proposed online matchmaking tool that would help to connect zoos with conservation NGOs and projects; and developing resources for the EAZA Let it Grow Campaign. In addition, a discussion session was organised to explore the possibilities of influencing the palm oil sector through collaborations and effective partnership. The afternoon finished with a visit to the BioParc Fuengirola.

The final day of the Forum focused on invasive species, and shared case stories from Africa and South and Central America. Invasive species are one of the major global threats to biodiversity, and tackling them requires skills that are well developed within zoos, such as hands-on animal management and public engagement. The session started with a keynote speech from Tiit Maran (Tallinn Zoo), who discussed some of the complexities of EU Invasive Species legislation and the impacts on conservation efforts, using his long-term work on European mink in Estonia as an example. Neil Maddison followed by showing how to approach the IUCN Guidelines for Management of Confiscated Species when it comes to dealing with confiscated alien species. Examples from zoos on how to engage local people in this topic came from Nina Trontti from Helsinki, who described how Spanish slugs (slightly

awkward given the meeting location) were caught and cooked and used as food for some of the species in the zoo. Hanneke de Boer (GaiaZoo) showed how it may be possible to communicate to zoo audiences the roles and impacts introduced species may have. The session also looked at the impacts of hybridisation; Helen Senn (RZSS) explained how genetic techniques had been used to try to discriminate feral from Scottish wildcats. Maria Cecília Martins Kierulff, who has done so much for Brazil's tamarins, described the challenges involved in moving golden-headed lion tamarins, released as pets, away from core populations of golden lion tamarins to prevent hybridisation. An eye-opening account of how invasives are threatening the marine environment and livelihoods in the Mediterranean was given by the IUCN Centre for Mediterranean Cooperation.

The Africa session managed to cover projects from all four corners of Africa, as well as a range of species, issues and conservation perspectives. Some of the highlights included Rosa M. Garriga from the Tacugama Chimpanzee Sanctuary in Sierra Leone, who showed how sanctuaries can be much more than rescue and rehabilitation centres and explained the huge impact they have had by working in partnership with the government, including coordinating the National Chimpanzee Census Project. Davide Bomben from the Poaching Prevention Academy in Africa talked passionately about the huge threat that poaching poses to rhinos, and the role that he and others play in building the capacity of dedicated ranger teams to protect these valuable animals. Svein Wilhelmsen showed us the beautiful landscape and wildlife of the Mara

Naboisho Conservancy in Kenya, and how an innovative collaboration of public and private stakeholders is protecting this important ecosystem. Paw Gosmer (Aalborg Zoo) also showed that the zoo animals – being ambassadors of their wild kinds – assist in the protection of their own species and how a keeper can trigger the involvement of zoos in a conservation project such as the all-female Black Mamba Anti-Poaching Unit.

The four programmes presented in the final session on Latin America clearly demonstrated the different issues regarding conservation in this fast-developing region. Patricia Medici (Instituto de Pesquisas Ecológicas) showed us how important long-term biological, ecological, physiological and social studies are to better understand and protect a flag species such as tapirs. Arnaud Desbiez (Royal Zoological Society of Scotland) demonstrated that there are still almost unknown species such as giant armadillos to discover and study, which are vital for their environment. Finally, Christopher Jordan from Global Wildlife Conservation showed us the importance of local communities for biodiversity conservation in this region where law enforcement is still a mirage.

It is clear from all of the Forum presentations that the conservation work being carried out and supported by EAZA Members and all the conservation organisations attending is inspirational. Sharing experiences and challenges amongst ourselves is crucial, but it was also recognised that we need to step outside our community more often to connect with the wider public – and we need to inspire more people to become involved in species conservation.



A very special thank you goes to Dyreparken Kristiansand, Parco Natura Viva and Copenhagen Zoo who kindly supported Svein Wilhelmsen, Davide Bombe and Maria Cecília Martins Kierulff's attendance at the EAZA Conservation Forum through Direct Sponsorship; and of course to our host BioParc Fuengirola and their amazing team.

Back from the brink

THE MESOPOTAMIAN FALLOW DEER IS MAKING PROMISING PROGRESS IN THE WILD IN ISRAEL THANKS TO A SUCCESSFUL REINTRODUCTION PROGRAMME

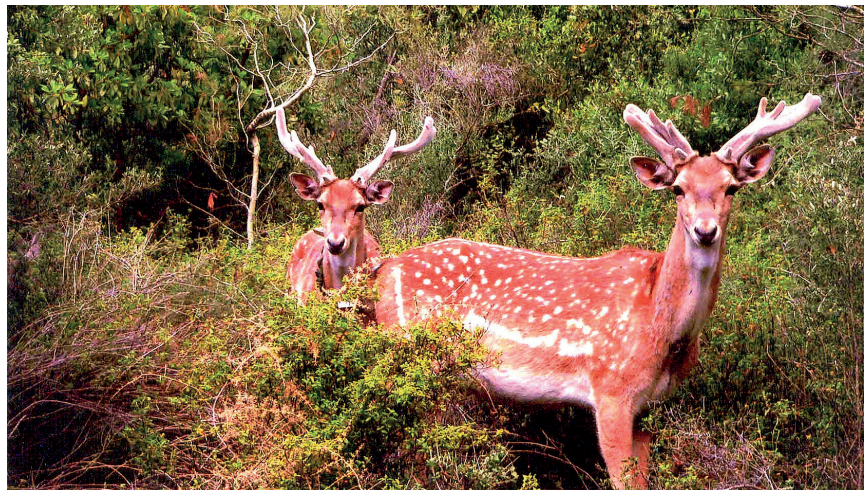
Dr Noam Werner, General Curator, and Nicole Wexler, Director of Development, The Tisch Family Zoological Gardens (The Biblical Zoo)

The Mesopotamian fallow deer (*Dama mesopotamica*) is a wonderful example of the contribution that zoos and breeding facilities can make to *in situ* conservation. This medium-sized deer species was formerly found in Iran, Iraq, Israel, Jordan, Lebanon, Syria and eastern Turkey and is mentioned in the Bible as one of the seven animals permissible for Jews to eat (Deut. 14:5). The Bible also reports that this meat was served at King Solomon's table (1 Kings 4:23) and archaeological finds support this account by proving that it was a popular food source during that time. However, with the growth of human population, the introduction of firearms and technological developments in the region during the nineteenth century, the population of the Mesopotamian fallow deer decreased significantly. In 1863 an English researcher called Tristram observed and reported sightings of the deer in Israel on the road from Tiberias (Sea of Galilee) to Haifa, and again in 1866 at Mt Tabor and in the Upper Galilee. But within a few years the Carmel region remained the last refuge for the species in Israel, and shortly afterwards it probably became extinct from this area as well, although antlers of the Mesopotamian fallow deer could still be bought in the bazaars of Jerusalem as late as 1923. The fate of the species in other countries was not much better and by the late 19th or early 20th century it became extinct from most of its historic range and was probably restricted only to southwestern and western Iran. By the 1940s it was considered globally extinct.

The destruction of the deer's tamarisk, oak and pistachio woodland habitats contributed to its population decline. Only around 10 per cent of the species' former range still exists for habitation in the present day. Since the Mesopotamian fallow deer is a primary herbivore in its ecosystem,



JERUSALEM ZOO



ROI ZIDON

it is affected by the decline of its main food plants as a result of habitat conversion and destruction. The decline of the Mesopotamian fallow deer's habitat is also likely to have contributed to increased pressure from predators due to the loss of dense areas that can be used as a refuge, as has been noted in similar deer species. Interspecific competition with domestic livestock, including cattle, has also further reduced the amount of food available to the deer, but the primary historical pressure on the Mesopotamian fallow deer has been human poaching.

NEW BEGINNINGS

In 1956, there was an exciting development when a population of

approximately 25 individuals were discovered in the Khuzestan Province in the south of Iran. Baron Von Opel of Germany financed a zoological expedition in 1957–1958 to the Khuzestan region, during which a pair of fawns were captured and brought to Opel Zoo in Kronberg, Germany, and in 1960 the wild-caught female gave birth to the zoo's first captive female. These first wild-caught animals and another male that was sent from Iran in 1964 are the founders of the current European EEP population. Around the same time the Iranian Game and Fish Department also captured individuals to initiate a conservation project for the species at the Dasht-e-Naz and Kareheh Wildlife Refuges, individuals that are the founders of most of the

Iranian captive population. A third captive breeding project started in Israel in the 1970s, following a government decision to reintroduce extinct species to the wild. The founders of the Israeli population were three individuals that arrived from Kronberg and four females that arrived on 8 December 1978, during the Iranian Islamic Revolution, in a special operation to fulfil a promise made by the Shah to the Israeli Government. These females, together with the individuals that had been previously brought to the country from Germany, were placed in a breeding facility in the Carmel Nature Reserve.

Whilst the European EEP and the Iranian captive populations remained only as back-up populations, the Israel Nature and Parks Authority implemented the government decision, and once the Israeli captive population was large enough, a reintroduction programme was initiated. The first location to be chosen was the Nahal Kziv Nature Reserve in the western Galilee and the first animals were released there in 1996. Following the success of this reintroduction, a further reintroduction programme was established at the Nahal Sorek Nature Reserve near Jerusalem, in which the Jerusalem Zoo has played a leading role in all aspects of the programme, including breeding, funding and monitoring the population.

BREEDING SUCCESS

The population in the western Galilee now comprises more than 250 mature individuals and it is the largest wild population of the species in the world. It is assumed to be viable and at the moment no further releases are planned for this area. In the Jerusalem Hills, where the Jerusalem Biblical Zoo has concentrated most of its efforts, the population has been growing slowly after a rough start to the project that included fatal encounters with the train that runs through the area and uncontrolled population of feral dogs, now the main predator of the deer in Israel. However, after these issues had been mitigated, the population is now estimated to number around 50 individuals, including wild-born

NICOLE WEXLER



fawns, and it is the second largest wild population in Israel and in the world. To try to expand the distribution area of the reintroduced population, mainly in the north of Israel, more reintroduction sites have been chosen and preliminary attempts to release individuals in the Mt Carmel area and in the Upper Galilee have begun; the hope is that all populations will expand their distribution areas and eventually meet to form a continuous distribution area in the north of Israel from the Mediterranean shore in the west to the Hula Valley and possibly the Golan Heights in the east.

Following IUCN guidelines for reintroductions, the various projects in Israel have been accompanied by research and monitoring by the Israel Nature and Parks Authority, the Academy and the Jerusalem Biblical

Zoo. These actions have generated a lot of information about the biology of the species including, among other things, its great importance as a seed disperser in the Mediterranean forest and the fact that it shows lower stress hormone levels in human care compared to in the wild.

Unfortunately, the numbers of the Mesopotamian fallow deer in the wild are not high enough to place it out of danger and the species is still classified as Endangered by the IUCN. However, continued work in captivity in Israel and Iran and in European zoos (EEP) guarantees that the species will not become extinct and the ongoing reintroduction projects in Israel ensure that for the foreseeable future beautiful Mesopotamian fallow deer will be observed – albeit rarely, as they are very shy – in the wild.

THE EAZA CONSERVATION DATABASE

The Tisch Family Zoological Gardens has entered this project and more of its conservation efforts in the EAZA Conservation Database, an online tool designed to facilitate cooperation and communication on conservation efforts. All EAZA Members can access the database, and are encouraged to use it to share their information as well as look for new projects to support, explore what activities other Members are undertaking and find opportunities for joint conservation efforts. To find out more, go to www.eazaconservation.org (Members only).

Planting new ideas

EAZA AND BIAZA JOINED FORCES THIS YEAR TO PRODUCE A ZOO HORTICULTURE CONFERENCE AT BRISTOL ZOO

Stephen Butler, Curator of Horticulture, Dublin Zoo, representing EAZA Zoo Horticulture Group/BIAZA Plant Working Groups

In May 2016, more than 50 people arrived at Bristol Zoo (England) for a joint EAZA/BIAZA Zoo Horticulture Conference.

Not all attendees were horticulturalists; the delegates included animal keepers, engineers and design professionals too, and all enjoyed an impressive mix of talks and walks as well as an interesting and highly relevant agenda.

SUSTAINABLE PRACTICES AND PROCUREMENT

Talks on fodder production ranged from large-scale browse, using woody trees and shrubs and cutting regularly on a 2/3/4 year coppice cycle, to fodder hedges allowing smaller amounts and sizes more often, fodder gardens including poly tunnels for winter production, and annual bedding schemes – especially at Artis Zoo, where all the bedding plants are used for fodder – using either a little bit each day, or eventually the whole plant at the end of summer. There were details, too, of specialist growing of fodder plants; one example given was that of Bristol Zoo's nursery, which is growing *Cytisus proliferus* for the Lord Howe Stick Insect (*Dryocelus australis*). There was also some discussion on how large an area might be needed for any significant browse production – for instance, up to 1000 trees need to be planted for each koala being planned for.

It is often necessary to outsource the majority of this work, and it is essential for small zoos with less land, many of which said they have a smaller area within the zoo as a back-up supply only. Using surplus summer growth for browse silage production, and trying for a range of evergreen – and therefore winter available – trees and shrubs, was also discussed. It was noted that a maze of maize was fun in summer for visitors, and would provide fodder later. It was agreed that it would be useful if more information regarding these topics could be added to the groups' web pages at www.zooplants.net so everyone has easy access. There is already a wealth of information on the website, including the nutritional values of many fodder plants and browse silage, and all EAZA Members are encouraged to use it and add information covering all aspects of plants in zoos.

Green walls and roofs have become a lot more popular, thanks to the advantages of insulation from cold and heat, gentle rainwater retention and the opportunity to encourage insects and wildlife. A talk on this emphasised the need for very careful choice of substrate and plant selection, which will depend how much weight the roof structure can bear. Mistakes in substrate or plant choice can lead to many problems and much extra maintenance and costs, and even complete failure of the planting. Poor choice of substrate or plastic structures for wall planting can be very unsustainable, requiring many resources and much transport. The most sustainable green wall was shown to be a good dense climber, self-anchoring and requiring no extra watering (and often less maintenance); with the addition of bird nest boxes and insect hotels they



can be very rich in biodiversity with little work, and with the right plant choice, they can be either evergreen or deciduous or a mix of both. One interesting point made was that solar photovoltaic panels perform better on a green roof as the temperature is less variable.

SUSTAIN AND RECYCLE

Several clever ideas for encouraging sustainability included an award-winning use at Budapest Zoo (probably uniquely) of spare hot water from the next door spa. The spa benefited from the cooled water (saving energy) and the zoo benefited from the free heat (saving energy again). Rainwater harvesting was mentioned too, including the use of large hollow drainage soakaways under road surfaces to contain sudden heavy rain and to allow it to drain slowly into soil naturally. Bristol Zoo also had many examples as we walked around, from sustainable coffee and fish in the restaurant, with an emphasis on local produce where possible, to simple segregation of visitor litter – especially so in the restaurant, where visitors trays are cleared at a 'cleaning station' to show recycling in action. There were also signs for visitors explaining the use of various good sustainable practices, such as photovoltaic panels, LED lighting, heating controls, secondary glazing, wool insulation and biomass boilers.

Biosecurity has become an issue of great significance as insect pests and plant diseases spread far and wide. We saw an example of this last year in the plant disease *Phytophthora*, which was discussed at the Nuremberg Zoo conference. Considering the vast numbers of plants that are moved around the world annually, the problem of new pests and diseases will



continue to increase.

Wilt disease *Ceratocystis platani* on Plane *Platanus*, Dieback disease *Hymenoscyphus* on Ash *Fraxinus*, and Asian Longhorn Beetle *Anoplophora glabripennis* on many woody plants were all discussed. When you consider that the iconic Plane *Platanus* in London is only 20 per cent of the tree numbers (121,000 trees) but provides 60 per cent of the leaf cover and would cost £350 million to replace, it shows the problem of the impact of diseases or pests. Some UK nurseries such as Barcham Trees have started quarantining any newly imported trees for one full growing year and inspecting them for pest and disease, and general health too, by checking the leaf fluorescence and chlorophyll content of leaves.

PLANT COLLECTION MANAGEMENT

Curating any plant collection depends on records, and there was a simple yet thorough presentation of the IrisBG Plant Database system. The system lists most plant names for a given collection and allows for GPS positioning and mapping of those plants if need be. This allows staff to access tree records for safety reasons, and can provide visitors with web-links to the records, which helps them to see the plants before they visit the garden as well as during their visit.

Links to other conservation organisations were encouraged as always, and an excellent presentation from Botanic Garden Conservation International BGCi on the EAZA/BGCi and Ecsite combined campaign 'Let It Grow' described various ways to increase and document the native flora and fauna, with bird boxes, insect hotels and wild flower patches wherever there was space. Bristol Zoo had a great many of

these, wherever there was a space to put them. The use of a Bioblitz day to get people involved and record what is on site has proved very beneficial to many zoos and gardens. The National Botanic Garden Wales also talked about native insects, detailing how over four years they had barcoded the DNA of all British native plants and then used this to identify pollen samples from foraging hoverflies Family Syrphidae to record the most popular plants. Bramble *Rubus fruticosus*, Devils Bit Scabious *Succisa pratensis* and various thistles *Cirsium spp* were much more preferred.

As this was a Joint EAZA Zoo Horticulture/BIAZA Plant Working Group meeting, there was discussion time for both groups to talk about the BIAZA Diploma in the Management of Zoo and Aquarium Animals, for which the group writes a chapter on zoo horticulture, and also on the EAZA Academy, looking at more practical courses.

It was hard to believe when walking round Bristol Zoo, with its often narrow pathways and very dense planting, that we were in a city and surrounded by buildings most of the time. The clever planting and high degree of maintenance reduced the effect of 500,000 visitors, too. The visit to Bristol Zoo's Wild Place itself showed a new zoo in the making, from bare ground to design to new zoo habitats. Although small in area, Bristol Zoo has so much going on, with conservation projects around the world, thousands of children going through on courses, degree students in their learning centre, two National Plant Collections, a very strong and visible emphasis on a sustainable operation, and of course a very varied animal and insect collection. It was an excellent conference, and many thanks are due to Bristol Zoo and its staff for organising it.



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Education for all

THE EAZA CONSERVATION EDUCATION STANDARDS HAVE BEEN REVISED AND UPDATED TO MEET THE EVER-CHANGING NEEDS OF OUR COMMUNITY

Sarah Thomas, Chair EAZA Education Committee, Head of Discovery and Learning (ZSL)

During 2015, the EAZA Education Committee was tasked with reviewing the EAZA Education Standards document, which was published in 2008. This timely update reflected the evolution of learning in zoos and aquariums and the types of educational activity they now provide. If conservation is to succeed, people need to be inspired to care about and understand animals and the threats they face in the wild. To do that, EAZA believes, everyone should have the opportunity to experience and learn about wildlife at first hand. EAZA Members have an important role to play in protecting nature and wildlife both at our zoos and in the wild, and communicating this role through conservation education is essential. Conservation education is not just confined to people who visit EAZA zoos and aquariums. It can take place out in the local community, in partnership with other organisations, within *in situ* projects and collaboratively on a global scale.

A new EAZA conservation education mission statement was written as part of this update, and reads as follows:

'To mitigate the extinction of biodiversity through quality conservation education that raises awareness, connects people to nature and encourages sustainable behaviours in the millions of people that engage with EAZA zoos and aquariums annually.'

Importantly, the term 'conservation education' was used in the mission statement and throughout the document, and was used to reflect the fact that biodiversity conservation must be at the core of any programme of educational activities within an EAZA zoo or aquarium. However, EAZA acknowledged that conservation education in its broader sense can include those programmes of activity that make an indirect contribution to biodiversity conservation – such as biological, science or environmental education, education for sustainable development and practical skills-based programmes.

There are 20 Standards that fall under five sections of the Standards document. These sections are: Organisation, Programming and Content, Facilities and Infrastructure, Professional Development and Evaluation. There are also two types of phrasing in the Standards statements. The majority are 'must have'; for example, Standard 2 states: *'The zoo must have a written conservation education plan. This plan must outline the zoo's conservation education activities, how they apply to different types of audience and the strategic thinking behind the plan's design.'* The remainder are 'should aspire to', which reflects where a zoo can reach beyond the minimum standards detailed in the document. An example of this is Standard 19, which states: *'The zoo should aspire to conduct a range of evidence-based research to demonstrate the effects of conservation education in zoos on people's knowledge, attitude and behaviour towards the natural world.'*

These Standards have been designed to be achievable and realistic for all EAZA zoos and aquariums, but it is important to remember that there is no single way to fulfil these



Standards. Conservation education activities in EAZA zoos and aquariums cover a broad range of purposes, methods of delivery, unique resources and messages. EAZA acknowledges the diversity of zoos within its membership, and recognises that the scale of conservation education in each EAZA zoo should be proportional to the size of its operations and in line with individual country's cultural expectations around conservation education in zoos.

At the same time as the Standards update, the questions for the education section of the EAZA Accreditation Programme were also updated. As a result, the accreditation questions are now closely aligned to the new Conservation Education Standards. The next task for the EAZA Education Committee is to produce supporting documentation that will assist EAZA Members to provide evidence of how they comply with the Standards, and to brief the EAZA accreditation team on the variety of ways in which EAZA Members can fulfil the requirements for each Standard in order to meet the needs of an accreditation inspection.

Writing a standards document that will be applicable to and achievable for 386 members in 44 countries is not a straightforward process, and as Chair of the EAZA Education Committee I would like to thank EAZA Executive Office staff members Myfanwy Griffith, April Adams and Laura Myers and the other members of the 2015 committee (Andrew Moss, Maggie Esson, Lothar Philips, Tomislav Krizmanic, Louisianne Fauchille, Eva Andersson, Antioneta Costa and Martin Becker) who gave me constructive comments and useful edits on the various drafts of the document.

The full EAZA Conservation Education Standards document can be found here: <http://www.eaza.net/assets/Uploads/Standards-and-policies/EAZA-Conservation-Education-Standards-2016.pdf>.

Population Q&A

THE WORK OF A POPULATION BIOLOGIST IS SOMETIMES MISUNDERSTOOD; HERE WE CLARIFY SOME OF THE MOST COMMON MISCONCEPTIONS.

Colleen Lynch, Consulting Population Biologist, Association of Zoos and Aquariums (AZA) Population Management Center (PMC); Kristine Schad, Population Biologist, European Association of Zoos and Aquaria (EAZA); and Claire Ford, Australasian Species Management Program (ASMP) Manager, Zoo and Aquarium Association Australasia (ZAA)

Population management is a core part of the work of modern zoos and associations, but continues to suffer from a number of misperceptions within the zoo and aquarium community, particularly between regions. While approaches may differ slightly from region to region, we all practise the same science and have much more in common than what separates us. Here, three population biologists address some common questions about their work.

IS POPULATION MANAGEMENT COMPLETELY DIFFERENT FROM REGION TO REGION?

No. The way in which breeding and transfer recommendations are created and communicated varies between regions, and even between programmes within a region, but the aim is always to be inclusive and consultative. Although we may have slightly different approaches, workflow processes or terminology, we are still very much aligned and working towards the same goal.

AREN'T SPECIES COORDINATORS AND STUDBOOK KEEPERS JUST THERE TO MAINTAIN THE STUDBOOK AND GIVE RECOMMENDATIONS?

No. Our regional associations tend to emphasise these two tasks, but there are many additional roles, including research, assisted reproduction, behaviour, veterinary, communication, conservation, fundraising, education, liaising with other organisations or regions, and many more. Some of these roles may be fulfilled by the TAG, by advisors or by you.

INBREEDING IS A TERRIBLE THING, RIGHT?

Not always. Although we try to avoid or minimise inbreeding, inbred animals are potentially important and should not be indiscriminately sterilised, exported or otherwise permanently

removed from populations. Sometimes inbred animals are recommended to reproduce for demographic reasons, or they are genetically important because they are the only ones representing very unique lineages. Outbreeding can be recommended as a corrective action. Intentional inbreeding needs to be controlled, limited to one or very few generations and carefully planned and monitored. It is essential also to consider the species biology and population history.

Inbreeding depression is unpredictable and there is no magic inbreeding coefficient (F) number for all populations. It is best to talk to a population biologist for guidance!

WE DON'T DO CULLING FOR POPULATION MANAGEMENT – DO WE?

Whether you call it culling or management euthanasia, it means the same thing: ending an animal's life while minimising its suffering within the limits of the available technology and view of recognised welfare science. Some institutions in every region use this tool to manage populations, even though there are variations in culture, legislation, politics, public perception and media sentiments. Our three regional associations and others have created position statements, guidelines or policies regarding this (see references). Even if your institution does not use this tool, we ask that you acknowledge the validity of its use in our global zoo and aquarium community.

POPULATION BIOLOGISTS WANT TO TAKE OVER MY PROGRAMME, DON'T THEY?

No! AZA, EAZA and ZAA all provide population biologists to assist you (other regions may also offer some support), although our role in each programme varies. We serve as advisors

and provide you with resources, networking, advice and support. Some of us have worked on hundreds of programmes. We know that they are all unique and we want your input and feedback on our suggestions. We can help you to navigate the science and software and will be honoured to play a part in your programme.

I GOT A 'DO NOT BREED' RECOMMENDATION FOR AN ANIMAL – DOES THAT MEAN IT CAN NEVER BREED?

No. A 'Do Not Breed' recommendation means that your animal is not needed to reproduce *right now*, but it is still playing an important role in the programme. It does not mean that your animal will never be recommended to reproduce in the future, nor that it should leave the programme, for example by being transferred out of the programme or permanently sterilised.

Genetics and demography both play a role in these decisions, and there is value in growing a population in a slow and steady way so as not to run out of space. Dramatic changes can also make your population unstable. Animals don't always follow the plans, so rates of 'Breed' and 'Do Not Breed' recommendation should be monitored and evaluated frequently. An animal with a 'Do Not Breed' recommendation might change status later on.

IF AN ANIMAL DOESN'T BREED EARLY OR OFTEN, WILL IT BECOME INFERTILE?

'Use it or lose it' is the idea that animals that do not breed early and/or often may lose their ability to do so, but there's not enough evidence to say either way. This has been studied in some taxa, but is anecdotal in most others. Studies are limited mostly to female mammals, so there aren't any hard conclusions at this stage. There's a pressing need for more study across

more species. This burden may fall on the coordinator, but remember that there are advisors, TAGs, institutions, scientific advisory groups and others that can help (e.g. AZA Reproductive Management Center, EAZA Group on Zoo Animal Contraception, ZAA Veterinary Specialist Advisory Group).

HOW CAN I MANAGE A GROUP?

Let us help! Groups, colonies, schools, herds and so on *can* be managed. There are many existing tools, although more need to be created. We do not need or want to force your programme into a one size fits all mould. Population biologists would love to help brainstorm strategies specific to your species.

Some existing tools and resources designed for amphibians that may be helpful, even if you're working with a completely different species, include Amphibian Data Entry Guidelines, Amphibian Population Management Guidelines, Amphibian Ark Founder Calculation Tool, and PopFrog online tool (see references).

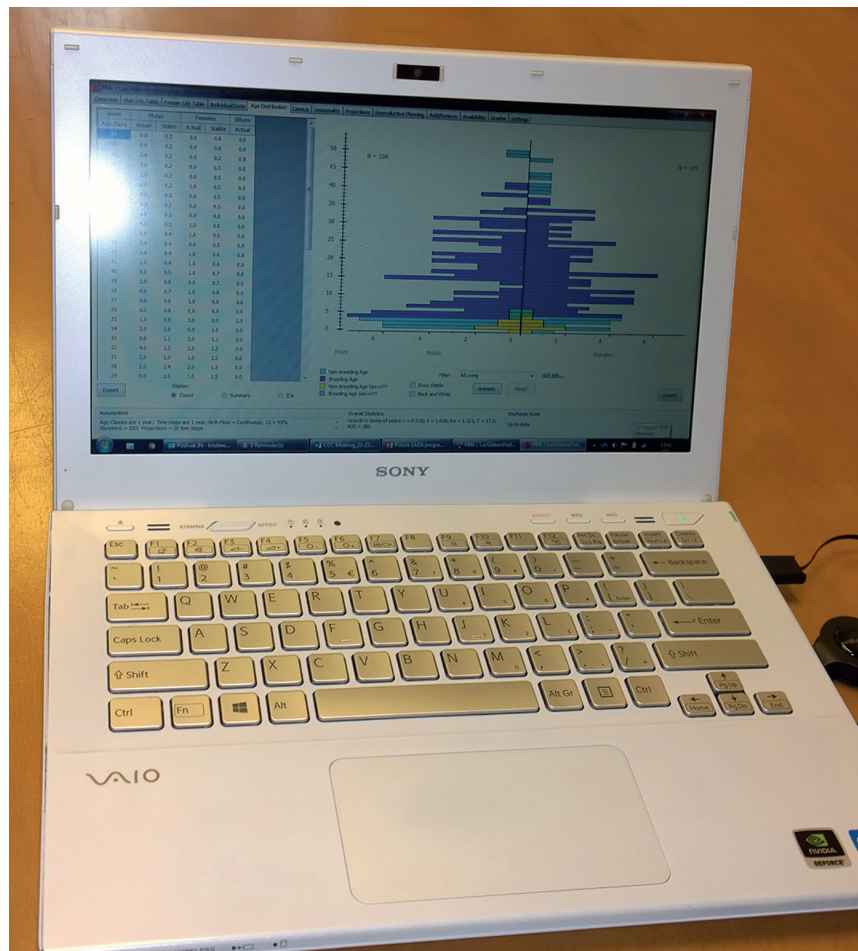
IS MOLECULAR GENETICS GOING TO REPLACE ALL THE OTHER TOOLS?

Not yet! Molecular genetic studies can help answer questions about taxonomy, geographic origin, population structure/heterozygosity, disease testing, parentage and pedigree reconstruction. Technology is great, but there are some challenges, including incomplete sampling of the living population, lack of available historic samples, lack of founder samples, unequal distribution or 'clumping' of samples, and low genetic variability (which is inherent in our small populations).

Molecular genetics does not replace pedigree-based management in most cases, but it can be helpful. The best outcomes occur when the coordinator, population biologist and molecular geneticist work together from the start.

WE NEED REGULAR IMPORTS OF ANIMALS TO KEEP THE POPULATION HEALTHY, RIGHT?

Yes and no. Imports are an important component of any managed programme, but we must ensure that the cost, time and resource commitment are justified. We need to consider: *genetic benefit* (Is there a need for new founders and are animals genuinely unrelated?); *demographic benefit* (Are animals



reproductively viable, of an appropriate age and sex and numerous enough to benefit the programme?); *likelihood of success* (Does the import help the programme? Is there expertise and space to ensure descendants?); *other spin-offs*, such as political benefit (Exchange of animals promotes goodwill and can encourage sharing of ideas); and *impact on populations* (What does this mean for the source and destination populations?).

Inter-regional transfers are possible. No two cases are the same, but by working with others we can ensure that imports benefit the population as well as the individual institutions and regions.

In conclusion, population biologists all have similar goals to help species, but sometimes we take a slightly different path to that goal. Still have questions? Please contact your local population biologist!

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Banking on our future

A NEW CENTRALLY ORGANISED BIOBANK WILL BE AN INVALUABLE RESOURCE FOR THE EAZA COMMUNITY

Christina Hvilsom, Copenhagen Zoo; Zjef Pereboom, Antwerp Zoo; and Kristine Schad, EAZA Executive Office

One of EAZA's most exciting initiatives in 2016 is the development of a centrally organised Biobank service for the European zoo and aquarium community. The aim of the EAZA Biobank is to establish a primary repository for biological samples from animals in the EAZA management programmes, which can be used for guiding the population management through genetics and for conservation-relevant research.

The success of EAZA *ex situ* programmes relies on intensive demographic and genetic management of animal populations. Currently, the majority of population management in zoos is individual and pedigree-based. This often causes problems because pedigree records for many populations are incomplete and the relatedness among founders is built on assumptions. Furthermore, many species still deal with taxonomic uncertainties, and the natural history of some species – such as species living in groups – does not lend itself to individual pedigree-based management.

DNA TO THE RESCUE?

In cases where there are management challenges, DNA analyses can greatly improve our knowledge of the genetic make-up of a population. In addition, mapping the genetic diversity of wild and zoo populations will help us to better understand their evolutionary history and taxonomy, and we can use this knowledge to ensure that our *ex situ* populations represent the genetic diversity of their wild counterparts. DNA analyses can also help in filling the gaps in pedigree record; for example, by genetically identifying the origin of founders and their relatedness. Biological samples are also very useful when testing for genetic diseases in order to conduct a survey on their prevalence. Furthermore, if serum samples are linked to a genetic sample, it will enable medical and epidemiological research. This work will provide valuable knowledge for veterinarians in their work to prevent and treat various diseases.

In recent years, molecular genetic techniques and tools have become

readily available to the zoo and conservation communities. Ongoing technological advances coupled with decreasing costs will create additional opportunities for adopting molecular genetics to help improve the management programmes under EAZA. But this will be possible only if biological samples are available, accessible, properly stored and well-managed, as they will be in the EAZA Biobank.

WHY DO WE NEED THE BIOBANK?

Biobanks are well-organised resources comprising biological samples such as blood, serum, tissue, whole specimens or isolated DNA, in association with information regarding the sampled individual. Globally, millions of samples with related data are already held in different collections that are accessible to scientific investigation, such as the Frozen Zoo® (San Diego Zoo) or the Frozen Ark (University of Nottingham). Even within individual zoos and aquariums, several initiatives already exist that store various kinds of biological materials for different purposes. But these collections are not always maintained properly, nor are they always widely accessible for research. Given the expanding needs for the use of molecular tools in population management, an EAZA Biobank will provide a professional service to the EAZA community.

The primary aim of the Biobank is to hold biological samples from all individuals of at least the EEP and ESB populations, and it will be designed to ensure optimal, secure and long-term storage of samples. The samples will be available for genetic analyses that should first and foremost benefit the improvement of intensively managed populations, as has been done for chimpanzees, Dama gazelle, sand cat and Somali wild ass. The Biobank will also create unique research opportunities; it will assist applied research in animal husbandry, population management and zoological medicine; and it will provide opportunities for addressing conservation-relevant and scientifically fundamental research questions.

THE EAZA BIOBANK IN PRACTICE

Initially, the EAZA Biobank will consist of three Biobank hubs, hosted and held by Antwerp Zoo, the Royal Zoological Society of Scotland (RZSS Edinburgh Zoo) and Copenhagen Zoo. Each of these institutions has adequate facilities and expert staff available and will provide funding, facilities and staff-time to keep, curate and register samples of all individuals sampled in EAZA programmes. After the official launch later this year, all EAZA zoos and aquariums will be encouraged to sample their individuals during routine veterinary interventions or handling for the purpose of DNA and serum biobanking and to send these samples to one of the biobank hubs for safekeeping.

The new EAZA Biobank Working Group, representing various EAZA committees, the three zoos hosting the Biobank hubs and other stakeholders, will act as the steering committee for the Biobank. The primary roles of the Working Group are to help develop the Biobank facilities, create the infrastructure, produce sampling guidelines, protocols and other relevant documents and assist EAZA Members.

One of the early roles of the Working Group is to collaborate with Species360's Zoological Information Management System (ZIMS) development team on the establishment of a sample management module for ZIMS, which will serve as the Biobank sample registration database. This module will enable Species360 members to easily gain an overview of Biobank samples and extract reports of samples on request. It will also allow an immediate link with information on individual animals within EAZA collections and thus holds unlimited potential for the future applications of these data in our *ex situ* programmes.

If you would like more information on the EAZA Biobank, please attend one of the presentations during the EAZA Annual Conference in Belfast, or come and find us during lunches or social events in Belfast.



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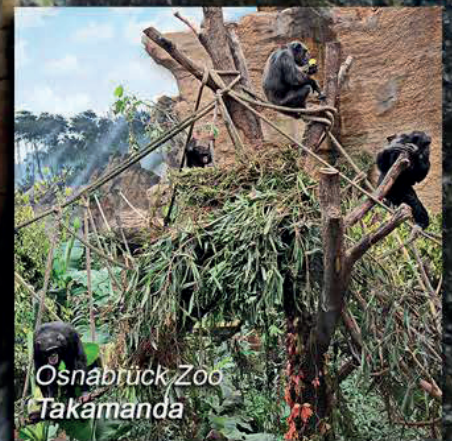
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