

ZOOQUARIA

QUARTERLY PUBLICATION OF THE EUROPEAN ASSOCIATION OF ZOOS AND AQUARIA

AUTUMN 2013

ISSUE 83

Cold comfort

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Zooquaria

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Follow your instincts

Some organisations, misguidedly, think that zoos and aquariums have no place in modern society. For some it is because they support an ideology that means they do not believe it is appropriate to keep animals in captivity for any purpose, to the extent that they would rather that species go extinct than be managed and cared for in a good zoo or aquarium. For others it's because they cannot see (or refuse to see), that professional zoos and aquariums fulfil an important conservation purpose, suggesting that zoos will not be needed in the future because species will be safe in nature. Really? This seems a hopelessly naive viewpoint if we simply look at the current and worsening situation for the biodiversity of our planet.

Habitats are being destroyed and fragmented every day for human resource demands. Species are illegally traded and hunted at a frightening rate and even legal trade in species, whole or parts, is driving some groups to oblivion. Two articles in this edition of *Zooquaria* talk directly about legal consumer demand for animals or animal products that threaten their future. Why are we still making face creams out of threatened and declining deep sea sharks when there are alternatives? Why are species like the electric blue gecko being harvested for the pet trade with little concern about their future status? Much of this edition is also devoted to the upcoming



Pole to Pole campaign which focuses on the threats to polar species from climate change and our inability to yet find ways to understand the thorny issue of managing energy sources in a sustainable manner. For each of these issues zoos and aquariums have a clear and urgent public education role not easily available to any other sector.

This is of course all happening at a time when the global human population is at 7.1 billion and estimated to reach 9.22 billion by 2075. An extra two billion people needing resources, yet somehow, according to the naysayers, species will be OK, and we don't need the conservation support of agencies such as zoos and aquariums. The United Nations has

predicted that even though the peak will be in 2075, the human population will still stand at 8.97 billion come 2300. In the face of this burgeoning human population it seems churlish in the extreme, even petulant, not to take advantage of every responsible way to try and save species and communicate about their conservation to the globe. Why would anyone block off conservation action? It also seems naïve to ignore the likelihood that without zoos and aquariums Aichi Target 1 will be nigh-on impossible to achieve – who else is speaking directly to the public, face to face, every day, in their millions, about nature and its conservation, and inspiring them with the opportunity to see animals. Professional zoos



and aquariums know of course that poor welfare can never be excused by conservation and that we must always be striving to ensure that the animals entrusted to us receive the best care. However, it is curious that the support of the IUCN to professional zoos and aquariums in EAZA is not recognized more widely, that the world's foremost conservation organisation, with observer status at the United Nations, does believe that professional zoos and aquariums are an important part of the conservation jigsaw. This is exemplified by the foreword, written by IUCN Director General, Julia Marton-Lefevre, to the new EAZA Strategy 2013-2016 and I would commend all EAZA members to read this document and

identify which areas in particular they can assist in implementing.

We know what essential direct or conservation support activities EAZA members are undertaking. We know how appreciated these actions are by our excellent non-zoo partners in the field. But we also know that it is getting harder and harder to protect species and we could be gloomy about their future. Let's not be gloomy. Let's, instead, use this as an impetus to continue our efforts, while combating the negativity of those who wish to stop conservation support from zoos. Sadly, those who attack us will ultimately never take responsibility for reduced funds and efforts towards conservation, or for losses of species – they will have

gone to their own mini-extinction. I for one want to go to mine secure in the knowledge that I did my best and did not do anything to hinder saving species, and for that we will need more than ever our good zoos and aquariums working alongside our partners.

I look forward to seeing you all in Edinburgh at the annual conference.



Dr Lesley Dickie
Executive Director, EAZA

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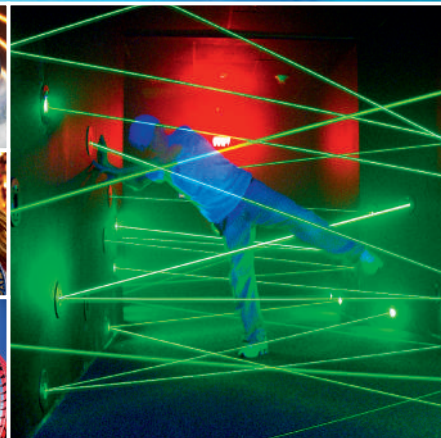
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NEW JOURNAL LAUNCH

WEDNESDAY 24 JULY 2013 will be remembered as a historic day, not just for EAZA, but also, and primarily, for the global zoo community. On this day the Journal of Zoo and Aquarium Research (JZAR) published its first issue online. A significant advance for EAZA, the launch of this journal in itself is not the most noteworthy aspect. JZAR is the first and – so far – the only scientific journal that focuses on zoo-based research AND is fully Open Access with NO author contributions. The journal is freely available to anyone interested in zoos and zoo research in particular, and anyone can contribute research papers free of charge. Most of the work is done by research staff of EAZA member zoos, and everything that has to be paid for is covered by EAZA.

So what's JZAR all about? JZAR provides a forum for rapid publication of conservation-related research, with a focus on novel, peer-reviewed research papers, review papers, technical reports and evidence-based case studies. Research categories covered by JZAR include studies in pure and applied biological sciences (eg behaviour, genetics, medicine, nutrition, population management and reproduction), *in situ* conservation research (eg socio-economic and field surveys) and research aimed at developing other roles of zoos and aquariums (eg visitor learning and marketing surveys). A section of the journal will be devoted to submissions of original, previously unpublished, case studies documenting the effects of husbandry interventions. Evidence-based husbandry for living collections aims to apply the best available evidence gained from the scientific method to decision-making. Sharing knowledge about the effects of management and/or husbandry



interventions will improve global management of living collections. The vision is that the assessment and dissemination of the effectiveness of husbandry actions will become a routine part of zoological management practice.

The concept of developing an EAZA scientific journal was spearheaded by the EAZA Research Committee. In 2008 the committee published the EAZA Research Strategy, paving the way for an increase in research activities or research participation by zoos. At the same time it was recognised that a major difficulty with implementing this strategy was ineffective communication of research results. Zoos globally are involved in research activities, but a huge amount of that never gets published or communicated in any way to other zoo staff or to the scientific community, and ends up on a dusty shelf, never to be seen again. For many zoos, access to scientific journals has been too expensive for their limited budgets and the idea for an open access journal was conceived. Now JZAR has finally arrived to serve the zoo



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community and academic researchers interested in zoo research. The first issue of JZAR was produced by members of the EAZA Research Committee and the BIAZA Research Committee who made up the interim editorial board. As of the second issue JZAR will be published under the expert guidance of our new Managing Editor, Eluned Price from Durrell Wildlife Conservation Trust. The majority of the interim editorial board will stay on as section editors and the Editorial Board will be expanded during the second half of 2013.

JZAR will be published quarterly. If you are interested in learning about the wonderful world of zoo science or you have the urge to submit a research article, please visit the journal website www.jzar.org.

NOTICEBOARD/BIRTHS & HATCHINGS



THE AMAZING AMAZILIA

HUMMINGBIRDS ARE RARELY KEPT IN zoos because of their specific needs, *write Hanne van Bavel and Diego C. Rubiano Franco, Weltvogelpark Walsrode*. One of the better known species is the Amazilia hummingbird (*Amazilia amazilia*), which occurs in Western Peru and Ecuador.

They have been bred in some institutions, but it remains very difficult to maintain a sustainable population in captivity. In 2011, Weltvogelpark Walsrode had the opportunity to start an Amazilia hummingbird breeding project. We designed a room where the light cycle, air inflow, temperature and humidity are artificially controlled, and in October 2011 the first birds arrived. After a false start in 2012, when three eggs were laid but unfertilized, we paired the female with a different male. In August last year they laid an egg which we hatched in an incubator. We hand-reared the chick (which only weighed 0.37g!) but it died on the third day.

In November, one of our females starting laying again. We were able to

monitor the breeding behaviour by placing a camera above her nest. She laid two fertilized eggs and incubated them perfectly, and on the morning of 8 December, we were delighted to find one healthy looking chick in her nest! The second chick followed a few hours later. Sadly, one died after 12 days when it got some food stuck in its trachea while being fed by the mother, but the second chick flourished.

This March, another egg was laid which we incubated, this time to great success. We hand-reared it with fruit flies soaked in isotonic water, supplemented with nectar and, once it was fully independent, it was moved to a small aviary where it could practise its flying skills.

This chick wasn't the end of our breeding success. In fact, five further chicks have successfully hatched and fledged, of which three were raised by their mother. Weltvogelpark Walsrode is very proud of this accomplishment, and of course we hope our efforts to breed these little birds will keep paying off in the future.

TEAMS WORK

EAZA AND CLAX ITALIA, ONE OF OUR GREAT CORPORATE MEMBERS, HAVE ENTERED into a new partnership that will reap dividends. Clax Italia, which manufactures, designs and fits small to huge acrylic panels, has generously agreed to donate monies to EAZA with every order made by an EAZA member to Clax Italia, either directly or when using Clax Italia acrylics ordered via a contractor. These donations will go to support our strategic work with a particular initial focus to outreach and training.

Lesley Dickie and Myfanwy Griffith of the EAZA Executive Office recently visited the Clax Italia headquarters in Rome where they had a tour of the factory and further discussions about the agreement. Clax Italia make the acrylic panels to order on their site and have some ambitious and interesting aquarium projects in mid-design. Clax Italia also made clear how proud they were of their membership with not only the Italian and EU flags flying outside their headquarters but also the Dutch and EAZA flags in honour of the visit – plus their newly designed staff uniform also carries the EAZA logo on the sleeve.

We thank Clax Italia for this fantastic support of the association. If you are designing a new exhibit that has an acrylic requirement then please contact Clax Italia, your fellow EAZA member, to discuss the possibilities (www.claxitalia.com).

HANDS ACROSS THE WATER

EAZA AND OUR COLLEAGUES IN AZA (Association of Zoos and Aquariums) in America have worked together closely for a number of years and now that relationship has become even more collaborative. In April EAZA and AZA signed a formal Memorandum of Understanding in which we jointly set out the ways we can work together into the future. This follows on from the success of other MoUs such as those with ALPZA and EAZWV.

The EAZA-AZA MoU will initially last for five years and will explore areas where we can work together more strategically for the benefit of both of our associations. More specifically the MoU sets out ways in which we can work more closely to ensure sustainability of populations, reflecting the ongoing work of both EAZA and AZA TAGs and programmes. This MoU also recognizes the complementary strengths of AZA and EAZA in public messaging of nature conservation, continuous professional development of collective community staff via both our training programmes, and conservation science, which will be explored for additional, future opportunities to collaborate.

Some collaborations already stimulated by this MoU include the agreement of Dr Paul Boyle, AZA Senior Vice President for Conservation and Education, to sit on the Advisory Board of our new EAZA Journal of Zoo and Aquarium Research. Paul has many years of research experience and will add valuable insight to this panel given his extensive aquarium knowledge.

The upcoming Pole to Pole campaign will also benefit from the closer relationship with AZA. AZA will be undertaking their work on the communication of climate change and sustainable living under the banner of Pole to Pole and in this edition of *Zooquaria* they have provided an article about the development of their 'green guides' for AZA members, helping them to promote sustainable practice to their visitors but more specifically their own facilities – 'walking the talk'.

We will be jointly examining where our policies overlap or where policies can be jointly agreed to meet our respective strategic aims and these talks will continue in Edinburgh with representatives from AZA attending the annual conference.

EAZA would like to extend its heartfelt thanks to Daniel Cox of Natural Exposures for allowing us to use his amazing photographs in the Pole to Pole campaign and in this edition of Zooquaria to promote the launch of the campaign. Daniel has been fascinated by, and in turn, enthusiastically documenting the natural world for nearly 30 years and in addition inspires others to take action for wildlife and nature via his images. He has worked with Polar Bears International (PBI) since 2004 as part of their advisory council and he and his colleagues at Natural Exposures devote hundreds of hours of their own time and their images to PBI to promote Arctic conservation. To that end Daniel recently established the Arctic Documentary Project (ADP), a joint effort between Daniel and Polar Bears International. In addition to documenting arctic animals and their ecosystems, the ADP is producing multi-media materials on some of the world's leading arctic scientists as they conduct fieldwork. All of the still images and video content become part of the PBI Multimedia Library which is available free of charge to educational institutions around the world that qualify for PBI's nonprofit media program. Daniel was recently honoured as the 2013 Outstanding Nature Photographer of the Year by the North American Nature Photography Association (NANPA). He's been awarded in competitions worldwide including the BBC Wildlife Photographer of the Year and Nature's Best. Images are powerful, as we see throughout this edition of Zooquaria, and Daniel's images will ensure that Pole to Pole is a visually striking and hopefully thought provoking campaign.



FIRST EUROPEAN REPRODUCTION OF PHILIPPINE CROCODILE

IN JULY 2013, THE FIRST REPRODUCTION OF THE PHILIPPINE crocodile (*Crocodylus mindorensis*) took place at the Cologne Zoo Aquarium, becoming the first breeding success of the species in Europe, write Thomas Ziegler, Karin van der Straeten, Anna Rauhaus, Detlef Karbe and Ralf Sommerlad of Cologne Zoo. This Critically Endangered reptile is among the rarest crocodilians in the world and the Crocodile Specialist Group strongly recommended *ex situ* management.

The parents of the hatchlings derived from a Philippine breeding facility and reached Cologne Zoo as a loan from the Philippine government in 2007. The couple was kept separated for most of the time, due to somewhat aggressive behaviour. However, many facilities that could be separated and continued target training enabled the team to bringing the crocodiles together from time to time.

The first copulations occurred in early 2012, but without egg deposition. Copulations from February to May 2013 finally led to a clutch of 10 eggs (of which six were deformed or infertile)

which was discovered on 2 May, and probably laid around 25 April. Artificial incubation took place at two temperatures (28.5 to 29.5 versus 31.5 to 32.5°C; up to 97 % humidity). The two eggs incubated at lower temperatures were opened on 13 and 14 July 2013 (days 79 to 80) after hatchling calls emerged, while the two remaining eggs remained under artificial incubation. Both young hatched by that point proved to be healthy.

This is the first breeding success for Mindo (dam, 15 years) and Pinoy (sire, 13 years) and a significant contribution to the ESB population, coordinated by Cologne Zoo. Cologne Zoo is also involved with ethological research of captive Philippine crocodiles. Prior to copulation attempts a genetic screening was performed to prove purity of breeding and exclude potential hybrid specimens from the ESB. Besides financial support of *in situ* crocodile conservation activities in the Philippines (Mabuwaya Foundation), Cologne Zoo also implements *in situ* natural history crocodile research in Vietnam and Borneo.

Pole to Pole campaign, 2013-2015

THIS IS A CAMPAIGN WITH A DIFFERENCE. TO SAVE THE POLES, WE MUST CHANGE PEOPLE'S LIFESTYLES. IT'S UP TO YOU

Jose Kok, Chair, Pole to Pole Campaign

The Poles are under threat. The polar bear and king penguin are the 'symbols' for conservation challenges in the Arctic and Antarctic, and in particular the spectre of climate change which is more acute at the poles than anywhere else on the planet.

Yet although the polar bear and king penguin are our chosen icons, just as with any other delicate ecosystem there are many more species in the Arctic and Antarctic that are under threat. Donations will not save the Poles, altering your lifestyle by making some simple changes will.

This campaign is about the Poles; the wonderfully varied species living there and the threats they face.

It's a campaign focusing on EVERYONE and how small changes in our behaviour can help polar species.

Save energy, save money, reduce CO₂ emissions... Get sustainable

Participation is simple. Take action and 'Pull the plug'. Unplug one or more of your electronic devices when they are not in use at the wall rather than leaving them on standby.

EAZA zoos can reach 135,000,000 visitors per year! If you alone unplug your mobile phone charger it saves 'only' 0.009 kWh per day. If all EAZA zoo visitors do that we together save 1,215,000 kWh. That's enough energy to leave 1,215,000 bulbs of 1,000 watts burning for one hour. You save money by saving energy and in the meantime you reduce your CO₂ output!

Setting a good example is very important in this campaign. If you're

going to ask people to change their behaviour, you need to show that you're leading the way yourself. The Pole to Pole campaign is the launch pad for developing a policy on how to prepare and run as near a carbon-neutral campaign as possible.

How do we as zoos ask our visitors to 'Pull the Plug'? We show them what we do in order to save energy and develop a more sustainable conduct of business ourselves.

Numbers count! Large numbers create the desired snowball effect and when people speak in sufficient numbers decision-makers take notice. With this campaign we can address politicians to reduce CO₂ emissions!

Taking action is not difficult; in fact if you share your actions and stimulate others it can be great fun!

TEAMING UP

Experts from the International Union for the Conservation of Nature (IUCN) are involved, together with the Arctic Action Team (AAT), Polar Bears International (PBI), the Antarctic and Southern Ocean Coalition (ASOC) and Groningen University (RUG). It is amazing to see how many organisations work for sustainability and how little is shared or pooled together. The Pole to Pole website will provide not only all (scientific) information, visitors resources and species factsheets. It will also list examples of what individuals, NGOs, zoos, communities do. Inspiring examples for you and your zoo.





Meet the Buchanans

THE EFFORTS OF ROBERT AND CAROLYN BUCHANAN SEAMLESSLY COMBINE WITH EAZA'S POLE TO POLE CAMPAIGN AND ITS AIM TO GET AS MANY ZOOS AND AQUARIUMS AND THEIR VISITORS INVOLVED IN ENERGY SAVING ACTIVITIES. HERE WE FIND OUT MORE ABOUT THEM AND, OPPOSITE, WE INTERVIEW ROBERT HIMSELF

What do you do when you love polar bears, have the chance to see them live in their own habitat for many successive years yet witness how they literally drown or are affected in other ways by rapid climate change? Some turn around and do what they did before. Others take action. Robert and Carolyn Buchanan are the driving force behind many actions to make people take action for a more sustainable lifestyle.

It was during repeat trips to the Arctic that Robert Buchanan first discovered how his marketing and finance expertise could be of assistance to world-leading polar bear and Arctic researchers. In 2000, he was asked to create a development plan for the fledgling conservation group, Polar Bears Alive. After a year's in-depth research, Polar Bears International (PBI) was born as an organisation with a focus on polar bear research and proactive education on how to conserve the great white

bears and their habitat. With that mission, PBI has attracted some of the world's finest scientists, zoologists, land management professionals, eco-tour operators, educators, government agencies and other NGOs.

Under Robert's leadership, PBI has grown into an organisation with an international scope, supporting projects throughout the circumpolar North. Funding provided by PBI helped support research that led to the listing of the polar bear as a threatened species by the US government. PBI is so well-respected by scientists that it was one of just two conservation groups invited to the recent IUCN Polar Bear Specialist Group meeting. Most recently, thanks to the vision and leadership of both Robert and Carolyn, PBI signed an MoU with the Association of Zoos and Aquariums and Canadian Association of Zoos and Aquariums that will introduce educational materials

about polar bear conservation and climate change into all AZA zoos. It also encourages the regular exchange of research between zoologists and scientists who study polar bears in the wild. EAZA has now also signed an MoU with PBI for the duration of the Pole to Pole campaign.

It became increasingly obvious that when you save the polar bear you save so many other different species. Realising this, Robert and Carolyn decided to focus their energies on changing the mindset of how humans care for this planet. No one seems to disagree that it is imperative that we leave this planet with clean air and clean water. To that end, the Arctic Action Teams (AAT) were formed. The focus is to make zoos and aquariums the centres of conservation communication for their communities by inspiring and creating action to help achieve these goals.



Robert Buchanan

Position: Founder of Polar Bears International and Arctic Action Teams

Hobbies: Marketing

Last book read: *Team of Rivals* Doris Kearns Goodwin

Last movie seen: *Argo*

Last concert attended: Cannot remember!

Last trip made abroad: May 2013 to Amsterdam then Rhenen for 2013 Bear in Mind conference

QUESTIONS:

A dozen years or so ago, the polar bear became a focus of your work. Could you describe your background up until that point?

I spent 35 years with Joseph E Seagram & Sons in marketing and product development. These skills led me to look for a way to give back to this great planet.

How did those existing skills and experiences influence and benefit your polar work?

My wife and I fell in love with the Arctic over 30 years ago. We quickly understood that the polar bear scientists were not getting their message through to the general public. Using the marketing skills taught me by J.E.S. we were able to work toward creating the polar bear as the iconic species for climate change.

What are the key visions of Polar Bears International?

It is an organisation with a focus on polar bear research and proactive education on how to conserve the great white bears and their habitat.

You've set up Arctic Action Teams: why is this, and what do you hope to achieve with them?

In today's world there is a huge need for hope, whether it's economic challenges, governmental issues, or environmental health and well-being. It is the Arctic Action Teams' belief and experience that hope can be inspired when individuals take action in ways that matter and are recognised for it. We have found that the more we showcase and thank those who are creating action, the stronger their commitment is to achieving change and thereby generating hope.

We believe that zoos and aquariums are the best fit to showcase community action on sustainability. In the United States alone, 175 million people visit AZA facilities in any given year. These centres of conservation have the capability to unite community

sustainability groups and government agencies with a focus on clean air and water. A community that is progressive on sustainability issues attracts young professionals to become residents, bringing the brainpower necessary to create the green economy that will lead to economic and ecological success for communities, countries, and the world.

In partnership with myActions (myActions.org), our short term goal is to create one million actions between September 2013 and April 22, 2014. On this Earth Day each community, institution, or business will be able to celebrate by showcasing their actions so that future generations will be able to enjoy all the wonderful flora and fauna that this planet can provide.

In which ways does polar conservation work symbolise the global effort to look after the planet?

When you save the polar bear you save so many other species!

How can zoos and aquariums help bring those visions about?

They are the geographic centres of conservation for their communities, with millions of people that go through them each year.

What excites you about EAZA's Pole to Pole campaign?

Its teamwork as well as its ability to change communities into becoming an integral part of sustainability for future generations.



South-facing view

AN INTRODUCTION TO ASOC, THE ANTARCTIC AND SOUTHERN OCEAN COALITION WHICH WELCOMES EAZA'S NEW POLE TO POLE CAMPAIGN

Ricardo Roura, Senior Advisor, ASOC, José Kok, Chair Pole to Pole Campaign

ASOC (1978) is a global network of environmental groups working on Antarctic environmental protection. It has 24 full member groups in 10 countries and supporting groups in those and several other countries. ASOC believes that the continent and its surrounding ocean are the natural heritage of all humankind and seek to ensure that Antarctic ecosystems – both terrestrial and marine – remain protected and intact. Present campaigns include negotiation of a legally-binding Polar Code regulating all vessels operating in the Antarctic; establishing a representative network of marine reserves by 2012, including Marine Protected Area status for the Ross Sea; managing Southern Ocean Fisheries sustainably; regulating Antarctic tourism and biological prospecting; strengthening the Southern Ocean Whale Sanctuary; and monitoring implementation of the Environment Protocol to the Antarctic Treaty. Generally ASOC works in all aspects of Antarctic governance that influence environmental protection

THREATS TO THE ANTARCTIC

Climate change has the potential of introducing profound changes to the marine ecosystem where the vast majority of Antarctic wildlife lives, through inter alia ocean acidification and the melting of seasonal sea ice. These changes may affect the Antarctic food chain as sea ice plays

a fundamental role in the early life stages of krill, the shrimp-crustacean upon which fish and other top predators feed. Local and regional human pressures such as tourism and, in particular, industrial fishing can add to the effects of climate change and cause substantive additional effects, for instance on local penguin populations. In this context, the establishment of large marine protected areas is of great importance, as they may serve as refuges for ice dependent species and as reference areas to understand how ecosystem processes are influenced by climate change and

ocean acidification. Human presence in the region has resulted in a range of environmental impacts: introduction of non-native species (including humans themselves), site-specific impacts caused by tourism, and impacts on the marine environment caused by sealing, whaling, and fishing.

The history of exploitation has been characterised by successive bouts of resource extraction, followed by a collapse of target populations. Exploitation dates to the late 18th century, when sealing began in the islands surrounding the Antarctic. Over a period of 150 years, seals, then



WHO IS RICARDO?

As senior advisor for ASOC, Ricardo Roura serves as representative in the Committee for Environmental Protection. He works on tourism, protected areas, environmental impact assessment, and biological prospecting. During his study (Geology) he became involved with the Greenpeace Antarctic campaign which was aiming to overturn the minerals regime that at the time was being negotiated by Antarctic Treaty states. After a Master in Philosophy he completed his PhD at the Arctic Centre of the University of Groningen. Ricardo is interested in the interaction between people and the natural environment in the Polar Regions.



whales, and then some species of finfish took a heavy blow. Some whale and finfish species have never fully recovered from being overexploited in decades past.

The exploitation of mineral resources is prohibited by the 1991 Protocol of Environmental Protection to the Antarctic Treaty. Positive effects, however, are mitigated by poor implementation of environmental agreements, illegal fishing, so-called scientific whaling, and a lack of comprehensive regulation for activities such as tourism. Furthermore, the geopolitics of presence encourages the development of Antarctic infrastructure such as new research stations in pristine sites, maintained roads traversing the continent and

airstrips, as well as fishing.

An additional problem comes from gaps in the overlap of the various regimes that govern activities in the Antarctic region – whaling, fishing, shipping, and most other activities are covered by different international treaties in which the environment is given varying degrees of importance.

WHAT CAN WE DO?

People can help to reduce environmental impacts related to climate change by minimising their footprint and pushing decision-makers to take action. Minimising human activities in the region, preventing and mitigating their impacts, and establishing protected areas, both on land and on the marine environment

is another very important issue.

This however requires political will and a strategic perspective among decision-makers. National interests are sometimes stronger than the common interest of the international community.

EAZA zoos and aquariums can act as platforms to raise awareness about the Antarctic among the general public. However, it would be important to turn public interest and awareness into action on key environmental issues, for instance through direct communication from members of the public to decision-makers. When people speak in sufficient numbers decision-makers take notice.

For more on ASOC, please visit www.asoc.org.

Natural behaviours

CAN THE MESSAGES BEHIND POLE TO POLE CHANGE PEOPLE'S BEHAVIOUR? ZOOQUARIA SPOKE TO LINDA STEG, PROFESSOR OF ENVIRONMENTAL PSYCHOLOGY AT THE UNIVERSITY OF GRONINGEN

What is your background/education?

I received my PhD in Psychological, Pedagogical, and Sociological Sciences at the University of Groningen in 1991. Before that, I studied adult education at the University of Groningen.

What is your professional passion?

Understanding why people act pro-environmentally, even though this may be somewhat costly, and which factors inhibit pro-environmental actions. I learn new things about human motivation and behaviour every day, which is very inspiring.

What kind of research is done at the your faculty?

Within environmental psychology, many different research projects are conducted. Our main interest is to understand what motivates people to do the right thing, and how we can encourage pro-environmental actions. We examine factors influencing pro-environmental actions, and the effects and acceptability of environmental policies. We study individual behaviour and behaviour in local communities as well as environmental behaviour at work. We also study the effects of nature, environmental conditions and behaviour on well-being.

More specifically, we study to what extent and under which circumstances knowledge affects pro-environmental actions. Furthermore, we study which factors affect one's environmental self-identity, and how this identity in turn affects pro-environmental choices. We also study how values affect our evaluations and acceptability of energy sources and, more broadly, pro-environmental actions. In addition, we study emotional responses to environmental issues, behaviour, and feedback, and how these emotions affect environmental choices.

We study which psychological factors affect the adoption of electric vehicles. Finally, we study how (signs of) behaviour of others affect individual pro-environmental actions.

Is it possible to change people's behaviour in favour of nature?

Yes, but not all strategies are equally effective.

What scientific proof is there?

A lot. Provision of information as such is mostly not effective. Information is more effective if it is tailored to one's personal situation, and when it resonates with one's key values. Many other strategies have proved to be effective, eg asking people to commit themselves to change their behaviour, particularly if this is combined with a so-called implementation intention, in which people specify how, when and where they will engage in the relevant pro-environmental action. Also, a block leaders approach proved to be rather effective – this involves a person in the relevant community helping to deliver interventions to the target group.

Feedback on one's performance has proved to be effective, particularly if this feedback is tailored to the individual situation, and when the information provided is important to people given their values. Additionally, changes in the choice situations can be implemented as to make pro-environmental choices relatively more attractive, eg via pricing strategies (eg subsidies, taxes), provision of facilities (eg bottle bank), laws (eg prohibit regular light bulbs) and technology (eg energy efficient appliances).

Why exactly are people prepared to change behaviour for the benefit of the environment? What is their main motivation?

Many people care about the environment, and are motivated to protect it. They are particularly likely to act upon this motivation when pro-environmental actions are not too costly, and do not seriously inhibit fulfilment of other values that people find important as well.

What do you believe to be the best way to make people act?

Strengthen and activate their environmental values and make sure that pro-environmental actions are not too costly or inconvenient.

Does the social economic status of target groups have any relevance?

It depends, but does so particularly when investments are needed (eg some pro-environmental actions are rather expensive).

Do you think visitors are more likely to act because they are emotionally triggered by species in a zoo or aquarium?

They might be, if they realise that by acting pro-environmentally, they may protect the species.

Are there cultural differences?

People in every culture endorse environmental values. They may not always act upon them, depending upon cultural factors (eg in some cultures eating meat is very common while in other countries it is not) and situational differences (eg climate, infrastructure).

What possible barriers are there that stop people from changing their behaviour?

Many. Sometimes acting pro-environmentally may be rather costly or inconvenient (eg investment behaviour, or cycling rather than driving long distances), but sometimes acting pro-environmentally may have other benefits as well (eg saving electricity saves money, and some people enjoy cycling).

Will the Pole to Pole 'Pull the Plug' work?

That is what we aim to find out. We expect that if we implement elements from my response to the question 'what scientific proof is there', the effects may be enhanced.



EXHIBIT DESIGN

Ring of bright water



COPENHAGEN ZOO'S NEW ARCTIC RING EXHIBIT GIVES VISITORS THE CHANCE TO SEE POLAR BEARS AS NEVER BEFORE

Bengt Holst, Vice-Director, Copenhagen Zoo

Have you ever seen polar bears swimming under water? If not, you should. It's a fantastic sight and one that makes this magnificent species even more magnificent. And that is what you can now experience in the newly opened Arctic Ring at Copenhagen Zoo.

When approaching the Arctic Ring you can initially see polar bears in an arctic summer landscape from a distance. The landscape has been formed to resemble the coastline of Greenland with rocks, pebbles and a few arctic plants, mostly shrubs. Separated only by a deep cleft you stand face to face with these enormous carnivores in their naturalistic environment. The keepers hide food items in this area every day, smear special smells on the stones and plants and make sure it is as stimulating as possible for the bears. At the back of the enclosure there are two freshwater pools that can be used as drinking water, and close to the exhibition house is the great saltwater pool containing 2,500m³ water.

You continue your trip through the Arctic along a twisted path leading you further down and into the house where most of the interpretation is situated. On your way down you pass by a window next to one of the freshwater pools. Here you can see the bears close up, drinking or just playing with the water.

As soon as you enter the house you stand in front of a huge 15cm thick, 8m long and 3m high acrylic window where you can enjoy seeing the polar bears swimming under water. This part is connected to the outer pool, and polar bears can be seen swimming round the rocks, coming from nowhere,

or swimming into nowhere. It's a strange but very authentic feeling. Here you can also watch the polar bears playing with whatever they have been given to play with. Often the bears get horse or cow heads that they carry around, explore, try to catch on land, try to jump on when they are swimming in the water and so on, and they can spend hours on this activity. The heads are exchanged with other items regularly in order to maintain a renewal process which keeps the interest high, and it is obvious that the polar bears like playing with these items.

If you can break away from this exciting sight you will continue further into the house and enter an acrylic tunnel going through the pool. Water is 7m deep in this area, and you can watch the polar bears approaching from a distance, starting as a ghostlike shadow coming around a rock at the far end and changing into a beautiful polar bear when getting closer. Here you can see the bears under water as they get really close to you. They swim over and under the tunnel, sit on the tunnel or dive down to the bottom of the pool to pick up a fish or other interesting object. The bears often stay for a while in this area, playing with and around the tunnel, and you get plenty of good opportunities to study the animals' movements, their huge paws and their fur that moves like kelp in the ocean. And if you turn around you have the chance to see the preferred prey of the polar bear – seals. A special common seal enclosure is situated just next to the polar bears so that they can see each other, but of course not touch. A 15cm thick acrylic window separates the two, but they can – and do – interact through the





THE RING IN NUMBERS

The Arctic Ring was developed in cooperation with the architects Dall & Linhardt A/S and was donated to the Zoo by the A.P. Møller and Chastine Mc-Kinney Møller's Foundation for General Purposes. Total price: ~ €20 million. The Arctic Ring was opened on 5 February 2013 and at once generated greatly increased visitation.

Land area: 720sq m • Pool: 330sq m • Water volume: 2,500m³ • Visitor area inside: 435sq m • Visitor area outside: 535sq m • Technique and service area: 746sq m

window. And if they don't feel so inclined they can just swim away; both pools are big enough for their animals to move away from each other.

During the first weeks after the opening of the Arctic Ring this place was a true bottleneck. People stayed to watch the polar bears up close and didn't want to move away. So, we had to station people at both ends of the tunnel to keep the traffic going and let everyone enjoy the exciting experience. But even that could be turned into a positive thing since we then took this opportunity to tell visitors about the polar bears while they were waiting. Today, four months later, it is not a problem. There are still plenty of people going through the house daily, but there's now a balance so that we don't have a bottleneck effect anymore.

After the tunnel visitors enter the interpretation hall where we tell the story of the polar bear as a lonely hunter, its adaptations to a life in the Arctic, the insulation power of its fur and more. All interpretation is done through interactive displays where kids – and adults – can play their way through the life of a polar bear.

This is also the hall where you can experience the life of a bird cliff. Opposite to all the interactive displays we have built a copy of a bird cliff from the Faroe Islands in the Atlantic. A steep cliff, partly overgrown with green grass, dips down into a 1.5m deep pool containing saltwater as does the big polar bear pool. In order to decrease the risk of infectious diseases the temperature in the room is



kept below 20 degrees by keeping the water temperature at 10 degrees and by having lots of ventilation.

The visitors can enjoy watching the birds both above and under water and can watch them diving into the water from the cliffs.

There are three species: common murre (*Uria aalge*), razorbill (*Alca torda*) and Atlantic puffin (*Fratercula arctica*). The puffins were brought to

Copenhagen as eggs collected from one of the major bird cliffs in the Faroe Islands

and as the result of a joint agreement with the local 'puffin association' that actually owns the rights to egg collecting on that particular cliff. Forty-eight eggs were brought back of which 18 hatched in the zoo. This year three pairs have already entered their nests and are defending the site fiercely. So, we are very optimistic for future breeding possibilities.

Leaving the interpretation hall visitors continue along a narrow path where they can experience the wonderful colours and patterns of the Northern Lights and finish one level up where you can look into the polar bear enclosure again, half under water and half above so that they can see the bears walking on the barren grounds, jumping into the water and swimming. At the same level is a platform offering a fine view of the bird cliff – a good place to relax and just enjoy the animals. From there visitors end their tour through the Arctic and exit the house just next to a big glass window where they can watch the polar bears digging their sleeping hollow or for food.

The beauty of sharks

AN UNUSUAL COMBINATION OF ZOO AND DEPARTMENT STORE IS FIGHTING TO KEEP SHARK OIL OUT OF COSMETICS

Fiona Llewellyn, Zoological Society of London

Would you like to rub oil from the liver of endangered deep-sea sharks on your face? Given the choice, the answer to this question is usually 'no'. The trouble is – we're not currently given the choice. Most people don't even know that shark oil is used in the beauty industry, and for those of us that do, there's really no easy way to tell if it's in the products you're buying or not.

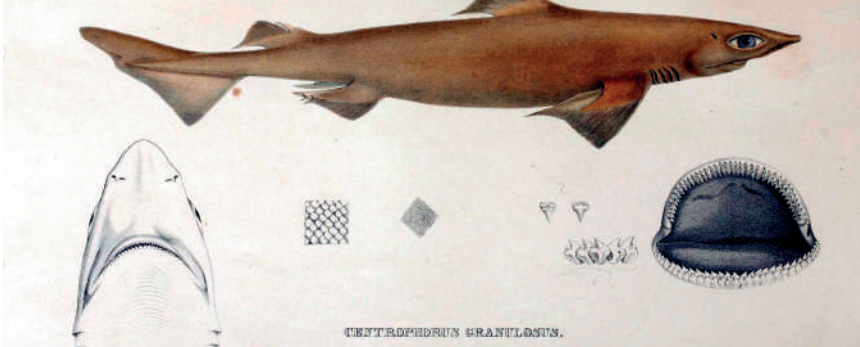
'Squalene' is the name of the ingredient we're talking about. It's an organic compound, often used as an emollient in face creams and lotions and it can be extracted from the liver oil of sharks. The good news is that it can also be extracted from plant-based sources, such as olives, wheat germ amaranth seeds and rice bran. The bad news is that manufacturers do not have to specify the source of these ingredients. So the consumer can read that a product contains squalene but has no idea whether it's plant-derived, or whether they're unintentionally slapping dead shark on their face. It was hoped that a new EU Regulation on Cosmetics (Regulation (EC) No 1223/2009) that entered into force on 11 July 2013, would resolve this issue by addressing the rules on labelling. Unfortunately, however, the rules were not strengthened, meaning the consumer is still in the dark. And it's not just an EU problem – it's the same the world over.

It's not good news for the sharks either. Deep-sea species, such as the Portuguese dogfish (*Centroscymnus coelolepis*) and gulper shark (*Centrophorus granulosus*), are targeted because of their large livers. These species are particularly slow-growing, with low reproductive potential. It takes around 3,000 sharks to produce just one ton of squalene. With a global market of 1,000 to 2,000 tons per year, we're looking at the killing of 6 million sharks every year for this trade alone. It's unsustainable and unnecessary.

So what's being done to tackle the issue? Enter 'Project Ocean'.

Project Ocean is a rather unusual collaboration, between the world's

19TH CENTURY ANATOMISTS' VIEW OF THE GULPER SHARK



oldest zoological society – The Zoological Society of London (ZSL) – and one of the UK's most luxurious department stores – Selfridges. Established in 2011, Project Ocean has two key messages: vote with your fork by eating only sustainable fish, and support the creation of more marine protected areas (MPAs). After the initial success of their 'No more fish in the sea' campaign to encourage consumers to buy only sustainable fish, Selfridges has turned its attention to its Beauty Department.

Earlier this summer, Selfridges' Oxford Street store in London ran the 'Save our Sharks' campaign, encouraging customers, partner brands and fellow retailers to recognise the importance of sharks to the environment, and to understand the threats they face. With the help of ZSL and the international marine conservation organisation, Oceana, Selfridges carried out an extensive audit of its beauty and health concessions, removing any products containing shark oil and shark by-products.

With its beauty shelves now 100% free of shark-derived squalene, Selfridges is leading the way, working with brands to raise awareness of the issue, and encouraging reformulation

using the equally effective plant-based alternatives.

There have been some really positive changes for sharks over the past few years, such as the introduction of various finning bans across the world (including in European waters), the setting of zero 'Total Allowable Catch' levels for some vulnerable species in different regions, and the addition of further shark species – hammerheads (*Sphyrinidae*), porbeagle (*Lamna nasus*), and oceanic white tip (*Carcharhinus longimanus*) – to Annex II of the Convention on International Trade in Endangered Species earlier this year. But there's still a very long way to go – recent estimates suggest humans are killing up to 100 million sharks every year.

We would like to see an end to the unsustainable and unnecessary practice of using shark liver oil in beauty products. However, until regulators take notice and sort out the hugely confusing and unclear labelling of these products, it will continue. Consumers have the right to make an informed decision about what they're buying – and what they're putting into and onto their bodies. We hope that other retailers will follow Selfridges, shedding light on the issue, reducing the demand for shark oil and ultimately helping to ensure a sustainable future for these species.

TEAM WORKS

As part of the Project Ocean campaign, Selfridges also supports the Marine Reserves Coalition, a group of five organisations working collaboratively for the establishment of fully protected marine reserves. Members include; ZSL, Greenpeace UK, Marine Conservation Society, Pew Charitable Trusts and Blue Marine Foundation. For more information visit www.marinereservescoalition.org

ASSOCIATION OF ZOOS & AQUARIUMS



GREEN SHOOTS

HOW AZA IN AMERICA IS HELPING ZOOS AND AQUARIUMS IMPLEMENT SUSTAINABLE PRACTICES TO MEET THEIR CONSERVATION MISSIONS

Shelly Grow, Association of Zoos and Aquariums; Debborah Luke, PhD, Association of Zoos and Aquariums; Jennifer Hale, AZA Green Scientific Advisory Group Chair, Denver Zoo; Doug Piekarz, AZA Green Scientific Advisory Group Vice-chair, Akron Zoo

Zoos and aquariums accredited by the Association of Zoos and Aquariums (AZA) serve as conservation centres that are concerned about ecosystem health, take responsibility for species survival, contribute to research, conservation, and education, and provide society the opportunity to develop personal connections with the animals in their care. These esteemed institutions play a vital role in maintaining our planet's diverse wildlife and natural habitats while engaging the public to appreciate and participate in conservation. Accreditation standards and board-approved policies ensure that all AZA-accredited facilities have substantial, positive impacts on conservation.

Habitat loss and degradation (resulting from pollution, over-exploitation, invasive species, and climate change) are some of the most significant threats facing wildlife worldwide. Conserving resources can lessen these threats and therefore AZA-accredited zoos and aquariums strive to conserve the natural resources within their own business operations. Sustainable practices are implemented to reduce water and energy usage, decrease waste generation, and encourage the generation and purchase of green products and renewable energy. From developing water-saving filtration systems in aquatic exhibits; installing both small and extensive solar panel arrays; designing and building innovative waste-to-energy systems; receiving ISO 14001 certification for designing and implementing effective environmental management systems and the US Green Building Council's LEED certifications for buildings and construction; and working with visitors, restaurants, and vendors to offer sustainable food options, accredited zoos and aquariums are inspirational public examples of putting conservation talk into daily operations.

To help AZA-accredited facilities develop and implement sustainable practices that support the missions of their facilities, save money, and respond to stakeholder demand AZA published 'The Zoo & Aquarium Green Guide: Suggestions for Beginning or Expanding a Sustainability Program' in 2011. This popular resource was expanded into a two-volume set in the fall of 2013 (it can be seen at www.aza.org/sustainable-practices). Together, these AZA Green Guides will help zoos and aquariums publicly demonstrate their commitment to wildlife conservation by 'walking the talk' and revealing model ways in which guests can learn how to be part of the solution for habitat and resource conservation. Each is organised by sustainability topic areas that mirror those used in AZA's annual Green Award and include:

- Awareness/Planning
- Chemical Management
- Construction
- Energy Management
- Fuel Management
- Innovation
- Purchasing
- Waste Management
- Water Management

Volume 1 of the AZA Green Guide, entitled 'Introduction to Building Zoo & Aquarium Sustainability Plans' is designed to help zoos and aquariums gain a basic understanding of sustainable practices, become fluent in a consistent sustainability language, and think about ways to develop a Sustainability Plan. All AZA-accredited zoos and aquariums are encouraged to develop a Sustainability Plan, which will provide a critical starting point for staff to support the organisation's sustainable practice strategies and contribute to the plan's success. To be a model of sustainable development, it is recommended that the Sustainability Plan consider and balance the organisation's economic, environmental, and social outcomes

when making operational decisions and defining operational costs.

Volume 2 of the AZA Green Guide, entitled 'Building and Measuring Your Zoo or Aquarium Sustainability Plan', is designed to help zoos and aquariums implement specific sustainable practice strategies, identify AZA Smart Source Cooperative Purchasing Programs to provide discounts on sustainable products, and document their progress on categorical metrics through scorecards. These scorecards, provided for each sustainability topic area, are modeled after the ICLEI-Local Governments for Sustainability USA's successful Green Business Challenge Program but modified to fit the needs of zoos and aquariums. The metrics and scorecards are designed to help an organisation document its sustainable practices internally via a point system and track progress against its own operation over time.

During September 2013, AZA is distributing a membership survey that gathers data from these scorecards to assess and promote the membership's individual and collective sustainable practice efforts. This information will then be gathered via a Sustainable Practices survey on an annual basis and included in the AZA Annual Report on Conservation and Science (ARCS) which will also summarise field conservation, mission-focused research, and educational programming efforts. The newly refined ARCS will allow AZA to be better able to share the story of how accredited zoos and aquariums are leaders in wildlife conservation. Whether saving species on the brink of extinction or ensuring species never reach such a precarious state by reducing threats, AZA-accredited zoos and aquariums are working hard to protect wildlife and wild habitat for future generations to enjoy.

To find out more simply visit www.aza.org/sustainable-practices.

Reasons to feel blue

A TINY GECKO NOW HAS A TINY POPULATION, DUE TO THE PET TRADE. ZOOS CAN HELP TO SAVE THIS CHARISMATIC CREATURE

Heike Maisch, Curator, Zoopark Erfurt

This turquoise dwarf gecko (*Lygodactylus williamsi*), or Williams' dwarf gecko as it is also called, is highly prized within the pet market. This is hardly surprising. The males are as blue as the sky, and out and about during the day, while the females are bronze-green and look good against foliage. They're tiny, too, which means they don't need to occupy much space in a collector's living room.

Once word got around about these geckos ten years ago, demand rapidly grew, and tens of thousands have been harvested from the Kimboza and Kuvu forest of Tanzania since then. Even today wild caught animals are much cheaper than captive bred ones that have been carefully nurtured and reared.

The gecko hasn't fared well as a result. Just a decade after its sudden appearance on the pet market it has appeared on the IUCN Red List for the first time: it is now Critically Endangered.

In the wild one male and several females share one screw pine tree *Pandanus rabaiensis*. The gecko seems to be dependent upon those trees

FIFTY YEARS OF PEACE

The turquoise dwarf gecko was first described by Loveridge 61 years ago. It went reasonably unnoticed until 2002, when first picture was published in a field guide. That's when demand went into overdrive.

and they have not been found on any other type of plant. To collect them people simply cut down the tree. Apart from Kimboza and Kuvu Forest (4 km² and 30 km² in area respectively) there are only two tiny fragments near those forests where the geckos have also been seen. One fragment consists of only 14 *Pandanus* trees: the rest have been cleared for banana plantations. The second fragment is similarly close to its final destruction. Less than 18 % of the Kimboza Forest is covered with *Pandanus* trees, so even in the forest area the habitat is much fragmented. When the trees have gone, the geckos will be gone forever.

But there is hope. Thousands of potential founders of a conservation breeding programme are right here

in Europe. They're mostly in private hands, but they are here: we do not need to start a breeding programme from scratch with only 10 individuals. The geckos do not need huge space, and they're easy to breed if the normal standards for temperature, humidity and so on are taken into account.

Their popularity in the pet trade means they are also an attractive species for our visitors. The message about what happens because of our unsustainable use of our natures' resources can clearly be passed on to our visitors, informing them that buying wild-caught animals that have been unsustainably harvested, using the gecko as an example, will only drive them more quickly to extinction. In addition, by breeding them in our zoos we can ensure that this tiny blue wonder of nature could have a future.

The gecko is perfect for conservation and education lessons. If you join our Reptile TAG meeting at the EAZA conference in Edinburgh, you can take part in a discussion about a potential studbook and joint efforts for the survival of the species.

For further information, please contact me at heike.maisch@erfurt.de.



GECKO INFO

Males are bright blue with black throat parts and black eye stripes. Amelanistic animals exist. Females are bronze to greenish, sometimes with a turquoise stripe at the sides. Hatchlings are more brownish the first days. Then they change to female colouring until males reach sexual maturity. Both sexes show varying black spots and lines on the head. Bellies are yellow to orange. Depending on the mood they both change to duller coloration. Pupils are round.

Size: Total length up to 8,5 cm. Hatchlings start at 15 -20mm.

Food: They eat all kinds of insects such as flies, crickets and so on. They also consume fruit juice which is licked from ripe fruits

Habitat: Territorial. One group consists of one male, several females and juveniles. In the wild they only live on screw pine trees *Pandanus rabaiensis* in the forest. Endemic to Tanzania.

Reproduction: In captivity every 3-4 weeks two eggs are laid. Incubation time depends on temperature – 60-90 days at 26-27°C (result: males), up to 120 days at 23-24°C (mostly females).

Status: Critically Endangered due to pet trade and habitat destruction.



Ten out of ten!

OVER THE LAST TWO YEARS 666 PEOPLE HAVE ATTENDED EAZA ACADEMY COURSES. FROM FEEDBACK AND STATISTICS, IT'S CLEAR THAT THE BENEFITS HAVE BEEN GREAT

Myfanwy Griffith, EAZA Academy Training Officer

Back in January 2011, with the help of a generous donation from Fondation Segré, EAZA recruited a Training Officer to support an expansion of the range of available courses, and the EAZA Academy was born. Two years on, its aims of delivering high quality, practical training applicable to the full range of staff working in zoos and aquariums are clearly being achieved, as these examples of participant feedback show:

- 'I felt a little bit lost before this course about how to proceed, who could help etc. All seems much clearer now.' Basic Breeding Programme Management course participant, 2012.
- 'The examples from other zoos helped to inspire and made us think we can do it too!' Visitor Studies: Survey Design course participant, 2012.
- 'This course was extremely useful and exceeded my expectations. The organisation as well as the tutors was outstanding; I enjoyed every talk and learned only useful things.' Introduction to Zoo and Aquarium Management course participant, 2012.

These are great endorsements, but what are the statistics to back them up? Let's look at the background to the Academy.

In addition to developing the primary courses, the EAZA Academy was able to broaden its offer by working with the EAZA Technical Assistance Committee to deliver subsidised courses for Candidate for Member institutions, as well as other training organisations to approve collaborative courses. This meant that in a two-year period the Academy was able to deliver 33 courses.



Encouragingly these courses were also seen to be of value to people outside the EAZA membership: Figure 1 shows that 25% of people on courses are from non-member institutions. This includes zoos and aquariums as well as Universities and private individuals.

Over this period 57% of EAZA member institutions have sent at least one staff member on a course. This shows a strong belief in the value of the courses offered and a commitment to professional personal

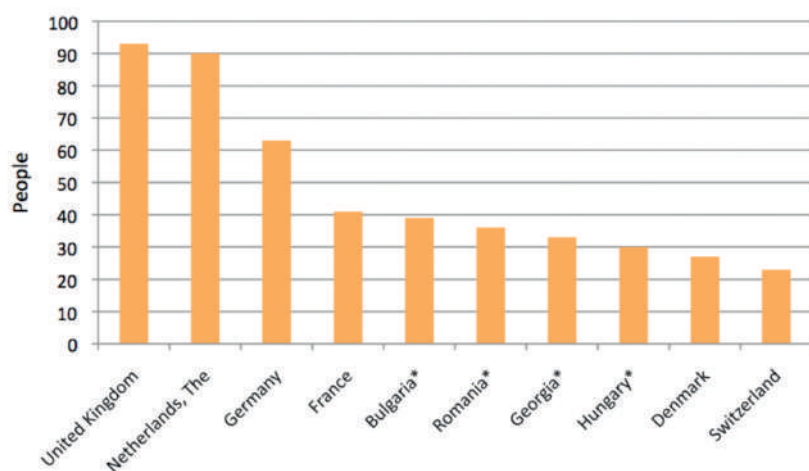
development via the Academy. In fact, in 2012 the number of participants per institution attending courses increased. This is likely to be a reflection of positive internal feedback after a course and institutions' seeing the follow-on benefits of sending someone on a course.

Given that the main remit of the EAZA Academy is to provide training opportunities for all EAZA members it is also encouraging to see that participants from 48 different countries attended courses. Further investigation into which countries and institutions sent people on courses shows that people from the UK, Netherlands and Germany had the highest attendance on courses (Figure 2). This is perhaps to be expected as these countries

FIGURE 1: NUMBERS OF EAZA MEMBERS AND NON MEMBERS ON COURSES

	NUMBER OF PEOPLE	PERCENTAGE OF TOTAL PEOPLE
FROM EAZA MEMBERS	498	75%
FROM NON MEMBERS	168	25%

FIGURE 2: NUMBER OF PEOPLE ATTENDING COURSES PER COUNTRY (* HIGH VALUES BECAUSE OF TECHNICAL ASSISTANCE COMMITTEE SUBSIDISED ENRICHMENT COURSES. IF EXCLUDE THESE COUNTRIES THEN THE NEXT 4 COUNTRIES ARE ITALY, SWEDEN, BELGIUM, AND POLAND).



CLOCKWISE FROM ABOVE: BASIC BREEDING PROGRAMME MANAGEMENT, DECEMBER 2012; ENRICHMENT AND ANIMAL HUSBANDRY WORKSHOP, GEORGIA; FORAGE PRODUCTION AND MANAGEMENT; FACILITATION TRAINING FOR TAG CHAIRS; INTRODUCTION TO ZOO AND AQUARIUM MANAGEMENT



was fantastic.' Educational Concepts and Techniques scholarship course participant, 2011.

- 'Getting this scholarship was not only my personal success; I felt my zoo was supported by others. This is very motivating, to believe that we are not alone and we can develop and transform to the modern zoo.' Animal Behaviour and Applications to Husbandry scholarship course participant, 2011.

None of the successes of the EAZA Academy would be possible without commitment from our membership and the outstanding experience and generosity of our tutors. As the expanded Academy moves into its third year many of the 'new' courses are being repeated and becoming established as key knowledge and skills development opportunities. Without the willingness of tutors to give up their time and share their experiences this would not be possible, and for this we thank them greatly.

From successes and range of positive feedback over the past two years it is clear that the EAZA Academy will continue to offer high quality applied courses well into the future. If you would like to know more please visit at the EAZA Academy pages of the website or contact Myfanwy. Griffith@eaza.net. We look forward to meeting you on a course soon!

also have high numbers of EAZA members. Nevertheless, it still shows the high value many institutions in these countries place on applied training and development. Institutions in Bulgaria, Romania, Georgia and Hungary have also sent high numbers of people on courses. This is largely due to very successful enrichment and husbandry workshops carried out in those countries with the support of the EAZA Technical Assistance Committee and in collaboration with The Shape of Enrichment Inc. However, institutions in these countries have also sent staff on additional courses showing that they are committed to wider training as well.

There is a trend for high participation from people in the

countries in which the courses are held. However, this alone does not explain differences between countries in course participation. For example, only one course was held in the UK and one in Germany during 2012, yet participants from these countries attended 13 and 10 different courses respectively.

Segré scholarships enabled participants from many EAZA Candidate for Member and less affluent institutions to attend courses. Again their feedback was excellent demonstrating the inclusive nature and value of EAZA Academy courses. Some of their comments follow:

- 'I feel the lecturing was of a very high standard and the opportunity to link with other zoo educators



PURE PRIDE

EAZA HAS HAD AN EEP FOR ASIAN LIONS FOR MANY YEARS, BUT SUB-SPECIFIC HYBRIDISATION HAS LONG BEEN THE PROBLEM IN CREATING A STUDBOOK FOR THE AFRICAN LION. NOW AN INTEREST GROUP IS PICKING ITS WAY THROUGH THE PROBLEM, AND STEADY PROGRESS TOWARDS A SOLUTION IS BEING MADE

Frank Oberwemmer and Ruben Holland (Zoo Leipzig), Alex Sliwa (Zoo Cologne) and Jesper Stagegaard (Ree Park Ebeltoft)

The lion is one of the most attractive and charismatic animals for zoo visitors and the most frequently kept large cat in zoos. Many zoos have a long history in breeding this species and ISIS counts about 150 holders of African lions in Europe with 820 living individuals (www.ISIS.org, data valid as of early 2012).

It has, however, been little noticed by the public that lion numbers in Africa have dropped within the last decades to just 23,000 – 39,000 individuals (although there are many uncertainties in this estimate). A significant decline, especially outside of protected areas, is suspected and the Red List has therefore been classifying the African lion as Vulnerable since 1996. In fact, more recent numbers published by the NGO LionAid in January 2013 suggest that only 15,250 individuals remain on the entire continent.

The IUCN/SSC Cat Specialist Group has published two conservation

strategies for Central/West Africa and East/South Africa as a result of corresponding workshops. These documents describe in detail the factors that threaten lions in different regions and suggest possible responses to them. Following these strategies, evaluations of lion status were conducted in Mozambique, Central African Republic, Tanzania, Malawi and Benin, while National Action Plans were set up in Mozambique, Kenya, Southern Sudan, Zimbabwe and Ethiopia.

It is currently too early to judge the effects and successes of these actions, which aim to stop the decline of lion numbers in the wild. However, being aware of these facts a group of zoos started in 2007 to investigate the role that zoos can play for *ex situ* lion conservation. They have adopted the name African Lion Interest Group (ALIG) for easier communication about the project.

It is well known that the majority

of lions kept in zoos are sub-specific hybrids of individuals that were imported in the early days of zoos from different geographical African regions and then interbred. Of the 820 lions registered in ISIS only 105 individuals are assigned to one of the seven subspecies (www.ISIS.org, data valid as of early 2012). It seems very doubtful that these individuals are still purebred as no management through studbooks was applied and secondly their small numbers suggest that inbreeding may have become a problem.

In 2008 Zoo Leipzig conducted a survey of all European lion-holders to find out more about any willingness to work with a pure bred African subpopulation of known origin. The long-term goal was to define a population of pure bred lions for a new EAZA studbook. There was considerable support for this idea and a project was initiated to analyse the genetic status of zoo lions in contrast to



LEFT: KALAHARI LION GROUP © F. OBERWEMMER; **ABOVE:** AFTER THE DISCUSSION WITH BOTSWANA OFFICIALS © D. MOSS;
BELOW: SUSAN MILLER DARTING LIONS DURING THE SAMPLING © S. MILLER



wild lions. Since 2009 ALIG has been presenting the results of this research during the Felid TAG meetings at the EAZA Annual Conferences and separate ALIG meetings.

The Max Planck Institute for Evolutionary Anthropology (MPI-EVA) in Leipzig was the scientific partner initially chosen to analyse blood samples of zoo lions and compare them to those of lions from the wild. In 2010 the Leibniz Institute for Zoo and Wildlife Research (IZW) in Berlin took over and expanded the method which uses microsatellite markers (MS). The main problem is getting enough samples of wild lions which can be confidently traced to pure-bred populations.

One aspect of ALIG's work therefore deals with a small genetic study conducted by the Department of Nature Conservation of Tshwane University of Technology (Pretoria, SA). This study aims to sample lions in South African National Parks and private reserves

and to analyse their genetic status to see if subpopulations can be detected and how related the individuals are. Ree Park Ebeltoft and Borås Zoo are kindly funding this study which also uses microsatellite markers as analysis method.

In March 2011 lion reference samples were sent from the National Cancer Institute in Maryland (USA) to the IZW in Berlin. NCI Maryland is the institute where the genetic method using microsatellite markers to differentiate cat species and subspecies was established (Menotti-Raymond *at al.* 1999). These imported blood samples are from the same source of reliable pure-bred lion populations of different regions that were used for this project. Unfortunately the quantities of the samples were small, and some insufficient to analyse all of the 30 microsatellite loci that IZW uses today.

Although ALIG managed to present and discuss different results of this

genetic analysis of MPI and IZW during the Felid TAG meetings at the EAZA Annual Conferences from 2009 to 2011 there is no final interpretation of these findings so far. In order to gain more reference samples from wild lions museum collections will be the next, and rather urgent, source. Another approach by IZW is to establish a second method for cat genome analysis using the so called Single Nucleotide Polymorphism (SNP). This method is said to be more powerful and more precise in its results.

During the ALIG meetings it was discussed which African subpopulations of lions would benefit most from a new studbook. It is obvious that the West African lion population is the smallest and most severely threatened. But the region is, at least partly, politically unstable and difficult to access and no contact with local organisations has been established so far.

Recently, ALIG members contacted



ABOVE: KALAHARI FROM ABOVE © J. STAGEGAARD;
LEFT: SUSAN MILLER WORKING IN THE LAB IN PRETORIA © S. MILLER; RIGHT: KALAHARI LION, © J. STAGEGAARD



the Department of National Parks and Wildlife in Botswana. Botswana has long kept its wildlife resources isolated from imports and exports, so the country's Kalahari lions are more likely to remain pure-bred. ALIG has applied for a research permit in Botswana in order to prove this theory through genetic testing.

A second condition for import of lions to Europe would be that these animals are free from feline immunodeficiency virus (FIV) which is said to be the case for some populations in Botswana. If genetic and disease status turn out to be suitable then Kalahari lions (eg surplus individuals in reserves or game farms) could become a possible source to set up a new EAZA studbook for pure-bred African lions of known origin. Sampling of 250-300 lions across different reserves is now under way in cooperation with field researchers in Botswana.

Another field of discussion prior to establishing a studbook for pure-bred African lions is the question of how best to deal with the large number of sub-specific hybrid zoo lions which are not managed through a studbook. Although ALIG does not believe that there are any problems in finding enough zoos that are happy to switch from keeping sub-specific hybrid lions to keeping individuals of a pure-bred population we took a look at the ISIS dataset using SPARKS. This is possible thanks to Laurie Bingaman who provided a studbook dataset in September 2012 – the fourth largest of all studbooks and includes data about nearly 8,200 individuals with over 800 living individuals listed. The full pedigree is only available for 15% of the animals, but this first rough analysis could finally lead to a permanent monitoring of zoo lions if a zoo can be found to take on

the task. Givskud Zoo in Denmark has indicated an interest in doing so.

The ALIG members are aware that the project seems to be progressing slowly but since the organisation of samples, the application of the microsatellite analysis, the establishment of contacts with different institutions and experts, as well as the discussions are time-consuming, there is no other way to proceed. Only if all preconditions can be met can a new studbook for African lions generate future conservation benefit.

The ALIG participants are happy to receive comments and suggestions to push the project forward and will present an update during the EAZA Annual Conference. If you would like to contribute to the project by providing lion blood samples for further analysis please contact Frank Oberwemmer (foberwemmer@zoo-leipzig.de).

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

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