Time is running out!

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The overall theme of the 66th WAZA Annual Conference is "Partnering for Sustainable Zoos and Aquariums", with the following as sub-themes:
"Secure long-term animal collections",
"Animal welfare and public opinion",
"Business prerogatives: Making money and saving wildlife".

My contribution focusses mainly on the first of these, with an emphasis on "partnering", and will here and there touch on the third aspect (business). It does not present really new information, but merely gives an introduction to the theme and summarizes developments in the past decades.

The title of this presentation, "Time is running out!", was inspired by two references from the literature. Firstly, the 1993 edition of the World Zoo Conservation Strategy, the last chapter of which called upon the zoos and aquariums of the World to "help build a time bridge" for wildlife to survive a critical period of increasing threat caused by human activities. Secondly, the 2010 paper by William Conway in *Zoo Biology*, entitled "Buying time for wild animals with zoos", a paper with the same overall message. Between 1993 and 2010, however, the urgency of this message considerably increased. Although nobody in 1993 was really optimistic about the future of wildlife and natural areas world-wide, meanwhile human pressure on our planet's natural systems has increased tremendously. Habitat destruction accelerated and the percentage of surface area still available for natural life diminishes by the year. Climate change undeniably is progressing. Human over-consumption is rocketing. The end of these developments seems further away than ever. Thus, the "time bridge" must be built, and we must buy time as rapidly as possible.

Speaking of bridging a critical period for wildlife, the question should be asked "how much time do we need?". In 1986 Soulé, one of the founders of the theory behind small population management in zoos, suggested that a period of some 500 to 1,500 years should be bridged to help wildlife survive what he called "demographic winter". In the 1980s SSPs, EEPs and other breeding programmes started to plan for a 200 year time-span, as they hoped for stable human population size before the end of that period, after which wildlife might recover again. A few years later, however, SSP/EEP understood that planning for 200 years might be too difficult, so they reduced their target to 100 years, amongst others on the basis of the expectation that gene banks for wild animals would become operational meanwhile. William Conway, though fully advocating the need for long-term planning, always underlined that zoos, simultaneously should also work on short-term (10-15 years) "rescue operations" (bring into captivity, breed, and re-introduce as quickly as possible), that proved to have great potential in saving Critically Endangered species.

Obviously, in order to play a substantial role in assisting the survival of wildlife, zoos and aquariums need to build up sustainable populations of endangered species. But what is "sustainable" in this regard? As Lees & Wilcken (2009) and others have explained, here we must distinguish between "self-sustaining" and "sustainable". A "self-sustaining" population should remain viable in the long run without any addition from the outside. In order to be "self-sustaining" a population should number at least several hundreds to several, or even many thousands of individuals. A "sustainable" population, on the other hand, can be much smaller (let us say a few hundreds to one thousand individuals), as occasional addition of animals from outside the core population is part of the strategy to keep it viable over a long period of time. Without wanting to go into any detail (there is an abundance of literature on this subject), the required population size in each of the two categories depends on factors such as the generation time of the species under concern, the number of founder individuals that formed the basis of the population, the speed with which the founder population grows towards the final population size, the percentage of genetic variability the program wants to preserve, the length of time during which this should be preserved, the effectiveness of population management, etc.

The objectives of sustainable zoo populations (for what do we want to maintain them?) also play an important role. If a species is (nearly) extinct in the wild, there is no choice: we should aim at-sustainability. If we want to help save threatened species by building up "reserve populations" in captivity, occasional additions from the wild seem fully legitimate, and we could do with much smaller populations. Sustainable zoo populations, however, are also needed in support of other zoo and aquarium conservations tasks, such as education, research, awareness-raising, and raising funds for conservation. In fact, zoos and aquariums need sustainable populations for their own future. There is no future for zoos without animals!

By the way, when discussing sustainable zoo populations, it is often feared that the need for sustainable – "writ large" – populations will unavoidably lead to an overall decrease of species diversity in the collections of the regional/global zoo and aquarium community. The opposite – I believe – is true: the maximum number of species we can all together keep in the future is determined by the degree of sustainability we can realize for each individual population, combined with the best possible joint collection planning. That is, how do we, all zoos and aquariums together, assign space to each of the species populations we want to maintain for the future. The less sustainable our populations are, and the less effectively we plan our collections, the poorer they will be turn out to become in the future.

The first cooperative zoo breeding programmes were initiated in the 1980s and their number and quality has increased. The theory of small population management basically is in place, and all required knowledge is available. Data management systems were developed, ISIS, ARKS, SPARKS, ZIMS. The regional zoo and aquarium associations set up professional organizational structures to run regional breeding programmes. Meanwhile the number of successful reintroductions of animals from captivity into the wild increased, and much knowledge on reintroduction techniques was accumulated. Altogether, the potentials of zoos and aquariums in supporting the survival of wild species by captive breeding became realistic and undeniable.

However, recent evaluations of the performance of breeding programs – after almost 30 years of hard work of hundreds of dedicated zoo and aquarium staff – do not show a very hopeful picture. Both Baker (2007) and Lees & Wilcken (2009) concluded that no more than 50%, or – depending on the criteria used – even far less of the studbook populations currently attained sustainability. And that, while less still than 30% of all zoo populations is managed as

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studbook or breeding programme populations. Thus, in spite of all efforts, we are not doing well at all. Lees & Wilcken literally concluded that "the zoo Ark, it seems, is sinking".

So what went wrong? All kinds of things: e.g., lack of breeding success in many species. Lack of space; even if a species is propagating sufficiently, it is often difficult to place the offspring. Inadequate exhibits; many exhibits are perfect for presenting species to the visitors, but often not for optimal breeding and partner choice (e.g. groups too small to breed optimally). Implementation of rules and recommendations of breeding programs often pose problems. Programs, in fact, are run by "volunteers" with time on their hands, whereas, especially the complex programs with large populations, would require full-time professional management. Effective regional joint collection planning (important for assigning enough space to the selected species populations) in most of the regions so far hardly came off the ground. And, last but not least: zoo and aquarium breeding program success suffers from a lack of partners.

Speaking of partnerships for sustainable zoo collections, I would like to distinguish three categories: 1. Internal partners (partners within your own institution), 2. Zoo network partners, and 3. External partners.

Starting with internal partners: building up and maintaining sustainable zoo collections seems to have become too much a matter for curators only. Unlike 25 years ago, even zoo directors now hardly want to be directly involved. Sustainable zoo collections and all their aims and objectives, however, require the full support and interest of zoo managerial, PR, marketing, educational and financial staff, as well as those of zoo governing bodies (boards, cities, etc.). Admittedly, there are excellent exceptions: examples of zoos and aquariums that have done extremely well in involving all sections of their staff, management and authorities in species conservation, and are performing superb conservation PR and marketing. Still, overall, it seems that a majority of zoos and aquariums have yet much work to do to abandon traditional views of the roles and functions of their institutions. Explaining and marketing the necessities and potential benefits of zoo conservation breeding internally and externally requires much attention. In this regard, I want to underline once more that the "recreation/conservation conflict" does not exist! In-house scepticists of zoo involvement in conservation often argued (and still are doing so) that zoo visitors will only want to pay their entrance fees for the recreation they expect in the zoo. They would not want to come to be educated or to learn about conservation. Especially zoo boards, city authorities and zoo marketers frequently adhere this standpoint. Recreation can be commercially marketed. Conservation is idealism that does not bring in visitors, nor money. It even looks as if such sounds in recent years – once again – are more loudly heard. I strongly want to warn against this trend! As already many zoos have demonstrated: recreation, education and conservation can perfectly go hand in hand, and can mutually reinforce each other. Let us be very happy that visitors are coming to the zoos in masses, simply to enjoy wild animals. Their joy is the best possible basis for conservation-mindedness. All the rest is a matter of creative and innovative education, PR and marketing.

The second category of partners for sustainable collections – zoo network partners – comprises particularly the regional associations and WAZA. The regional associations are very able to run and manage their breeding program, and are increasingly also involved in *in situ* conservation activities. Together with WAZA the regions constitute a unique network of professionals. Hardly any other type of institutions has such an intensive, effective and widely distributed network. However, this global network could (and should) even become more efficient after a reconsideration and redefinition of relationships and task divisions between WAZA and the regions. Additionally, WAZA should play a more prominent role in the coordination of global breeding programs. As I said: the regional associations are well equipped to organise their regional breeding program (WAZA could never do that), but an increasing number of species programs requires some level of inter-regional coordination, and that is where WAZA should step in (Figure 1). Inter-regional coordination of species programs does only mean that regional species coordinators should be brought together in order to discuss and plan occasional animal exchanges between their regions (depending on the species, its captive population size and history, no more than one or a few inter-regional exchanges per generation). Not a big task for WAZA, but an important one.

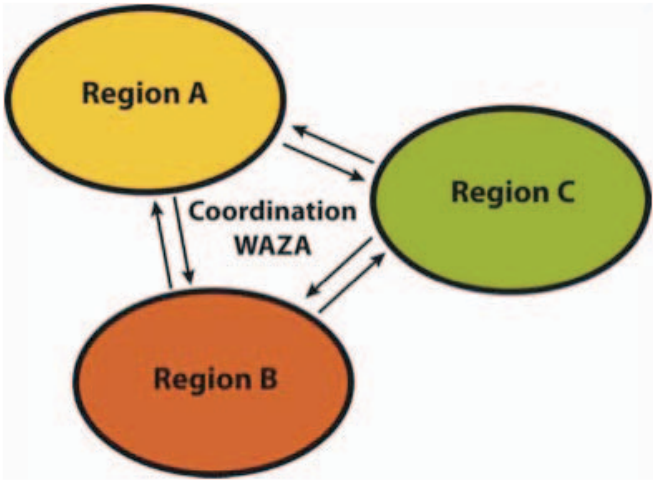

Figure 1. Regional sub-populations, global coordination.

The third category of partners for sustainable zoo collections includes a whole range of external (= non-zoo/aquarium) bodies. CBSG of course, IUCN/SSC, international conservation bodies (WCS, CI, WWF, etc.), all kinds of "trusts" specialised in or focussing on breeding and conservation of specific animal groups (cranes, pheasants, waterfowl, etc.), private breeders with great expertise in the propagation of certain species (take care, however, not to get mixed up with the animal trade!), local, regional and national conservation authorities, and – last but not least – wildlife parks in all countries and corners of the world. Partnering up with the latter will have to be at a species to species basis (at least one partner for every species we want to maintain in the zoo/aquarium community). Consequently, this will require building up a very extensive, global, "parallel" network, connected to, and interwoven with the network of the zoo regions and WAZA.

In regard to "partnering up with wildlife parks" I would like to remind you of the "meta population concept". This concept was already introduced in the zoo species conservation discussion in the 1980s. Have a look at Figure 2. Natural (=wild) populations originally often consisted of two or more geographical subpopulations. Along the borderlines of their distribution areas some level of genetic

exchange took place. Due to human activity, wild subpopulations often became fragmented and isolated from one another. Exchange of genetic material between wild remnant subpopulations therefore nowadays often can only be effectuated by population management in wildlife parks. An increasing number of wild animal populations will require such management. The captive populations of endangered species consist of (regional) subpopulations as well, with some exchange between them (as explained above).

Metapopulation management implies that the *in situ* components (Figure 2 left), as well as the *ex situ* components (Figure 2 right) of a given species are considered as part of one entity. *In* and *ex situ* components should be managed interactively, including – when necessary – occasional exchange between wild and captive. Such exchanges (please note that the exchange of one or two individuals per generation is enough to maintain acceptable levels of genetic variability on either side!) would logistically be easier, financially cheaper, and medically safer if there would be something in between of *in* and *ex* situ: e.g. breeding/rescue centres for the species under concern in their country of origin (see Figure 3), such as they exist already for several species.

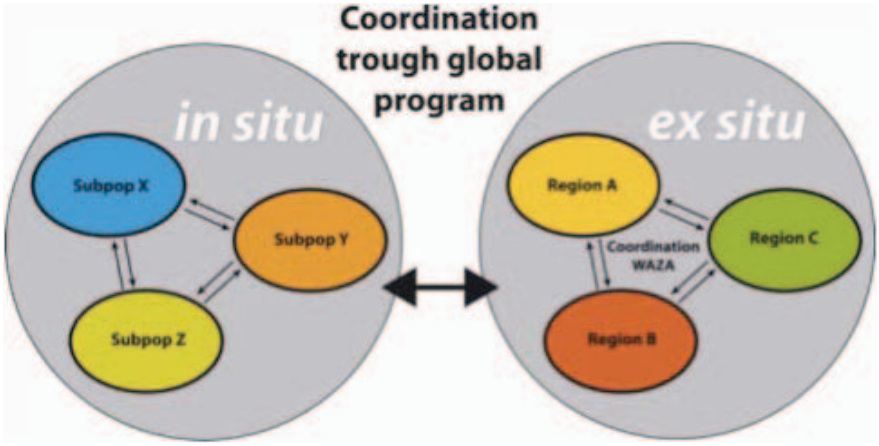

Figure 2. *Ex situ* and *in situ* sub-populations as parts of interactively managed meta-populations.

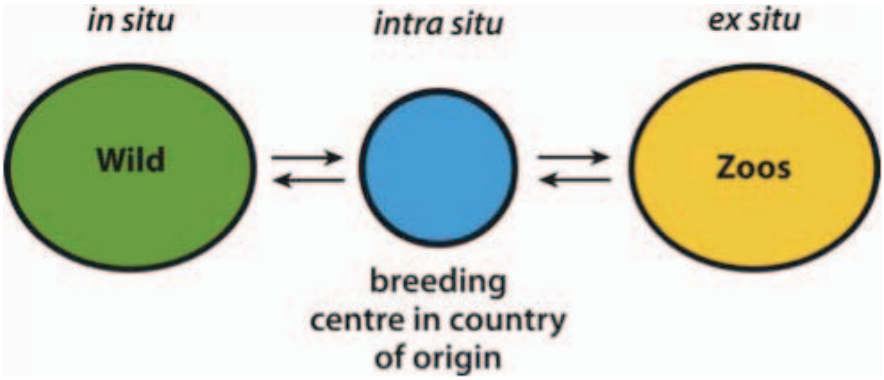

Figure 3. In-country breeding/rescue centres facilitate interactive management of *in* and *ex situ* populations.

Zoos and aquariums in fact should once and forever abandon the traditional "Zoo Ark" concept (Figure 4), and stop promoting the idea that they might be able to save substantial numbers of endangered species by maintaining self-sustaining populations for any length of time in captivity. This concept is unrealistic. The "Zoo Ark" is much too small and much too expensive to safeguard more than a maximum of 1,000 species, while we all know that tens of thousands of species are at risk now, and many more will require assistance for their survival very soon. And even now already, with less than one third of the maximum number of species on board (in the form of studbook/breeding program populations), the Zoo Ark seems to be sinking….. (Figure 5).

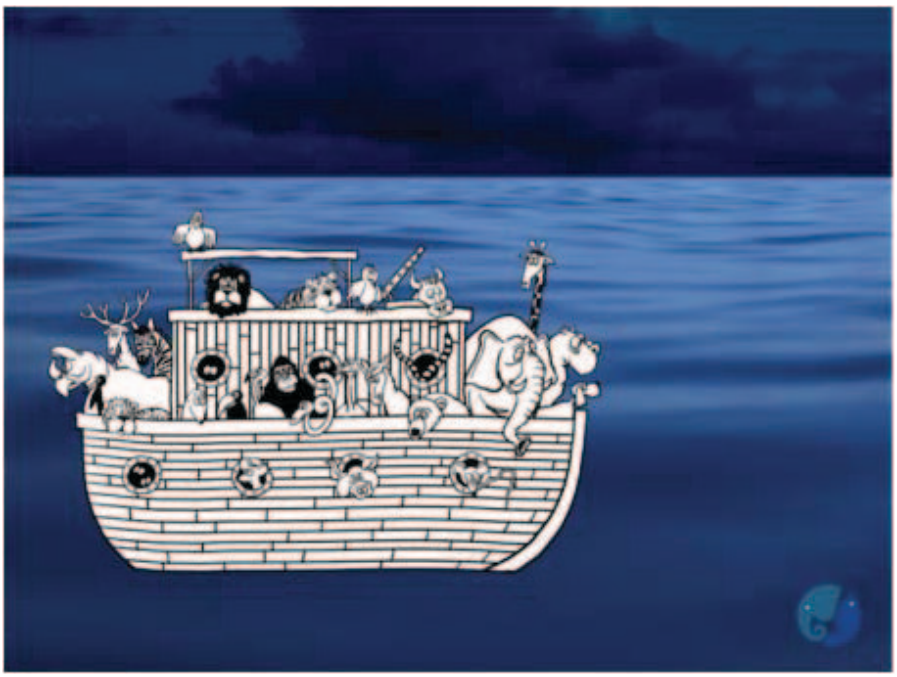

Figure 4. The traditional Zoo Ark concept.

Instead of sticking to the traditional "Zoo Ark" concept, zoos and aquariums should understand that they never can accomplish anything in isolation. Instead of the "Zoo Ark", an "Ar(k)mada" is needed to save as many as possible species from extinction. A fleet in which the zoos' ship sails together with those of its partners in conservation: IUCN/SSC, CBSG, CI, WCS, WWF, Trusts, Parks, etc., etc. (Figure 6). Only as part of such a fleet the zoo and aquarium ship makes sense, and can play a role in building the required "time bridge" for the survival of wildlife. Only as part of a large fleet, zoos and aquariums with 500 or even 1,000 ecological key

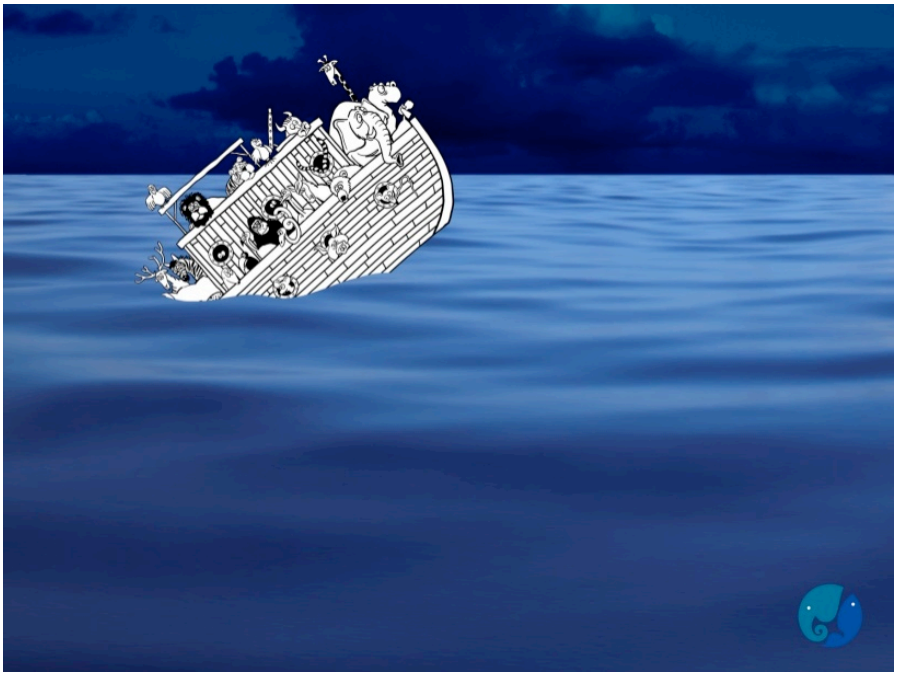

Figure 5. The Zoo Ark is sinking.

and ambassador species on board, can effectively help saving an equal number of habitats, and a multitude of endangered species world-wide.

I would like to conclude this paper with four statements:

Zoo populations serve many conservation purposes. None of these conservation tasks can be performed without sustainable zoo animal collections.

Zoo populations do not necessarily need to be sustained 100% in-house. If zoo populations are considered as parts of meta-populations (interactively managed), partnering up with a wide variety of conservation partners is of utmost and urgent importance.

Returning to the title of this presentation – "Time is running out!" – my conclusion is that "buying time for wild animals" as William Conway called it, is becoming exponentially more expensive by the day.

Any further delay should be avoided, and I therefore sincerely hope that the WAZA Prague Conference 2011 will see a major step forward in "the great mustering of all available forces" (as the World Zoo Conservation Strategy of 1993 called it) to man the Ar(k)mada

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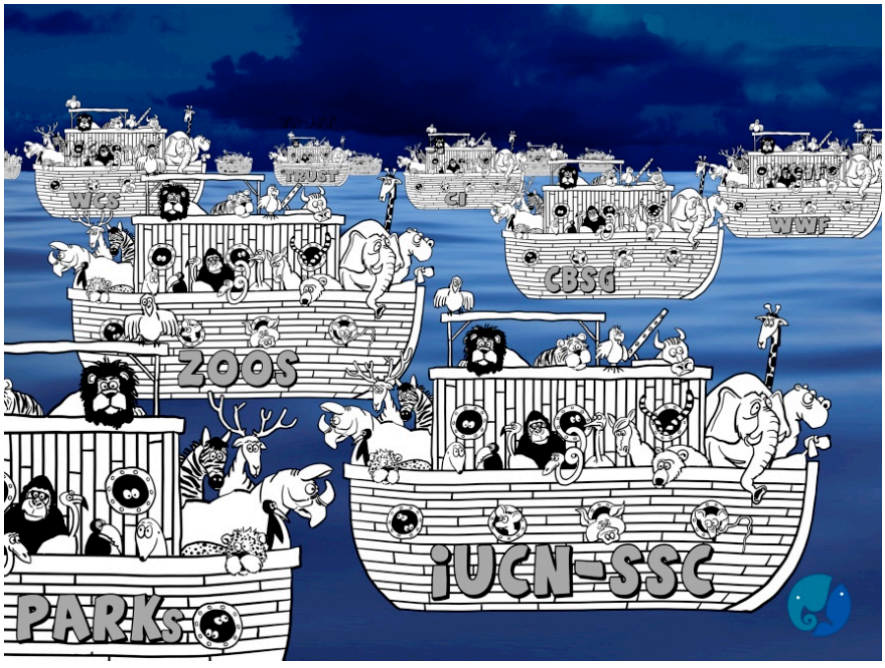

Figure 6. What we need is an Ar(k)mada.

Note on the Author:
Bert de Boer began his zoo career as a researcher in the Foundation for Research in Zoological Gardens based at the well-known Appenheul Primate Park.

From the first Bert had a "wider view" of the profession than most. He attended the seminal Zoo Association Conference at Front Royal/Smithsonian in 1992 and delivered a powerful keynote presentation in support of zoo associations' need to become coordinated and more active globally.

In 1993 Bert, authored 'The World Zoo Conservation Strategy' (WZCS) launched in 1993 and the precursor of the current strategy to which he also strongly contributed.

In 2003 Bert became Chair of the European Association of Zoos and Aquaria a post he held until 2009. Bert strongly supported the EAZA Research Strategy 2008 emphasizing the need for zoos to engage in field research for conservation.

During this period he became Director of Appenheul Primate Park and retired after years of service. Afterwards he also was a force for the dramatically innovative Gaia Park.

Bert de Boer's extraordinary vision, intellect, industry and management capability was acknowledged through a lifetime achievement award from WAZA at the 65th Annual Conference in Cologne, October 2010.