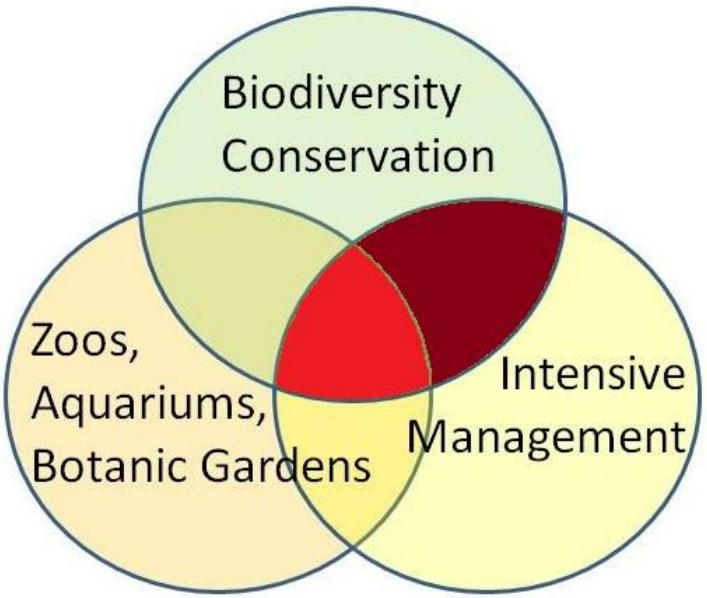
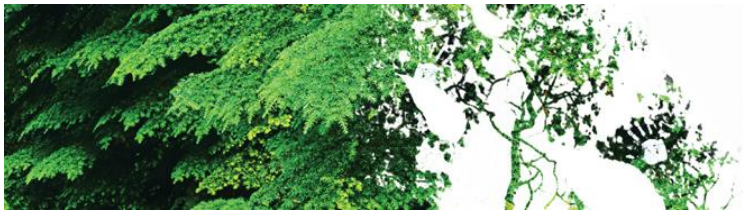
Intensively Managed Populations for Conservation Workshop

San Diego, CA, US
6 – 9 December 2010

Final Workshop Report





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CONSERVATION BREEDING SPECIALIST GROUP

Workshop organized by: IUCN/SSC Conservation Breeding Specialist Group (CBSG);
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CBSG (ed.). 2011. *Intensively Managed Populations for Conservation Workshop Report*. IUCN/SSC Conservation Breeding Specialist Group, Apple Valley, MN.

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Background

As habitats are increasingly altered and wildlife populations impacted by human activities, more species are being actively managed on some level to combat the risks of small population size and other threats. This has led to a new term among conservationists – Intensively Managed Populations (IMPs). Intensive population management is one facet of biodiversity conservation and can occur in a variety of settings, from populations managed solely in field situations to those populations managed primarily within zoos and aquariums. Although potentially a powerful tool for species conservation, intensive population management is falling short of its potential. Zoos hold only about 20-25% of the mammalian and avian species identified by the IUCN to be at some level of conservation risk, and the numbers are much lower for reptiles and amphibians (Conde *et al*. 2011). Of the threatened species that are held in the world's zoos and aquariums, about one half consist of fewer than 50 individuals among all ISIS members. Recent analyses by EAZA, AZA and ZAA indicate that most zoo populations are not being managed at adequate population sizes, reproductive rates, genetic diversity levels, and projected long-term viability that would allow them to contribute positively to species conservation.

Workshop Process

In December 2010 a workshop on the intensive management of populations for conservation was hosted by the San Diego Zoo. Organized and facilitated by CBSG, the workshop was attended by 42 zoo professionals, academics and field biologists from 12 countries spanning 8 regional zoo associations (ALPZA, AMACZOOA, AZA, EAZA, JAZA, SAZARC, SEAZA, ZAA) as well as from WAZA, ISIS, CBSG, Amphibian Ark and the Botanic Gardens Conservation International. This workshop developed in response to working group discussions on *ex situ* population management at the 2008, 2009 and 2010 CBSG Annual Meetings centering on the growing concern among regional zoo associations regarding the lack of sustainability for a majority of populations under their care and the low potential for these populations to contribute to species conservation. The purpose of the workshop was to address the challenge of ensuring that intensive population management contributes to integrated and holistic conservation plans that result in species living within healthy ecosystems in evolving communities.

This workshop focused its discussions on those *ex situ* populations that are being intensively managed for the conservation of their species. It was recognized that zoo populations also serve important educational, aesthetic, and cultural values, but these roles of zoos do not necessarily involve the maintenance of threatened taxa and are outside the scope of this workshop. Plenary presentations summarized the history of population management, current status and issues of concern, and potential new strategies and philosophies under consideration. A vision statement was discussed and primary goals developed that supported a refocusing of zoos and aquariums on species conservation and recognized that population management occurs over a broad continuum of intensity, scale, location and investment of resources. Increased collaboration between the *ex situ* and *in situ* conservation communities will be needed to develop true conservation plans for species that integrate the efforts of these two communities and increase the overall effectiveness of conservation activities.

A vision statement for the intensive management of populations for conservation was drafted by a working group at the 2010 CBSG annual meeting in Cologne. This draft vision was presented and discussed at the IMP workshop and accepted in principle by the workshop participants:

To preserve biodiversity, the global conservation community commits to providing the level of intervention necessary to prevent the extinction of species. Intensive population management (including, but not limited to management within zoos and aquariums, botanic gardens, other propagation centers, closely managed reserves, and genome banks) is effective (only) when integrated with other conservation measures within an overall species conservation strategy that fully addresses the threats to the species, using the best available science, technology, and practices. We work toward a world in which all species can live within healthy ecosystems as part of evolving communities, without the need for continued human intervention.

Five working groups tackled various aspects of intensive population management by zoos and aquariums for species conservation, from identifying priority species for management, to improving management effectiveness and increasing collaboration. These groups identified challenges and developed goals, objectives and actions related to species assessment and prioritization, IMP program design, different types of management programs, management of multiple interacting populations, integration of stakeholders and management activities in species conservation, and promoting a paradigm shift in transforming zoos into conservation centers. Many projects, workshops, activities, tools, databases, and population management efforts were recommended, many of which already have been initiated (see Section 10 of this report for summary tables of recommended actions).

Recommendations

The following goal encapsulates much of what participants believe we need to achieve:

The world zoo and aquarium communities are, and are acknowledged as, effective conservation partners in the context of integrated conservation strategies that include intensive population management.

To work toward this goal, we must:

- Change the current paradigm of the ways zoos and aquariums contribute to species conservation by committing to conservation missions and adopting appropriate business models to achieve this.

- Incorporate intensively managed populations as potential effective conservation tools into holistic species conservation strategies, increase collaboration with conservation partners, and improve overall understanding of the role and function of IMPs in species conservation.

- Improve the viability and success of long-term IMP programs, ensuring that each species has a precise and appropriate management plan and adequate resources to achieve its defined role(s).

- Improve the success of species conservation programs by optimally utilizing populations along a management continuum, including exploration of alternative approaches to intensive population management and expanding metapopulation strategies for managing multiple populations effectively.

Next Steps

Putting the workshop recommendations into action to achieve success will require concerted efforts by zoo associations, zoos and aquariums, and individuals. Efforts are already underway to implement some of the necessary changes and activities identified at the workshop. This workshop report hopefully will serve as a guiding reference upon which future population management innovations may build. The scope and urgency of the species conservation crisis obligates us to move ahead as quickly as possible.

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SECTION 2

Overview of the Problem and Plenary Presentations

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INTENSIVE MANAGEMENT OF POPULATIONS FOR CONSERVATION
(adapted from Baker et al. 2011)

What is an "Intensively Managed Population"?
As habitats are increasingly altered and wildlife populations impacted by human activities, more species are being actively managed to assure their persistence. This has led to a new term among conservationists – Intensively Managed Populations (IMPs). An IMP is one that is dependent on human care at the individual and population level for its persistence (Fig. 1). *Ex situ* populations that depend on managers for food, medical treatment, living space, protection from predation, and access to mates are clearly intensively managed. Some wild populations are reliant on at least some of these kinds of individual care and would also fall within the scope of IMPs. Populations living without regular intervention for individuals but requiring management at the population level (e.g. protection from poaching) or habitats will often be "light managed" or "conservation dependent" (Cook 2010).

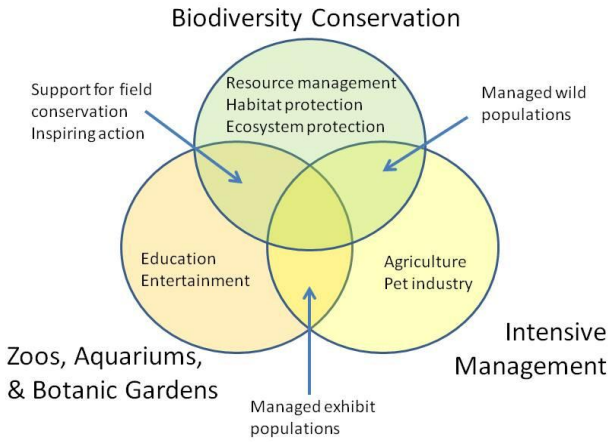


Figure 1. Intersections of biodiversity conservation, *ex situ* zoological and botanical institutions and intensive management of populations, with examples of the activities that fall within each region. The center of overlap between all three circles contains those *ex situ* populations that are being managed intensively to help achieve their conservation. That region plus the intensively managed wild populations constitutes the focus of the discussions on the use of IMPs for conservation.

The opportunity for zoos
The opportunity for zoological institutions to contribute to species conservation through the long-term maintenance of populations is very large. The more than 800 zoos and aquariums that are members of the International Species Information System (ISIS) currently hold more than 600,000 living specimens of about 4,000 species of vertebrates. Of these populations, 18% are currently for those species identified at some level of conservation risk in the wild. For mammals and birds, zoos hold about one-fifth to one-quarter of the species identified by the International Union for Conservation of Nature (IUCN) as threatened, while the numbers are much lower for reptiles and amphibians (Conde *et al.* 2011). However, for about half of these threatened species, the total number of individuals held in all ISIS zoos is fewer than 50 specimens, a size below which conservationists do not consider a population to be viable for even the short term.

Concerns regarding the sustainability and not fully realized conservation potential of these zoo populations led to this workshop on the use of intensively managed populations for species conservation. The purpose of the workshop is to address the challenge of ensuring that intensive population management contributes to species living within healthy ecosystems in evolving

communities. Although zoo populations also serve important educational, aesthetic and cultural values, these roles do not necessarily involve the maintenance of threatened taxa. Efficient use of resources might require that zoo populations that are used for educational and display purposes also be breeding populations of species needing protection (Conway 2011), and in those cases the management of the populations must be adequate for achieving the species conservation goals as well as the exhibit goals.

The challenges

Regional zoo associations coordinate the collaborative management of about 800 species, in programs such as the Species Survival Plan (SSP) of the Association of Zoos and Aquariums (AZA) in North America, the European Endangered Species Programme (EEP) of the European Association of Zoos and Aquaria (EAZA), the Australasian Species Management Programme (ASMP) of the Zoo and Aquarium Association (ZAA) Australasia, and others. Often, however, these populations are managed in isolation and *ex situ* efforts often are not integrated with *in situ* conservation needs or activities, even for endangered species. Although we in the zoo community have convinced ourselves, our staff and our public that our managed programs serve important conservation roles for those species, rarely is this the case.

Population goals for managed taxa are usually defined in terms of genetics and demographics, rather than in terms of supporting species conservation. Even given these limited goals, most managed zoo populations are not sustainable. Recent analyses show that most of these populations are not currently being managed at the numbers of individuals, reliability and predictability of reproduction and levels of genetic diversity required to assure that they can contribute to species conservation. Rather than managing for conservation, the majority of programs are managing for "acceptable" levels of decay, instead of for truly sustainable, resilient and adaptable populations that will be available and suitable to serve conservation needs in the future. Not surprisingly, some colleagues within the conservation and scientific community do not see the conservation value of intensively managed *ex situ* populations.

Zoos can become and be seen as very powerful forces for species conservation, not only through the significant resources that they direct towards field conservation programs, but also through the direct conservation roles of the populations managed within their collections. Reaching this goal will require strategic assessment, planning and action, and this will occur only if zoos shift their focus from managing facilities as places with animals that also do some conservation, to managing themselves as conservation organizations that support *ex situ* animal populations in order to reach conservation goals (Fig. 2). The World Zoo and Aquarium Conservation Strategy identifies conservation as the primary purpose for modern zoological institutions. However, most zoos are still managed in ways that demonstrate that they are focused first on exhibition; they attend to conservation only when resources permit or when the conservation serves the other goals of the institution.

Changing the paradigm

Effecting this shift will not be easy and will require that zoos change a number of current practices and paradigms. At the outset they need to work more collaboratively with others in the conservation community, working together to assess species for their full range of conservation needs and developing holistic species management plans. There are a few shining examples of collaboration between Taxon Advisory Groups (TAGs) of regional zoo associations and the IUCN/SSC Specialist Groups; this type of interaction needs to be expanded. The networks of taxon conservation experts in the IUCN/SSC Specialist Groups should be best able to identify which taxa require intensive management as part of the species conservation strategies. However, they are unlikely to provide that guidance unless they view the zoo community as effective partners in conservation. Achieving that level of confidence in the role of zoos in species conservation will require changes in both the practices and the perception of zoos.

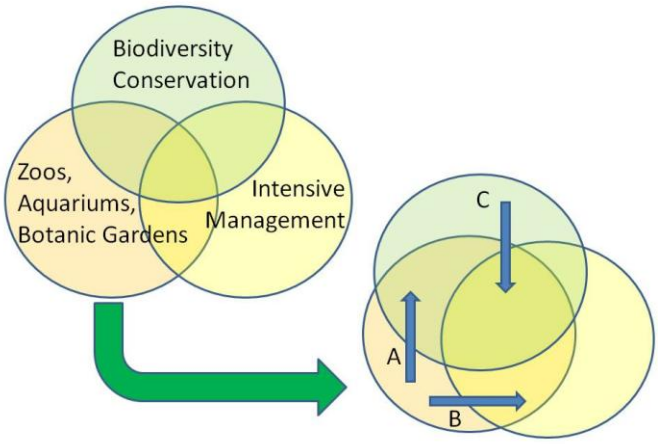


Figure 2. The desired and expected shifts of emphasis among roles. *Ex situ* facilities have the capacity and responsibility to focus more of their resources on actions that directly lead to improved species conservation (arrow A). Moreover, to be able to sustain also exhibit populations for other purposes, increased management will be needed for those *ex situ* populations that will not be easily replaceable (arrow B). As wild environments continue to be degraded by increasing human activities, it is expected that more species conservation will require coordinated intensive management of both *ex situ* and *in situ* populations (arrow C).

Methods are needed to assess the need and value for intensive management and also for prioritizing these taxa; factors to be taken into account include existing expertise, capabilities, resources and likelihood of success. This cannot be accomplished without reaching outside of the *ex situ* community to embrace other stakeholders, including field biologists, academics, regional and global conservation organizations and interdisciplinary specialists such as sociologists.

With clear goals defined by holistic species management plans, *ex situ* programs will need to be refined and restructured to maximize success. The traditional approach of trying to sustain zoo populations only through breeding within exhibition programs will be sufficient for only a relatively small number of species – those that are so popular that large exhibit populations will be maintained, that breed readily in exhibit facilities with little need for specialized facilities, and that are easy to transport and amenable to periodic rearrangement of social groups. For the remaining species, a broader range of population management strategies needs to be considered along a management continuum (Conway 2011). For some species, this may mean Global Species Management Plans (GSMPs) administered by WAZA. For others, it may mean placing breeding individuals into specialized breeding facilities, while ensuring that exhibit needs can be met with non-breeding animals. For yet others, it may mean exploring the concept of extractive reserves, a strategy that the aquarium community is already developing.

Accomplishing the above will require additional resources and has implications for how *ex situ* institutions structure their financial plans. We will need to better understand our business models, questioning assumptions about what we believe may negatively impact our ability to manage species effectively. For example, zoos often assume that the public wants to see a huge variety of species and that if species collections are similar from zoo to zoo, then attendance will suffer. We assume that exhibits need to be large and elaborate to be successful. These assumptions need to be tested, as they impact our ability to develop business plans that expand our ability to adequately resource intensive population management in support of conservation goals.

There are a number of factors that have contributed to a lack of success for many IMPs. Common problems include lack of necessary husbandry expertise, regulatory obstacles, space limitations, inadequate founder base, and lack of institutional commitment, exacerbated by poor communication among staff and lack of accountability for those responsible for implementation of recommendations. None of these obstacles is insurmountable, but overcoming them will require commitment to change. The scope and urgency of the species conservation crisis obligates us to move ahead as quickly as possible.

LIST OF PLENARY RESENTERS AND TOPICS
(ppt pdfs available on the IMP Workshop Report portal site)

1. Jonathan Ballou: Philosophy, history and current methods for pedigree-based management of breeding programs
2. Robert Lacy: Status and trends of the world's species
3. Kathy Traylor-Holzer: Status of managed species in regional zoo associations
4. Caroline Lees: Zoo population sustainability
5. Danny de Man: Evaluation of self-sustainability of EAZA bird and mammal programs
6. Sarah Long: Status of AZA cooperatively managed populations
7. Nate Flesness: Space allotted in managed programs for at-risk species and ZIMS potential
8. Lisa Faust: PMCTrack – evaluating recommendation outcomes for AZA managed programs
9. David Wildt: Conservation Centers for Species Survival (C2S2)
10. Bob Lacy: Open-population meta-management
11. Kay Havens: Botanic garden approaches to saving plant species
12. Richard Gibson: Amphibian Ark's conservation needs assessment process
13. Kristin Leus: Revision of IUCN Technical Guidelines on the Management of *Ex Situ* Populations for Conservation
14. Kathy Traylor-Holzer: Integrated species conservation planning

Presentation 1: Philosophy, History and Current Methods for Pedigree-based Management of Breeding Programs

Jonathan Ballou, Smithsonian Conservation Biology Institute, Washington, DC, USA

The science of population management for captive populations continues to evolve to take into consideration the variety of life history strategies, mating systems, and management strategies that characterize the diversity of species we hold in our collections. Genetic management originally focused in the 1970s on simply minimizing inbreeding, it evolved in the 1980s to considerations of equalizing founder contributions, and finally in the 1990s minimizing average mean kinship was considered the most appropriate strategy, as it still is today. However, genetic management of these populations has always struggled with incomplete information: uncertainty of sires; groups in which animals cannot be individually identified; groups in which matings between specific individuals cannot be managed, etc. The recent release of the software PMx has increased our ability to begin to deal with some of these uncertainties. We now can analyze population data that includes data on multiple possible sires, each with its probability of being the sire, or data on species for which sexual mating systems is not the norm (e.g., invertebrates), and on species managed as groups, in which individuals are not uniquely identified (e.g., fish in a tank). These tools will enable us to better manage many species that we have not been able to manage effectively in the past.

Presentation 2: Status and Trends of the World's *Species*

Robert Lacy, IUCN SSC CBSG & Chicago Zoological Society, Brookfield, IL, USA

A brief overview was provided of the Status of the World's Species outlined in *Wildlife in A Changing World: An analysis of the 2008 IUCN Red List of Threatened Species* (ed. by J-C. Vie, C. Hilton-Taylor and S. Stuart). The number of species assessed as threatened increases each year; at least 38% of the 44,837 species assessed have been classified as threatened (see IUCN report for detailed status and threat data by taxonomic classification).

Presentation 3: Status of Managed Species in Regional Zoo Associations

Kathy Traylor-Holzer, IUCN SSC Conservation Breeding Specialist Group, Apple Valley, MN, USA

The number of threatened vertebrate species continues to increase, as does the need for intensive population management. While not appropriate for all threatened species, effective intensive population management by the world's zoos and aquariums can contribute positive to species conservation. A database of 942 taxa with studbooks and/or management programs was compiled to understand the characteristics of currently managed species and as a tool for identifying management opportunities. Threatened species (based on the IUCN Red List category of threat = EW, CR, EN or VU) account for 48% of species managed by ALPZA, AMACZOOA, AZA, CAZG, CZA, EAZA, JAZA, PAAZAB, SEAZA, ZAA, WAZA, and AArk programs. While managed populations are heavily represented by mammals and birds (76% of all managed species), those herp and fish species that *are* managed are more likely to be threatened, suggesting that conservation need may play a greater role in species selection for these taxonomic groups. Most taxa are only managed in one region; only 10% of managed taxa are intensively managed in multiple regions. Regional differences exist in the number of programs, taxa, and management intensity. Those zoo associations that are new to intensive population management are focusing more on establishing studbooks and programs for threatened species.

What about the species that we (the zoo and aquarium community) are not managing? Shouldn't we be intensively managing a greater number of threatened species? Intensive management is a potential tool that can contribute to species conservation. Hoffman *et al.* (2010) indicated that 26 species (9 mammals, 15 birds, 2 amphibians) have seen status improvement in the wild with *ex situ*/ reintroduction/translocation listed as a contributing factor. Currently, only about 9% of threatened vertebrate species are being managed even at the studbook level in zoos and aquariums. However, *ex situ* IMPs are not appropriate or beneficial for all threatened species, so it is difficult to know how well we are doing. Are we doing enough? What is the true size of the task (i.e., number of taxa that would benefit from *ex situ* management)? Do we focus on species before they reach a critical status in the wild? How do zoos balance zoo-focused vs. conservation-driven programs? What is our target/goal? These questions and more will need to be answered as we prioritize species for intensive management.

Presentation 4: Zoo Population Sustainability

Caroline Lees and Jonathan Wilcken, IUCN SSC CBSG Australasia, Auckland, NEW ZEALAND

The sustainability of zoo populations is explored. Sustainable populations are considered to be those able to persist "indefinitely" with the resources available to them. They are categorized as either a) self-sustaining populations – those with sufficient internal resources to persist without supplementation, or b) sustainable through supplementation – able to be supported through an external resource capable of bearing the required harvest without itself becoming depleted. Under the criteria applied in the study, at least 9% of the populations tracked through international studbooks have the potential to fall into category *a* and 57% into category *b*. The standard goal for managing captive populations (retention of 90% gene diversity for 100 years) is directed not towards sustainability as it is defined here, but towards a managed decline in genetic health over the period, regardless of the program's broader context. The appropriateness of this as a standard target is questioned. An analysis of 87 European and North American populations against standard targets associated with this 90 GD/100yr goal show that deterioration in population health is likely to be faster than planned. Sixty-seven percent of the populations studied were too small; 59% were based on too few founders; and 52% showed inadequate growth. This has particular implications for the sustainability of zoo populations in Australasia, where zoo space is limited and populations rely on ongoing supplementation from overseas captive programs.

Presentation 5: Evaluation of Self-Sustainability of EAZA Bird and Mammal Programs

Danny de Man, European Association of Zoos and Aquaria, Amsterdam, NETHERLANDS
(in collaboration with Kristin Leus, Laurie Bingaman Lackey, William van Lint, Sanne Riewald, Anne Veldkamp and Joyce Wijmans)

A rapid assessment of the self-sustainability of EAZA bird and mammal EEP and ESB populations was initiated in 2008 and 2009 in response to concerns arising from the EU Bird import ban triggered by avian flu. There is as yet no such ban for mammal populations, but various groups of mammals have already experienced transport restrictions in response to disease outbreaks such as blue tongue, BSE, foot and mouth disease, etc. A total of 91 bird and 177 mammal populations were analyzed. The SPARKS studbook datasets used for analysis were those submitted to ISIS that were no more than two years out of date. Only individuals in EAZA institutions were included in the analysis. This approach illustrates what can be achieved with only the individuals in EAZA member institutions. The degree of self-sustainability of the populations was assessed based on 5 criteria: 1) Does the population have fewer than 50 total individuals?; 2) Is the proportion of breeding individuals of the total population less than 25%?; 3) Is lambda less than 1?; 4) Is less than 85% pedigree known?; 5) Does the population contain fewer than 30 known founders? The table below shows the scores for each of the five self-sustainability criteria for the bird and mammal populations. For each population, a score card was completed showing how many of the self-sustainability criteria it failed. It could be concluded that 75% of bird programs and 30% of mammal programs failed on three or more criteria.

Criterion	Birds	Mammals
1. Population < 50 living individuals:	36%	28%
2. Proportion of individuals breeding ≤ 25%:	73%	25%
3. PM2000 growth rate <1 (= decline):	37%	16%
4. Less than 85% of pedigree known:	78%	52%
5. Less than 30 founders:	94%	85%

Apart from the realization that many of EAZA's managed programs for birds and mammals are not self-sustainable, this analysis has led to another important realization. To be able to truly decide whether or not EAZA's breeding programs are successful, we should not be measuring whether each population is self-sustainable, but whether each population is achieving its specific goals as outlined by the TAG in the Regional Collection Plan (RCP). This then leads to the realization that we lack a sufficiently sound basis for setting priorities and determining roles and targets in the RCPs.It is at present not clear:

- which species would benefit from *ex situ* populations as part of their conservation strategy, and how to decide that in a standardized and transparent way;
- how this decision-making process may vary depending on whether or not the species is threatened (and to what extent), whether or not the species is already in captivity, how feasible success is and what resources it would take; and
- how the priorities for conservation and for other zoo roles (education, entertainment, research etc) should be balanced.

In collaboration with other regional zoo organizations, WAZA, CBSG and other groups within the IUCN SSC, and other conservation organizations, EAZA therefore aims to play an active role in the various initiatives that are currently underway to create the necessary methods, tools and paradigm shifts to ensure that we increase our contribution to conservation through the intensive management of populations, and achieve more secure long term-populations for our collections. A more complete account of the methods, results and conclusions of this study can be found in Leus *et al*. 2011.

Presentation 6: Status of Association of Zoos and Aquariums Cooperatively Managed Populations

Sarah Long, AZA Population Management Center, Chicago, IL, USA

The Association of Zoos and Aquariums (AZA) is one of the many zoo associations worldwide that is undergoing a renewed focus on the sustainability of its managed populations. Maintaining demographic stability and gene diversity have long been a part of creating viable, cooperatively managed populations in zoos and aquariums, including the AZA's Species Survival Plan® (SSP) and Population Management Plan (PMP) Programs. In an attempt to characterize the viability of AZA managed populations, basic descriptive information was gathered from studbooks and management plans for 428 populations and demographic and genetic analyses conducted by the PMC have been summarized for 319 populations. Of particular interest are measures which provide insight into genetic and demographic health such as founding population size, current population size, proportion of animals breeding, and recent population growth rates.

Of the AZA populations for which genetic calculations could be conducted (264), the median number of wild animals founding a population was 15, below the minimum 20 founders generally recommended to provide a good foundation of gene diversity. Approximately 38% of populations have a current gene diversity that falls below the 90% benchmark selected to represent the threshold between sufficient adaptive potential and increasing inbreeding risks. Of the 428 AZA Animal Programs with studbooks or published breeding and transfer plans, approximately 39% of populations are comprised of 50 or fewer individuals, with the median population size being 66 individuals. Recent growth rates (rates for the five years prior to the most recent PMC planning analyses) reveal that approximately 40% of AZA populations have been decreasing in size, 15% are stable, and more than 44% are increasing in population size. Proven breeders comprise approximately 25% of AZA populations (median Ne/N = 0.25). In summary, while AZA populations range from very small and inbred to quite large and genetically diverse, the majority of AZA populations lie at the midpoint, making them vulnerable to random variations in birth/hatch and death rates or birth/hatch sex ratios, and more likely to rapidly lose gene diversity and encounter negative effects from inbreeding. In addition, non-biological constraints caused by logistical factors or lack of cooperation among participating zoos can further impede the success of populations as small as these.

The zoo community needs to critically examine the species held in zoos and aquariums, select species which are most important for achieving their missions (e.g., conservation efforts, education goals, exhibit needs) and take action to ensure that these important populations persist. Prioritizing space for selected species, creating new or improved breeding and holding facilities, improving the cooperative management process, improving husbandry, and increasing regional and global cooperation may all play a role in improving the viability of zoo and aquarium populations.

Presentation 7: Space Allotted in Managed Programs for At-Risk Species and ZIMS Potential

Nate Flesness, International Species Information System, Eagan, MN, USA

As of 2010, ISIS tracks about 650,000 live individuals and about 350,000 more in groups, for a total of roughly one million live animals. There are of the order of ~800 or so total taxa with "managed" population programs active across the zoological regions. An optimistic guess is that the average population size of these managed populations is 100, so we have a crude optimistic estimate of ~80,000 live animals in our managed populations. Others have found that about half of these taxa are At Risk according to IUCN. So a "back of the envelope" very crude and quick estimate of the number of animals in managed populations of at-risk taxa, is 40,000. If true, that would be 4% of the animals in the community's care (using ISIS census numbers). These guestimates should be replaced by careful calculations (and will be addressed by other presentations), but the overall trend is likely to be the same. The zoo community is having a real conservation impact through breeding programs, but this would seem a rather modest allocation of space and population management effort to taxa at risk.

ISIS data provides a broad and unique look at these ~ one million live animal holdings in 800+ institutions. As we move to the new real-time integrated ZIMS software, ISIS is looking for practical ideas for reports, graphs and analyses that ZIMS could deliver, which would help institutions and regions assess sustainability and focus areas of their collections. ISIS welcomes suggestions at any time. ZIMS will offer substantial visibility among a broad group of institutional staff, and may be able to assist in encouraging wider implementation of recommendations from national, regional, or global viewpoints.

Presentation 8: PMCTrack – Evaluating Recommendation Outcomes for AZA Programs

Lisa Faust, Lincoln Park Zoo, Chicago, IL, USA

PMCTrack is a web-based database and monitoring system designed by Lincoln Park Zoo to evaluate the outcomes of breeding and transfer recommendations made through the Association of Zoos and Aquariums (AZA) Animal Programs such as Species Survival Plans (SSPs). PMCTrack provides the necessary tools and data to understand, monitor, and improve AZA's cooperative population management system. The knowledge gained through this monitoring should ultimately improve the long-term viability of populations of animals held at AZA zoos and aquariums.

Since 2000, the AZA Population Management Center has issued thousands of SSP breeding and transfer recommendations to hundreds of institutions; however there is no systematic evaluation of the recommendation outcomes. Was an animal actually transferred? Was the pair put together to breed? If a recommendation wasn't carried out, was it because of logistical issues, communication problems, or reproductive problems with the animals themselves? To address these issues, the Lincoln Park Zoo and the PMC developed PMCTrack with a three-year Institute of Museum and Library Services (IMLS) grant. PMCTrack is a web-based database and monitoring system designed to collect feedback and evaluate the outcomes of breeding and transfer recommendations. PMCTrack will provide the data necessary to make informed changes and improvements in AZA's population management strategies.

PMCTrack compiles data on all previously published breeding and transfer plans. This historic data provides an understanding of the baseline rates of recommendation fulfillment. As more plans are completed in the future, PMCTrack will be used to pinpoint management challenges that need to be addressed, to track whether rates of recommendation fulfillment improve over time, and to understand more about each managed program, as well as how the AZA management system works across programs. The website (www.pmctrack.org) will be released in Fall 2011.

Presentation 9: Conservation Centers for Species Survival

David Wildt, Smithsonian Conservation Biology Institute, Washington, DC, USA

The Conservation Centers for Species Survival (C2S2) is a group of five AZA-accredited zoos that collectively manage more than 25,000 acres of land devoted to the survival of threatened species with special needs – large land areas, natural group sizes and minimal public disturbance. C2S2 formed in 2005 largely because it realized that the odds of having a bigger impact would be increased substantially through greater collaboration and sharing resources. By combining their scientific and management expertise, these centers excel in studying and creating self-sustaining *ex situ* and *in situ* populations of some of the world's most endangered animals. In all cases, the goal is to generate information on animals and populations that directly benefits the species in nature. Currently, the five members are Fossil Rim Wildlife Center (TX), San Diego Zoo Global (CA), the Smithsonian Conservation Biology Institute (VA), the Wilds (OH), and the White Oak Conservation Center (FL).

There are two emerging projects led by C2S2 that may partially address the sustainability crisis. The first project, *Creating Sustainable Herd Populations Sustainably*, looks at the ungulate population in AZA institutions. There is a need to step beyond traditional pedigree-based analysis to identify and explore other biological traits that contribute to adaptability, resiliency and ultimately population sustainability. By using four priority species, C2S2 is combining space and scientific research to create self-sustaining populations of rare ungulates while simultaneously determining the biological, resource and financial benefits of such a strategy. Secondly, the *Cheetah Sustainability Program*, looks at this charismatic conservation ambassador that is in great demand for exhibition, yet the *ex situ* population is not self-sustaining. C2S2 has joined the Cheetah SSP, committing to managing large groups of cheetahs and improving breeding efficiency to achieve sustainability and making this species accessible to all interested AZA institutions for educational displays, while simultaneously supporting *in situ* conservation and *ex situ/in situ* research. As AZA-endorsed initiatives, it is likely that these approaches will stimulate contemplation of the value of 'breeding centers' as spacious resources for the efficient, economical, and effective production of sustainable populations. For more information: www.conservationcenters.org.

Presentation 10: Open-Population Meta-Management

Robert Lacy, IUCN SSC CBSG & Chicago Zoological Society, Brookfield, IL, USA

All that we have learned over the past few decades about inbreeding, adaptation to captivity, and loss of the diversity suggests that the concept of closed conservation breeding programs is a losing proposition – one in which we try to minimize the damage, as we monitor our losses. To truly help conserve species, we need to stop trying to manage closed populations with goals such as retaining 90% of the starting diversity for 100 years (a goal that often unachievable and inadequate). We need instead to develop approaches that seek integrated management with wild populations, and have as goals to retain -- continually and into perpetuity -- healthy levels of genetic, behavioral, and physiological diversity as part of an overall conservation program for species. Programs for the Puerto Rican crested toad, golden lion tamarin and Karner blue butterfly are good examples of successful efforts to manage interacting populations both *in situ* and *ex situ* for the overall benefit to species conservation.

Presentation 11: Botanic Garden Approaches to Saving Plant Species

Kay Havens, Chicago Botanic Garden, Glencoe, IL, USA

Many zoos, aquaria and botanic gardens share the same dual mandate, serving as a public attraction and serving as a conservation center. Ideally, our conservation role involves partnering in integrated conservation programs that support species survival in the wild. We also share many challenges: balancing our dual roles, strategically selecting species for *ex situ* management, linking out-of-country facilities with on-the-ground conservation (often in developing, biodiversity-rich countries) and building capacity in biodiversity hotspots. We undoubtedly have much to learn from each other and I would encourage more cross-fertilization between our conservation communities.

The plant conservation community can employ seed storage as a long-term conservation strategy for most species, since the majority of plant taxa have seeds that can withstand drying and freezing. Properly stored seeds can remain viable for decades to centuries. This allows conservation botanists to store large numbers of individuals at a reasonable cost with relatively low risks of genetic drift, adaptation to cultivation and disease if grow-outs are minimized. The Global Strategy for Plant Conservation, a program of the UN's Convention on Biological Diversity, provides a framework for employing *ex situ* conservation and restoration for plants worldwide. Networks of botanic gardens have joined forces to undertake large scale seed banking of threatened species, native species needed for restoration, and in some cases, entire floras. These seeds provide a safety net against extinction in the wild and a source of propagules for restoration today and potentially for assisted migration in the future.

Presentation 12: Amphibian Ark's Conservation Needs Assessment Process

Richard Gibson and Kevin Johnson, Amphibian Ark

Amphibian Ark (AArk) staff helps coordinate *ex situ* programs implemented by partners around the world, as part of our role in addressing the *ex situ* components of the Amphibian Conservation Action Plan (www.amphibianark.org/pdf/ACAP.pdf), with emphasis on programs within the range countries of the species. We are always aware of our obligation to couple *ex situ* conservation measures with the necessary efforts to protect or restore species in their natural habitats. AArks helps to coordinate all aspects of implementation within the AArk initiative and assist our partner organizations to identify priority taxa for further *in situ* or *ex situ* conservation. An initial part of this process involves assessing species to identify those that are most in need of various types of *in situ* or *ex situ* management.

In February 2006 CBSG and WAZA convened an Amphibian *Ex Situ* Conservation Planning Workshop, in El Valle de Anton, Panama. During this workshop a taxon selection and prioritization working group comprising 13 amphibian experts from around the world developed a decision tree for the selection and prioritization of taxa for *ex situ* conservation work. This decision tree was subsequently used at several in-country workshops, and has undergone several phases of modification and improvement, based on feedback from workshop participants. It includes a series of questions with weighted scores that help to assign levels of priority for various conservation actions. In 2009, the process underwent a significant review by AArk staff, which modified it from a taxon selection and prioritization process to a process for assessing amphibian species for a wider variety of both *in situ* and *ex situ* conservation actions.

All amphibian species that are assessed during the workshops are automatically assigned to one or more of these conservation roles, based on the collective knowledge of the field experts for each species. Within each conservation role, species are listed from highest to lowest priority, based on scores that are assigned to questions used in the assessment.

During the conservation needs assessment workshops, each species for the particular country is assessed, with all data captured in the conservation needs assessment tool. At the end of each workshop, reports are generated for each of the conservation actions, and these reports are distributed to all workshop participants. Amphibian conservationists are able to use the information from the workshop as a guide to assist with development or refinement of local amphibian action plans. The data collected at each workshop is also made available to the wider amphibian conservation community on AArk's portal (www.amphibianark.org/assessmentresults.htm). Since these workshops began in 2006, 38% of the world's amphibian species have been evaluated for their conservation needs in 22 workshops.

Presentation 13: Revision of IUCN Technical Guidelines on the Management of *Ex Situ* Populations for Conservation

Kristin Leus, EAZA/CBSG Europe/Copenhagen Zoo, Antwerp, BELGUIM

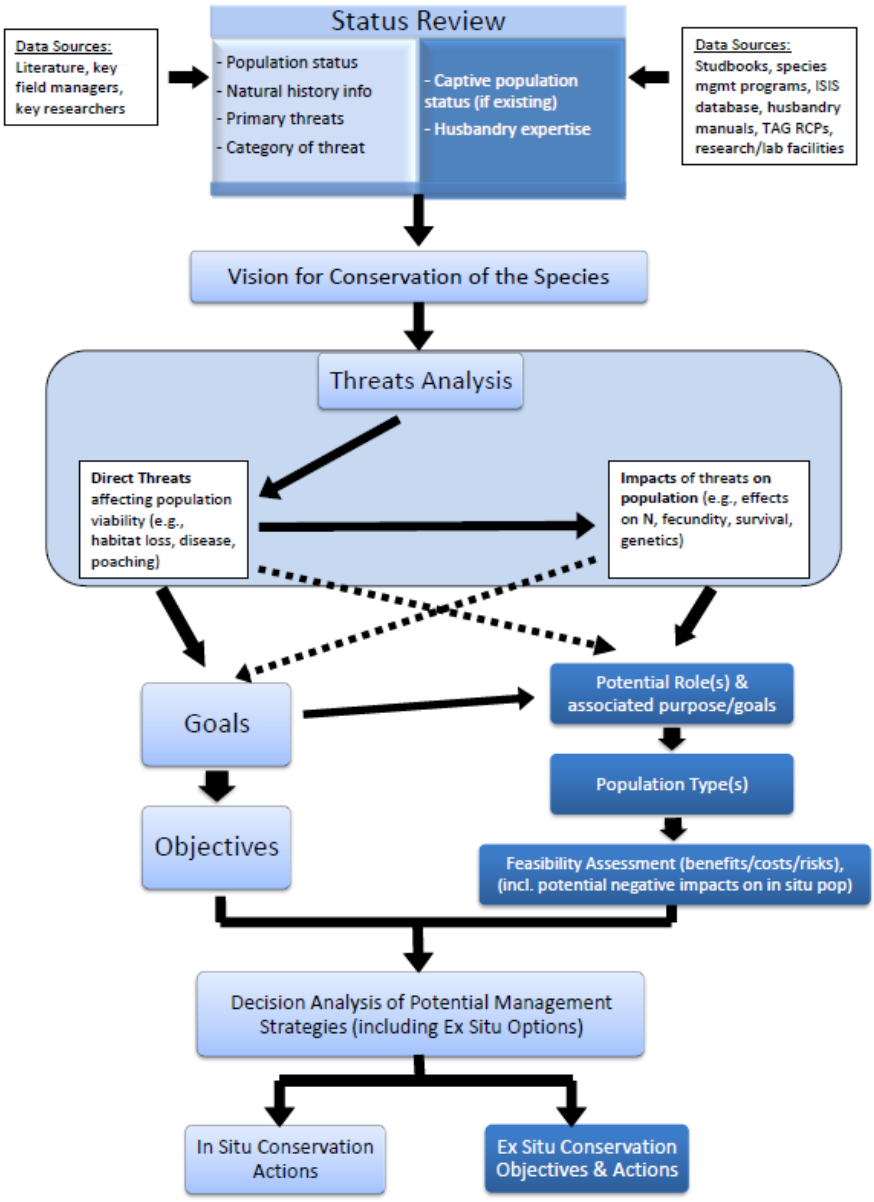
The current *IUCN Technical Guidelines on the Management of Ex Situ Populations for Conservation* do not provide sufficient clear guidance on IF and WHEN *ex situ* activities are a beneficial component of an overall conservation strategy for a taxon and, in some cases, can even lead to contradictory interpretations. At the 2010 CBSG annual meeting in Cologne, a working group was convened to begin the process of revising these guidelines by outlining suggested steps in a more formal, informed, and transparent decision-making process to guide the evaluation of whether individuals should be taken from the wild for the purpose of supporting species conservation. These steps include a status review, including a threat analysis; definition of purpose (role) and structure/characteristics of any *ex situ* program; and a feasibility/risk assessment that considers available resources and expertise as well as potential benefits and risks. An initial list of relevant factors or characteristics to consider in this process was identified for each of these steps. Immediately following the CBSG annual meeting, a formal proposal for revision of the guidelines was submitted to the IUCN SSC's Steering Committee and has been approved. Guidelines revision will proceed in 2011.

Presentation 14: Integrated Species Conservation Planning

Kathy Traylor-Holzer, IUCN SSC Conservation Breeding Species Group, Apple Valley, MN, USA

Ex situ populations and activities best serve conservation if they are part of an overall conservation strategy for the species. However, species conservation strategies have not been developed for many threatened species, and many existing strategies do not consider or evaluate the appropriateness of *ex situ* activities. Similarly, many *ex situ* populations are established and program goals and strategies developed with little consideration of and integration with *in situ* conservation needs for the species.

The revised *IUCN Technical Guidelines on the Management of Ex Situ Populations for Conservation* have the potential to guide both the *in situ* and *ex situ* communities in evaluating the appropriate role (if any) that *ex situ* management can play in the conservation of specific species. The analytical steps outlined in the revised guidelines have the potential to be integrated with and provide input into the Species Conservation Planning / Population and Habitat Viability Assessment (PHVA) process, either as part of an interactive process or as a separate evaluation that can function to inform the development or evolution of a comprehensive species conservation plan. Parallel components in both *in situ* and *ex situ* species conservation planning include status review, threats analysis, decision analysis based on feasibility/effectiveness/ costs of various management options, and development of short- and long-term goals and recommended actions (see diagram).


Status Review
Data Sources: Literature, key field managers, key researchers
- Population status
- Natural history info
- Primary threats
- Category of threat
- Captive population status (if existing)
- Husbandry expertise
Data Sources: Studbooks, species mgmt programs, ISIS database, husbandry manuals, TAG RCPs, research/lab facilities
Vision for Conservation of the Species
Threats Analysis
Direct Threats affecting population viability (e.g., habitat loss, disease, poaching)
Impacts of threats on population (e.g., effects on N, fecundity, survival, genetics)
Goals
Objectives
Potential Role(s) & associated purpose/goals
Population Type(s)
Feasibility Assessment (benefits/costs/risks), (incl. potential negative impacts on in situ pop)
Decision Analysis of Potential Management Strategies (including Ex Situ Options)
In Situ Conservation Actions
Ex Situ Conservation Objectives & Actions

Intensively Managed Populations for Conservation Workshop

San Diego, CA, US
6 – 9 December 2010

SECTION 3

Plenary Discussion: Defining Our Vision for IMPs

Plenary Discussion: Defining Our Vision for IMPs

FOCUS: Caroline Lees (Australasia), Danny de Man (EAZA), Bob Wiese (AZA) and Sarah Long (AZA) gave presentations on the various successes and short-comings of their respective regional species management programs. These presentations were followed by discussion from the wider group as summarized below.

CURRENT STATUS AND ISSUES OF REGIONAL SPECIES MANAGEMENT PROGRAMS

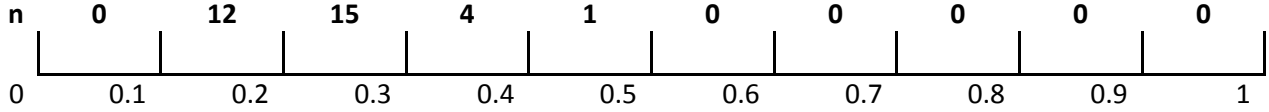
The commonality among regional programs was noted, especially with regards to basic issues that can be improved. How do the issues compare across taxa? Would they be the same? Have our colleagues compared the status of managed programs across all taxa? AZA suggested that their results would be the same as the EAZA results.

- What are the main problems that are keeping populations from being sustainable?
    - AZA: Space is a huge problem. There are lots of recommendations for breeding, but we are limited by space. People and/or animals not following through with recommendations. Problem species fall into two groups – those that cannot breed (we might not have figured out the husbandry), but many of these species are not in our managed programs. We have possibly hit capacity and not many zoos want these species, so space is limited, and breeding has been stopped.
    - ZAA: Lack of space is a big problem, husbandry, progression of program design and management, and programs not being managed by professional Species Managers leads to problems.
    - EAZA: The problems are much the same as outlined for ZAA, but in a different order – population growth rate is low, the lack of professionalism in species management is an issue, as is the lack of space. Zoos are afraid of making a decision to stop managing existing programs, in favor of improving other programs.
- It was noted that there are different problems with bird programs because there are so many species in zoos, generally with smaller population sizes, and this causes population management issues.
- If space is a huge problem, why are people targeting low numbers? It might be because population sizes are set as a result of space assessments being carried out, and program leaders are then setting target sizes based on the spaces available.
- Could extrapolating regional programs into global programs make the situation any better, by potentially providing increased spaces?
- The number of pairs that are recommended for breeding is usually higher than 25, but the end result is often fewer than 25 pairs breeding.
- Growing populations is often related to husbandry problems. Genetic management was not the initial problem when population management in zoos first began, but husbandry issues were the focus. Initially the husbandry aspect was researched and improved, so populations grew in the EAZA region. When SSPs were started, more focus was given to the science of population management rather than the husbandry.

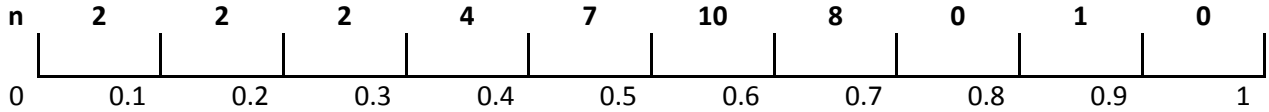
- Is the problem really that we do not have space, or perhaps that given the limited space we have, are we choosing species that are too large, and perhaps we should be choosing smaller species that require less space?
- In AZA, TAGs are responsible for setting population sizes. If communication is poor, this can lead to problems. There are many issues surrounding disposing of excess animals, especially offspring from highly fecund species, and euthanasia is against many institutions' policies. This is a serious issue that needs to be addressed.

WHERE ARE WE TODAY WITH REGARD TO INTENSIVE MANAGEMENT OF POPULATIONS?
Three questions were put to the workshop participants, who all indicated (by raising their hands) how successful they feel we are doing, where *0 = we are doing very badly* and *1 = we are doing very well* (n = number of workshop participants 'voting' at each 10% level).

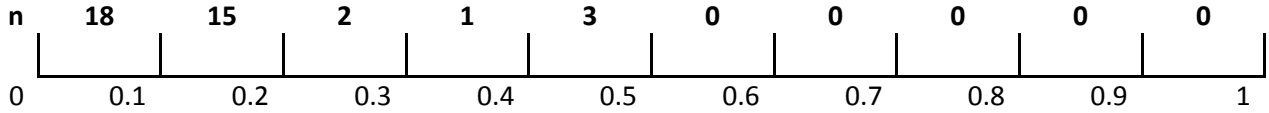
How are we doing relative to what we think should be done? (mean response = 0.28)



Do we have the mechanisms, structures, expertise, resources, programs, etc. in place to be able to succeed into the future? (mean response = 0.52)



Do we have the resources in place to succeed? (mean response = 0.19)



- There are confounding variables with regards to success. With a lot of the programs, the number of founders to work with is part of the problem for sustainability and is the reason why we need to expand out populations so much. Is this a conflicting issue? It is a separate question from "Are we knowledgeable?" or "Do we have the resources?" We have impediments to optimal management.
- We have good science and expertise, but we are not prioritizing the management of our populations and so we do not have the right decisions going into some programs.
- Exhibit space can also work as suitable population space, and if you think about it in that context, we have achieved remarkable success, but we could learn from some of the Amphibian Ark's ideas. Zoo space is a good space to showcase what can be done, but serious *ex situ* conservation should possibly be something else or a lot more than we initially thought.

- As an industry, we seem to be quite well resourced relative to other industries, but this depends how you look at the allocation of resources. There is a lot of potential there, but have the resources been targeted where we need them most? It was noted that resources are required by many different groups within our industry – educators, animal health, etc. so there is always competition for resources within the industry.
- The ISIS data indicate that there are approximately 1000 managed programs and perhaps 75 animals per program. Maybe one half of those species are of conservation value according to the IUCN. But there are approximately 1,000,000 animals in zoos at the moment, so we are only managing a very low percentage of what we currently hold.
- There are historical trends in species declines in captivity, and a lack of space, and many of the species we have now are likely to become more endangered in the future – should we be working on the premise that only species that are endangered now should be considered for programs? What about those species that will become endangered in the future?

DISCUSSION ABOUT THE PROPOSED FOR INTENSIVELY MANAGED POPULATIONS

R. Lacy presented a draft vision statement developed by a working group at the 2010 CBSG annual meeting in October in Cologne, Germany, and asked for comments from the group. The proposed vision statement, followed by elaborated text to further explain the statement, is as follows:

> *"Intensive population management as part of an integrated and holistic conservation plan results in species living within healthy ecosystems in evolving communities."*
>
> *"To preserve biodiversity, the global conservation community commits to providing the level of intervention necessary to prevent the extinction of species. Intensive population management (including, but not limited to management within zoos and aquariums, botanic gardens, other propagation centers, closely managed reserves, and genome banks) is effective (only*) when integrated with other conservation measures within an overall species conservation strategy that fully addresses the threats to the species, using the best available science, technology, and practices. We work toward a world in which all species can live within healthy ecosystems as part of evolving communities, without the need for continued human intervention."*

Is this the kind of vision we would want for how we will manage species for conservation? If not, what are the other elements that should be added, changed or deleted?

- In the first sentence "prevent extinction" – preventing extinction is not enough. The statement should be "reverse the current trend of extinction".
- We should swap the first and last sentences.
- Species loss is going to occur – it is a matter of how much loss are we willing to manage?
- We are trying to maximize species survival, not halt the decline – should be "optimize maximum potential".
- There is a clash between evolving communities and preventing extinction.
- A species might not be extinct biologically, but might be extinct functionally.
- We should optimize biodiversity, which is in the last sentence.
- There is a dichotomy between intensive species management, and no need for human intervention – have we gone past that point already? Should it be "minimize the need for intervention", since we can never stop intervention. Even successful programs now still have massive intervention to maintain them.

- The statement should be moved away from a dream and more to a reality, or something in between.
- We need a vision statement that you have to reach for – one that challenges us about where we can be. Is it too far to say that we are going to have healthy ecosystems without human intervention?
- The draft vision is very different to the elaborated version – one works toward what we want and the other says we are doing it. We should be saying that we are trying to prevent extinctions. The sense of urgency should be glossed over, and we should not set goals that we cannot achieve.
- Are we speaking for other people when we say "global conservation community", or just the people at this workshop? We are speaking about the global community, and what the world should be doing.
- This is an aspiration goal – would the global conservation community all agree? The statement is not true now.
- Managing intensively to managing extensively is a continuum – everything will be managed in some way. The mid-point needs to be moved along the continuum, e.g., we should be doing more management in habitat, in range. It is unrealistic to think that we can resolve everything.
- Human intervention should also include *in situ* populations. So the statement should mention that we will also need management *in situ*, for wildlife rangers, etc.
- There was some discussion on the word "effective" in Cologne. Is the word "effective" limiting? We have not been overly effective in the past but there are also other communities out there that are not achieving their goals. We might be limiting our role or where we see our role as being effective. Maybe we should change this to "most effective". It was noted that there was a lot of discussion about this point at the CBSG meeting in Cologne.
- We are on a spectrum and this is critical – there is not a wonderful outcome at the end. There is a myriad of ways in which support is being given to species, not just via population management. Maybe "intervention" might be a limiting term. What does "other conservation measures" mean to different groups? They could see this as quite different. Maybe use "support" instead of "intervention"?
- There is not going to be anywhere in the world that is not managed by people in the future. We should say "minimal" intervention, as this can never stop. We are currently confronted with 3,000 amphibian species that might be threatened with extinction. If we saved only 10% of them, then this would be a very successful outcome, and not a failure. We are looking at reducing unnatural levels of extinction.
- The term "using the best available science, technology and practices" sounds a bit too optimistic in a "science-y" way. Maybe say "use the best available practices" instead, or include either "science" or "technology", so it is not such a critical part. It was noted that science and technology were included because they represent two different contexts.
- What about "social cooperation"? Support versus intervention – support could be financial, educational, etc. Part of what we are trying to get people to buy into is that intervention is necessary and to get people to acknowledge that this is a part of the whole kit for management of species. Prefers "intervention" over "support".

No consensus was reached regard the final wording of the vision statement; this discussion was put aside in the interest of time.

MAJOR GOALS

Workshop participants were asked to consider the spirit and intent of our vision and to brainstorm high level goals that we need to achieve to meet this vision.

- Prioritization tools for which species need intensive management
- For priority species – establishing populations that can be viable over a long time
- Rapid assessment consensus on what is viable in managed programs.
- Better goals for our programs and program design to meet those goals
- Wild population increases – move toward improving status of wild populations
- Healthy ecosystems
- Less intensive management in captivity means finding more space.
- Better collaboration with the field community
- Consideration of different and innovative management strategies
- Creating detailed life history data on priority species
- Figuring out what the perfect institution looks like that can manage these species
- Species triage and not prioritization
- Strategic planning of recruitment of founders from the wild
- Better compliance/accountability with recommendations from breeding programs
- Better successful integration of tools right across the *ex situ*/*in situ* fields
- Better goals – to link program goals to threats to the species. Make sure that program goals address the threats to the species.
- Comprehensive conservation plan for each species
- Better and fast evaluation of what is working and what is not
- Having species with appropriate goals (not a "one size fits all" strategy)
- Working more closely with governments to develop more common goals
- Streamlining the regulatory framework for approved programs to make them more effective and quicker
- Means of building capacity within the intensive management community
- More resources
- Not only setting goals, but also cooperating better with governments. Look at legislative frameworks, and have better funding from governments to reach those goals.
- Stakeholder buy-in. Goals for species should be the goals of those who can influence the fate of the species, not necessarily governments.
- Better communication between regional and global zoo associations
- The SSC community needs to act as one. We should not have a situation where half of the community does not know what the other half is doing.
- Better alliance of zoo associations with SSC taxonomic specialist groups
- A more proactive exploration of all forms of intensive population management. We should not jump toward populations of breeding individuals – there are other types of forms of intensive management, e.g., translocations, cryopreservation. Exploration of the whole range of techniques.
- Changing what zoos do – moving away from species conservation as a volunteer position. Conservation should be core to what zoos are about.
- Need a campaign to promote our vision of this to zoo administrators. Getting the message beyond this workshop.

- Making sure that zoo directors, curators, etc. understand that this is a paradigm shift and a new business model. They need to know that it pays to do conservation or they will not do it.
- Reference to IUCN needing to review all of its policy – natural range area, re-introduction.
- Climate change – in 20 or 30 years a lot of species are not going to be able to live where they currently live. Translocation is needed, as is assisted colonization.
- We need a clear definition of the taxonomic units we are working with.
- Doing something about elevating our standing as *ex situ* practitioners in the global conservation scene. Do they take us seriously? We need to do more to promote ourselves.
- We need more collaboration from the IUCN secretariat in release programs.
- A systematic way of evaluating or recommending different intensive management options within the Red Listing process.
- A global system where we can be more aware of how many zoos there are and what our species are for. Display vs. *ex situ* conservation.
- Need to be careful that other zoo business is not discarded as conservation, and also currently common species may become endangered in the future.

WORKING GROUPS FOR THIS WORKSHOP

These proposed goals were reviewed, and resulted in the formation of the four working groups designed to encompass the breadth of these goals:

1. Species Assessment and Prioritization – which species need intensive management; how would they be evaluated within the Red List process

2. Program Goals and Design – clearer program goals for our populations and managing toward those goals; building capacity to what is needed to achieve what we want – resources, expertise, space, etc.; assessment and evaluation of success

3. Integration – integration with other aspects of conservation or species work/comprehensive species plans

4. Collaboration – collaboration among stakeholders, IUCN SSC specialist groups, etc.

5. Paradigm Shift – creating a paradigm shift in what we are doing; getting the message out to zoo directors, etc.; doing things differently; zoos' priorities

These working groups then convened to begin the process of discussing and defining their high-level goals, challenges to those goals, objectives to be accomplished to overcome those challenges, and recommended action steps.

Intensively Managed Populations for Conservation Workshop

San Diego, CA, US
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SECTION 4

Shifting the Conservation Paradigm Working Group Report

Working Group: Shifting the Conservation Priority Paradigm in Zoos

Members: Anne Baker; Jonathan D. Ballou; Paul Boyle; Lesley Dickie; Richard Gibson; Kay Havens; Peter Riger; Dan Wharton; Bob Wiese

FOCUS: This group discussed the challenges that many zoo conservation breeding programs are having in maintaining sustainable and viable populations for many species in their collections, even when there are population management programs supporting these efforts. Overall, the group recognized that many of the current paradigms related to how zoo and aquarium conservation programs are designed and implemented need to be changed if zoos want to increase the success of these programs.

GOAL: The world zoo and aquarium communities are, and are acknowledged as, effective conservation partners in the context of integrated conservation strategies that include intensive population management.

CHALLENGE 1: Under the current paradigm, for many zoos conservation is not a high priority, and this negatively impacts the community's ability to maximize its success with population management programs.

a) WHY DOES THE PROBLEM OCCUR?
   i) Zoos have other priorities (e.g., exhibits that bring in revenue) that compete for resources.
   ii) Zoos need to run as businesses to exist.
   iii) For many zoos, it's a challenge to integrate conservation into their business model.
   iv) The time-frame for business plans are typically 3-5 years while conservation is a long-term process.
   v) Conservation is not seen as a "saleable" product.
   vi) Many zoos run as postage stamp collections, rather than conservation centers.

b) WHAT ARE THE CONSEQUENCES?
   i) Conservation takes a second seat to running the zoo business.
   ii) It is a challenge to position zoo resources towards conservation programs.
   iii) Impacts zoo's abilities to maintain sustainable populations *in situ* or *ex situ*.
   iv) Other conservation organizations do not recognize or trust the zoo community to be serious contributors to conservation.

c) OBJECTIVES:

   OBJECTIVE 1a: Change the current paradigm of the ways zoos play a role in and contribute to species conservation. Redefine and restructure IMP programs to maximize success. This would include redefining the kinds of institutions that deliver IMPs to include breeding specialization centers (or designated breeding centers). Recognize that in some situations, dedicated breeding centers (could be zoos that specialize in particular species or types of species) are preferred over distributed populations among multiple zoos (the typical SSP/EEP approach). For example, for failing IMPs, to maximize reproductive potential, re-distribute breeding individuals into dedicated specialized breeding facilities (not necessarily zoos), while ensuring that exhibit needs can be met with non-breeding animals of this or another species. An example of this approach is the dedicated cheetah breeding facilities being promoted by the CCSS.

ACTIONS:

i) Identify IMPs that are failing. This involves compiling the published and gray literature – there have been several publications and presentations over the last several years that have documented challenges faced by many breeding programs.

ii) Work with program members of these IMPs to re-define the structure of the program to maximize success. Where are the bird population managers on this issue?
WHO: A. Baker
WHEN: January 2011

OBJECTIVE 1b: Members of the zoo and aquarium community should each re-commit or re-evaluate their realistic conservation mission and specify in detail what that means. This would ensure their clarity of purpose and help standardize the meaning of committing to conservation at the international level.

ACTIONS:

i) Ask the regional associations' conservation committees (field, research, education, animal management, other?) to define, within their area of expertise, how they would define and assess the conservation-related activities of their member organizations. Including the AZA field conservation definitions as an example:
WHO: P. Boyle
WHEN: Responses by June 2011

ii) Consolidate the responses from conservation committees to an agreed upon international standard.

OBJECTIVE 1c: Identify those zoos that do conservation, and acknowledge their commitment to conservation by establishing a new level of membership in regional zoo associations that recognizes their role as conservation leaders in this community.

ACTIONS:

i) Develop a concept proposal for an organization along the lines of the "Botanical Gardens Conservation International" model that works within regional zoo associations, or possibly internationally, or levels of membership within regional zoo associations, that acknowledges and identifies institutions conducting significant conservation programs. Norden's Ark, in Sweden, is the type of institution visioned to be recognized by this program.
WHO: L. Dickie, P. Boyle
WHEN: March 2011

ii) After this concept proposal has been drafted, develop criteria for inclusion of zoos for this level within zoo associations. For example, is ISO designation appropriate for all zoos and can this be used to aid in reaching the objective above?

OBJECTIVE 1d: Our business plans should be developed in context to a zoo's overall mission, and, if appropriate, explicitly include adequate recourses for IMP needs.

ACTIONS:

i) Accurately quantify costs of a variety of successfully operating IMPs in different taxa. This includes IMPS that include field conservation programs (CIMPS) as well as IMPs for zoo populations (ZIMPS). CIMP candidates include: GLTs, Wyoming toads, condors, field crickets, European mink, Corrobaree frog. ZIMPS candidates include: cheetah, giraffe, elephants, penguins, flamingos. This involves two steps:

   (1) Write a guideline for how to calculate these costs.
   WHO: J. Ballou, A. Baker
   When: February 2011

   (2) Estimate costs
   WHO: A. Baker, J. Ballou – GLTs; A. Baker – Wyoming toads; K. Johnson – C. frogs; P. Pearce Kelly – field crickets; Tiit Maran – European mink; R. Wiese – California condors
   WHEN: TBD

ii) Provide guidelines on how zoos can fund conservation in the zoo's business plan. (This requires that a zoo has a conservation strategy in place, if appropriate).

OBJECTIVE 1e: We need to better understand our business models. We make a lot of assumptions that we believe negatively affect our conservation role:

- We presume that the public want to see huge variety of species.
- We presume among directors that if zoo collections are similar that people will stop coming.
- We presume our exhibits need to be huge elaborate exhibits to be successful.

Are these true? And how do they impact our ability to become more successful conservation centers by:

- Being able to focus more resources on needy species.
- Better focus resources on public needs.
- Be better presenters of animal visibility and behavior.

ACTION:

i) Determine what species and activities visitors NEED to have in zoos to have a good zoo visitor experience. Do visitors need a variety of species at zoo? Do curators want "stamp" collections (i.e., many species, few specimens of each species)? Is there a conflict between visitor perceptions, curatorial collection planning interests vs. the needs of successful IMPs?
   WHO: P. Boyle to circulate their visitor info survey that has been done. P. Boyle to ask Scott Corwon about this questionnaire.
   WHEN: TBD

CHALLENGE 2: Under the current paradigm, we too often fail to deliver on promises and missions to use IMPs to support conservation.

a) WHY DOES THE PROBLEM OCCUR?
   i) Expanded to too many programs too rapidly.
      (a) Stopped breeding because of overpopulation and surplus.
      (b) Fund-raising capacity could not keep up with needs.

(c) Have done a poor job at passing on husbandry knowledge to other zoos, younger generations of staff.

ii) Conflicting role of our animals: exhibit? Breeding? Show? All the above?

iii) We have conservation missions for zoos, not zoo missions for zoos = setting ourselves up to fail.

iv) Regional Collection Planning don't exist and where they do often have no set priorities

b) WHAT ARE THE CONSEQUENCES?
See Overall Goal: failure to be seen as an effective conservation partner.

<u>CHALLENGE 3</u>: Under the current paradigm, lack of full cooperation between zoos and between zoos and managers of IMPs is often tolerated, not strongly reprimanded, or "managed around," negatively impacting the success of IMPs.

a) WHY DOES THE PROBLEM OCCUR?
i) Institutions priorities trump collective priorities.
ii) Personal priorities collective priorities.
iii) Business model of zoos often not compatible with cooperation.
iv) Corruption
v) Ego – zoo managers sometimes don't like to be told what to do.
vi) Lack of buy in to a common conservation vision
vii) Lack of trust between participants
viii) It's easier to do it on your own.
ix) Cultural differences within and between regions
x) Poor communication of IMP recommendations, primarily within institutions (i.e., getting the recommendations to the right people in an institution)
xi) Lack of decision making within institutions
xii) Animal ownership and financial value sometimes trump IMP recommendations.
xiii) System does not have a way to deal with the cheaters: "tragedy of the commons".

b) WHAT ARE THE CONSEQUENCES?
i) Cooperative programs not as effective as they could be.
ii) Zoos that want to fully participate (e.g., get animals for breeding) can't comply with recommendations if recommendations involve zoos that don't participate.
iii) Animals end up going to dealers or are sent out of the IMP rather than contributing to the IMP.
iv) Recommendations are not followed; populations crash.
v) Mistrust between institutions, institutions and IMP managers
vi) IMPs can't accomplish really big goals.
vii) Increases costs of IMPs: inbreeding = increased health care, failed populations need new, expensive founders, etc.

<u>OBJECTIVE 3a</u>: Have species sustainable programs link cooperation to inclusion. Those that cooperate get to be included in the shared benefits (e.g., receive breeding animals, etc.) while the cost of non-collaborating is lack of availability to animals.

ACTIONS:

i) Develop processes and tools to "name and shame" zoos that do not cooperate to improve compliance. For example, tools that compare studbook completeness statistics of studbooks held by a particular institution to the regional or average completeness statistics.
   WHO: ISIS to start
   WHEN: After ZIMS Release 3 (Studbook module): 2012, 2013?

ii) Regional zoo associations need to get tough on sanctions for deliberate non-cooperation in IMPs.
   WHO: Zoo associations

OBJECTIVE 3b: Enhance compliance if IMP recommendations by having taxa being managed by IMPs be owned by country of origin or collective ownership by association (recognize not possible in some cases), rather than individual zoos.

CHALLENGE 4: Under the current paradigm, animals in collections and IMPs often have conflicting roles (individuals expected to be both on exhibit and breeding), which leads to less successful IMPs.

OBJECTIVE 4a: Develop internationally accepted standards for defining the types of roles that individuals can take on in zoos.

ACTION:

i) Define and standardize internationally zoo "Program" names more appropriately to reflect their real role: sustainable programs, reintroduction programs, display/exhibit/research programs. See 1 above. Ask WAZA Conservation Committee to develop a "taskforce" group to define these standards.

OBJECTIVE 4b: Determine what does work in exhibit spaces vs those that don't and plan accordingly.

CHALLENGE 5: Under the current paradigm, availability of animals is taken for granted, and assumed to be free of charge.

a) WHY DOES THE PROBLEM OCCUR?
   i) Wanted to detach retail value from animals.
   ii) Wanted to see animals as a community resource.

b) WHAT ARE THE CONSEQUENCES?
   i) Animals are not valued.
   ii) Having sustainable populations has a cost, so should NOT be free.
   iii) If sustainable populations are seen as free, zoos won't put in appropriate resources for to maintain sustainable populations.
   iv) Leads to source and sink populations:
      (a) Resentment between zoos and program managers when animals aren't available.
      (b) Some zoos do contribute more than others, again, resentment.
      (c) Source zoos act as "Enablers" – provide animals for free when there is a real cost.

c) OBJECTIVE 5: Zoos and aquariums that are sources of animals need to document and understand the real costs of producing animals. There needs to be a value system associated with making animals available to programs, zoos.

ACTIONS:

i) Explore "Pay to Play" strategies where Pay can come in variety of forms (e.g., institution receiving animals acts as studbook keepers).
ii) See Actions for Objectives 1d above: survey of costs.

CHALLENGE 6: Under the current paradigm, taxa selected for IMPs are selected by zoos managers or regional zoo advisory groups rather than experts in species' conservation needs, leading to developing and using resources on IMPs in ways that are less than ideal for most effectively addressing global conservation issues.

a) WHY DOES THE PROBLEM OCCUR?
   i) See Challenge 1
   ii) We don't solicit information.
   iii) We think we already know the needs and answers.
   iv) We rely too much on the Red List – but there is lack of guidance from Red List.
   v) Most SSC Specialist Groups members are not conservationists.
   vi) We have not sold what we can do in an effective way.
   vii) We have not sold the idea that IMPs are just a tool rather than a final goal of conservation.

b) WHAT ARE THE CONSEQUENCES?
   i) Investing in species that don't need assistance.
   ii) Use resources for non-high conservation priority species.
   iii) IMPs are not used when they can be.

c) OBJECTIVES:

OBJECTIVE 6a: Make organizations that are doing global or regional conservation planning (IUCN/SSC, IUCN Specialist Groups, regional zoo association advisory groups, etc) aware that there are tools available that objectively evaluate the role of *ex situ* IMP in the conservation programs (e.g., an AArk-type conservation planning tool, PHVA processes, others?)

ACTIONS:

i) Find another taxonomic group that would be willing to test the AArk tool for that taxonomy. Candidates: IUCN Felid Specialist Group
   WHO: R. Gibson, K. Johnson
   WHEN: Within 2011
   UPDATE: Possible interest by USFWS in applying tool to North America bat species.

ii) Attend meetings with societies, GOVs, NGOs being realistic about what we can provide, cannot provide, how and when we can be most effective. Define a message.

iii) Ask WAZA marketing committee to produce a portfolio of conservation services that zoos can provide.

iv) Identify non-zoo appropriate people to deliver the message to their own groups.

OBJECTIVE 6b: Be largely reactive not proactive in species conservation planning (whilst being proactive at offering our services – see objective above), but recognize that there are situations that zoos can take the lead or be proactive in developing conservation planning.

CHALLENGE 7: Under the current paradigm, experts in species conservation outside the *ex situ* community often do not recognize or value the potential contribution that can be made by *ex situ* IMPS.

a) WHY DOES THE PROBLEM OCCUR?
   i) We support a process without knowledge of the required support to reach obj.
   ii) We are seen as consumers of wildlife, not as conservation organizations
   iii) Because zoos and aquariums are seen as a high resource and a sideline
   iv) IMPs are not used, so not realized as useful, so are not used….etc.

b) WHAT ARE THE CONSEQUENCES?
   i) No useful dialogue between zoo and aquarium community and other conservation organizations.
   ii) Zoos acting in isolation.
   iii) We have made bad choices.
   iv) We have waste resources and don't achieve desired result.
   v) IMPs are not used when then can be.

OBJECTIVE 7: Promote the services that the *ex situ* community can provide for species conservation. Do a better job in communicating what our services are.

ACTION:
i) Develop a formal Marketing Plan that promotes those services

CHALLENGE 8: Our current population management paradigm creates significant challenges to the zoo and aquarium community's ability to contribute as much as they potentially could to species conservation. The challenge is to have the zoo and aquarium community fully recognize that paradigm shifts are needed.

OBJECTIVE 8a: Convince the zoo community that there is a crisis. Zoo populations are crashing and for most species we lack sustainable populations. This is a crisis with short time to act. We need to better communicate the crisis because what we have said so far does not work.

ACTIONS:
i) Write and publish a peer-reviewed paper for both the zoo and non-zoo community on the topic of the need to shift the zoo paradigms to focus more cooperative conservation efforts.
   WHO: L. Dickie
   WHEN: TBD

OBJECTIVE 8b: Convince the directors of the zoo and aquarium community that they need to take responsibility for maintaining zoo populations. Directors need to recognize this and take responsibility to change things – to improve zoos success with conservation.

ACTIONS:

i) Identify a leadership group of directors and managers to take the lead in communicating this responsibility.

ii) Focus on and collaborate only with other conservation-minded zoos.

iii) Help identify what zoo directors need to take responsibility for.

OBJECTIVE 8c: Define what would zoos look like (to public? Peers? Authorities?) if zoos really were affective conservation organizations and had sustainable/viable populations that are managed as part of a broader species conservation plan that support wild populations and habitats

ACTION:

i) Develop a conservation assessment tool to evaluate zoo's real contribution to *ex situ* population management conservation.

Intensively Managed Populations for Conservation Workshop

San Diego, CA, US
6 – 9 December 2010

SECTION 5

Assessment and Prioritization Working Group Report

Working Group: Assessment and Prioritization

Members: Sarah Christie; Nancy Clum; Nate Flesness; Kevin Johnson; Kristin Leus; Andy Odum; Paul Pearce-Kelly; Kate Rodriguez-Clark

FOCUS: The focus of this group was to discuss ideas for a tool that could be used at a general level to assess all species for their recommended conservation actions and then prioritize species for attention. The process and tool should:

- Be flexible – allow setting different priorities within scale, geographic regions, species groups, etc.
- Allow users to set their own weightings, specific to their use.
- Be transparent – the process and all data should be freely available to everyone.
- Be objective and repeatable.
- Allow for species data to be fed into it, and produce detailed and complete output of prioritized species lists.
- Should be able to be used with a set of species or all species in a country/region.
- Have credibility and buy-in from all appropriate stakeholders, such as the IUCN, *in situ* conservation committee, *ex situ* community, government wildlife agencies, etc.
- Be tested with real data, and published with concrete case study data.
- Be user-friendly, intuitive, and able to be used by any group, with or without a facilitator.
- Be linked to IUCN Red List.
- Have broad acceptance so there is a wider scope than simply *ex situ* management or not.
- Include multiple actions or outcomes, one of which is *ex situ* conservation, e.g., include research, habitat restoration.
- Be used proactively – the process tool should be used by the conservation community **before** they take any action.

Some stakeholder groups that might use this process and tool include: IUCN SSC specialist groups (as both producers and consumers of the tool) and governments or other stakeholders that work in a specific geographic region. It was noted that Population and Habitat Viability Assessments (PHVAs) are likely to be a critical element after using the tool.

GOAL: Every species needs to be assessed for its full range of conservation needs, and this should be periodically updated. Where conservation management is deemed appropriate, these management actions should be prioritized both within and between species, accordingly. Assessments should work with and expand on existing assessment processes.

CHALLENGE 1: A unified approach has not been identified for assessment and prioritization.

a) WHY DOES THE PROBLEM OCCUR?
We have not identified a unified approach for assessment because the process is complex, there are a number of very different approaches already in use, there is insufficient awareness of the real need for standardized assessment, and there is insufficient communication or cooperation amongst the relevant people who could develop this approach.

b) WHAT ARE THE CONSEQUENCES?
The lack of a standardized approach to general conservation needs assessment and priority-setting results in lack of unified conservation efforts, inappropriate allocation of resources, and avoidable declines or extinctions.

c) OBJECTIVES:

OBJECTIVE 1: The *ex situ* conservation community should identify and lead a collaborative effort to develop an assessment and prioritization process. A team should be developed that includes representatives and key players from different user groups (e.g., developers of existing processes and tools, science community, zoos, wildlife managers, curators, etc.), to ensure buy-in from the beginning (liaise with M. Stanley Price, Chair of IUCN Species Conservation Planning sub-committee).

ACTIONS:

i) Identify initial team members based on tool developers. Working group to contribute suggested additional members.
WHO: All working group members
WHEN: Notify K. Johnson of suggestions by mid-February 2011

ii) Identify team leader and possible funding opportunities for that role.
WHO: All working group members
WHEN: End of March 2011

iii) Liaise with the Tool Development Working Group of the IUCN Species Conservation Planning sub-committee.
WHO: K. Johnson, with C. Lees and R. Lacy
WHEN: Circulate to WG in Dec 2010; send to IUCN SCP sub-committee by 1 January 2011.
UPDATE: Presented to IUCN SCP sub-committee March 2011; WG will collaborate with current SSC initiative to look at prioritization issues.

iv) Test existing tools with a wide range of other taxa (Felid Specialist Group, freshwater fish, etc.) and scopes (ecosystems, etc.).
WHO: Working group members and collaborators
WHEN: 2012?

v) Communicate and publish findings.
WHO: Working group members and collaborators
WHEN: 2013?

vi) Make recommendations on further adaptation of existing tools and/or development of new tools.
WHO: Working group members and collaborators
WHEN: 2013?

vii) Facilitate implementation of the new tool.

<u>CHALLENGE 2</u>: Data are deficient and/or not available for assessment and prioritization.

a. WHY DOES THE PROBLEM OCCUR?
We have insufficient data to carry out assessments due to insufficient research, lack of training or techniques, intellectual property, or data that remain unpublished.

b. WHAT ARE THE CONSEQUENCES?
This causes incomplete assessments, lack of ability to prioritize, and leads to further declines and extinctions.

c. OBJECTIVES:

<u>OBJECTIVE 2a</u>: Devise a process to ensure unpublished data are included in assessment and prioritization.

ACTION:

i) Ensure that process for assessment and prioritization includes mechanisms to build trust so that existing research results are shared.
WHO: Working group members and collaborators?
WHEN: 2012?

<u>OBJECTIVE 2b</u>: Increase properly-conducted field research in areas that are essential for assessment and prioritization.

ACTIONS

i) Ensure that assessment process includes explicit description of research needs.
WHO: Working group members and collaborators?
WHEN: 2012?

ii) Ensure that process for assessment and prioritization includes guidelines for conducting effective research, as well as information about existing resources on how to conduct effective research (design, funding, execution, results communication).
WHO: Working group members and collaborators?
WHEN: 2012?

<u>CHALLENGE 3</u>: Scope of the assessment and prioritization problem is very large

a. WHY DOES THE PROBLEM OCCUR?
The scope of the assessment and prioritization task is enormous because the ongoing extinction crisis is not being adequately addressed by other methods and requires a rapid and iterative assessment of a huge number of taxa. The assessment process and tool need to be developed relatively quickly, so that species assessment work can begin. The actual assessment process needs to be designed in such a way assessments for groups of species (e.g. Orders or Families, or all species in a given region) can be undertaken relatively quickly.

b. WHAT ARE THE CONSEQUENCES?
This results in a complicated technical task, dilution of effort, and intellectual paralysis.

c. OBJECTIVE 3: The approach and tool that is developed must be adequately and repeatedly assess a large number of taxa in a streamlined and effective process that can be carried out in a short amount of time (e.g., in a workshop situation)**.**

ACTION:

i) Test approach and tool in situations with a large number of taxa and work specifically to reduce the amount of time the process takes per taxon.
WHO: Working group members and collaborators?
WHEN: 2012?

CHALLENGE 4: The amount of resources needed to carry out the assessment and prioritization is large.

a. WHY DOES THE PROBLEM OCCUR?
There is a lack of resources (both monetary and human) for assessment and priority setting for population management, because there is a lack of funding sources for biodiversity conservation in general, and those funds that are available are focused on implementation rather than assessment. Funds that are available for assessment do not focus on population management because the conservation community does not sufficiently appreciate the scope and significance of the issue. This also leads to the community not requesting sufficient funding.

b. WHAT ARE THE CONSEQUENCES?
All of this results in a lack of long-term strategic approaches to species conservation and a lack of credibility; this sets up a vicious cycle of lack of resources, insufficient action, a lack of credibility and ultimately, failure.

c. OBJECTIVES:

OBJECTIVE 4a: Increase funds available for assessment and prioritization.

ACTIONS:

i) Educate the public and decision-makers about the importance of assessment and prioritization.
ii) Educate existing conservation donors about the importance of assessment and prioritization.

OBJECTIVE 4b: Increase requests for existing funds for assessment and prioritization.

ACTIONS:

i) Identify existing funding sources for assessment and prioritization.
iii) Make information about how to apply for existing funds easily available to users as part of the standardized assessment & prioritization process.

<u>CHALLENGE 5</u>: Integration with similar assessment and prioritization tools (e.g., Red List and action planning process) is not occurring or is insufficient.

a. WHY DOES THE PROBLEM OCCUR?
There is insufficient integration of emerging and existing assessment and prioritization tools because of lack of confidence in evolving approaches and lack of understanding of the development history of existing ones, perceived territoriality, and prejudice against particular conservation management interventions.

b. WHAT ARE THE CONSEQUENCES?
This leads to failures in communication and collaboration, lack of engagement, duplication of existing efforts, and increased cost.

c. OBJECTIVES:

<u>OBJECTIVE 5a</u>: Seek participation from the IUCN Species Conservation Planning sub-committee**.**

ACTIONS:

i) Prepare a short summary of our intention and work approach for C. Lees to take to IUCN Species Conservation Planning (SCP) sub-committee.
WHO: K. Johnson, with C. Lees and R. Lacy
WHEN: Circulate to WG in Dec 2010; send to IUCN SCP sub-committee by 1 January 2011.
UPDATE: Presented to IUCN SCP sub-committee March 2011; WG will collaborate with current SSC initiative to look at prioritization issues.

<u>OBJECTIVE 5b</u>: Search for existing approaches and tools.

ACTIONS:

i) Carry out exhaustive research into existing approaches (and core developers) and identify those that are worth further investigation and testing, e.g. Amphibian Ark tool, WCS, Queensland government tool, etc.).
UPDATE: Workshop planned for October 2011 to discuss priority-setting for conservation.

ii) Circulate CBSG Abruzzo tool table to working group.
WHO: K. Leus
WHEN: 17 December 2010

iii) Conduct literature research on any existing species assessment and/or prioritization processes and tools.
WHO: K. Rodriguez-Clark, S. Christie (IOZ people) and all working group members (cc: any requests to KRC). Send results (including possible team members) to K. Johnson for compilation. Ask for feedback from all workshop participants.
WHEN: 1 March 2011
UPDATE: In progress (K. Rodriguez-Clark)

CHALLENGE 6: There is resistance to triage of threatened species.

a. WHY DOES THE PROBLEM OCCUR?
There is resistance to triage of threatened species for a variety of potentially legitimate ethical and practical reasons. Some feel that all species are equally important, and that triage implies somehow that some species are more worth saving than others. Others feel that conservation is conducted fundamentally as a result of emotional motivations, and that practically speaking, trying to redirect such motivation using a logic-based system will ultimately be fruitless. Another practical argument against prioritization is that it presumes that resources are limited, and are available in a zero-sum manner (more funding for one species means less for another).

b. WHAT ARE THE CONSEQUENCES?
(We suspect that) A greater total number of species will move into higher categories of threat (and ultimately extinction) under current conditions than would do so if an effective process for species assessment and prioritization were in place. This is based largely on analogy with observations of other complex problem-solving situations (i.e., saving human lives in emergency conditions, saving corporate profits in adverse economic conditions, etc.) since data in a conservation context are less available.

c. OBJECTIVES:

OBJECTIVE 6a: Openly acknowledge ethical objections to species triage, being clear about the ultimate goal (the greatest number of total species being in the lowest categories of threat possible).

ACTIONS:

i) Include experts in bioethics and participants with a variety of viewpoints on such ethical problems in the development of the process/tool.

ii) Clearly present the variety of ethical positions in documentation about the process/tool, including analogies from other spheres of human activity (i.e., emergency health, economics) in which assessment and priority-setting have been determined to be acceptable.

OBJECTIVE 6b: Reduce practical objections to species triage.

ACTIONS:

i) Identify and enumerate practical objections in addition to those outlined above.

ii) Seek out existing evidence to the contrary

iii) Where evidence doesn't exist, conduct studies to generate new evidence.

<u>CHALLENGE 7</u>: The process and tool, once developed, should be available in multiple languages, to facilitate use of the tool in a wide range of regions and countries.

a. WHY DOES THE PROBLEM OCCUR?
   To be as effective as possible, a species assessment and prioritization process should be available in local languages.

b. WHAT ARE THE CONSEQUENCES?
   If the process and tool are not available in the local language of the countries that plan to use it, there could be misinterpretation of the process and/or specific questions within the process, and this could lead to inaccurate results. The overall assessment therefore, might not be as accurate as it might otherwise have been.

c. OBJECTIVES:

   <u>OBJECTIVE 7</u>: Ensure that the process and tool, once developed, are available in a multitude of languages. Initially, English, Spanish, Chinese, and Japanese would be recommended, with help being sought to make other language versions available.

   ACTIONS:
   i) Include speakers of target languages in process and tool development.

   ii) Produce translations of process materials into multiple languages.

<u>CHALLENGE 8</u>: Ensure that there are sufficient people available to use the process and the tool. It is important to ensure that there are a number of people who have a thorough understanding of the process and the tool, so that any ambiguities that may arise when the tool is being used can be resolved.

a. WHY DOES THE PROBLEM OCCUR?
   An assessment may be carried out by a group of people who do not have a thorough knowledge of the process, or sufficient understanding of the implications of inaccurate input due to a misinterpretation of the process.

b. WHAT ARE THE CONSEQUENCES?
   The absence of one or more people with a thorough understanding of the process and tool during an assessment and prioritization workshop can lead to inaccurate in insufficient data being collected during the assessment process. This can lead to ineffective results and inappropriate conservation actions being recommended as a result of the assessment.

c. OBJECTIVES:

   <u>OBJECTIVE 8</u>: Ensure that sufficient people have a thorough understanding of the assessment and prioritization process and tool.

ACTIONS:

i) Include a wide-range of current and potential stakeholders during the design and implementation process for the assessment tool.
ii) Ensure that very thorough documentation is always available for anyone who may make use of the assessment and prioritization process and tool. This documentation should not only include detailed information and examples about what data should be included during the assessment process, but it should also include examples of data that should not be included, or how particular aspects of the assessment process might be misinterpreted.

<u>CHALLENGE 9</u>: Ensure that when an assessment and prioritization is being undertaken, there are sufficient stakeholders present during the assessment who have the data and knowledge to feed into the tool.

a. WHY DOES THE PROBLEM OCCUR?
The most knowledgeable experts for a particular group of species may not have been present when an assessment of a group of species for their recommended conservation needs is carried out.

b. WHAT ARE THE CONSEQUENCES?
The consequences of this can be dire! If insufficient knowledge is available during a conservation needs assessment, the results and outcomes will not be as thorough as they could have been. This will lead to less meaningful or inaccurate conservation outcomes being recommended, and a lack of trust in the outcomes from the assessment.

c. OBJECTIVES:

<u>OBJECTIVE 9</u>: Encourage groups who plan to use the assessment process and tool to be sure they assemble to most appropriate expertise in the species being assessed, before they carry out the assessment.

ACTIONS:

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i) Ensure that documentation about the process and tool stresses the importance of including such groups, as it has proven to be one of the biggest failings of similar, existing assessments.
ii) Ensure that documentation about the process and tool includes a list of effective strategies for ensuring participation, and multiple concrete examples of how such participation was achieved.
iii) Ensure that funders of assessment and prioritization require evidence of broad participation before proposals are funded, by providing recommendations to funders as well.

<u>CHALLENGE 10</u>: Training in the use of the process/ tool will be needed, and this will need to be tailored to different user groups.

a. WHY DOES THE PROBLEM OCCUR?
Human nature is such that any new complex task that requires multiple user groups to work together with multiple data streams will require practice to work effectively, and experience with very similar processes, such as species Red Listing, suggests that species needs assessment and prioritization will be no different.

b. WHAT ARE THE CONSEQUENCES?
The species needs assessment and prioritization process/tool will be ineffective if it is developed assuming that participants will automatically know how to implement them and will do it well.

c. OBJECTIVES:

<u>OBJECTIVE 10</u>: Incorporate training in all aspects of process/tool development and provide training as a part of process/tool implementation.

ACTIONS:

i) Include those with experience in training in process/tool working group development and testing.

ii) Collaborate with related existing training efforts (i.e., in Red Listing and PHVA, in academic departments, in government agencies, etc.) so that training in species needs assessment and priority-setting is offered through existing structures and contexts, and thus strengthens training in the entire sequence of risk assessment, needs assessment and priority setting, detailed action planning, action implementation, and monitoring.

<u>CHALLENGE 11</u>: Process follow-up. Once a group of species has been assessed and prioritized, even if these are done well, there will be no conservation benefit unless priorities are actually put into action, and conservation benefits will remain unknown unless actions are monitored through time.

a. WHY DOES THE PROBLEM OCCUR?
As difficult as it is to develop assessment and prioritization tools, ensuring their implementation and monitoring is even more difficult, since they are even more costly, time-consuming, and complex. Also, those involved in needs assessment and priority setting frequently view implementation and monitoring as “someone else’s” responsibility without identifying concretely who specifically that someone else is. Furthermore, conservation actions may take place in multiple locations and scales, and be performed by people for whom reporting and monitoring are challenges.

b. WHAT ARE THE CONSEQUENCES?
The result of a lack of follow-up means that avoidable increases in threat and extinctions will occur, and even if they don’t but achieved benefits are undocumented, it will be difficult to justify the continued investment of effort/expense in needs assessment and priority-setting in the future.

c. OBJECTIVE 11: Follow-up on action planning, implementation and monitoring.

ACTIONS:

i) Make the identification of possible implementers/monitors an explicit part of the process/tool.

ii) Ensure that the process/tool provides an explicit means of reporting ongoing actions and their consequences, in a standardized manner.

iii) Encourage funders to prefer implementers taking action in the context of a formal needs assessment and prioritization process.

iv) Provide explicit guidance on how to implement priorities effectively, once they are decided upon, by linking to existing detailed conservation planning processes (i.e., PHVA).

v) Provide explicit guidance on how to monitor conservation implementation effectively, once it commences

OTHER DISCUSSION POINTS

- Noted that the IUCN has requested zoos and aquariums to take a lead role in species-level conservation.
- We need to ensure that the process and tool can be applied at different geographic scales and will assess conservation needs within which, taxa in need of population management of high and low intensity are identified and prioritized.
- We need to provide guidelines for specific user groups in how to use the tool and to progress with their own conservation actions based on the output from the tool.
- Rapid assessment of conservation needs and population management needs is an essential component of this process and tool.
- Noted that conflicting priorities/agendas of the stakeholders, and limitation of resources (time/funds, etc.) will more than likely lead to slow and ineffective development of a tool and process. This could be resolved if dedicated resources were applied to the task.

Intensively Managed Populations for Conservation Workshop

San Diego, CA, US
6 – 9 December 2010

SECTION 6

Program Design
Working Group Report

Working Group: Program Design

Members: Nate Flesness; Lisa Faust (presenter); William van Lint (reporter); Sarah Long (facilitator); Danny de Man; Leonel Ovalle; Ollie Ryder; Kevin Zippel; additional participants for the initial discussion were: Candice Dorsey; Lewis Green; Jamie Ivy; Steve Monfort; Kathy Traylor-Holzer; and Dave Wildt.

FOCUS: This working group discussed how to improve the long-term sustainability of intensively managed populations (IMPs), based heavily on the experiences of the regional zoo associations present in the group (primarily EAZA and AZA). The main focus was on management plans, approaches and structures (what we are doing) and capacity (resources, science and space) required to achieve this.

This group originally met to discuss four goals identified in the plenary session related to the development and implementation of population management plans. The results of this discussion are outlined below (Initial Discussion). Subsequently this working group modified its focus and membership (as indicated above) for the discussion and recommendations in the second section of this report (Focused Discussion).

INITIAL DISCUSSION: Elements of a Management Program

GOAL 1: All intensively managed populations need to have a clearly defined role.

CHALLENGES:

1. The (level of) threats for wild populations are currently assessed following objective and consistent guidelines by IUCN (Red List). Conservation actions (and whether there is need for IMPs and in what form) are currently not assessed according to such objective and consistent guidelines.
2. Conservation roles are not currently determined for specific taxa/IMPs .
3. Those individuals who assign population management roles in the zoo community (Taxon Advisory Group (TAG) chairs) do not necessarily have the right skill set to define and assign these roles. The roles should be based on the specific threats and, as with the threat status (Red List), should therefore be designated by field experts.
4. There are differences among zoo regions and we will need to remember that in some regions there are no TAGs or similar structures in place yet (so no assessment and role assignment).
5. Who defines the roles? This should be done jointly between field experts (who understand threats and requisite mitigation actions) and conservation practitioners with resources to take those actions.
6. How to define the role?

GOAL 2: Each species has a precise and appropriate management plan that includes management strategies and other activities necessary to achieve its defined role.

CHALLENGES:

1. Lack of skilled people (skills/training + motivation + empowered)
2. Lack of motivated people
3. Lack of empowerment/mandate
4. Lack of time
5. Lack of funding
6. Lack of process
7. Lack of data (lack of sample size, lack of appropriate husbandry practices, etc.)

8. Lack of planning
9. Impatience
10. Lack of organization
11. Legal restrictions
12. Lack of (real) institutional support
13. Lack of population management tools/science
14. Lack of communication/integration (sharing plans)
15. Lack of understanding at all levels
16. Lack of space
17. Lack of infrastructure
18. Language barriers
19. Discussions related to conflicts between population management decisions versus individual welfare issues.

GOAL 3: Each program has adequate resources to implement the established management plan to meet its defined role(s).

CHALLENGES:

1. There is overlap with the challenges from the previous goal (see above).
2. Lack of founders
3. Lack of breeding
4. Lack of husbandry/behavioral expertise
5. Lack of facilities and spaces
6. Competing species or programs
7. Lack of focus of programme leader and/or participants to make the programme a success
8. Lack of understanding or knowledge at government level, welfare NGOs, zoo directors, etc.
9. Lack of (long term) commitment
10. Lack of priority/value (government, zoos, director/curator/keepers)
11. Lack of connection/integration of program components or stakeholders
12. Surplus animals (including possibilities to euthanize and/or breed and cull), lack of space
13. Regulatory restrictions preventing implementation

GOAL 4: Each program is evaluated regularly and revised as necessary to determine if the plan is meeting its defined role(s).

CHALLENGES:

1. Non-existent role, plan, process, etc.
2. Determination of metrics
3. Unclear/moving (dynamic) timeframes (e.g., 90% of GD for 100 years vs. 200 years)
4. Apathy
5. No accountability (including no repercussions if you are failing) or visibility to others
6. Too intangible/lofty/distant/ (e.g., 100 years), less relevant
7. Too depressing
8. Lack of objective/outside evaluation (objective evaluation by a group of people not directly involved or who do not have a stake in the outcome)
9. Unclear corrective actions
10. Lack of resources (time, people, money)
11. Lack of authority/unclear who has authority/lack of enforcement to make changes
12. Difficulty in getting feedback from participants
13. Considered as less relevant

Group restructuring. For the next working session it was decided to change the focus of the working group, as it was felt that the main issue – improving our current programs – might not receive enough attention/focus if all of the goals and challenges were addressed. The group felt that if the current issues of concern for our breeding programs could be solved, this would probably mean that all other concepts, such as short-term holding but no breeding, could be dealt with. This also allowed the group to focus more on its core expertise, current challenges, and aspects that we as the zoo world have under control. However, the group acknowledged that this is just one component of the whole IMP spectrum.

The group decided to 'park' the first goal of 'All intensively managed populations need to have a clearly defined role'. This topic was being discussed to a minor extent by the Prioritization Working Group. The group also felt that there are different tools available already to determine roles (e.g., Amphibian Ark (AArk) tool, AZA processes) and as such this discussion topic had a lower priority given the limited time for discussion. It was also decided to 'park' Goal 4 – ' Each program is evaluated regularly to determine if the plan is meeting its defined role(s) and is revised as necessary' given time constraints, although it was recognized that lack of evaluation and accountability make be significant causes of lack of progress.

The main focus of the working group for the remainder of the workshop was Goal 2 ('Each species has a precise and appropriate management plan, that includes management and other activities necessary to achieve its defined role(s)') and Goal 3 ('Each program has adequate resources to implement the established management plan to meet its defined role(s)'). This provided the possibility to brainstorm about new tools/ solutions to solve the current challenges (as documented in our previous working group session). However, as the main focus would be on the current concept within a zoo environment, a part of the group felt that the link was missing to a more metapopulation approach, utilizing connections among populations along a management continuum, including those in the wild. A subset of participants split off to form a second group (Conserving Species Across a Management Continuum Working Group) to discuss issues related to the management of interacting populations (see Section 7).

FOCUSED DISCUSSION: Improving Viability of IMP Zoo Programs

<u>GOAL</u>: Improve the viability and success of long-term Intensively Managed Population programs. Toward this end, each species should have a precise and appropriate management plan, which includes management, adequate resources and other activities necessary to achieve its defined role(s).

<u>CHALLENGE</u>: Measuring (the need for), and where appropriate improving, the (self) sustainability of regionally (and globally) intensively managed *ex situ* populations, by defining program goals and establishing appropriate management plans for each programme.

a) WHY DOES THE PROBLEM OCCUR?
   i) The majority of breeding programs do not have a defined role or goal, so it is impossible to evaluate each individual programme against its own goals.
   ii) The majority of breeding programs do not have an appropriate management plan.
   iii) Evaluation of demographic and genetic self-sustainability of regional programs concluded that populations are not self-sustainable because of low number of animals, negative growth rate (lack of breeding), too small founder base, high percentage of pedigrees unknown.
   iv) Lack of resources to address the challenge and manage programs more (self) sustainably.

b) WHAT ARE THE CONSEQUENCES?
   i) Less healthy populations and increased risk of losing species, regionally or globally.
   ii) Not possible to evaluate ex situ conservation achievements, potential not used to its full extent and risk of species extinction.
   iii) Losing credibility toward authorities, conservationist and general public.

c) OBJECTIVES:

OBJECTIVE 1a: Improve collection planning on a global and regional level. The regions need improved communication and better processes for working together/ensuring that regional priorities are clear. They also need help in making tough decisions within their Regional Collection Plans (RCPs); this will mean that RCPs then allocate sufficient space to meet IMP goals (or limit their efforts to species and populations for which there is sufficient space and resources to manage sustainably) and that IMP viability and success will be improved.

Allocate/reallocate resources (globally, regionally, within zoos). Assess current species, add/subtract based on priorities, define roles, evaluation of everything (sources, effects on accreditation, carrots/sticks), accountability (bench mark system, 5% free to do what you want as institution, the other species have to be globally managed, regionally or nationally relevant).

ACTIONS:

Regional collection planning:

i) Work on prioritization, selection of species, statement of species roles, etc. on all levels (WAZA global, regional level, within zoos); global collection planning (create process – Workshop on ISB). If appropriate based on the agenda for the meeting, a regional representative of all regions should attend the upcoming WAZA 'future of international studbooks' meeting to discuss and develop an approach for global collection planning.
   WHO: Regional and CPM representatives – administrative, population biology person(s)
   WHEN: To be initiated in April 2011
   UPDATE: WAZA workshop held in April 2011 in Gland, attended by representatives from WAZA, AMACZOOA, AZA, EAZA, JAZA, PAAZAB, ZAA, ZOO, CBSG and ISIS. Species selection criteria and candidate species for GSMPs were discussed.

ii) Assess RCPs and current programs to identify current overlap (among regional associations) and evaluate their RCP status; select TAGs (e.g., Felid TAGs) as examples.
   WHO: Danny de Man
   WHEN: April 2011

iii) Within existing programs (RCPs + zoo collection planning), reallocate space and reduce number of species (and number of individuals of low priority species) to make sure highest priority programs meet goals – create appropriate targets + select appropriate species.

Objective review of RCPs (include assessment of feasibility in RCP process), create process – force people to make choices.
   WHO: Regional associations
   WHEN: 2011-2012

iv) Evaluate whether the Amphibian Ark feasibility tool will work for regional associations' evaluation of RCPs and/or develop a feasibility tool for RCPs. A draft is available from AArk.
WHO: Regional associations initially, then jointly share experiences
WHEN: September 2011 (CBSG meeting in Prague?)

v) Integrate a potential feasibility tool in the regional zoo associations' handbooks, guidelines and templates (when relevant).
WHO/WHEN: To be determined after feasibility tool is available.

vi) Integrate the evaluation of TAGs into the new handbooks that AZA is developing and/or the EEP manual EAZA is working on.
WHO: AZA (C. Dorsey, S. Long), EAZA (D. de Man, W. van Lint)
WHEN: AZA- December 2010 and/or during rewriting in 2011, EAZA- September 2011

vii) Identify species role for each population, and compare assessment for a species across regions; define possible roles and encourage inclusion of programs that have multiple roles
WHO: TAGs encouraged by their regional associations
WHEN: Ongoing

viii) Develop tool/database where all RCP information can be seen across TAGs (and across regions?) so that institutions for their Institutional Collection Plan can easily identify the targets (without looking at all different RCPs).

Institutional collection planning:

i) Create tool for Institutional collecting planning (to make sure this happens more consistent).
WHO: Regions to produce guidance for institutional collection planning and enforce setting up and implement institutional collection plans (based on RCPs).
WHEN: 2011-2012

Space:

i) Explore different types of space (breeding centers, etc.) to create more successful managed programs.

ii) Space surveys to make it more concrete – to set target population (supplement in ZIMS).

iii) Assess global holding capacity for each species, develop a single survey of institutional space – 1 survey across all taxa – so that RCPs can accurately assess how many programs they can work with (census of exhibits/enclosures in ZIMS?); As a first stab, use report in PMCTrack that aggregates wants/needs information for managed programs; ISIS could potentially produce a report that is numbers of individuals across institutions across taxonomic groups

iv) Brainstorm about Super TAG concept (Carnivore TAG – as species between the different TAGs are competing for space).

v) Develop new incentives/accountabilities for improving our RCP decision making.
- Need to develop carrots/sticks to force people to make decisions to eliminate non viable or low priority programs.

- Need to develop an accountability and reward system for institutional participation in terms of what proportion of institutional collection is devoted to target IMPs
- Help zoos improve institutional planning process to better understand how they plan, make it more consistent year to year – this is a key step that we need to understand.

Surplus animal management:

i) Deal with surplus animal management (Improve demographic management or modelling? Examine and educate about the use of euthanasia and/or breed and cull strategies).

Capacity building in other regions:

i) Explore ability of other regions to build structures (IMPs) and expand space (added space gives us on global level more possibilities for collection planning).
   WHO: WAZA (CPM) and CBSG
   WHEN: Ongoing
   UPDATE: Studbook training scheduled in Indonesia in Oct 2011; PMx training to be conducted for CAZG in Nov 2011 and for JAZA in Feb 2012.

ii) Approach regional zoo associations about recruiting additional staff members and/or training a member of staff who can guide/evaluate RCPs, assist TAGs in development, etc.

OBJECTIVE 1b: Create better/stronger program leadership (relevant aspects are selection process, training opportunities, accountability and authorization).
(*) program leader means coordinator or studbook keeper of a managed program

Shift paradigm to make it clear that participants are also responsible for program's success, not just the leaders – population management is a joint responsibility. Increase accountability of all key stakeholders involved in the program (see Shifting Paradigm working group).

ACTIONS:

Selection process:

i) Create a program leader checklist for each region so that project leaders understand what is expected and the zoo associations can hold them accountable.
   WHO: Regional associations

Training opportunities:

i) Compare current coursework for training of program leaders and evaluate how easily those courses could be adapted for quickly posted online training. Training is needed in:
   a. Program leader skills – based on a list of what makes a good program leader (communication, basic population biology concepts, organizational/operational processes, software).
   b. Institutional collection planning, how it can contribute better to prioritized IMPs.
      WHO: EAZA and AZA course leaders (D. de Man, W. van Lint, S. Long, L. Faust)

ii) Translate the training material in other languages (when relevant).
   WHO: Specific to training efforts
   WHEN: As needed
   UDPATES: PMx software now translated into Japanese and Chinese (Mandarin); translation of PMx manual into these languages is underway, to be completed in 2011.

iii) Develop a formal mentoring system for a project leader. Studbook and mentoring guidelines have been developed for the WAZA CPM that can help guide this effort.
WHO: K. Traylor-Holzer to draft for consideration by CPM and regional associations
WHEN: Late 2011

iv) Connect program leaders working on the same species in the various regions; EAZA, AZA and other regional zoo associations should merge their contact lists and share contact information with the project leaders/coordinators, and when any new program leaders are added they should automatically be put in contact.
WHO: K. Traylor-Holzer to bring to WAZA CPM for discussion; will integrate into Managed Program database portal site.
WHEN: 2011
UPDATE: Alternative method of distribution may be preferable; regions are discussing.

v) EAZA and AZA will discuss allowing restricted access between their respective members to member-specific areas of their websites to encourage information sharing; explore expanding to all regions. Regional associations need to discuss what information is OK to share (contact information, plans, documents?).

Accountability and authorization

i) Associations need to develop or enforce policies that evaluate whether the program is helping the population to meet its targets (accountability deadlines and sustainability targets/roles), and to develop/enforce policies that empower program leaders and the managed programs (backing up the program leader when institutions disagree with recommendations and management and are disrupting the program).

Share EEP evaluation tools (EAZA) with other regions, and other regions can consider adopting them.
WHO: EAZA (D. de Man/W. van Lint) will send to AZA (C. Dorsey/S. Long) and other regions
WHEN: before 28 February 2011

OBJECTIVE 1c: Evaluate current status and identify challenges for individual species programs; determine what is hindering population viability and program success (e.g., husbandry, space, communication).

ACTIONS:

i) Take the Population Management Center's (PMC's) quick assessment tool for Population Management Plans (PMPs) and evaluate whether the tool needs additional questions (check AArk assessment tool) to categorize current status; develop assessment tool online that will shows programs current status and can be continually used; check with K. Johnson, who developed this for Amphibian Ark.
WHO: AZA, K. Schad and small working group
WHEN: TBD

ii) Evaluate all species management programs with this tool.
WHO: To be determined once the tool is available.
WHEN: To be determined once the tool is available.

iii) Explore other means of evaluation (PVA-like approach).
WHO: L. Faust to conduct PVAs for AZA managed populations; K. Traylor-Holzer to explore PVA options with current software
WHEN: 2012
UPDATE: Grant submitted by L. Faust for AZA population assessments, K. Traylor-Holzer developing Vortex PVA model for tiger ex situ populations.

iv) Approach WAZA to develop a Population Management Advisory Group under the umbrella of CPM or develop at least the infrastructure, and hold a meeting of this group in the next year.
WHO: K. Traylor-Holzer and N. Flesness to take to CPM for discussion
WHEN: April 2011
UPDATE: Discussed at the April 2011 CPM meeting; given recent expansion of CPM to include additional corresponding members with technical expertise, this discussion is premature and has been postponed for future consideration.

OBJECTIVE 1d: Ensure adequate founder bases for managed programs (both starting and existing populations); founder base needs may depend on program goals.

ACTIONS:
i) Set recommended minimum for number of founders for all new programs (required for official program status and use of resources).

ii) Assess founder base of existing programs and use this information in the prioritization process (for program status and phase out, for use of resources, etc.).

iii) Assess the ability to find new founders (if available); make use of confiscated/surplus animals in other regions (e.g., Andean bear is regularly offered to zoos in range countries).
WHO: Program leader/coordinator and/or relevant TAG
WHEN: Ongoing

iv) Deal with legislative issues; if an IMP is needed for conservation reasons, a solution could be to develop a program in country (facilities, knowledge, etc.).

v) Consider the founder base in program evaluation (green mark, red mark), including what is the current status and has the program made the efforts to get in new founders?

OBJECTIVE 1e: Develop process, resources and system to target and biobank potential founders and/or genetically valuable individuals.

ACTIONS:
i) Establish mechanism for banking samples from individuals from IMPs not already banked, working with the programs to identify the priority individuals for banking; develop a prioritization approach to determine which species are most important.
WHO: O. Ryder and program leader(s); OR will discuss with P. Boyle about AZA supporting this priority to bank samples.
WHEN: At this IMP workshop in San Diego (Dec 2010)

Intensively Managed Populations for Conservation Workshop

San Diego, CA, US
6 – 9 December 2010

SECTION 7

Management Continuum Working Group Report

Working Group: Conserving Species Across a Management Continuum

Members: Evan Blumer; Jamie Ivy; Caroline Lees; Steve Monfort; Peter Riger; Kathy Traylor-Holzer; Dan Wharton; David Wildt

FOCUS: This working group focused its discussions on the management of populations beyond the idea of a single, closed population managed at a level of high intensity, to consider a broader range of population management strategies along a management continuum, including the management of multiple, interacting populations.

Goal: To improve the success of species conservation programs by optimally utilizing populations along a management continuum.

MANAGING LONG-TERM POPULATIONS FOR CONSERVATION POTENTIAL

Given future uncertainty, every population that is expected to persist in captivity long term, should be managed in a way that confers the *potential* to contribute directly to conservation through reintroduction, supplementation and/or genetic exchange.

To do this we will need new, more conservation-relevant definitions of program success and a more sophisticated understanding of what makes a program successful. We will need to explore new approaches to running programs, such as centralizing expertise and productivity; and we will need new tools and new strategies to enable more effective connections among populations along the management continuum, in pursuit of thriving, responsive meta-populations.

WHY should we manage all long-term populations in this fashion?

- Because these long-term captive populations may become important in the future (if status in the wild changes).
- We have a stewardship mandate that requires us to provide optimal care not only for individuals but also for populations.
- There is a recognized need for populations in zoos to be sustainable. Properly directed, the management required for sustainability will also confer conservation value.

WHY should we NOT manage all long-term populations for potential conservation contribution?

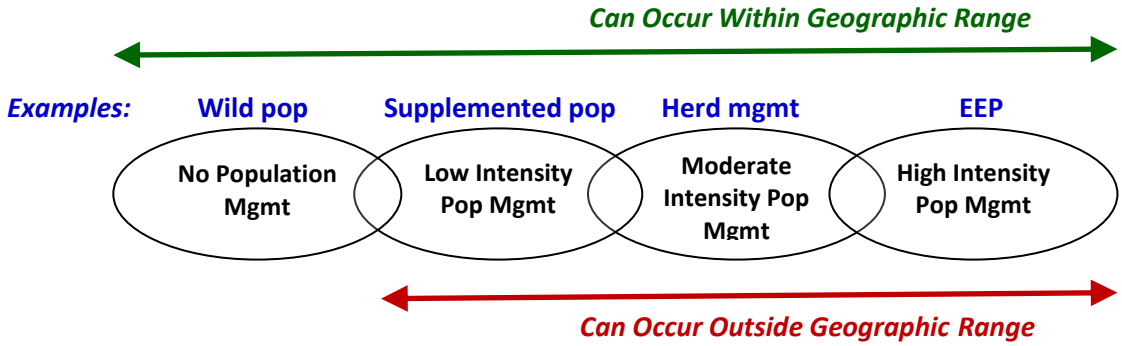
Many workshop participants disagreed with this recommendation. We need to explore why – is it philosophical? Is it resource-based? Most of the concern seemed to relate to resource issues (i.e., not enough resources available to manage all species well) – this can be dissected and addressed. It was noted that the term “intensive” management may be at the root of some of the concerns about the resources.

THE MANAGEMENT CONTINUUM

The working group discussed the general types of managed populations. Management may involve building a fence around a wild population and posting guards, or it may involve close manipulation of reproductive pairings and demographic rates at a site outside the species’ range. Management of populations must be guided by the role that the population is expected to play.

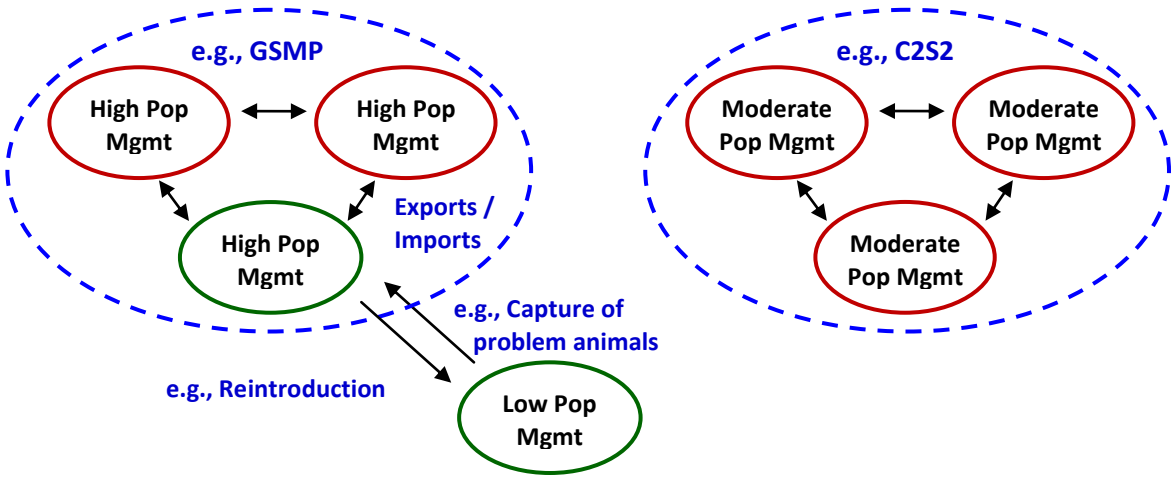
It was agreed that, in reality, management occurs across gradients of: management intensity; resources; expertise; and distance from natural range and/or conditions. We need to understand how to manage optimally across these gradients, and to change the position of populations on these gradients as the status of the species in the wild changes, as the status of source population(s) change, and as the status of the population itself changes.

Along this management continuum, some populations are highly managed (e.g., ASMP/EEP/SSP), some are moderately managed (e.g., herd management, group management, Free Range Enclosure management), and some are lightly managed (e.g., some supplemented or reintroduced populations) or even not managed at all (e.g., some wild populations). Some populations are located within the native range (along a continuum from *in situ* to *ex situ*), and some *ex situ* populations are also managed outside of the native range. The following diagram shows some examples (in blue) of different management intensity levels (remembering that this represents a continuum, not discrete categories). Essentially all levels of management can occur within the natural range of the species (indicated by green arrows), while by definition, *in situ* populations cannot occur out of the species' range and habitat (red arrows).



These populations can interact in a variety of ways. Some examples of these interactions include:

- Interactions among mostly high intensity populations (e.g., GSMP)
- Interactions among several moderately managed herds or groups (e.g., C2S2)
- Several interacting populations of various intensity levels (e.g., Tasmanian devil metapopulation)
- Range country *ex situ* population connections with out of range *ex situ* populations (exports/imports/genetic exchange)
- *Ex situ* populations to *in situ* population (e.g., reintroduction, supplementation)
- *In situ* population to *ex situ* populations (e.g., capture of problem animals, confiscations, rescue)



IMPROVING THE SUCCESS RATE OF INTENSIVELY MANAGED POPULATION (IMP) PROGRAMS

CHALLENGE 1: There are too few successful IMP programs.
Recent studies, including those presented during the workshop, indicate that relatively few zoo-based species programs are meeting established criteria for success.

a. WHY DOES THE PROBLEM OCCUR?
   Though studies have shed some light on this, there remains a lack of understanding of the factors that lead to a successful program. Further, our current definitions of success may be inadequate for what we want or need to achieve with these populations.

b. WHAT ARE THE CONSEQUENCES?
   Zoo-based IMPs are in decline and in some cases this decline is irrevocable. These populations will not be of ongoing value to conservation.

Studies have been carried out (for example in the Australasian region) indicating that a range of factors may be contributing to failure, including: inadequate husbandry expertise, inadequate within and between institution communication/cooperation, regulatory obstacles, inadequate targets for population size and annual demographic rates, ownership issues, inadequate facility design, access to founders, and so on. Further studies are needed to understand fully what measures would be effective in reversing current trends. Similar studies have been carried out for individual programs (e.g., tigers) and a new PMC initiative (PMCTrack) will enable electronic collection and analysis of program success data across North American programs.

The group discussed the difficulty of defining program success, due, in part, to the fact that most population management programs are necessarily long term and the status and threats to wild populations are constantly shifting. It may be unrealistic to define specific “final endpoints”, and perhaps better to recognize that program outcomes and expectations will have to be adjusted to the account for the changing relationships (i.e., threats, status, population size etc.) between wild animal populations and their captive counterparts.

Given this difficulty, the group agreed that it might be more useful to think in terms of whether programs are SUCCEEDING at achieving contemporary goals, rather than whether or not they will ultimately be SUCCESSFUL—something that can’t be defined in present terms.

The group also acknowledged that the some IMP programs have been quite effective (e.g., California condors, golden lion tamarins), and that examination of these programs may guide management directions and refinements to improve failing programs.

c. OBJECTIVES:

   OBJECTIVE 1a. Define what constitutes a successful program, going beyond traditional genetic and demographic milestones and including metrics that can be applied to populations along the management continuum. Establish benchmarks and factors for measuring progress toward program success or failure as related to species conservation. Examples of measures might include:
   - Status of wild populations (trend, size, genetic diversity, etc.) and the habitats they require for survival

- Status of IMP (GD retained, breeding rates, effective population size, demographic profile (relatively to representative wild profiles), mean inbreeding coefficients, etc.)
- Reduction of threats to wild population
- Capacity – increase in basic and applied science (training)
- Change in funding over time

ACTIONS:

i) Convene a discussion (virtual or email) to build definitions of success, appropriate measures and benchmarks. Formalize this as a CBSG and/or WAZA guideline, a published paper, or some other form of formal distribution and endorsement.
WHO: C. Lees, S. Monfort
WHEN: April-May 2011

ii) Incorporate input from program administering bodies (e.g., zoo associations and others) to ensure acceptance and implementation.
WHO: C. Lees, S. Monfort
WHEN: April-May 2011

OBJECTIVE 1b. Establish baselines (today), for all managed populations along the management continuum.
ACTION: *To be determined once the measures have been identified*

OBJECTIVE 1c. Identify factors and management commonalities leading to both the success and failure of IMP programs to help guide management refinements.

ACTION: Compile, review and summarize previous analyses of program success. Make all materials available on the IMP workspace on the CBSG member portal.
WHO: C. Lees
WHEN: By May 2011

OBJECTIVE 1d. Double the number of programs that are succeeding within the next 10 years (by 2020). This goal can only be outlined once we determine current successes.

EXPERIMENTING WITH NEW APPROACHES

CHALLENGE 2: Current approaches to managing IMPs are not working as evidenced by the low percentage of sustainable populations.

a. WHY DOES THE PROBLEM OCCUR?
   i) Current approaches entail behavioral/social elements, which may impact negatively on sustainability and reintroduction success.
   ii) Management decisions are often based on assumptions that are not science-based and/or have not been scientifically tested.
   iii) For some species there are too many zoos involved and their expertise and capacity are unequal. Trying to coordinate programs across these facilities is inefficient/ ineffective.
   iv) Management needs may vary across the stages and lifetime of each program and these are not regularly accommodated.

v) Programs are currently managed by a corps of volunteers, many of whom are not fully invested in decisions, or possibly not fully invested in the industry. Others may not have the authority within their own organization to prioritize and implement program objective. As volunteers, they also may not have adequate experience, expertise or time to devote to their programs.
vi) As the number of programs increases there will be insufficient numbers of program managers to effectively manage these programs.

b. WHAT ARE THE CONSEQUENCES?
Even where currently accepted approaches to running programs are being executed "successfully" they are not necessarily delivering the required results.

c. OBJECTIVES:

OBJECTIVE 2a. Explore and experiment with new/alternative approaches to intensive population management that have potential for increasing the effectiveness, efficiency and ultimately success of programs.

OBJECTIVE 2b. Create/emphasize regional centers of excellence where much of the propagation and research is accomplished for some species. The C2S2 group is exploring this idea, and a similar approach is underway for Tasmanian devils in the Australasian region.

OBJECTIVE 2c. Programs need to monitor benchmarks regularly and adjust levels of management intensity in response to changing program priorities as programs move through different stages over time.

For example, demographic growth may be a higher priority in the early stages of establishing an *ex situ* population, while genetic management may become the focus as the population reaches its target size, or behavioral traits may be important for programs preparing for reintroduction efforts (e.g., Chinese giant panda program).

CONNECTING POPULATIONS ACROSS THE MANAGEMENT CONTINUUM

CHALLENGE 3: Lack of good biological understanding or recommended process for optimally integrating intensive management of multiple populations as part of an effective meta-population strategy for retaining genetic diversity and meeting other IMP program goals.

a. WHY DOES THE PROBLEM OCCUR?
Past efforts to integrate multiple managed populations (either inter-regional *ex situ* programs and/or *in situ – ex situ* managed populations) have often worked in isolation with little overarching guidance and coordination. Exchanges of individuals between regional programs may focus on the short-term needs of these populations without adequate consideration of optimal long-term benefits or consequences. Administrative processes are being developed for inter-regional collaboration via WAZA's Global Species Management Plans (GSMPs), but little effort has gone into identifying the optimal strategy for exchanging individuals among populations with different degrees of relatedness (i.e., founders in common).

b. WHAT ARE THE CONSEQUENCES?
Lack of collaboration means that programs may waste time by 'reinventing the wheel' or are ineffective or do not attempt potentially beneficial meta-population management due to lack of guidance and coordination. Resources (e.g.,financial, time, political, etc.) may be inefficiently used by importing/exporting individuals that are less than optimal, and in some cases, could even be detrimental to the donor and/or recipient population. Overall species population viability is not optimized when programs fail to take full advantage of all available populations/individuals. For example, the intensive management of several smaller non-viable populations can provide the opportunity for creating a viable larger meta-population.

c. OBJECTIVE 3: Develop a good understanding of the primary considerations and optimal strategies for meta-population management, and provide tools and processes to guide IMP programs in developing meta-population management strategies.

ACTIONS:

i) Explore meta-population strategies through modeling, including those that link populations across the management continuum.
WHO: K. Traylor-Holzer, C. Lees and others
WHEN: Begin in 2011
UPDATE: C. Lees is writing a Ph.D. proposal focusing on managing populations across a continuum; work expected to begin in November 2011 (with Ian Jamieson).

ii) Disseminate resulting analyses and recommendations on metapopulation management strategies, including to relevant multi-population management entities (e.g., GSMPs).

CHALLENGE 4: *Ex situ* population management expertise and ongoing training and mentoring opportunities are lacking in the range countries of many threatened species. This limits the conservation potential of range country *ex situ* populations, which should form the cornerstone of population management efforts for a species.

a. WHY DOES THE PROBLEM OCCUR?
Population management expertise and capacity has developed unevenly across regions, due to differences among regions in financial (and other) resources, priorities, access to information/training, etc., as well as a lack of organized, well-funded programs/ mechanisms for knowledge transfer from zoological organizations to range countries. Language and cultural differences have also hindered sharing of expertise and effective capacity building efforts.

b. WHAT ARE THE CONSEQUENCES?
Many regions with high levels of biodiversity at risk and in need of intensive management are the same ones that lack expertise and capacity for IMP. Zoos and other *ex situ* facilities in range countries are likely to be the recipient of confiscated animals, captured problem animals, or otherwise sources of genetic lines that are unrelated to IMPs in other regions; this potential genetic source may be essentially lost without accurate records and intensive management on some level within the range country. Likewise, range countries are the appropriate location to explore a continuum of intensive management and related programs such as reintroduction, which is currently not being fully utilized. Development of IMPs in range countries may strengthen public awareness and political will to take responsibility for the conservation of its native species.

c. OBJECTIVE 4. Where possible and appropriate, management programs for species should include capacity building in the range country to support its ability to contribute to conservation of the species in the wild. The development of a small number of "model" programs would be useful as "proof of concept" for what sorts of programs can be replicated and scaled up, as appropriate. Funding for these efforts may be a challenge.

ACTIONS:

i) Compile a list of species managed by the various regional zoo associations and identify whether or not these species are being intensively managed by the zoo association(s) within their range. Identify potential gaps in IMP (programs, expertise, etc.) in range countries and provide this information to the relevant zoo associations managing the species to facilitate potential capacity building in range countries as appropriate; to WAZA CPM; and to ISIS for incorporation into ZIMS.

WHO: K. Traylor-Holzer
WHEN: Database to be compiled by April 2011
UPDATE: Primary database compiled; CBSG portal site under development to make this database accessible to regional zoo associations (to be completed in Fall 2011).

ii) Liaise between the proposed global population management training/mentoring/ advisory group and regional zoo associations to assist in connecting interests and needs with potential population management trainers and advisors.

WHO: CBSG (K. Traylor-Holzer)
WHEN: To be discussed at WAZA CPM meeting in April 2011
UPDATE: Ongoing; training activities scheduled for PKBSI (October 2011); CAZG (November 2011); and JAZA (February 2012).

LINKING *IN SITU* AND INTENSIVELY MANAGED POPULATIONS

CHALLENGE 5: Currently the database records for animals in *ex situ* populations (e.g., ISIS ARKS) usually end if an animal is released into the wild. In many cases, released animals are carefully monitored using separate databases, yet the information is not linked to the animals' *ex situ* database records. Lack of data on animals in the wild, particularly those that have been released and their descendants, reduces our ability to integrate the management of IMPs and wild populations.

a. WHY DOES THE PROBLEM OCCUR?

It can be difficult to obtain data from animals in wild environments. Even where information is known, recording it and accessing it may be difficult due to language, technology and resource barriers. In some cases where monitoring of released animals occurs, separate databases may be used, which may not be compatible with other databases and/or are not linked to pre-release records of the same animals.

b. WHAT ARE THE CONSEQUENCES?

The absence of good field data requires program managers to make assumptions about biological parameters used for modeling wild populations and reducing the accuracy and effectiveness of the resulting management strategies. The absence of accurate information

about the status of wild/reintroduced animals hinders efforts to accurately evaluate success and to design appropriate adaptive management strategies.

c. OBJECTIVE 5. Enable access to available longitudinal studies on wild populations of a variety of taxa, and on best practice methods for obtaining the required data from wild populations. Link *in situ* and *ex situ* data management to facilitate information exchange between zoo professionals and those studying/monitoring animals in the wild. This will also facilitate records-keeping to benefit the continuum of IMP management strategies.

   One way that this can be done is through the use of ISIS ZIMS software, which has an increased capacity for data for animals released to the wild. K. Schwartz is currently identifying important data to be collected on released animals and current methodologies and technology to collect these data as part of her dissertation research.

   ACTION: Convene a working group at the 2012 CBSG annual meeting on reintroduction programs to map the framework for further development and use of ZIMS to monitor animals in the wild.

   WHO: K. Schwartz to convene working group
   WHEN: October 2012

CHALLENGE 6: There is insufficient collaboration and integration of *in situ* and IMP conservation efforts/programs. There are too few zoos and other IMP-focused organizations with good connections to field conservation.

a. WHY DOES THE PROBLEM OCCUR?
   Population management plans by the *ex situ* community are often developed in isolation from the development of species field conservation plans (and vice versa). Historically there has been poor integration of the efforts of these two communities, although there are notable exceptions. Zoos have evolved quickly, and unevenly, in their conservation roles and commitments, and there is some level of mistrust of their conservation intentions. In some cases, funds and other efforts contributed by zoos to field conservation projects have not been used or accounted for sufficiently, or have not produced the anticipated or desired results. These and other factors have led to misunderstanding, miscommunication and mistrust on both sides. *Ex situ* programs often are not aware of the needs and opportunities for supporting field conservation efforts, either through funds/research/capacity building, etc., or through the conservation roles that IMPs can and should play in support species conservation most effectively.

b. WHAT ARE THE CONSEQUENCES?
   Species conservation efforts are less effective than they could be if they were greater collaboration and integration between IMP managers and other conservation stakeholders (e.g., governments, NGOs, aid organizations). Zoos and other IMP organizations are not fulfilling their conservation potential. Field conservation programs do not optimize the full suite of available resources and partners, resulting in lost opportunities to conserve species, raise awareness, enhance scientific knowledge, leverage funds, share information, build capacity, and provide increased access to genetic founders needed to sustain IMP programs.

c. OBJECTIVE 6. Species management programs should have close connections with field conservation efforts and appropriate IUCN Specialist Groups.

The Species Prioritization Working Group is working on the development of a rapid assessment tool to prioritize species conservation needs for species, including whether or not an IMP is needed. If adopted in concert with other IUCN tools this should help bring IMPs into the generally accepted suite of recovery tools. The Integration Working Group is also discussing the integration of *in situ* and *ex situ* conservation efforts. Integration and collaboration between field expertise and IMP management strategies will be important in timely and effective implementation of conservation actions recommended by the assessment tool.

IMPLEMENTATION OF ACTIONS

CHALLENGE 7: The working group acknowledged that, like most of the objectives and recommended actions resulting from this workshop, there are no full-time professionals dedicated to fulfilling the objectives identified by this working group. This is a primary hindrance to accomplishing our objectives and goals.

Intensively Managed Populations for Conservation Workshop

San Diego, CA, US
6 – 9 December 2010

SECTION 8

Collaboration and Integration Working Group Report

Working Group: Collaboration and Integration

The Collaboration Working Group met separately on the first day, then integrated with the Integration Working Group as of the second day since there was much overlap in the discussions. The Integration Working Group incorporated the results from the Collaboration Working Group into their discussions.

Working Group: COLLABORATION
Members: Yolanda Matamoros; Kumar Pillai; Karin Schwartz; Kazu Takami

FOCUS: This working group focused on the importance of collaboration with stakeholders throughout the continuum of IMP conservation action and the identification of specific stakeholders for collaboration. Specific action steps were not developed as it was clear after the first day's session that this group should combine with the Integration Working Group.

GOAL: Identify stakeholders in conservation action for collaboration.

CHALLENGE: Integration of collaboration between zoological institutions and other entities for development of holistic conservation action.

a) WHY DOES THE PROBLEM OCCUR?
   i) Population management plans (PMPs) by Regional Zoo Associations are not sustainable.
   ii) IMPs within zoological institutions act independently without utilizing outside resources.
   iii) Regional PMPs have many small populations that are declining.
   iv) IMPs within Regional Zoo Associations are not connected to holistic conservation action planning for species in the wild.
   v) There is a lack of information exchange between zoological professionals within institutions and with those working on conservation of species in the wild.

b) WHAT ARE THE CONSEQUENCES?
   i) IMP success is in peril without change in management strategies.
   ii) Collaboration would increase the success of holistic conservation action.

c) OBJECTIVE 1: Identify stakeholders for collaboration on holistic conservation action.
   i) Regional zoo associations:
   AZA (North America); ALPZA (Latin America); AMACZOOA (Mesoamerica); CAZG (China); CAZA (Canada); EAZA (Europe); JAZA (Japan); KAZA (Korea); PAAZAB (Africa); SEAZA (South East Asia); SAZARC (South Asia); ZAA (Australasia); others

   ii) Conservation stakeholders:
   Government authorities; non-government organizations (NGOs); field biologists/researchers; local communities; museums; breeding centers; rescue/ rehabilitation centers; faunistic and botanic institutions

   iii) Global organizations:
   IUCN/SSC (Taxon Specialist Groups; Conservation Breeding Specialist Group; Reintroduction Specialist Group); WAZA; UNEP/CBD

   iv) d. Academia and scientific organizations.

Working Group: INTEGRATION
Members: Evan Blumer; Ron Gagliardo; Markus Gusset; Caroline Lees; Yolanda Matamoros; Kumar Pillai; Frank Princée; Karin Schwartz; Kazu Takami

FOCUS: To determine strategies for integrating IMPs into holistic conservation programs.

Recognizing a diverse set of potential partners and collaborators as examined by the Collaboration Working Group prior to being merged with the Integration Working Group, there are three broad phases of a conservation program into which IMPs may need to be integrated: the stage where conservation needs are prioritized (prioritization stage); the stage where conservation strategies and action are planned (planning stage) and the stage where conservation strategies/actions are implemented (implementation stage).

GOAL: To consider and where appropriate include intensively managed populations (population focused) / intensive population management (tool level) in holistic conservation strategies.

CHALLENGE 1: Philosophical and ethical barriers.
Welfare considerations can result in philosophical/ethical barriers to the acceptance of IMPs as a conservation tool. In addition to this, cultural/religious/political barriers are present that exist outside of animal welfare considerations. Objections to the use of IMPs may be informed by real problems. For example, in some cases, captive animals don't breed or behave as normal. Thus, these animals cannot ethically be reintroduced back to the wild.

Insufficient information about roles and inappropriate terminology and labeling clouds the understanding of the conservation potential for IMPs.

a. WHY DOES THE PROBLEM OCCUR?
   i) Perspectives on animal welfare and quality of life issues differ within the diversity of cultural/religious and political arenas.
   ii) Personal, organizational, cultural and religious issues affect attitudes towards inclusion of IMPs in holistic conservation strategies.

b. WHAT ARE THE CONSEQUENCES?
   Entrenched views about IMPs inhibit some people from considering a full range of conservation tool options thus limiting the overall conservation strategy and making it less effective.

c. OBJECTIVE 1:
   Respect the philosophical, cultural and religious values and where possible find consensus.

   ACTION:
   i) Offer objective and scientific options for considering IMPs.
      (a) Include interdisciplinary specialists such as sociologists for consilience to integrate knowledge across disciplines. There is a need for integration of social and biological or natural sciences to address conservation issues. This will help insure that cultural/religious/political differences will be taken into account*.
      (b) Disseminate information to foster understanding (see Actions for Challenge 2 below).

<u>CHALLENGE 2</u>: ***Lack of understanding and/or misunderstanding of the role/potential of IMPs.***

a. WHY DOES THE PROBLEM OCCUR?
   i) Historical perspectives color current perceptions.
   ii) There is a lack of confidence in competency of captive-bred animals (real or perceived).
   iii) Poor or inadequate track record of success of IMPs exists in some areas.
   iv) Success of IMPs is ignored (deliberate or otherwise).
   v) Terminology and labeling not readily understood.

b. WHAT ARE THE CONSEQUENCES?
   Some people may be inhibited from considering a full range of options such that the conservation strategy is limited and may be less effective (intentionally listed again here).

c. <u>OBJECTIVE 2</u>:
   Increase the trust, overall understanding and lessen misperceptions by making IMPs, their role and function known to conservation partners.

   ACTIONS:
   To ensure that all stakeholders have a voice in the development of the conservation plan, create a framework with the participation of all concerned parties. Stakeholders have previously been identified in the Collaboration Working Group report. Example: PHVA (Population and Habitat Viability Assessment) or PCEA (Population and Captive Environment Analysis) for a designated species.

   i) Disseminate and promote availability of *Building a Future for Wildlife: The World Zoo and Aquarium Conservation Strategy* (WZACS) (2005) and Turning the Tide: A Global Aquarium Strategy for Conservation and Sustainability (2009) to:
      - Staff (or "relevant staff") of all organizations participating in IMPs.
      - Regional Zoo Associations
      - Universities with wildlife management/conservation programs
      - Associations that support biodiversity conservation
      - Society for Conservation Biology
      - Association for Environmental Studies and Science
      - Stakeholders: Non-Government Organizations (NGOs)
      - IUCN/Species Survival Commission (SSC) Specialist Groups
      - Other conservation partners

      WHO: Regional CBSG Offices – work with WAZA's Conservation and Sustainability Committee to promote availability of WZACS and Turning the Tide on the WAZA website (http://www.waza.org/en/site/conservation/conservation-strategies) CBSG will encourage the regional zoo associations to make WZACS available to member institutions through association websites. Encourage institutions to make WZACS available to all zoo staff.
      WHEN: Immediately.

   ii) Disseminate results of IMP meeting to conservation partners.
      WHEN: Upon completion of IMP meeting report.

iii) Promote publications (IMP workshop report – summary for *Zoo Biology*, regional zoo association publications, *WAZA News, CBSG Newsletter*; *Building a Future for Wildlife: Zoos and Aquariums Committed to Biodiversity Conservation, G. Dick and M. Gusset, eds. 2010)*; success stories of conservation impact through IMP project involvement.
WHO: Core group of IMP participants.
WHEN: Summer–Fall 2011
UPDATE: CBSG portal site established to collect ex situ conservation success stories; compilation of stories to be the focus of a working group at the CBSG annual meeting in Prague, September 2011

iv) Increase collaboration between regional zoo association Taxon Advisory Groups and SSC Specialist Groups. Identify SSC Special Groups that have integrated programs with regional zoo association TAGs.
WHO: CBSG members who are members of TAGs and Specialist Groups can facilitate interactions via Field Conservation Committees within the regional zoo associations. Use Tapir Specialist Group as a model of integration of regional zoo association TAGs, wildlife researchers, and academics for conservation action planning. K. Schwartz can lead the search as a CBSG member, AZA Tapir TAG and Monotreme/Marsupial TAG advisor, Tapir Specialist Group and Reintroduction Specialist Group member.

v) WAZA should continue to talk to international conservation partners.
- WAZA MoU partners (IUCN; Convention on Biological Diversity; Convention on Migratory Species; Ramsar Convention on Wetlands)
- NGOs, such as Conservation International and World Wide Fund for Nature

vi) Disseminate information via social network site such as Facebook.
Example: For certain Causes pages for conservation of individual species, include information on participation of zoos through contribution of funding, expertise, captive breeding, etc. For group sites such as CBSG or Tapir Specialist Group, highlight action by zoos in contributing to conservation.
WHO: Facebook site coordinators (to be contacted by IMP participants).
WHEN: Immediately.

<u>CHALLENGE 3</u>: Lack of tools and methodologies for implementation of IMPs in some situations.

a. WHY DOES THE PROBLEM OCCUR?
i) Lack of access to tools for various stakeholders.
ii) Those needs not previously recognized or occur, thus no tools ever developed.
iii) No experience or failure to learn from experience.
iv) Lack of knowledge/information on available tools.

b. WHAT ARE THE CONSEQUENCES?
Lack of access to ISIS, veterinary, husbandry and other tools keeps programs from achieving goals.

c. OBJECTIVES:

OBJECTIVE 3a: Develop and promote tools and methodologies as required through needs assessment.
Extend the community of toolmakers by engaging new partners such as field researchers supported by zoological institutions and academia, and collaborate to provide training.

Example: Senior Field Conservation Biologist Raj Amin at Zoological Society of London is developing software for monitoring black rhinos managed as a metapopulation in three reserves in Kenya.

ACTIONS:

i) Engage Field Conservation Committees for WAZA and Regional Zoo Associations as well as global academic wildlife/conservation scientists in IMP discussions/meetings and planning.
WHO: CBSG Regional Offices can offer an outreach to identify possible collaborators. EAZA, the European section of the IUCN/SSC Conservation Breeding Specialist Group (CBSG Europe) and WAZA are in the process of establishing a World Zoo and Aquarium Conservation Database that can be a resource for identification of possible conservation partners.
WHEN: Establish contacts by end of 2011.

ii) Develop needed new tools via open source technology or shareware (free). This was not discussed further as far as what tools were needed. This would depend on results from Action 1 as far as developing new partners for tool development.

OBJECTIVE 3b: Facilitate access to current tools and tools to be developed for global conservation community.

ACTIONS:

i) Expand access to tools or identify barriers to access. Find resolution to increase access.
WHO: CBSG to work with ISIS and regional zoo associations to resolve limited resource issue for ISIS membership. Example: Develop a system for zoos to partner together for sponsorship in ISIS (need more effective method).
WHEN: By the end of 2011

ii) Develop overall clearinghouse (website) for IMP resources. The website would contain:
- IMP reports
- Success stories
- Tools
- Links to other databases and organizations
- List of experts
- Funding information
- IMP conservation partners
- Technical information
- Comprehensive background information
- Notices of meetings
- Interactive forums
- Training info database

WHO and WHEN: Convene a CBSG working group to discuss development of a CBSG-managed site in Prague 2011 and/or will be discussed internally within CBSG.
UPDATE: Several CBSG portal sites have been created to compile data/documents and make them accessible and to promote related discussions, including a database of species management programs, conservation success stories, and PMX development.

iii) Create a list of regional specialists to help with communication of the various resources and prioritize a communication framework for these specialists to share information.
WHO: Regional zoo associations and CBSG regional networks develop lists of regional specialists in various fields. CBSG could merge and compile the list and provide to stakeholders to work on each individual issue in each area as the need arises.
WHEN: Regional lists completed by the end of 2011. International list compiled by June 2012.

<u>CHALLENGE 4</u>: Competition for funding resources (perceived and real)

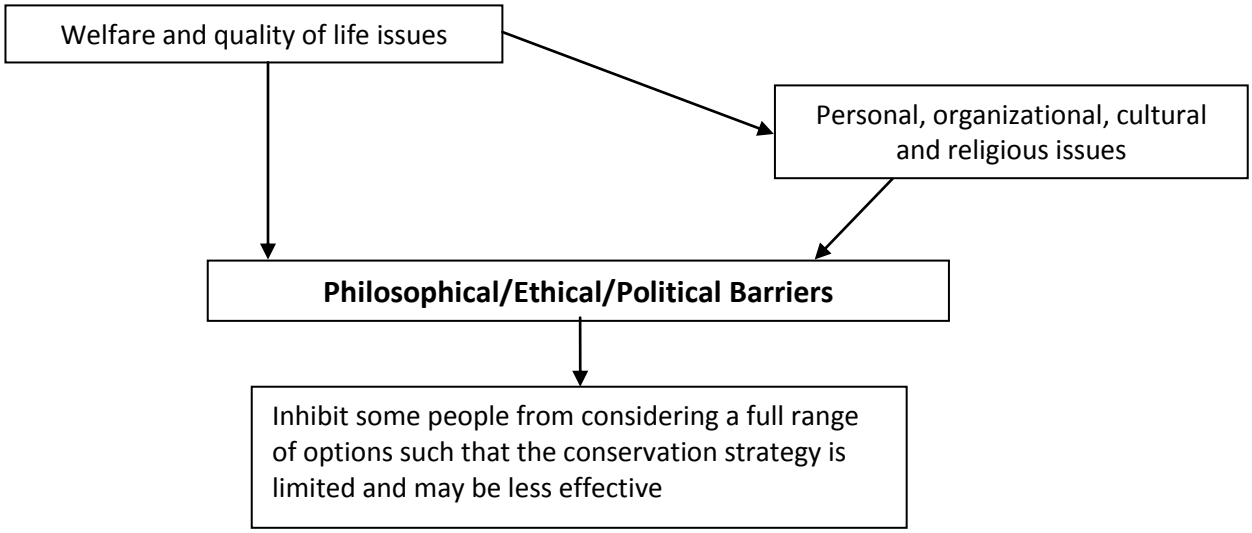
a. WHY DOES THE PROBLEM OCCUR?
   i) Misunderstandings occur about transferability of zoo funding. Some zoo funding is bound to specific projects and cannot be transferred to other projects, even if some people might consider this other project as being more appropriate for the money to be spent on.
   ii) Inadequate communication and coordination.
   iii) Lack of funding.

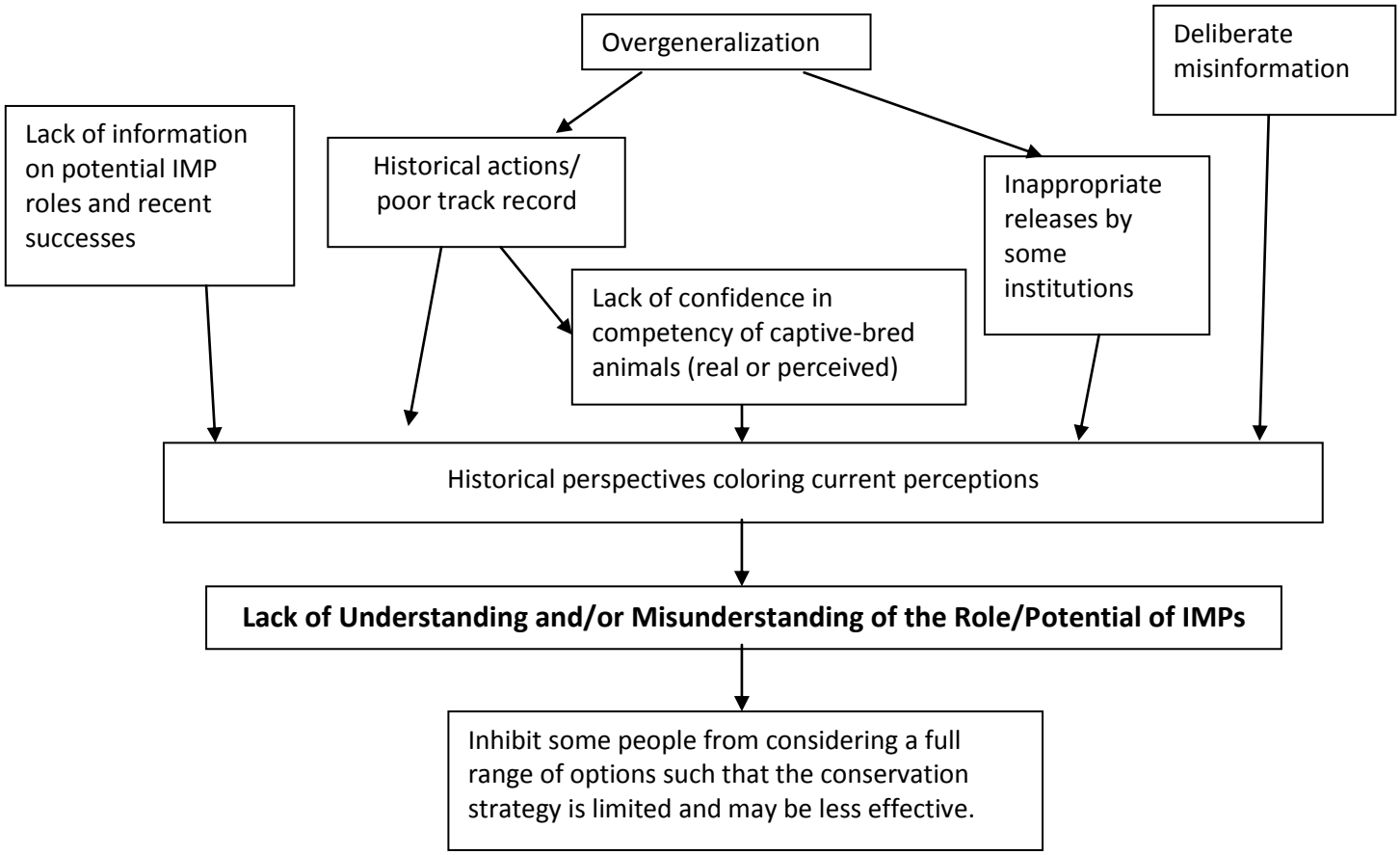
b. WHAT ARE THE CONSEQUENCES?
   Limited resources causing competition undermines the success of holistic conservation efforts. Unnecessary duplication of efforts may occur unless there is an effort for better communication and collaboration.

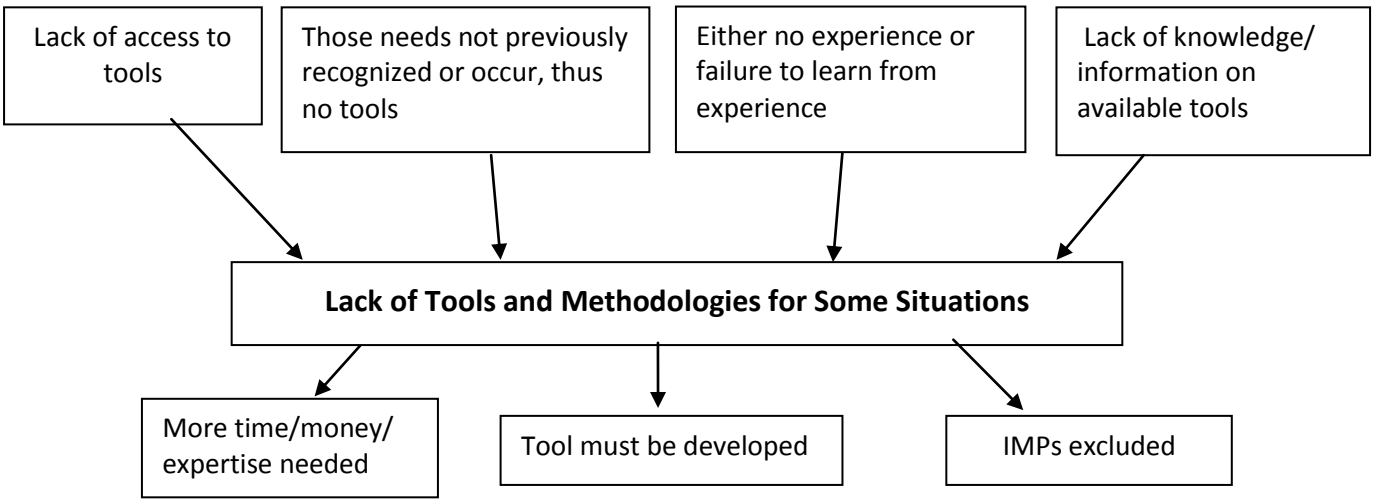
c. <u>OBJECTIVE 4</u>: Recognizing the limited availability of resources for IMPs, partners work together to share and find new resources.

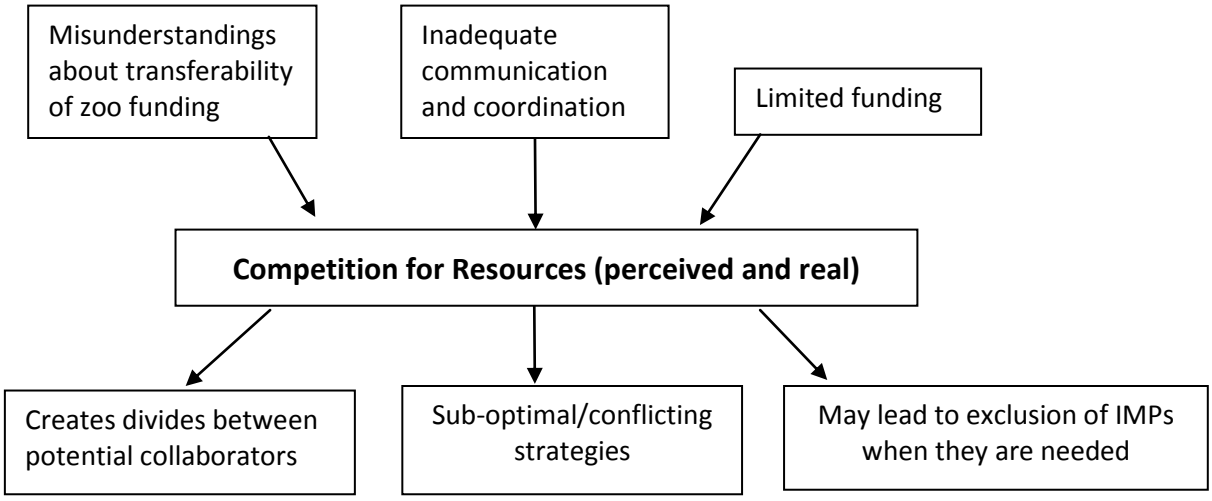
   ACTIONS:
   No specific actions worked out. Overall, there is desire to increase communication and trust between partners (e.g. IUCN/SSC Specialist Groups and Regional Zoo Association TAGs). See Action *iv* under Challenge 2.

Why/What of Each Challenge






Lack of access to tools
Those needs not previously recognized or occur, thus no tools
Either no experience or failure to learn from experience
Lack of knowledge/ information on available tools
Lack of Tools and Methodologies for Some Situations
More time/money/ expertise needed
Tool must be developed
IMPs excluded


Misunderstandings about transferability of zoo funding
Inadequate communication and coordination
Limited funding
Competition for Resources (perceived and real)
Creates divides between potential collaborators
Sub-optimal/conflicting strategies
May lead to exclusion of IMPs when they are needed

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SECTION 9

Plenary Discussion: Moving Forward

Plenary Discussion: Moving Forward

WHAT SHOULD WE MANAGE, AND HOW – Discussion review

FOCUS: This plenary session, held at the beginning of the final day of the workshop, involved a group discussion regarding participants' thoughts about the workshop discussion to date and what direction we want to take out of this workshop.

WHAT ARE WE ATTEMPTING TO MANAGE?

- Bob Lacy drew a diagram yesterday about what we are working on during this workshop. It indicates areas of overlap between conservation biology, intensive management of populations and the *ex situ* community. With the addition of the new objective to manage all species as if they will be returned to the wild, we seem to have expanded further into the diagram. This raises a few problems:
    - Language problems – everything is an intensively managed population;
    - Feasibility – we are only managing a small proportion of our species now and this is going to expand, though we do not currently have the resources;
    - New management strategies so that we don't have to increase our target population sizes are required.
- The workshop looks like it is focusing on *intensive* management of populations vs. managing populations. There must be a balance where we have confidence that we are managing a population but without the major benefit that a conservation program requires. We need to be able to move up and down the scale of intensity of management.
- Perhaps the term "intensive management" is producing confusion? There will always be some form of management (in national parks, etc.) but it is not always intensive. Whether we call the institution holding animals a zoo, a breeding center, a national park, or anything else, management will always be required for all species at some level. We must aim towards sustainable populations, but the word *intensive* is perhaps related to wild populations. We need to prove that we already have, and can continue to show that we have the expertise to manage populations.
- Intensively managed populations are those populations in the wild that have a management component out of the wild. This makes us look at what we are doing for a wild population, and takes the thought away from managing for longevity and long-term success in our zoos vs. intensively managed populations for conservation.
- We do not need a collection policy for zoos that outlines how intensively we manage a population for risk assessment – if we do not want to lose a population then we should manage that population very intensively. There are zoo populations that we do not want to lose because of zoo business and conservation purposes. We need to look at the balance. We cannot manage everything – the big decision is, are we going to recommend that zoos move towards managing for sustainability of zoo populations or more for conservation purposes?
- We might not be able to cope with the resources needed for the whole concept of managing species in the long term, and the extra resources we need to work with species in the wild. We need to focus our resources on the species we can make a difference with, not what we might be able to do in the next 100 years. Let's use what we have now, to work with what we can now and accept our current limitations.

- We have already made some profound suggestions this week. We are saying we need population management for all species in our collections, but we do not have the resources to manage all species in captivity. If we take out the idea that we have "special" species, this breaks the barrier and allows us to have more conservation species. Everything should be managed, and we need to merge "special" and "non-special". We need to manage everything.
- We cannot always make a choice between having species and managing them. It should be that we need to have species and manage them. We cannot lose the opportunity we have to convert visitor dollars into conservation dollars, and all of our species need to be managed. We are not currently on top of managing our assets. We need to focus on species that are not readily available from the wild. For every species in every collection, zoos need to know where they can obtain additional specimens if they need to, and where they can move any surplus animals if that situation should arise. Regional collections are very inert, and changes in priorities can happen very quickly. Institutional plans are not currently stable, so it is difficult to direct regional resources, and institutions' requirements are continually changing. We should possibly pick 50 species and jointly decide to manage them really well, to see how well we can do this. We should not get into another situation of being inert and possibly making the current situation worse.

SHOULD ZOOS BE CHANGING THEIR MANAGEMENT, AND IF SO, HOW?

- It seemed like we had a clear vision of how we would change how zoos are currently managing populations and their relevance to conservation. In these discussions we seem to have now moved to a need to do more, and a need to do it better. Concern was raised that we might end up with a product that might not look too different to where we started. We do not seem to really be making a vision change.
- We have not really looked at what we can achieve. It is noble to look at managing all species in zoos but this is not realistic. We need to focus on what our zoo animals are for and we need to be realistic. We need to recognize that some of our populations are not about conservation. We need to focus on what we *can* do.
- Zoos' business models are the fundamental problem. We cannot survive on gate takings without displaying key species for the visitors. These species are often the least likely to benefit from conservation programs and release. We need to focus on sustainability.
- It might be easier to think about zoo business species if we think about how finite the list of species is. Possibly only 10 species are in the category of "essential draw-card" species.
- Zoo curators and directors need to base decisions on what zoo visitors demand, and if they are not doing that then they are not doing their jobs properly. They need to better focus their resources on conservation.
- There are quite a number of species that occupy zoo spaces that could be better used by priority species.
- Workshop participants have talked a lot about zoo collections that contain primarily what zoo directors want. It is quite likely that most directors do not actually care what is in their zoos. It is the curators that sometimes have the 'stamp collector' mentality. Maybe if the curators thought more about their collection planning, and made appropriate changes, the directors would not even know that their collections had changed.
- We have been talking about how we should be trying to change zoo directors' opinions and zoo business models. We should be looking at how we need to change within the current business model to see what can be done. Institutional decision makers continue to bring in new novel

species, they breed, take up space, and then loose favor and the populations fade out. This is driving us even further from our goals.

- We need to greatly improve institutional collection planning – to date this has not necessarily been done properly.
- If we just reiterate what we have said before and that we are going to do it better, then we might not be taken seriously. We need some dramatic ideas that will lead to further discussion, and so far, there does not seem to be unity about the approach within the participants of this workshop. Our goals need to be adjusted. Others think we need to adjust our institutional goals. Our outcomes would be better if we communicate all of the good ideas from the workshop, while emphasizing a few of the key issues.
- Maybe we need a divergence in conservation models. Maybe explore the possibility of putting together a new institution that is addressing specifically what is needed to make an intensively managed population. We need bold and provocative ideas.
- Three issues seem to be clear from this meeting: 1) let's tell other people how to do things differently; 2) let's invent a new institution that we do not know how to fund (it is possible to look at organizations that are starting to be these new institutions – there are a few organizations that are already conservation organizations that are not zoos); and 3) what can we do with the institutions that we have now, since we do not have funds to invent new ones?
- Everything we are talking about relates to animals, but everything we do with them relates to people. There is an amazing diversity and in some ways, deterioration of skills and experience, within our zoo staffs, but we want to manage everything for the future. We need to ensure that the people in the institutions are changed, they share the paradigms we are trying to shift, and they share the responsibility. We need a better ability to share that knowledge with the next generation so we can move forward.
- We should think about the strategy of what zoos are doing, and that all strategies have a vision of what is happening in the wild. About 30 years ago, we made a valid observation that every exhibit niche in zoos could be populated with a species that is under some degree of threat. This was dismissed at the time, as it was considered to be too hard and it was a difficult management idea. We need to think about lifting some of the constraints that were imposed on the management process and make things a little more feasible.
- Some of the things we have been discussing are 'sea changes', and we should flag which of the goals and objectives discussed to date are fundamental changes that we must make sure do not get lost in the detail of the rest of conversations. It is critical that these changes are included in the workshop report.

ZOOS AS CONSERVATION ORGANIZATIONS

- We should be maximizing what we do with regard to our conservation collections. We are still a community of zoos that do a little bit of conservation. We need a philosophical change to become conservation centers that use zoos to showcase their conservation work.
- We might get further if we change from being primarily zoos that are involved in a small amount of conservation actions, to conservation organizations that also have zoos. This might help other conservation organizations to look at what they do.
- There is nothing wrong with reiterating the realities of the current situation, even if we cannot come up with all the answers. The consensus seems to be that we are not utilizing the existing tools as effectively as we could. It is not likely that the structure of the zoo world will change dramatically in the short term. Our job is to make it as practical as possible to make changes that are required to improve the conservation value of our collections.

- We have to accept the reality that we cannot save everything. How do we measure our success on the conservation side of our activities, if not the business side of things? There does not seem to have been much talk about how we are actually benefiting species in nature.
- We need to try to produce a set of model programs that we current hold that we can manage really well. There is currently a failure to integrate the animals that we keep in zoos with animals that require conservation in the wild.
- We need to keep in mind that it is not just our problem – there is also the wild and management of parks, etc. We need to find the best way to manage populations at both ends of the spectrum. We have a responsibility to prove that our methods are relevant across the entire spectrum of species conservation.
- Noted that George Rabb talked about zoos being conservation organizations 30 years ago, and now we are saying that we need to do the same thing, but to make it more meaningful, and we need to shift the current thinking of all staff – curators, keepers and directors. We have to give zoos the animals they need to run their businesses, but they also need a new direction that is hopeful for the future.
- We need to recognize the real cost of producing animals, and the need to have sufficient space to do this. We need to have regional centers to enable this to happen and to forge better ties with the wild. Experience has shown the C2S2 consortium that you cannot have a small zoo to support a huge conservation facility – the money just is not there. There needs to be a new model – pooling resources, specializing, etc. but we have to realize that there is a cost and we need to share that cost.

CONCLUDING DISCUSSION AND NEXT STEPS

FOCUS: This final plenary session focused on presentation and discussion of the Objectives and Actions from the five working groups, followed by a group discussion of the process to compile and communicate the results and recommendations of this workshop.

Comments following from OBJECTIVES and ACTIONS
The following comments were made in response to issues/objectives/actions presented by the working groups in the final plenary, beginning with comments related to the Conserving Species Across a Management Continuum working group and expanding into comments related to other working groups.

Measuring Program Success

- Success (in terms of our species programs) can be measured in a variety of ways, from genetic measures to conservation support, status of both *in situ* and *ex situ* populations, by population viability and reduction of threat, etc.
- It was suggested that success and failure are endpoints of a continuum, and that what we want to measure is progress along this continuum.
- It is anticipated that examination of past programs and common factors that relate to 'success' or 'failure' will suggest potential solutions or strategies that can be tried by programs that are currently 'failing'.
- Depending upon how success is defined, this could be applied across the entire IMP spectrum.

Expanding Participation in Species Planning

- Technical expertise exists outside of the zoo community. As we go forward with the idea of zoos as conservation organizations, why not provide access to our living collections to outside conservation partners? Program coordinators could include species experts.
- Consideration of bringing in other 'outside' participants to species planning sessions deserves more thought, but if pursued, this process should be reciprocal.
- We should promote the services we could provide. One opportunity is the World Conservation Congress (next one is under two years away); the last one had close to zero representation from zoos. The Congress provides the opportunity to talk to 10,000 people. The next one will be held in South Korea in 6-15 September 2012.
- Another opportunity is the Society for Conservation Biology (SCB) meetings.
- A global conservation meeting is a great idea and should be identified as an action.
- Yesterday we talked about the idea of getting IMP included in the Convention on Biodiversity (CBD) as a means of conservation action.
- We must determine how we can use ZIMS to accomplish this. ISIS is expanding our work with the aquarium community.

Application of the AArk Tools

- It is possible to make the language more generic in the Amphibian Ark tools for assessing conservation needs/roles and for program feasibility, and to apply them to other groups. Felids might be a good example – for use by the Felid TAGs and the Cat Specialist Group.
- There was some question/concern about the field experts/specialist groups using the assessment tool without involvement or input from the *ex situ* community (not taking advantage of the knowledge, expertise and perspective that the *ex situ* community can offer, not involving all of the stakeholders in the decision process).

- There needs to be a clear approach to using these tools along the continuum from specialist groups to IMPs – both ends of this management continuum need to communicate with and understand the other.

Training and Mentoring Resources

- Capacity building and training in population management has been discussed in at least two working groups. Recently studbook (and general population management) training and mentoring guidelines were developed and adopted by WAZA's Committee for Population Management. CBSG has proposed the establishment of a global population management training team (composed of trainers from various regions) to respond to training requests and needs of regions in which no formal training program currently exists. There have been many such training efforts already in the past few years in Latin America and much of Asia, and additional training opportunities are planned in Asia for 2011.
- At the 2003 CBSG annual meeting there was a working group that discussed a training and mentoring strategy – this working group report is another source of information and ideas.

NEXT STEPS FORWARD

Workshop participants then discussed the process for compiling and distributing the full report of this workshop (primarily consisting of the plenary and working group notes) as well as other products or forms of communication and distribution.

IMP Workshop Report

The full workshop report should include:

- '30 Seconds of Truth' from the participants (without names)
- Executive summary
- Working group reports, including actions
- Summaries of the plenary session discussions

Working groups will complete their discussions and develop their working group reports, perhaps as a wiki, and post the reports on a restricted area of the IMP workshop workspace on the CBSG member portal. It was recommended that this area of the portal be restricted to IMP workshop participants, so that we can polish our final report and conclusions before it is seen by others. Important points from the plenary discussions also need to be included in the report. A standard format should be developed to aid in report writing and consistency. Some editing will be necessary to handle similar ideas in various working group reports and limit redundancy or conflicting efforts. A small core editing group was established to review the entire report and make sure that the 'big picture' is depicted.

ACTION: K. Johnson to set up Wiki or appropriate section on the CBSG member portal for report review and editing. ***UPDATE: completed 19 Dec 2010.***
ACTION: J. Ballou will use the Paradigm Shift working group report to develop a suggested template for other reports. K. Traylor-Holzer to provide templates for group reports and plenary sessions to the various note takers. ***UPDATE: completed 15 Dec 2010.***
ACTION: Working group drafts and plenary session discussions to be posted on the IMP Report portal site by 24 December 2010. ***UPDATE: completed Spring 2011.***
ACTION: Small group will take responsibility for editing the workshop report (K. Traylor-Holzer; K. Leus; K. Schwartz). Draft of full report to be completed by January 2011. ***UPDATE: completed August 2011.***

Short Communication

We need a concise synopsis – core summary of the key elements – to go out to our conservation partners. There was some discussion whether this summary should be one page in length or longer (e.g., five pages) – each might serve different purposes/audiences. When presenting this, we also need to be aware of and respect differences in priorities among the different regions. The small group of people writing this should include representation from different regional associations. This synopsis can also serve as a basis for the executive summary of the full workshop report.

ACTION: Small team will write a short summary (E. Blumer; A. Baker; L. Dickie; Y. Matamoros; P. Boyle; K. Johnson – includes representation from AZA, EAZA, AMACZOOA, ZAA) by mid-February 2011.
UPDATE: A. Baker completed March 2011.
ACTION: L. Dickie to write piece on zoo paradigms to provide structure.

Publications

The workshop synopsis can also be included in the upcoming sustainability issue of *Zoo Biology* (due out in late 2011), perhaps as a preamble or commentary. It was noted that it would be useful to also disseminate this information beyond the *ex situ* community (i.e., beyond *Zoo Biology*); one suggestion is to write a commentary for *Conservation Biology* based on the executive summary of the workshop.

ACTION: R. Lacy will communicate with D. Wharton (Zoo Biology editor) about this.
ACTION: E. Blumer will work on draft for commentary for Zoo Biology.
ACTION: Short communication writing group to develop draft commentary for Conservation Biology.

Presentations

It is important that the results and recommendations from this workshop are not only distributed in writing (via reports, communications, websites, etc.) but also presented face-to-face. A synopsis of the workshop could be presented at the regional zoo association meetings – upcoming meetings include AZA (March), EAZA (late March) and ZAA (April). Another opportunity is the next IUCN World Conservation Congress, which will be held in South Korea.

ACTION: Presentations developed for regional zoo association meetings should be posted on the portal.
UPDATE: AZA presentation posted on the portal in February 2011.

Tracking Progress

It is also important to designate individual(s) to follow up on the status and progress of recommended actions. Each working group should identify a task master to keep track of actions, who is doing what, help decide how to move forward, and make sure that recommended actions leads to actual action.

ACTION: K. Traylor-Holzer will follow up with working groups and designated individuals on developing actions and following their progress and implementation.
UPDATE: First update in September 2011; ongoing.

Next Meeting

It would be useful for this group to convene again to review and build upon our progress and identify further next steps. The theme of the 2011 WAZA annual meeting in Prague will be sustainability of zoo populations; it is possible that the preceding CBSG annual meeting (also in Prague) could also focus on sustainability.

ACTION: R. Lacy will look into possible funding for a follow-up IMP meeting, possibly in connection with the CBSG and WAZA annual meetings in Prague in Fall 2011.
UPDATE: One-day session devoted to IMP issues at the CBSG annual meeting in Prague in Sept 2011; working groups to be convened to discuss next steps, including potential follow-up IMP workshop(s).

Intensively Managed Populations for Conservation Workshop

San Diego, CA, US
6 – 9 December 2010

SECTION 10

Summary Tables of Recommended Actions

SUMMARY OF RECOMMENDED ACTIONS: Shifting the Conservation Priority Paradigm in Zoos

GOAL: The world zoo and aquarium communities are, and are acknowledged as, effective conservation partners in the context of integrated conservation strategies that include intensive population management.

CHALLENGE: Under the current paradigm, for many zoos conservation is not a high priority, and this negatively impacts the community's ability to maximize its success with population management programs.

Objective	Action	Responsible party	(Timeline)/Progress
Change the current paradigm of the ways zoos play a role in and contribute to species conservation. Redefine and restructure IMP programs to maximize success.	Identify IMPs that are failing. This involves compiling the published and gray literature – there have been several publications and presentations over the last several years that have documented challenges faced by many breeding programs.		
	Work with program members of these IMPs to re-define the structure of the program to maximize success.	A. Baker	(By January 2011)
Members of the zoo and aquarium community should each re-commit or re-evaluate their realistic conservation mission and specify in detail what that means.	Ask the regional associations' conservation committees (field, research, education, animal management) how they would define and assess the conservation-related activities of their member organizations.	P. Boyle	(Responses to be compiled by June 2011)
	Consolidate the responses from conservation committees to an agreed upon international standard.		
Identify those zoos that do conservation, and acknowledge their commitment to conservation by establishing a new level of membership in regional zoo associations that recognizes their role as conservation leaders in this community.	Develop a concept proposal for an organization along the lines of the "Botanical Gardens Conservation International" model that works within regional zoo associations, or possibly internationally, or levels of membership within regional zoo associations, that acknowledges and identifies institutions conducting significant conservation programs.	L. Dickie, P. Boyle	(By March 2011)
	After concept proposal has been drafted, develop criteria for inclusion of zoos for this level within zoo associations.		
Our business plans should be developed in context to a zoo's overall mission, and, if appropriate, explicitly include adequate recourses for IMP needs.	Accurately quantify costs of a variety of successfully operating IMPs in different taxa. This includes IMPS that include field conservation programs (CIMPS) as well as IMPs for zoo populations (ZIMPS) – see a) and b) below:		
	a) Write a guideline for how to calculate these costs.	J. Ballou, A. Baker	(By February 2011)
	b) Estimate costs for CIMPS and ZIMPS	A. Baker, J. Ballou (GLTs); A. Baker (WY toads); K. Johnson (C. frogs); P. Pearce Kelly (field crickets); Tiit Maran (E. mink); R. Wiese (CA condors)	(To be determined)
	Provide guidelines on how zoos can fund conservation in the zoo's business plan. (This requires that a zoo has a conservation strategy in place).		

We need to better understand our business models. We make a lot of assumptions that we believe negatively affect our conservation role	Determine what species and activities visitors need to have a good zoo visitor experience. Do visitors need a variety of species at zoo? Do curators want "stamp" collections? Is there a conflict between visitor perceptions, curatorial collection planning interests vs. the needs of successful IMPs?	P. Boyle to circulate AZA visitor info survey results (will ask Scott Corwon about this).	(To be determined)
CHALLENGE: Under the current paradigm, we too often fail to deliver on promises and missions to use IMPs to support conservation.			
Objective	Action	Responsible party	(Timeline)/Progress
Covered by other objectives and actions.			
CHALLENGE: Under the current paradigm, lack of full cooperation between zoos and between zoos and managers of IMPs is often tolerated, not strongly reprimanded, or "managed around," negatively impacting the success of IMPs.			
Objective	Action	Responsible party	(Timeline)/Progress
Have species sustainable programs link cooperation to inclusion. Those that cooperate get to be included in the shared benefits while the cost of non-collaborating is lack of availability to animals.	Develop processes and tools to "name and shame" zoos that do not cooperate to improve compliance. For example, tools that compare data completeness statistics of studbooks held by a particular institution to the regional or average completeness statistics.	ISIS to start	(After ZIMS Release 3 (population manage-ment module); 2012, 2013?)
	Regional zoo associations need to get tough on sanctions for deliberate non-cooperation in IMPs.	Zoo associations	
Enhance compliance of IMP recommendations by having taxa being managed by IMPs be owned by country of origin or collective ownership by association (when possible).	To be determined		
CHALLENGE: Under the current paradigm, animals in collections and IMPs often have conflicting roles (individuals expected to be both on exhibit and breeding), which leads to less successful IMPs.			
Objective	Action	Responsible party	(Timeline)/Progress
Develop internationally accepted standards for defining the types of roles that individuals can take on in zoos.	Define and standardize internationally zoo "Program" names more appropriately to reflect their real role: sustainable programs, reintroduction programs, display/exhibit/research programs. Ask WAZA Conservation Committee to develop a "task force" group to define these standards.		
Determine what works (vs doesn't) in exhibit spaces and plan accordingly.	To be determined		

CHALLENGE: Under the current paradigm, availability of animals is taken for granted, and assumed to be free of charge.			
Objective	Action	Responsible party	(Timeline)/Progress
Zoos and aquariums that are sources of animals need to document the real costs of producing animals. There needs to be a value system associated with making animals available to programs and zoos.	Explore "Pay to Play" strategies where Pay can come in variety of forms (e.g., institution receiving animals acts as studbook keepers).		
CHALLENGE: Under the current paradigm, taxa selected for IMPs are selected by zoo managers or regional zoo advisory groups rather than experts in species' conservation needs, leading to developing and using resources on IMPs in ways that are less than ideal for most effectively addressing global conservation issues.			
Objective	Action	Responsible party	(Timeline)/Progress
Make organizations that are doing global or regional conservation planning (IUCN/SSC, IUCN SSC Specialist Groups, regional zoo association advisory groups, etc.) aware that there are tools available that objectively evaluate the role of *ex situ* IMP in the conservation programs.	Find another taxonomic group that would be willing to test the AArk tool for that taxonomy. Candidate: IUCN SCC Cat Specialist Group	R. Gibson, K. Johnson	(In 2011); **Interest by FWS in applying to bats**
	Attend meetings with societies, governments, and NGOs, being realistic about what we can provide, cannot provide, how and when we can be most effective. Define a message.		
	Ask WAZA marketing committee to produce a portfolio of conservation services that zoos can provide.		
	Follow up and identify non-zoo appropriate people to deliver the message to their own groups.		
Be largely reactive, not proactive, in species conservation planning (while being proactive at offering our services), but recognize that there are situations that zoos can take the lead or be proactive in developing conservation planning.	To be determined		
CHALLENGE: Under the current paradigm, experts in species conservation outside the *ex situ* community often do not recognize or value the potential contribution that can be made by *ex situ* IMPS.			
Objective	Action	Responsible party	(Timeline)/Progress
Promote the services that the *ex situ* community can provide for species conservation. Do a better job in communicating what our services are.	Develop a formal Marketing Plan that promotes those services		

CHALLENGE: Our current population management paradigm creates significant challenges to the zoo and aquarium community's ability to contribute as much as they potentially could to species conservation. The challenge is to have the zoo and aquarium community fully recognize that paradigm shifts are needed.			
Objective	Action	Responsible party	(Timeline)/Progress
Convince the zoo community that there is a crisis and for most species we lack sustainable populations.	Write and publish a peer-reviewed paper for both the zoo and non-zoo community on the topic of the need to shift the zoo paradigms to focus more cooperative conservation efforts.	L. Dickie	(To be determined)
Convince the directors of the zoo/ aquarium community that they need to take responsibility for maintaining zoo populations and improve zoos' success with conservation.	Identify a leadership group of directors/ managers to take the lead in communicating this responsibility.		
	Focus, collaborate only with other conservation-minded zoos		
	Help identify what zoo directors need to take responsibility for.		
Define what zoos would look like if they really were effective conservation organizations and had sustainable/ viable populations managed as part of a broader species conservation plan that support wild populations and habitats.	Develop a conservation assessment tool to evaluate zoo's real contribution to *ex situ* population management conservation.		

SUMMARY OF RECOMMENDED ACTIONS: Assessment and Prioritization

GOAL: Assess every species for full range of conservation needs with periodic updating. Where conservation management is deemed appropriate, prioritize management actions both within and between species accordingly.

CHALLENGE: A unified approach has not been identified for assessment and prioritization for conservation action.			
Objective	Action	Responsible party	(Timeline)/Progress
The *ex situ* conservation community should identify and lead a collaborative effort to develop an assessment and prioritization process.	Identify initial team members including representatives and key players from different user groups, based on tool developers.	Working group (WG) members	(Suggestions to K. Johnson by Feb 2011)
	Identify team leader and possible funding opportunities for that role.	All WG members	(By March 2011)
	Liaise with the Tool Development Working Group of the IUCN Species Conservation Planning sub-committee.	K. Johnson with C. Lees and R. Lacy	**Presented to SCP sub-committee in March 2011; WG will collaborate with current SSC initiative re: prioritization.**
	Test existing tools with a wide range of other taxa (felids, freshwater fish, etc.) and scopes (ecosystems, etc.).	WG members and collaborators	(2012?)
	Communicate and publish findings	WG members and collaborators	(2013?)
	Make recommendations on further adaptation of existing tools and/or development of new tools.	WG members and collaborators	(2013?)
	Facilitate implementation of the new tool.		
CHALLENGE: Data are deficient and/or not available for assessment and prioritization.			
Objective	Action	Responsible party	(Timeline)/Progress
Devise a process to ensure unpublished data are included in assessment and prioritization.	Ensure that process for assessment and prioritization includes mechanisms to build trust so that existing research results are shared.	WG members and collaborators?	(2012?)
Increase properly-conducted field research in areas that are essential for assessment and prioritization.	Identify the essential research areas.	WG members and collaborators?	(2012?)
	Ensure that assessment process includes explicit description of research needs.		
	Ensure that process for assessment and prioritization includes guidelines for conducting effective research, as well as information about existing resources on how to conduct effective research.	WG members and collaborators?	(2012?)

CHALLENGE: Scope of the assessment and prioritization problem is very large.			
Objective	Action	Responsible party	(Timeline)/Progress
The approach and tool that is developed must adequately and repeatedly assess a large number of taxa efficiently in a short amount of time.	Test approach and tool in situations with a large number of taxa and work specifically to maximize efficiency in the process.	WG members and collaborators?	(2012?)
CHALLENGE: The amount of resources needed to carry out the assessment and prioritization is large.			
Objective	Action	Responsible party	(Timeline)/Progress
Increase funds available for assessment and prioritization.	Educate the public and decision-makers about the importance of assessment and prioritization.		
	Educate existing conservation donors about the importance of assessment and prioritization.		
Increase requests for existing funds for assessment and prioritization.	Identify existing funding sources for assessment and prioritization.		
	Make information about how to apply for existing funds easily available to users as part of the standardized assessment and prioritization process.		
CHALLENGE: Integration with similar assessment and prioritization tools (e.g., Red List, action planning process) is not occurring or is insufficient.			
Objective	Action	Responsible party	(Timeline)/Progress
Seek participation from IUCN Species Conservation Planning sub-committee.	Prepare a short summary of our intention and work approach for C. Lees to take to IUCN Species Conservation Planning (SCP) sub-committee.	K. Johnson with C. Lees and R. Lacy	**Presented to SCP sub-committee in March 2011; WG will collaborate with current SSC initiative re: prioritization.**
Search for existing approaches and tools.	Carry out exhaustive research into existing approaches (and core developers) and identify those that are worth further investigation and testing.		**Workshop planned for October 2011 to discuss priority-setting for conservation.**
	Circulate CBSG Abruzzo tool table to working group.	K. Leus	(17 December 2010)
	Conduct literature research on any existing species assessment and/or prioritization processes and tools.	K. Rodriguez-Clark, S. Christie and all WG members. K. Johnson to compile results.	(1 March 2011); **in progress**

CHALLENGE: There is resistance to triage of threatened species.			
Objective	Action	Responsible party	(Timeline)/Progress
Openly acknowledge ethical objections to species triage, being clear about the ultimate goal (the greatest number of total species being in the lowest categories of threat possible).	Include experts in bioethics and participants with a variety of viewpoints on such ethical problems in the development of the process/tool.		
	Clearly present the variety of ethical positions in documentation about the process/tool, including analogies from other spheres of human activity in which assessment and priority-setting have been determined to be acceptable.		
Reduce practical objections to species triage.	Identify and enumerate practical objections in addition to those outlined above.		
	Seek out existing evidence to the contrary.		
	Where evidence doesn't exist, conduct studies to generate new evidence.		
CHALLENGE: The process and tool, once developed, should be available in multiple languages, to facilitate use of the tool in a wide range of regions and countries.			
Objective	Action	Responsible party	(Timeline)/Progress
Ensure that the process and tool, once developed, are available in a multitude of languages (initially English, Spanish, Chinese, Japanese).	Include speakers of target languages in process and tool development.		
	Produce translations of process materials into multiple languages.		
CHALLENGE: Ensure that there are sufficient people (with a thorough understanding of the process and too) available to use the process and the tool.			
Objective	Action	Responsible party	(Timeline)/Progress
Ensure that sufficient people have a thorough understanding of the assessment and prioritization process and tool.	Include a wide-range of current and potential stakeholders during the design and implementation process for the assessment tool.		
	Ensure that very thorough documentation is available for anyone who may make use of the assessment and prioritization process and tool.		
CHALLENGE: Ensure that when an assessment and prioritization is being undertaken, there are sufficient stakeholders present during the assessment who have the data and knowledge to feed into the tool.			
Objective	Action	Responsible party	(Timeline)/Progress
Encourage groups who plan to use the assessment process and tool to be sure they assemble the most appropriate	Ensure that documentation about the process and tool stresses the importance of including such groups with appropriate expertise.		

expertise in the species being assessed, prior to carrying out the assessment.	Ensure that documentation about the process and tool includes a list of effective strategies for ensuring participation, and multiple concrete examples of how such participation was achieved.		
	Ensure that funders of assessment and prioritization require evidence of broad participation before proposals are funded by providing recommendations to funders.		
CHALLENGE: Training in the use of the process/tool will be needed, and this will need to be tailored to different user groups.			
Objective	Action	Responsible party	(Timeline)/Progress
Incorporate training in all aspects of process/tool development and implementation.	Include those with experience in training in process/tool working group development and testing.		
	Collaborate with related existing training efforts so that training in species needs assessment and priority-setting is offered through existing structures/contexts.		
CHALLENGE: Once a group of species has been assessed and prioritized, there will be no conservation benefit unless priorities are actually put into action, and conservation benefits will remain unknown unless actions are monitored through time.			
Objective	Action	Responsible party	(Timeline)/Progress
Follow-up on action planning, implementation and monitoring.	Make the identification of possible implementers/monitors an explicit part of the process/tool.		
	Ensure that the process/tool provides an explicit means of reporting ongoing actions and their consequences in a standardized manner.		
	Encourage funders to prefer implementers taking action in the context of a formal needs assessment and prioritization process.		
	Provide explicit guidance on how to implement priorities effectively, once they are decided upon, by linking to existing detailed conservation planning processes (i.e. PHVA)		
	Provide explicit guidance on how to monitor conservation implementation effectively once it commences		

SUMMARY OF RECOMMENDED ACTIONS: Program Design

GOAL: Improve the viability and success of long-term Intensively Managed Population programs, with each species having a precise and appropriate management plan, which includes management, adequate resources, and other activities necessary to achieve its defined role(s).

CHALLENGE: Measuring (the need for), and where appropriate improving, the (self) sustainability of regionally (and globally) intensively managed *ex situ* populations, by defining program goals and establishing appropriate management plans for each program.			
Objective	Action	Responsible party	(Timeline)/Progress
Improve collection planning on a global and regional level. *Regional Collection Planning:*	Work on prioritization, selection of species, statement of species roles, etc. on all levels (WAZA global, regional level, within zoos); global collection planning.	Regional and CPM representatives	**Initiated at WAZA workshop in Gland, April 2011**
	Assess RCPs and current programs to identify current overlap (among regional associations) and evaluate their RCP status; select TAGs (e.g., Felid TAGs) as examples.	D. de Man	(April 2011)
	Within existing programs, reallocate space and reduce number of species (and number of individuals of low priority species) to make sure highest priority programs meet goals; create appropriate targets and select appropriate species Conduct an objective review of RCPs and force people to make choices.	Regional associations	(2011-2012)
	Evaluate whether the Amphibian Ark feasibility tool will work for regional associations' evaluation of RCPs and/or develop a feasibility tool for RCPs. A draft is available from the AArk.	Regional associations initially	(September 2011) (CBSG Prague?)
	Integrate a potential feasibility tool in the regional zoo associations' handbooks, guidelines and templates (when relevant).	TBD after feasibility tool is available	(TBD after feasibility tool is available)
	Integrate the evaluation of TAGs into the new handbooks that AZA is developing and/or the EEP manual EAZA is working on.	AZA (C. Dorsey, S. Long), EAZA (D. de Man, W. van Lint)	(AZA- during rewriting in 2011; EAZA-September 2011)
	Identify species role for each population, and compare assessment for a species across regions; define possible roles and encourage inclusion of programs that have multiple roles	TAGs encouraged by their regional associations	(Ongoing)
	Develop tool/database where all RCP information can be seen across TAGs (and across regions?) so that institutions for their Institutional Collection Plan can easily identify the targets (without looking at all different RCPs).		
Improve collection planning on a global and regional level. *Institutional Collection Planning:*	Create tool for Institutional collecting planning (to make sure this happens more consistent).	Regions to produce guidance for institutional collection planning and enforce setting up and implementing ICPs (based on RCPs).	(2011-2012)

Improve collection planning on a global and regional level. *Space:*	Explore different types of space (breeding centers, etc.) to create more successful managed programs.		
	Space surveys to make it more concrete – to set target population.		
	Assess global holding capacity for each species, develop a single survey of institutional space – 1 survey across all taxa – so that RCPs can accurately assess how many programs they can work with (census of exhibits/enclosures in ZIMS?); As a first stab, use report in PMCTrack that aggregates wants/needs information for managed programs; ISIS could potentially produce a report that is numbers of individuals across institutions across taxonomic groups		
	Brainstorm about Super TAG concept (Carnivore TAG – as species between the different TAGs are competing for space).		
	Develop new incentives/accountabilities for improving our RCP decision making.		
Improve collection planning on a global and regional level. *Surplus Animal Management:*	Deal with surplus animal management (improve demographic management or modelling? Educate about use of euthanasia and/or breed and cull strategies).		
Improve collection planning on a global and regional level. *Capacity Building in Other Regions:*	Explore ability of other regions to build structures (IMPs) and expand space (added space gives us on global level more possibilities for collection planning).	WAZA (CPM) and CBSG	Ongoing; **studbook training scheduled in Indonesia in Oct 2011; PMx training for CAZG in Nov 2011 and for JAZA in Feb 2012**
	Approach regional zoo associations about recruiting additional staff members and/or training a member of staff who can guide/evaluate RCPs, assist TAGs in development, etc.		
Create better/stronger program leadership.	Create a program leader checklist for each region so that project leaders understand what is expected and the zoo associations can hold them accountable.	Regional associations	
	Compare current coursework for training of program leaders and evaluate how it could be adapted for quickly posted online training. Training is needed is program leader skills and institutional collection planning.	EAZA and AZA course leaders (D. de Man, W. van Lint, S. Long, L. Faust)	
	Translate the training material in other languages (when relevant).	Specific to training efforts	**PMx software and manual currently being translated into Japanese and Chinese by end of 2011**
	Develop a formal mentoring system for a project leader. Studbook and mentoring guidelines have been developed for WAZA CPM that can help guide this process.	K. Traylor-Holzer to draft for review by CPM and regional associations	(Late 2011)

	Connect program leaders working on the same species in the various regions; EAZA, AZA and other regional zoo associations should merge their contact lists and share contact information with the project leaders/coordinators, and when any new program leaders are added they should automatically be put in contact.	K. Traylor-Holzer to bring to WAZA CPM ; will integrate into Managed Program database for portal	**Alternative method of distribution may be preferable; regions are discussing.**
	EAZA and AZA will discuss allowing restricted access between their respective members to member-specific areas of their websites to encourage information sharing; explore expanding to all regions.		
Shift paradigm to make it clear that participants are also responsible for program's success. Increase accountability of all key stakeholders involved in the program.	Associations need to develop or enforce policies that evaluate whether the program is helping the population to meet its targets and to develop/enforce policies that empower program leaders and the managed programs		
	Share EEP evaluation tools (EAZA) with other regions, and other regions can consider adopting them.	EAZA (D. de Man/W. van Lint) will send to AZA (C. Dorsey/S. Long) and other regions	(Before 28 February 2011)
Evaluate current status and identify challenges for individual species programs; determine what is hindering population viability and program success.	Take the Population Management Center's (PMC's) quick assessment tool for Population Management Plans (PMPs) and evaluate whether the tool needs additional questions (check AArk assessment tool) to categorize current status; develop assessment tool online that will shows programs current status and can be continually used	AZA, K. Schad and small working group	(To be determined)
	Evaluate all species management programs with this tool.	To be determined once the tool is available.	(To be determined once the tool is available.)
	Explore other means of evaluation (PVA-like approach).	L. Faust to pursue PVAs for AZA populations; K. Traylor-Holzer to explore PVA software	(2012); **grant submitted by L. Faust for AZA assessments; KTH developing Vortex model for tiger ex situ populations**
	Approach WAZA to develop a Population Management Advisory Group under the umbrella of CPM or develop at least the infrastructure, and hold a meeting of this group in the next year.	K. Traylor-Holzer and N. Flesness to take to CPM for discussion	**Decision postponed by CPM due to recent expansion of expertise in new corresponding CPM membership**
Ensure adequate founder bases for managed programs (both starting and existing populations); founder base needs may depend on program goals.	Set recommended minimum for number of founders for all new programs (required for official program status and use of resources).		
	Assess founder base of existing programs and use this information in the prioritization process (for program status and phase out, use of resources, etc.).		
	Assess the ability to find new founders (if available); make use of confiscated/surplus animals in other regions	Program leader/ coordinator and/or relevant TAG	(Ongoing)

	Deal with legislative issues; if an IMP is needed for conservation reasons, a solution could be to develop a program in country		
	Consider the founder base in program evaluation (green mark, red mark), including what is the current status and has the program made the efforts to get in new founders?		
Develop process, resources and system to target and biobank potential founders and/or genetically valuable individuals.	Establish mechanism for banking samples from individuals from IMPs not already banked, working with the programs to identify the priority individuals for banking; develop a prioritization approach to determine which species are most important.	O. Ryder and program leader(s); OR will discuss with P. Boyle about AZA supporting this priority.	(At this IMP workshop in San Diego - Dec 2010)

SUMMARY OF RECOMMENDED ACTIONS: Conserving Species Across a Management Continuum

GOAL: To improve the success of species conservation programs by optimally utilizing populations along a managed continuum.

CHALLENGE: There are too few successful IMP programs that meet established criteria for success.			
Objective	Action	Responsible party	(Timeline)/Progress
Develop an expanded definition of program success beyond traditional genetic and demographic milestones that is able to be applied to populations along a management continuum and establish benchmarks for measuring progress toward success or failure.	Convene a discussion to build definitions of success, appropriate measures and benchmarks. Formalize as a CBSG and/or WAZA guideline, published paper or other form of formal distribution/endorsement.	C. Lees, S. Monfort	(April-May 2011)
	Incorporate input from program administering bodies (e.g. zoo associations and others) to ensure acceptance and implementation	C. Lees, S. Monfort	(April-May 2011)
Establish baselines for all managed populations along the management continuum	Action to be determined once the measures have been identified.		
Identify factors and management commonalities leading to both the success and failure of IMP programs to help guide management refinements.	Compile, review and summarize previous analyses of program success. Make all materials available on the IMP workspace on the CBSG member portal.	C. Lees	(May 2011)
Double the number of programs that are succeeding within the next 10 years.	To be determined once we determine current successes		(2020)
CHALLENGE: Current approaches to managing IMPs are not working as evidenced b the low percentage of sustainable populations.			
Objective	Action	Responsible party	(Timeline)/Progress
Explore and experiment with new/alternative approaches to intensive population management that would increase the effectiveness, efficiency and ultimate success of programs.			
Create/emphasize regional centers of excellence where much of the propagation and research is accomplished for some species.	C2S2 group is exploring this idea and a similar approach is underway for Tasmanian devils in the Australasian region.		
Programs need to monitor benchmarks regularly and adjust levels of manage-ment intensity in response to changing program priorities as programs move through different stages over time.	Develop guidelines for monitoring programs		

CHALLENGE: Lack of good biological understanding or recommended process for optimally integrating intensive management of multiple populations as part of an effective meta-population strategy for retaining genetic diversity and meeting other IMP program goals.			
Objective	Action	Responsible party	(Timeline)/Progress
Develop a good understanding of the primary considerations and optimal strategies for meta-population management, and provide tools and processes to guide IMP programs in developing meta-population management strategies.	Explore meta-population strategies through modeling, including those that link populations across the management continuum.	K. Traylor-Holzer, C. Lees and others	**C. Lees is writing Ph.D. proposal focusing on managing populations across a continuum; work to begin in Nov. 2011 (w/ I. Jamieson).**
	Disseminate resulting analyses and recommendations on metapopulation management strategies, including to relevant multi-population management entities (e.g., GSMPs).		
CHALLENGE: *Ex situ* population management expertise and ongoing training and mentoring opportunities are lacking in the range countries of many threatened species.			
Objective	Action	Responsible party	(Timeline)/Progress
Where possible and appropriate, management programs for species should include capacity building in the range country to support its ability to contribute to conservation of the species in the wild.	Compile a list of species managed by the various regional zoo associations and identify whether or not these species are being intensively managed by the zoo association(s) within their range. Identify potential gaps in IMP (programs, expertise, etc.) in range countries and provide this information to the relevant zoo associations managing the species to facilitate capacity building in range countries as appropriate; to WAZA CPM; and to ISIS for incorporation into ZIMS.	K. Traylor-Holzer	**Managed program database compiled in April 2011; range country info to be added in late 2011; portal site developed**
	Liaise between the proposed global population management training/ mentoring/ advisory group and regional zoo associations to assist in connecting interests and needs with potential population management trainers and advisors.	CBSG (K. Traylor-Holzer)	Ongoing; **training activities scheduled for PKBSI (Oct 2011), CAZG (Nov 2011), and JAZA (Feb 2012).**
CHALLENGE: Currently the database records for animals in *ex situ* populations (e.g., ISIS ARKS) usually end if an animal is released into the wild. In many cases, released animals are carefully monitored using separate databases, yet the information is not linked to the animals' *ex situ* database records. Lack of data on animals in the wild, particularly those that have been released and their descendants, reduces our ability to integrate the management of IMPs and wild populations.			
Objective	Action	Responsible party	(Timeline)/Progress
Enable access to available longitudinal studies on wild populations and on best practice methods for obtaining data. Link *in situ* and *ex situ* data	Convene a working group at the 2012 CBSG annual meeting on reintroduction programs to map the framework for further development and use of ZIMS to monitor animals in the wild.	K. Schwartz	(October 2012)

management to facilitate information exchange between zoo professionals and those studying/monitoring animals in the wild.			
CHALLENGE: There is insufficient collaboration and integration of *in situ* and IMP conservation efforts/programs. There are too few zoos and other IMP-focused organizations with good connections to field conservation.			
Objective	Action	Responsible party	(Timeline)/Progress
Species management programs should have close connections with field conservation efforts and appropriate IUCN Specialist Groups.	Action as per Species Prioritization and Integration Working Groups.		
CHALLENGE: The working group acknowledged that, like most of the objectives and recommended actions resulting from this workshop, there are no full-time professionals dedicated to fulfilling the objectives identified by this working group. This is a primary hindrance to accomplishing our objectives and goals.			

SUMMARY OF RECOMMENDED ACTIONS: Collaboration and Integration

GOAL: Identify stakeholders in conservation action for collaboration.

CHALLENGE: Integration of collaboration between zoological institutions and other entities for development of holistic conservation action.			
Objective	Action	Responsible party	(Timeline)/Progress
Identify stakeholders for collaboration on holistic conservation action.	Identified as: regional zoo associations; conservation stakeholders; global organizations; academia	Working group members	**Completed at IMP workshop**

GOAL: Consider and where appropriate include intensively managed populations (population focused) / intensive population management (tool level) in holistic conservation strategies.

CHALLENGE: Philosophical and ethical barriers			
Objective	Action	Responsible party	(Timeline)/Progress
Respect philosophical, cultural and religious values and where possible find consensus.	Offer objective and scientific options for considering IMPs; include interdisciplinary specialists, and disseminate information (see actions for next Challenge below).		
CHALLENGE: Lack of understanding and/or misunderstanding of the role/potential of IMPs			
Objective	Action	Responsible party	(Timeline)/Progress
Increase the trust, overall understanding and lessen misperceptions by making IMPs, their role and function known to conservation partners.	To ensure that all stakeholders have a voice in development of the conservation plan, create a framework with the participation of all concerned parties.		
	Disseminate and promote availability of WZACS and Turning the Tide – increase website availability.	Regional CBSG offices / WAZA C&S Committee / regional zoo associations	(Immediately)
	Disseminate results of IMP workshop to conservation partners.		(Upon completion of workshop report)
	Promote publications	Core group of IMP workshop participants	(Summer – Fall 2011; ongoing); **CBSG portal site established to collect conservation success stories/focus of WG in Prague (2011)**
	Increase collaboration between regional zoo association TAGs and SSC Specialist Groups. Identify SGs that have integrated programs with TAGs.	K. Schwartz to lead; CBSG members of TAGs and SGs to facilitate interaction.	

	WAZA continue talking to international conservation partners (IUCN, CBD, CMS, NGOs)	WAZA	(Ongoing)
	Disseminate information via social network site	Facebook site coordinators	(Immediately)
CHALLENGE: Lack of tools and methodologies for implementation of IMPs in some situations			
Objective	Action	Responsible party	(Timeline)/Progress
Develop and promote tools and methodologies as required through needs assessment (engage new partners; collaborate to provide training)	Engage Field Conservation Committees for WAZA and regional zoo associations and global academic scientists in IMP discussions and planning	CBSG regional offices to identify possible collaborators. EAZA, CBSG Europe and WAZA are compiling WZAC database.	(Establish contacts by end of 2011)
	Develop needed tools via open source technology or shareware.		
Facilitate access to current and future tools for the global conservation community.	Expand access to tools or identify barriers to access; find resolution to increase access.	CBSG, ISIS, regional zoo associations to work to resolve limited resource issue for ISIS membership	(By the end of 2011)
	Develop overall clearinghouse (website) for IMP resources	CBSG and/or CBSG working group to discuss development of a CBSG-managed portal site	**Several CBSG portal sites have been developed (IMP report, PMx users, success stories, managed programs)**
	Create list of regional specialists to help with communication of the various resources and prioritize a communication framework for these specialists to share information.	Regional zoo associations, CBSG regional networks to develop lists of regional specialists in various fields. CBSG to compile and provide to stakeholders as the need arises.	(Regional lists to be completed by end of 2011; international list to be compiled by June 2012)
CHALLENGE: Competition for funding resources (perceived and real)			
Objective	Action	Responsible party	(Timeline)/Progress
Partners work together to share and find new resources (in recognition of limited resources for IMPs)	See Action above to increase collaboration		

SUMMARY OF RECOMMENDED ACTIONS: Next Steps to Follow-up on IMP Workshop

Objective	Action	Responsible party	(Timeline)/Progress
IMP Workshop Report	Set up Wiki or appropriate section on the CBSG member portal for report review and editing	K. Johnson	**Completed December 2010**
	Develop a suggested template for working group and plenary discussion reports and provide templates to all note takers.	J. Ballou, K. Traylor-Holzer	**Completed December 2010**
	Working group drafts to be posted on the IMP Report portal site	WG note-takers, K. Traylor-Holzer to coordinate	**Drafts and revisions posted December 2010 and spring 2011**
	Small group will take responsibility for editing full workshop report	K. Traylor-Holzer, K. Leus, K. Schwartz	**Completed August 2011**
Short communication	Small group will write a short summary of the IMP workshop	E. Blumer, A. Baker, L. Dickie, K. Johnson, Y. Matamoros, P. Boyle	**Completed March 2011**
	Write an article on zoo paradigms to provide structure	L. Dickie	
Publications	Communicate with D. Wharton about an article in *Zoo Biology*	R. Lacy	
	Work on draft commentary for *Zoo Biology*	E. Blumer	
	Short communication group will develop a draft commentary for *Conservation Biology*	E. Blumer, A. Baker, L. Dickie, K. Johnson, Y. Matamoros, P. Boyle	
Presentations	Presentations developed for regional zoo association meetings should be posted on the portal.		**AZA ppt posted Feb 2011**
Tracking progress	Follow up with working groups and designated individuals on developing actions and following their progress and implementation	K. Traylor-Holzer	Ongoing; **updated prior to CBSG annual mtg in Prague (Sept 2011)**
Subsequent IMP meeting	Investigate possible funding for a follow-up IMP meeting	R. Lacy	(2011 or 2012); **one-day session at CBSG mtg in Prague (Sept 2011); follow-up workshops to be discussed at that time**

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APPENDIX I

"Thirty Seconds of Truth" from the Workshop Participants

Thirty Seconds of Truth

At the beginning of the Workshop on the Intensive Management of Populations for Species Conservation held in San Diego on 6-9 December 2010, the workshop participants were invited to provide brief "30 Seconds of Truth" about their perspective, vision, dream or whatever they wanted to share about how they see where we are and/or where we should be headed with respect to the intensive management and conservation of species. Below are these (anonymous) statements:

We have been so successful in developing and growing our SSP/EEP, PMP/ESB and Taxon Advisory Groups that many zoo managers have a difficult task deciding what the priorities truly are. The large numbers of these programs, many managed by "volunteer" staffing, are diluting our resources. Are we promoting quantity or quality?

We have convinced ourselves, our staff and our public that managed programs, reproducing animals in zoos, is conservation. This is becoming a misdirected message which undermines the original goals of our earlier programs.

There is a need to collection plan out past a 3 year time frame to sustain the viability of managed programs and our focus should be better collaboration between institutions and *in situ* support for the wildlife we focus on in our collections.

Given sufficient prey and space, lions are able to re-colonize suitable habitat within a very short time. Indeed, their numbers grow so quickly that the long-term challenge facing small reserves is population management (Luke Hunter, *Africa Geographic*, 2010, 18(10), 57).

I think that a significant number of challenges that we face is because we assume (pretend) that conservation is a top priority for zoos – when it is not!

So we often design conservation breeding programs, even for our most critically endangered species, around zoos, when, in fact zoos have often fiercely competing priorities: exhibiting animals.

[There are also the issues of] volunteer studbook keepers, volunteer coordinators, an overbooked population management center, situations with 20 breeding birds spread over different institutions, etc.

I think we need to change that. Rather than design conservation breeding programs for zoos, we should be, more often, designing zoos, or dedicated conservation breeding facilities, for conservation breeding programs.

Statement 1: Why studbooks
Twenty-five years ago, natural history data of most species in zoological gardens was incomplete or missing; nowadays natural history data of various endangered species in protected areas are based on studbook populations.

Statement 2: Buying time
The people who burn land and eat bushmeat turn out to be friendly neighbors who daily struggle to survive and whose children are too hungry to listen to the teacher who talks about nature conservation.

Recognising that conservation in the wild is our goal – I want to place something on the table that is crucial to that happening + having zoos and aquariums in the future is also part of that outcome. So, in addition to the science and technology and other subjects on this workshop agenda, we need to achieve formal recognition by governments, IUCN, the UN and other worldwide entities that the cooperative breeding programs of zoological institutions are a special class in terms of permitting for the movement of animals and gametes to facilitate the important work of breeding animals for exhibits to teach and engage the public and for the conservation of biodiversity through global collaborations.

I believe zoos need to reduce the overall number of programs and prioritize for, and specialize in, species that need help in terms of conservation of that species. Programs we run need to professionalize (including becoming part of daily routine) and need to be accompanied by realistic budgets and have clear goals.

Habitats are shrinking and wildlife is diminishing regardless of all efforts to conserve and preserve.
Captive populations are not sustainable and are in dire need for intervention.
What can we do that we have not done to reverse this threat?
Illegal wildlife trafficking is at the highest level and none of these will belong or come into managed populations.

Japanese Association of Zoos and Aquariums (JAZA) has a committee for population management called SSCJ. SSCJ is managing more than 140 captive species in Japan. We have a lot of problems.
1. The numbers of half of the managed species are less than 30. So that is difficult to maintain.
2. Many of the managed species are not native species.
3. Many of the managed species are managed to show the visitors (and some of them are for the education purpose). But of course we are willing to contribute to the conservation activities.
We (JAZA) are discussing to meet the conservation goal and to maintain the captive animals to show the visitors.
Many endangered species are from the countries from which we do not have the participants today. We have to take it into account.

We are now at a crisis point – with the extinction crisis (such as with amphibians), with the sustainability of wild populations and of populations under human care. Due to this crisis, there is an increasing grey area between the needs of animals in the wild (in their natural habitat) and those under intensive management under human care. New strategies that integrate management all along this spectrum are required for species conservation. As a co-administrator of the AZA Institutional Records Keeping (IRK) course, I have been teaching theory and mechanics of records keeping for over 12 years. In IRK we have been saying that ZIMS will take care of everything – not limited to data on animals under human care. Now ZIMS is here and the first issue is out, with continued evolution occurring each day. How can ZIMS help with species conservation? Let's look into how ZIMS can help to link data management for IMPs between species under human care and those released to the wild for reintroduction programs. How can ZIMS help to monitor populations in extractive reserves or metapopulations in various reserves – such as black rhinos in Kenya? How can ZIMS help to infuse information into PHVAs that suffer from data deficiency syndrome? How can ZIMS help in monitoring health in wild populations or tracking genetics in wild vs IMP populations? Open sharing of data is essential between *in situ* and *ex situ* and all the gray areas in between.

About 1/5th of recent species conservation success stories are due to captive breeding. That's a dozen or two species, which we should be proud of. However our community has ~1 million live animals of ~10.000 species in our care, an average of ~100/species. That is a lot of capacity, however allocated. We could and should be doing a lot more for conservation, and we should be able to sustain a significant number of populations. [This is] in the direct interest of zoological institutions. I'm here to find some things ISIS can do to help.

Because this is a CBSG workshop, we all expect some big bold ideas will emerge over the next few days. It is important that we discuss actual implementation of the ideas in the context of how we will pay for them.

The truth is that we need to educate our directors and zoo administrators to accept that accomplishing these big ideas costs lots of money – and the animals that they need for their new exhibits are not free – our zoo core budgets need to be re-invented and/or readjusted to accommodate the ability to create sustainable populations.

The truth also is that we should not give up on the private sector – especially when our ideas are out-of-the-box and edgy and considered by some to be impossible. In fact that is what inspires many private donors.

If you don't know where you're going it's hard to figure out the best way to get there. Most of our breeding programs don't have clearly articulated goals (beyond 90% for 100 years) that define why we have the program. That makes it difficult to identify the most appropriate population management for any given program.

What good is having an intensively managed *ex situ* program for polar bears if we don't have an Arctic to put them in?

Without concerted action to ensure sustainability of populations, and to directly connect these efforts to *in situ* conservation, zoos themselves face extinction.

While supportive of this workshop, I, for one, have no interest in "sustaining" populations that benefit the business models of zoos unless these models begin to include direct, substantial support for *in situ* conservation. In my opinion, those zoos that adopt such models are most likely to persist long term.

[What I would like to] take away from this congress:

- How do we make sure we focus on the right species(conservation point of view)?
- How do we make sure that we balance the costs/energy etc between the different species/programs?
- How to improve our (current) programs by introducing new concepts/tools, also better applicable for all other taxa than mammals?

I now think that the focus of much of my work over the past 25 years has been misguided.

I have worked hard to develop optimal techniques for sustaining captive populations, without the need to bring in any more animals from the wild. But all that we have learned over the past few decades about inbreeding, adaptation to captivity, and loss of the diversity suggests that the concept of closed conservation breeding programs is a losing proposition – one in which we try to minimize the damage, as we monitor our losses. To truly help conserve species, we need to stop trying always to manage closed populations with goals such as retaining 90% of the starting diversity for 100 years (a goal that we very rarely meet and is in adequate in any case). We need instead to develop approaches that seek integrated management with wild populations, and have as goals to retain -- continually and into perpetuity -- healthy levels of genetic, behavioral, and physiological diversity.

We shouldn't be managing for "acceptable" levels of decay and loss, but instead for truly sustainable, healthy, resilient, and adaptable populations.

We value and find deep connection with the natural world, leading to heart-felt efforts to celebrate and conserve it. Drawn as we have been to concerns about and efforts for individual species, we deal with the legacy of evolutionary processes and human influences on the tips of the branches of the tree of life, employing knowledge we know to be incomplete to assess the potential for a species to multiply or to apply approaches likely to conserve the soul of a species – its evolutionary potential. These efforts bring us to the forefront of biological inquiry. Standing at this point between past and future, the view from a strategic promontory is what we seek, fully knowing that those who come after us will possess greater knowledge, look back from their promontory and whisper to us what they wish we might have done.
A task before us is to bless the future with options they would otherwise not have had. Assessing, monitoring, and managing genetic diversity; preserving species and, too-little recognized, preserving precious samples will surely help conserve biological diversity.

Pragmatically, we know that these efforts will be insufficient for many species and that, in spite of best efforts, we will see well-intentions efforts fail.

We must address the need that will certainly arise as more species are brought into intensive management that, sometimes, these efforts are "too late", as viewed from our perspective. We must look at the possibility of resuscitating or resurrecting species, though this prospect is fraught with controversy, technical burdens, and the prospect of impossibility. We must watch for hubris in what we imagine we might accomplish or for assuming that we have knowledge of what we cannot.
If we are to preserve options for the future, we must expand our efforts to preserve viable cell collections. Serious research must be undertaken to explore conservation applications of new technologies for incorporating assisted reproductive technologies into conservation planning efforts.

I am pleased and excited that people are discussing prioritization of species, creating different management strategies for species of different priority levels, and explicit links between *ex situ* and *in situ* efforts because these are the things that are necessary to make zoos relevant to conservation. This will require hard choices as many of our most robust populations in captivity are not the species with greatest need, we need to make sure that zoo administrators are not working against our goals, and that AZA, PMC, and other groups that create our management process frameworks are creating frameworks that will support our goals.

I would like to find a way of focusing global zoo resources on the taxa where we can do the most good, whether this occurs via fundraising, awareness and inspiration, research, training, reintroduction or a combination of these factors; and I'd also like to be sure that in doing so we can create effective linkages between zoos' exhibits and their conservation work, without which the whole can be rather less than the sum of the parts. This is likely to involve finding common ground between the economic realities of visitor interests and the conservation imperatives of species decline, and careful forethought in terms of both collection planning and selection of field projects.

I would like to see a better understanding of the central role that solid, innovative husbandry plays in delivering results in population management programmes. We too readily reach for exciting, expensive technologies to overcome breeding and management problems. Often we could overcome those same problems through husbandry interventions. There are people in our community with extraordinary skills in this area and I'd like to see us collaborate more closely with them on programme design.

My "30 seconds of truth" involves asking ourselves the question: "Are we willing to let go of having a species in captivity in exchange for seeing it in the wild?"

Are we willing to face the "fear" of self-evaluation when it comes to looking at our conservation programs? Are we "walking the walk" or just "talking the talk?"

Should we examine the use of the word "rescue" in our programs and publicity?

From Webster: Rescue = forcibly removing from harm's way.

Removing animals from the wild and placing them in glass boxes is not necessarily rescuing them.

Along the lines of the theme for this meeting, I'd like to raise an issue that has often bothered me - Why is that many zoos around the world spend relatively large sums of money to belong to national or regional zoo associations, and yet despite asking for, and being provided with much-needed species management recommendations to help them co-operatively manage their captive populations, they continue to ignore these recommendations? Instead they often follow their own institutional whims and then much later, complain bitterly that many of their populations are dwindling in size, inbred, and/or post reproductive. You have to wonder why some zoos begrudgingly spend their money on association membership, and then often ignore the advice which their money pays for.

'Zoo' community needs clarity, honesty and uniformity across regions as to the real purpose (roles) of *ex situ* populations.
Expert guidance/decision-making is needed in order to identify those taxa with genuine *ex situ* breeding needs
Ex situ conservation must to be taken seriously by the conservation community at large and resourced accordingly – ideally by government in the same was as protected areas etc might be – in order that *ex situ* conservation breeding initiatives can be divorced from the financial constraints of zoo commercial needs. Government (or other) funded 'contracts' to undertake *ex situ* management of a taxon or taxa would then be undertaken by the most appropriate body, whether that be a zoo, aquarium or other without impacting upon institutional priorities and commercial imperatives.

Bill Conway's recent paper, "Buying time for wild animals with zoos" expresses much of my 'truth' for this workshop. However, I would further emphasize that achieving this vision, of zoos directly and consistently integrating their *ex situ* actions with *in situ* conservation, requires a much greater commitment to international collaboration than presently exists, since the geographical distributions of intensive management capacity and biodiversity in need of conservation are very different.

Given that all small population management is, essentially, demographic management, then we should find a way to put “genetic management” in its proper place as a sub-category of demographic management. We have observed repeatedly that genetic management “process” very easily and very often can trump demographic management objectives.

Our conservation focus needs to evolve from the short term to the long, from preserving species as they are today to preserving diversity to sustain evolutionary trajectories for the future. We are confronted with a significant biodiversity deficit created by the mass extinction event currently occurring on our planet. Success cannot be measured in what we are saving for 100 years. Our thinking needs to be expanded to consider time in the tens of thousands, or perhaps hundreds of thousands of years. This change is essential for our ultimate success in *ex situ* programs.

Zoo and aquarium breeding programs (whether or not conservation focused) rely almost entirely on goodwill of all participants. Ownership issues stifle progress and some zoos deliberately use ownership to negatively disrupt programs.

I would like to live in a world where:

- IMP is carried out whenever it is needed/appropriate (with a more proactive, systematic and transparent evaluation of this need for threatened species).
- IMP is NOT done when it is not appropriate.
- When IMP is done, it is done according to the state of the art, the IMP programmes has clear and specific roles and measurable goals and targets (form follows function), before the start of the IMP programme every partner involved realises it takes a serious investment of time and resources and commits to making this time and resources available.

Both in the IUCN world and the zoo and aquarium world it would appear we are largely trying to save biodiversity in our “spare time” and with “spare cash” (many IUCN species conservation activities, and many zoo and aquarium activities related to *ex situ* management for conservation are volunteer driven – i.e. people do it alongside a “day job”). Would anyone expect the economic crisis to be solved in people’s spare time?

Currently there is a lack of well integrated, overarching conservation plans for species. Typically conservation plans are developed independently for *in situ* and *ex situ* populations, and often are focused only within countries or regions, rather than working in concert with each other for the overall benefit of the species. I believe we need a more holistic approach, with shared analyses and agreed upon common goals between the *in situ* and *ex situ* communities and among regional programs. There is an enormous task on our shoulders and our abilities and resources are limited – we need to all work collaboratively so that we can contribute most effectively to the conservation of species to the best of our ability.

Many zoos, aquaria and botanic gardens share the same dual mandate, serving as a public attraction and serving as a conservation center. Ideally, our conservation role involves partnering in integrated conservation programs that support species survival in the wild. We also share many challenges: balancing our dual roles, strategically selecting species for *ex situ* management, linking out-of-country facilities with on-the-ground conservation (often in developing, biodiversity-rich countries) and building capacity in biodiversity hotspots. We undoubtedly have much to learn from each other and I would encourage more cross-fertilization between our conservation communities.

Despite much planning and repeated strategizing, our management plans are not instigating action for the populations or species that require improvements in space or management strategies in order to succeed. Our carefully crafted plans describing the needs of these populations continue year by year but recommendations for major changes go unheeded. It seems as though we either need to care less or horrify people more in order to instigate a more significant response. Parts of the current cooperative management system work but common weaknesses continue to cause problems: lack of clarity and agreement in goals and priorities, poor communication among different players in the system, procrastination, lack of planning ahead, etc. We need to clarify our goals, assess the necessary data, and refocus our energies and mobilize in an organized manner to help the populations we have the ability to help.

A month ago we attended the Mesoamerican Biology Conservation Society Congress and two important issues came to our attention:

1) Models say that Mesoamerica is the HOTSPOT of climate change in the Americas, which mean that we are going to have:

- dry weather
- higher temperatures
- stronger meteorological events

2) There was a consensus that the word Management is a bad word in the Mesoamerican Region.

We have done an excellent job of convincing the community of the importance of some genetic concepts - that inbreeding is always bad, even though sometimes we need to temporarily produce inbred individuals for demographic reasons, and that dropping below 90% gene diversity is always bad, even if this is a somewhat arbitrarily chosen benchmark and is dependent on a population's specific genetic makeup (i.e. its genetic load). The community has perhaps heard these messages too well, and may focus on these genetic criteria even when a population may have other, more pressing issues, such as experiencing a demographic decline, having breeding recommendations that don't produce births, etc. We need to be careful about how we communicate our response to this sustainability crisis (and our purpose for this meeting) so that the zoo community doesn't get fixated on only a piece (e.g. inbreeding, 90%) rather than the entire puzzle of population sustainability.

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APPENDIX II

Workshop Participants and Agenda

IMP Workshop Participant List

Last name	First name	Country	Institution
Baker	Anne	USA	Toledo Zoo
Ballou	Jonathan	USA	Smithsonian Conservation Biology Institute
Blumer	Evan	USA	The Wilds
Boyle	Paul	USA	AZA
Christie	Sarah	UK	Zoological Society of London
Clum	Nancy	USA	Wildlife Conservation Society
De Man	Danny	Netherlands	EAZA
Dickie	Lesley	UK/Netherlands	EAZA
Dorsey	Candice	USA	AZA
Faust	Lisa	USA	Lincoln Park Zoo
Flesness	Nate	USA	ISIS
Gagliardo	Ron	USA	Amphibian Ark
Gibson	Richard	UK	Amphibian Ark
Greene	Lewis	USA	Columbus Zoo
Gusset	Markus	Switzerland	WAZA
Havens	Kay	USA	Botanical Gardens Conservation International
Ivy	Jamie	USA	San Diego Zoo
Johnson	Kevin	Australia	Amphibian Ark
Lacy	Robert	USA	CBSG/Chicago Zoological Society
Lees	Caroline	New Zealand	CBSG Australasia
Leus	Kristin	Belgium	EAZA / CBSG Europe
Long	Sarah	USA	AZA Population Management Center
Matamoros	Yolanda	Costa Rica	Simon Bolivar Zoo / CBSG Mesoamerica
Monfort	Steve	USA	Smithsonian Conservation Biology Institute
Odum	R Andrew	USA	Toledo Zoo
Ovalle	Leonel	Venezuela	Caracas Zoo
Pearce-Kelly	Paul	UK	Zoological Society of London
Pillai	Kumar	Singapore	Singapore Night Safari
Princée	Frank	Central African Republic	
Ready	Mike	USA	TreeWalkers
Riger	Peter	USA	Houston Zoo
Rodriguez-Clark	Kathryn	Venezuela	IVIC
Ryder	Oliver	USA	San Diego Zoo
Schwartz	Karin	USA	Chicago Zoological Society
Takami	Kazu	Japan	JAZA / Osaka Zoo
Thomas	Patrick	USA	Wildlife Conservation Society
Traylor-Holzer	Kathy	USA	CBSG
Van Lint	William	Netherlands	EAZA
Wharton	Dan	USA	Chicago Zoological Society
Wiese	Robert	USA	San Diego Zoo
Wildt	David	USA	Smithsonian Conservation Biology Institute
Zippel	Kevin	USA	Amphibian Ark

Workshop Agenda

San Diego Zoo, San Diego, CA, USA, 6 – 9 December 2010

Monday, 6 December

AM	Welcome/introductions/"30 seconds of truth"/workshop overview and goals
	Plenary discussion: Defining our vision for IMPs (Lacy)
	Plenary presentation (Ballou)
PM	Afternoon plenary presentations (Lacy, Traylor-Holzer, Lees, De Man, Wiese, Long)
	Plenary discussion: Brainstorming challenges to achieving the vision
	Formation of working groups
6:00	Dinner at San Diego Zoo

Tuesday, 7 December

AM	Working groups: Identify the goal(s) and challenges in achieving those goals
	Plenary session: Working group reports/discussion
PM	Plenary presentations (Flesness, Faust, Wildt, Lacy)
	Working groups: Develop objectives for each challenge
6:00	Dinner on own

Wednesday, 8 December

AM	Plenary presentations (Havens, Gibson, Leus, Traylor-Holzer)
	Working groups: Develop objectives to address the challenges
	Plenary session: Working group reports/discussion
PM	Working groups: Identify actions to work toward the objectives, with timelines and responsible parties
	Plenary session: Working group reports/discussion
6:00	Dinner at San Diego Zoo

Thursday, 9 December

AM	Working groups: Continue development of actions
PM	Plenary session: Working group summaries/discussion
	Plenary discussion: Next steps

Intensively Managed Populations for Conservation Workshop

San Diego, CA, US
6 – 9 December 2010

APPENDIX II

List of References

Useful References

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