Amphibian Biodiversity Conservation (ABC) Course at DWCT & DICE

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Across the globe, amphibian populations are in decline. In many cases, the effects of habitat destruction are outpaced by other factors: about a quarter of all threatened species are under attack by environmental contaminants and diseases such as chytridiomycosis, while factors such as small range size or a limited ability to disperse, human disturbance, invasive species and global warming each affect about 8% of species. Harvesting for food, the pet trade and scientific research are also causes of decline for about 3% of threatened species. Keeping in view of the above factors, the first course on Amphibian Biodiversity Conservation was organized by the Durrell Wildlife Conservation Trust (DWCT) to train the amphibian biologists working around the globe.

In partnership with the UK's Declining Amphibian Population Task Force (DAPTF), the Durrell Institute of Conservation and Ecology (DICE) at the University of Kent and the Amphibian Research Centre, Melbourne, Australia, the Durrell Wildlife Conservation Trust therefore organised an Amphibian Biodiversity Conservation course – the first of its kind – to train eighteen amphibian biologists from all around the world India, Sri Lanka, Bangladesh, Singapore, United Kingdom, U.S.A., Greece, Columbia, Bolivia, Argentina, Brazil, South Africa and New Zealand.

The course directors were ITC's Jamie Copsey and Dr Richard Griffiths of DICE. We also benefited greatly from the contributions of people like Chris Clark, Dr Andrew Cunningham (Zoological Society of London), Prof. Tim Halliday (DAPTF), Prof. Trevor Beebee and Gerry Marantelli, Director of the Amphibian Research Centre in Australia, as well as staff from Durrell's vet and herpetology departments and many others, to discussions on the problems and potential solutions to them.

19th June, 2006 Monday

The ABC Course started on 19th June, 2006 with a welcome and introductory lecture by Dr. Quentin Bloxam, Director (Research), DWCT to the participants highlighting this ABC course is being run at this time. Subsequently Dr. Miranda Stevenson, Director of British & Irish Association of Zoos and Aquariums conceptualized the course in terms of its relevance to zoos and the potential role of zoos in combating the amphibian extinction crisis and amphibian bio-diversity conservation. Jamie Copsey outlined the course format explaining main aims and highlighting mix of skills and understanding key focus on developing inter-organisational linkages and introduced participants and lecturers and requested participants to introduce themselves.

Richard Griffiths outlined the current knowledge on amphibian species richness and diversity on a global scale identifying the areas of the world of greatest conservation importance, in terms of levels of endemicity and total numbers of species. Prof. Tim Halliday, International Director, DAPTF International and working with Department of Biology, Open University, U.K. gave detailed note on how amphibian species richness and diversity are changing in particular parts of the world, comparing these changes with those experienced by other taxa - are amphibian's mirroring the pattern? This session also included an update on the Global Amphibian Assessment. Further in his lecture Prof. Halliday and Prof. Griffith focussed on the particular life history traits of amphibians that make them particularly susceptible to the impacts of anthropogenic factors, highlighting those amphibian groups at most risk due to their biology, behaviour and ecology.

Dr. Gerardo Garcia, Head, Herpetology, Durrell Wildlife Conservation Trust provided an example of an anuran species in subject to multiple threats and in part threatened through its particular reproductive biology (low clutch size and exceptional parental care), highlighting the potential role of captive populations in fueling our understanding of the species. He gave examples of Mountain chicken and his Ph.D., work on these frogs.

In the evening participants were taken to the herpetile tour at Durrell Trust, to introduce participants to their amphibian collection within the Zoo and which familiarised us with the programmes currently running both *ex situ* and *in situ* by the trust. The focus of the day was to "understand the patterns of amphibian distribution and abundance".

20th June, 2006 Tuesday

The second day of the training was devoted to "understand the amphibian threat". The day began with Jamie Copsey providing an opportunity to all participants to share their understanding of the drivers of amphibian extinction highlighting the gaps in our knowledge and an hour long brain storming session went off. This session was followed by Prof. Tim Halliday, providing an overview of current thinking concerning the main threats facing amphibians at

A section of the course participants attending a lecture

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a global scale emphasising the importance of pooled information on population change across the range of a species rather than a focus on single locations. Prof. Halliday also focussed on the threat posed by habitat destruction and degradation on amphibian populations and the related impact of habitat fragmentation on population viability and "source and sinks". Jamie also provided a practical activity designed to introduce participants the "thinking tools" to understand cause and effects that determine amphibian species decline. A case study of a currently threatened species – Jersey agile frog was used to develop this skill the aim being to identify principle reasons for the decline and generate hypotheses for testing through management actions. This activity focused the use of causal flow diagrams, flipcharts, brainstorming and the roles of facilitator and recorder in managing group thinking. The activity continued with formation of three small groups of 4-5 participants in a group.

Prof. Haliiday continued the session with a discussion regarding the extent to which conservationists' responsibility in documenting extinction rather than channeling all their efforts into conserving a few species. Considering the apparently rapid rate at which biodiversity, in particular amphibians, are being lost, how much should we realistically aim to save? Should we as amphibian conservationists accept our role as amphibian historians, focusing our resources on documenting loss rather than acting to try and save it?

21st June 2006, Wednesday
Each day three or four presentations were given by the participants as post diner talks. Thus by the 3rd day of the training every one was aware with the amphibian activity going around the world.

The third day was to know more about "The Problem of Pathogens". Chris Clark, Head of the International Training Centre provided an opportunity for participants to share their own understanding of the current threat to amphibians posed by pathogens and the extent to which this threat is particularly pertinent to this animal group. Followed by this, Dr. Andrew Cunningham, Head of Wildlife Epidemiology, Zoological Society of London provided an overview of current knowledge of the pattern and severity of disease spread across the world, in particular of chytrid fungus and ranavirus. Identifying most susceptible groups and reasons for their vulnerability, he also reflected on the evidence for particular causative agents of disease spread, including environmental stress, global warming and commercial trade. Dr. Cunningham considered current gaps in our knowledge about pathogen biology and ecology highlighting areas for research and suggesting mediums for filling the gaps. Including the potential role of captive facilities as research centres and the contribution that fieldworkers can make through the collection and dissemination of particular amphibian research.

The next session was delivered at Veterinary Section of the DWCT by Dr. Javier Lopez, Head of Veterinary Department. The participants were also detailed about the skills to be used in conducting post-mortoms and preserving samples for amphibians focusing on how to remove and store particular body tissues for analysis for disease. This session also included a practical on inserting transponders for monitoring purposes.

22nd June, 2006, Thursday
Fourth day of the training provided participants module on "Prioritizing our actions" started with views on the extent to which amphibians are included in current conservation efforts and in approaches used to prioritising areas for conservation attention. During the session all participants undergone steps that the amphibian conservation world should take in order to raise the profile of the taxa and ensure that it becomes more of a priority for conservation effort. It also provided an opportunity for participants to feedback from the small group activity and present what they see as the main problem facing amphibians with regards to their profile among global stakeholders and what solutions could be found within the amphibian conservation world to remedy the situation. The afternoon session explored existing international, regional and national level legislation and agreements within Europe and beyond that could be used in support of amphibian conservation as a priority case.

John Pinel, Countryside Manager, Department of Planning and the Environment, Jersey provided details on the critically assessed examples of amphibian conservation programmes that have engendered local public support and involvement through pond creation, habitat protection, and advocacy using Jersey as a case in point ('Toad Watch' and agile frog conservation). Chris Clark covered a detailed lecture on developing participants skills at using modeling programmes (VORTEX) to identify priority strategies for conservation action and the need for particular data to make informed decisions. The session ended with Prof. Griffiths obtaining feedback from groups on the priority strategy and to reflect on the strengths and limitations of computer modeling as a decision-making tool. This session also introduce an alternative modeling programme and demonstrated how it has been used to inform management decisions about a threatened species.

23rd June, 2006, Friday
On fifth day focus being the "Planning our conservation action", we used action planning process and the importance of good interpersonal and rational skills in designing the most effective and efficient plans. We also compared the level of success of individuals within the teams to the success of the teams themselves in identifying the best course of action to survive the desert, by way of outlining the main steps involved in planning in groups, highlighting the importance of interpersonal skills in determining the quality and level of support for these decisions.

Dr. Gerardo provided case studies using examples from within Durrell's amphibian conservation programmes to assess the evolution of conservation planning and highlight the most important changes that have taken place in improving the planning process. These exercises provided participants with existing action plans and consider their strengths and weaknesses and how we could improve them for more effective impact, the ingredients for writing a "successful" action plan.

24th June, 2006, Saturday
The day focussed on "monitoring amphibian populations", Prof. Griffiths narrated the importance of having a clear research question before designing a monitoring or survey programme with an appreciation of the level at which we need to operate and the resultant value of the data collected and comparing populations or determining actual population size.

This session also provided an opportunity for participants to share their experiences of population monitoring and some of the strengths and weaknesses of particular approaches adopted. This session also allowed for discussion over most appropriate methodologies to apply to particular species and the validity of the data generated. The exercise also lead to the strengths and limitations of sampling techniques that allow factor in detectability into measurements of population sizes, using distance sampling. The participants were also explained the basics of data analysis produced from distance sampling and consider the limitations as well as the strengths of this approach for studying amphibians. Chris lead the participants up to speed with the fundamentals of Excel as a data management and analysis tool with particular attention to the use of Pivot Tables & Frequency Tables and filters for fundamental data manipulation also which proved to be very useful. Dr. Cunningham, provided detailed talk on the risks associated with fieldwork including the issue of pathogen transmission, elevated amphibian mortality risks through the use of particular marking and monitoring techniques and how to minimise the risks becoming a reality.

26th June, 2006, Monday
The seventh day focus was on "Studying amphibian using lives" the current study of the common toad (or "crapaud") on Jersey this session lead by John Wilkinson, Amphibian Researcher working with Durrell Institute of Conservation Ecology. John considered the whole ecology of common toad extent to which understanding from one amphibian population to another and the inherent risks of making too many assumptions. This talk also considered the value of radio-tracking as a tool for studying amphibian ecology. Infact in the late evening participants in smaller groups were taken for radio tracking the jersey toad on the island. John also led a detailed field demonstration on mark and recapture as a tool for studying both population size and ecology introducing the methodology, its strengths and limitations. This session involved live data from recent work on toad populations on the island.

One whole session also provided participants with the opportunity to practice conducting a mark and recapture experiment and analysing the data generated. Participants then calculated population size and the influence of detectability on population estimates produced. Bailey's modifications were outlined for improving reliability of estimates. This session also considered the benefits of multiple estimators over "simple" ones and some of the assumptions made in applying these more complex analytical methods. The computer programme MARK was also introduced as a tool in data-crunching. John also demonstrated the application of biometry studies, radio-tracking and GIS in amphibian ecological research in

relation to understanding the local common toad population. This session on studying amphibian lives in the wild provided an opportunity for further questions or points on the subject.

Gerry Marantelli, Director, Amphibian Research Centre, Australia provided a detailed note on the potential role of captive populations in developing our understanding of amphibian ecology, behaviour and other life history traits, the opportunities and limitations of this approach. He also provided an example of the potential of captive breeding facilities to contribute significantly to our understanding of and ability to conserve threatened amphibian populations through an introduction to the Amphibian Research Centre, Australia. The talk also included reference to the importance of dedicated facility design and examples of designing facilities from other countries also.

27th June, 2006, Tuesday
The eight day focal point was "roles of realities of captive amphibian populations". Prof. Griffith provided an overview of the current state of captive breeding facilities in particular zoos, in terms to amphibian conservation through conservation action, research and education. The status of various captive breeding populations in zoos in particular of threatened species was discussed. Gerry provided participants to consider the range of issues that are raised in establishing a captive breeding programme and particularly with the programme designed for breeding animals for release, for conducting research under controlled conditions or for long term management in captivity.

Prof. Trevor Beebee, Co-editor "Amphibia-Reptilia", Department of Biochemistry of Sussex University, spoke on the importance of understanding some fundamentals in small population biology and the inherent risks associated with high genetic load and inbreeding both in captivity and in small populations in the wild.

Prof. Griffith lead a session exploring the case study of comparing the genetics and fitness of captive and wild amphibian focusing on the case of Mallorcan midwife toad. Last session of the day covered the overview of the current systems available for managing the animal records and the

importance of fundamental information to manage animal effectively lead by Amy Hall, Animal Registrar of the DWCT.

28th June, 2006, Wednesday
On ninth day the focus of the training was "Managing risk in animal movement" lead by providing the details on the use of current management practices employed at Jersey Zoo to manage the risk of disease spread within the captive environment and between captivity and the wild (quarantine), a detailed discussion also facilitated into procedures that should be adopted. The participants were taken to quarantine facility of the zoo to provide an opportunity for participants to reflect on the procedures in place to manage disease transfer at Jersey Zoo and consider potential areas for improvement or maintenance. At the end participants came out with very useful recommendations for the Jersey Zoo which were presented with a scenario in which they are to consider in order to minimize risk of disease transference bringing animals into captivity or getting them back into the wild.

Gerry provided examples of his conservation work of the Amphibian Research Centre as a case study to encourage participants to reflect on what steps should be taken to minimise the risk of disease spread and to consider how they would deal with a situation in which disease is present in a population (e.g. Chytrid in corroboree frog). This session took advantage of the experiences of the Amphibian Research Centre in managing releases of threatened amphibians in Australia and their involvement in similar projects overseas.

29th June, 2006 Thursday
The tenth day centred on "Metapopulation & mirco-habitat planning" began with Prof. Trevor and Prof. Griffiths, introducing meta-population management, encouraging participants to share their own understanding of the concept. Prof. Trevor also covered topics on conservation genetics linking to population history of amphibians in general. He also used the genetic information to understand population origin and movement. Prof. Trevor also critically reviewed the lessons learnt and the ingredients for success in managing threatened amphibian populations in the wild through the case of the Natterjack toad conservation efforts in Britain over the last 40 years- transferable knowledge for other conservation efforts globally?

In the afternoon, all participants were taken to field for a live case study on Jersey dealing with a locally threatened species, using the example to explore management approaches at the species and habitat level and involving an investigation of the balance between managing breeding sites ("ponds-as-patches") and managing "interstitial" terrestrial habitats. This activity used to evaluate the use of Habitat Suitability Indices also.

30th June, 2006, Friday
The last and final day of the training, was summing up Quentin Bloxam, Director – Conservation Research of the Trust on the legacy of Gerald Durrell. His talk reflected on Durrell's initial interest the Little Brown Jobs in particular the Mallorrcan midwife toad and look to the future for

Participant of the ABC Course

amphibian conservation in general. Respected lady Lee Durrell, Honorary Director of the Gerald Durrell Wildlife Conservation Trust joined all participants to say hello and to know up to what extent training was useful. She spared her valuable time listening to discussions and interacting with participants. Chris Clark, Prof. Griffiths and Jamie Copsey wrapped up the training, considering the range of organizations, in particular at the international level, that have been established to support in expanding knowledge in support of amphibian conservation and the future shape of these organizations- how can we support them and they can support us? During this session the main strands of the course and emphasizing its importance of maintaining contact and disseminating new understanding was also dealt, in order to challenge the many question marks that still surround amphibian life and how best to conserve it.

In the end participants were also asked both written and verbal feedback on the course in order to consider the next stage of development for ABC Course. A unique presentation -"Trivia" was delivered by Gerry who made everyone to laugh and also to understand how amphibians are important to conserve.

The closing remarks delivered by Dr. Mark Stanley Price, Director, Durrell Wildlife Conservation Trust emphasizing the importance of a "gear-change" in everyone's efforts to conserve amphibian life on earth and the role that individuals and individual organizations can play in this movement, with particular reference to Durrell's ongoing interests in amphibian conservation. The certificate of participation was given to everyone with a CD containing all relevant reference material for the use of participants.

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