AArk Amphibian Conservation Needs Assessment process

Based upon draft prepared by: Taxon selection and prioritisation working group – CBSG/WAZA Amphibian Ex situ Conservation Planning Workshop, El Valle de Anton, Panama, February 2006.

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Rationale

Conservation resources are limited, more so for amphibians than many other taxa, and with over 2000 threatened species in need of help the process outlined below seeks to objectively and consistently identify priority species and their immediate conservation needs.

The mission of the AARK is "facilitating partnerships that ensure the global survival of amphibians, focusing on those that **cannot *currently* be safeguarded in nature**".

Ex situ conservation of a threatened amphibian species should be considered a necessity when the imperative of *in situ* conservation cannot by itself ensure the survival of a species and its ecosystem.

When *ex situ* management of an amphibian species is considered necessary and appropriate, the priority should be to establish the initiative within the range State of ecological origin. Emphasis should therefore be placed on developing appropriate capacity within the range State where this does not exist. However, if the perceived urgency of the situation requires it, *ex situ* programs will be set up outside of range State wherever expertise and other resources are forthcoming.
Data derived from *ex situ* management of amphibians should be made openly available to workers involved in the *in situ* conservation of the species (or similar species) and *vice versa*.

Ideally an *ex situ* initiative should be temporary in nature and viewed as just one of the tools that can help in the overall conservation of a species. It therefore follows that strong links between *ex situ* and *in situ* components are fundamental to the long-term success of species conservation. Full integration between *ex situ* and *in situ* conservation approaches should be sought wherever possible. This is normally best highlighted through the establishment of a formal Taxon Management Plan that explicitly states the short, medium and long term goals of each component of the conservation initiative.

In cases where an *ex situ* conservation initiative has been established prior to, or in the absence of, a concurrent *in situ* initiative (e.g. where a political situation currently prohibits *in situ* conservation measures, or where a disease problem currently invalidates measures to protect wild populations), emphasis should be placed on establishing the appropriate *in situ* links as soon as it becomes possible to do so in order to achieve the end goal of having the species safely back in nature.

The conservation needs assessment tool has been structured in two sections:

The first section concerns **Assessing** species for conservation actions both *in situ* and *ex situ* - i.e. with limited resources (space, staff, money etc.) which species should have *ex situ* programs established ahead of others, which species urgently need field research or protection, etc. It takes the form of a series of questions with weighted scores. The total score for a species is derived via a number of relevant questions with weighted answers. Some questions may not be straightforward to answer and will require consultation with colleagues, taxonomic experts and other individuals/groups working with the species.

The second section includes questions ensuring that there is **Authorisation** for any proposed *ex situ* conservation program, and that founder animals are available.

The information provided in sections one and two is then used to categorize each species into one or more **Conservation Roles**. These roles are then used to generate a series of prioritized lists which can then be used to determine the next steps required for the conservation of each species.

When considering **Implementation** of an *ex situ* program, each facility should work through AArk's Program Implementation tool, which considers the practical feasibility of initiating and maintaining a program – a sort of check list of essential elements prior to initiation.

While a number of very successful amphibian conservation programs have begun, and are currently underway **without** following all of these steps, **the Amphibian Ark recommends that where possible, these steps are all followed**, to ensure the best possible outcome for the population being managed.

It cannot be emphasised enough how important it is to ensure that adequate resources, including skilled staff, live food, funding, veterinary services etc. can be provided for the expected life of the *ex situ* program. Many programs run for five, ten, or even more years, and sufficient resources to support the program for the whole of this time must be available if the program is to be successful. Establishing facilities and collecting rescue populations is only the first. albeit perhaps the single greatest expense. However, it is insufficient to support only those first-year expenses without operational support for the long term, which as stated above, may amount to years or even decades. In addition to financial planning, *ex situ* programs should establish at the onset a plan for working with partners to mitigate threats in the wild and, where necessary, getting animals back into the wild, as well as how to distribute and properly manage the progeny of captive animals in the interim.

If hope remains that a species can be saved as the result of *ex situ* breeding, any number of founder animals is better than none, however, Amphibian Ark strongly recommends that **at least twenty pairs of animals** (or groups of individuals) are collected as founder animals. Ideally these would be unrelated and will successfully reproduce, but of course that cannot be guaranteed. Realize that many more than this number may have to be captured to ensure that twenty pairs actually survive and successfully reproduce. Searches for the sufficient number of founders should be thorough and complete, and if exhaustive searches do not result in a minimum of twenty pairs of founders, searching should continue after the program has been initiated.

Collection of founders should be targeted towards obtaining as many unique lineages as possible (e.g., collect from different locations and, if possible, different sites at each location to reduce the probability of collecting related animals). This assumes that a genetic study has been done among these different populations verifying that they are in fact the same species.

Amphibian Ark has developed a tool to help calculate the number of founders that should be collected, based on the reproductive biology of the species being considered. The tool uses data from our **Amphibian Population Management Guidelines**.

This conservation needs assessment tool should be an evolving protocol. The criteria and their rankings will be adjusted as we gain experience with the process and continue to work with the broader amphibian conservation community to identify goals, threats, and conservation options. In addition, the selection and prioritisation of individual species will be revised as we gain knowledge and as the threats to the species change. Thus, there will be a need to constantly assess species status and monitor threats, so that emerging critical situations are responded to sufficiently quickly.

Section One – Taxon Assessment

1. **Extinction risk:** What is the current IUCN Red List category for the taxon? (modified accordingly if new/additional information is available, or if country-level assessments exist).

    Extinct in wild
    Critically endangered
    Endangered
    Vulnerable
    Data deficient*
    Near threatened
    Least concern
    Extinct

    (*taxon has been regionally or nationally recognised as 'at risk' despite data deficiency)

    If there is a proposal to modify the Red List category by the workshop participants, a note should be added explaining the rationale for the proposed change.

2. **Phylogenetic significance**: What is the taxon's Evolutionary Distinctiveness (ED) score, as generated by the ZSL EDGE program?

    ED value > 100
    ED value 50-100
    ED value 20 - 50
    ED value <20

    EDGE score
    Using a scientific framework to identify the world's most Evolutionarily Distinct and Globally Endangered (EDGE) species, the EDGE of Existence program highlights and protects some of the weirdest and most wonderful species on the planet. EDGE species have few close relatives on the tree of life and are often extremely unusual in the way they look, live and behave, as well as in their genetic make-up. They represent a unique and irreplaceable part of the world's natural heritage, yet, an alarmingly large proportion is currently sliding silently towards extinction, unnoticed.

    Every species in a particular taxonomic group (e.g. amphibians) is scored according to the amount of unique evolutionary history it represents (Evolutionary Distinctiveness, or ED), and its conservation status (Global Endangerment, or GE). You can download the EDGE scientific paper to find out more about how EDGE scores are calculated:
    http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0000296

    Additional information about the EDGE scoring process can be found at
    http://www.edgeofexistence.org/about/edge_science.php

3.   **Protected habitat:** Is a population of at least 50% of the individuals of the taxon included within a reliably protected area or areas?

Yes
No
Unknown

Protected habitat is defined as a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.

The status of protected habitat is used to calculate Conservation Roles, and is not scored.

Initial data were extracted from IUCN 2008. IUCN Red List of Threatened Species. www.iucnredlist.org and Alliance for Zero Extinction (2010). 2010 AZE Update. www.zeroextinction.org

4.   **Habitat for reintroduction:** Does enough suitable habitat exist, either within or outside of currently protected areas that is suitable for reintroduction or translocation?

Yes
No

If the answer is Yes, a note should be added to provide details of the suitable areas.

This question provides information on particular areas of existing habitat that are suitable for reintroduction of captive-bred animals. When prioritizing species for possible *ex situ* conservation and reintroduction programs, priority should be given to those species that are known to have suitable release habitat available.

5.   **Previous reintroductions:** Have reintroduction or translocation attempts been made in the past for this species?

Yes, successfully
Yes, but unsuccessfully
Yes, but outcome is unknown
No

If the answer is Yes, a note should be added to provide details.

This question does not affect the conservation role(s) assigned to the species, and nor does it affect the scoring. It is included purely to help guide, and to indicate the potential for demonstrable success with future reintroduction or translocation attempts.

6. **Threat mitigation:** Are the threats facing the taxon, including any new and emerging threats not considered in the IUCN Red List, potentially reversible?

    Species does not require conservation action at this time
    Species is effectively protected
    Threats are being managed - conservation dependant
    Threats are potentially reversible in time frame that will prevent further
        decline/extinction
    Threats cannot/will not be reversed in time to prevent likely species extinction
    Threats unknown

    Species does not require conservation action at this time
    This species is not currently facing any major threats in the wild, and no conservation action is currently required to safeguard this species in the wild.

    Species is effectively protected
    All, or the majority of the population of the species in the wild is sufficiently protected to prevent further decline in numbers (e.g. the bulk of the population occurs in protected areas).

    Threats are being managed - conservation dependant
    Without the current management of the threat, the species would disappear in the wild. Examples of this sort of management include actions such as filling temporary ponds each year for breeding, diverting a dam to create a torrent, or harvesting predatory species.

    Threats are potentially reversible in time frame that will prevent further decline/extinction
    The threats to the species can, or will likely be removed or reversed, in a timeframe that will prevent further decline of the species in the wild.

    Threats cannot/will not be reversed in time to prevent likely species extinction
    The species will very likely go extinct in the wild before anything can or will be done to save it, but in principle the threats to the species could be reversed and the animals in *ex situ* colonies could be used to re-stock the wild if/when the threats are reversed.

    Threats unknown
    Either no knowledge about the threats to this species exists, or there is so little information known about the distribution of the species in the wild, that the threats cannot be determined.

7. **Population recovery:** Is the known population of this species in the wild large enough to recover naturally, without *ex situ* intervention if threats are mitigated?

    Yes
    No
    Unknown

    The size of the population in the wild is used to calculate Conservation Roles, and is not scored.

8. **Biological distinctiveness:** Does the taxon exhibit, for example, a distinctive reproductive mode, behaviour, aspect of morphology or physiology, *within the Class* Amphibia?

    Aspect of biology identified that is unique to species
    Aspect of biology shared with <6 other species
    No aspect of biology known to be exceptional

    If the species is identified as being biologically distinct, a note should be included to explain this.

9. **Cultural/socio-economic importance:** Does the taxon have a special human cultural value (e.g. as a national or regional symbol, in a historic context, featuring in traditional stories) or economic value (e.g. food, traditional medicine, tourism) within its natural range or in a wider global context?

    Yes
    No

    Socio-economic – are the benefits from the economic activity likely to influence the conservation of the species?

    If the species is identified as being of cultural or socio-economic importance, a note should be included to explain this.

10. **Scientific importance:** Is the species vital to current or planned research other than species-specific ecology/biology/conservation? (e.g. human medicine, climate change, environmental pollutants and conservation science), *within the Class* Amphibia.

    Research dependent upon species
    Research dependent upon <6 species (incl. this taxon)
    No research dependent on this species

    If the species is identified as being of scientific importance, a note should be included to explain this.

11. **Over-collection from the wild:** Is the taxon suffering from unsustainable collection within its natural range, either for food, for the pet trade or for any other reason, which threatens the species' continued persistence in the wild?

    Yes
    No
    Unknown

    Information about collection from the wild is used to calculate Conservation Roles, and is not scored.

12. *Ex situ* **research:** Does conserving this species (or closely related species) *in situ* depend upon research that can be most easily carried out *ex situ*?

    Yes
    No

    Information about *ex situ* research is used to calculate Conservation Roles, and is not scored.

13. **Husbandry analog:** Do the biological and ecological attributes of this species make it suitable for developing husbandry regimes for more threatened related species? i.e. could this species be used in captivity to help to develop husbandry and breeding protocols which could be used for a similar, but more endangered species at a later stage?

    Yes
    No

    Resources for *ex situ* programs are scarce, and analog species should only be specified for target species that are threatened, and have not previously been successfully kept in captivity. A note should be included which lists the target species for this analog. Information about husbandry analogs is used to calculate Conservation Roles, and is not scored.

14. **Captive breeding:** Has this species been successfully maintained and bred in captivity?

    Yes, bred to F2
    Yes, bred to F1
    Maintained but no successful breeding
    Not held in captivity to date

    Information about captive breeding is used to calculate Conservation Roles, and is not scored.

15. **Educational potential:** Is the species especially diurnal/active/colourful and therefore suited to be an educational ambassador for amphibian conservation?

    Yes
    No

    Information about education potential is used to calculate Conservation Roles, and is not scored.

Section Two – Ex situ Program Authorization/Availability of animals

16. **Mandate:** Is there an existing conservation mandate recommending the *ex situ* conservation of this taxon? A recommendation for an *ex situ* population of a threatened amphibian species can come from a number of recognised national or international sources (see Appendix 2).

    Yes
    No

    If the answer is **No**, there is insufficient authorisation for an *ex situ* initiative at this time.
    SEEK MANDATE FROM ASG/AARK OR OTHER AUTHORITY

17. **Range State approval:** Would a proposed *ex situ* initiative for this species be supported (and approved) by the range State (either within the range State or out-of-country *ex situ*)?

    Yes
    No

    If the answer is **No**. there is insufficient authorisation for an *ex situ* initiative at this time.
    SEEK APPROVAL FROM RANGE COUNTRY (WITH HELP FROM AARK/ASG AS REQUIRED) BEFORE PROCEEDING

18. **Founder specimens:** Are sufficient animals of the taxon available or potentially available (from wild or captive sources) to initiate the **specified** *ex situ* program? AArk recommends that a minimum of twenty pairs of animals be collected as founder animals.

    Yes
    No
    Unknown

    If the answer is **No**, there are insufficient potential founder specimens to initiate the *ex situ* program.
    EVALUATE OPTIONS FOR ALTERNATIVE CONSERVATION STRATEGY INCLUDING GAMETE BIOBANKING

19. **Phylogenetic study:** Has a complete phylogenetic analysis of the species in the wild been carried out, to understand what the functional unit you wish to conserve is (i.e. have species limits been determined)?

    Yes *
    No

    Typically this unit is a species; however, because species are continuously changing units evolving through time, there are often distinct but not yet unique subunits (evolutionary significant unit or ESU) in the process of divergence within the species and which might warrant independent consideration.

    If the answer is **No**, there is insufficient knowledge of the species, and a phylogenetic study should be undertaken before considering an *ex situ* program for the species.
    UNDERTAKE APPROPRIATE RESEARCH IN CONJUNCTION WITH LOCAL FIELD BIOLOGISTS (WITH HELP FROM AARK/ASG AS REQUIRED) IN ORDER TO CONFIRM THAT THE SPECIFIC PROGRAM ENCOMPASSES ONLY ONE EVOLUTIONARY DISTINCT UNIT (ESU) BEFORE PROCEEDING

Appendix One – Conservation Roles

Simply keeping and breeding threatened amphibian species in captivity does not in itself equate to conservation. As part of a genuine amphibian conservation initiative, *ex situ* captive management must have a clearly defined role in the conservation of the species or its habitat.

Eight Conservation Roles have been defined, and these are calculated for each species, based on the data provided during the prioritization workshop.

Ark
A species that is extinct in the wild (locally or globally) and which would become completely extinct without *ex situ* management.

Triggers for Ark species are:
- IUCN Red List category = Extinct in the Wild (EW)

Rescue
A species that is in imminent danger of extinction (locally or globally) and requires *ex situ* management, as part of an integrated program, to ensure its survival.

Triggers for Rescue species are:
- IUCN Red List category is not Extinct in the Wild (EW) **and**
- Threat Mitigation = Threats cannot/will not be reversed in time to prevent likely species extinction.

    Note: Threats that constitute imminent danger of extinction include:
- Threats for which we currently have no remedy:
    - Bd, including any species known or suspected to be susceptible
    - Climate change, including any species documented to be drastically contracting its range, e.g., mountaintop salamanders in Central America (per Wake et al.) and mountaintop frogs in Madagascar (per Raxworthy et al.)
- Threats for which we have a remedy but not the resources or will to intervene
    - Imminent destruction of more than 50% of habitat, e.g., dam construction, mining/pollution
    - Species collected to brink of extinction
- All other threats are considered to be "reversible in time frame".

In Situ **Conservation**
A species for which mitigation of threats in the wild may still bring about its' successful conservation.

Triggers for *In Situ* Conservation species are:
- Threat Mitigation = Threats are reversible in time frame that will prevent further decline/extinction **or**
- Threat Mitigation = Threats cannot/will not be reversed in time to prevent likely species extinction (species is in Rescue role) **and** Protected Habitat = No (species will need a secure place to go back to).

In Situ **Research**
A species that for one or more reasons requires further *in situ* research to be carried out as part of the conservation action for the species. One or more critical pieces of information is not known at this time.

Triggers for *In Situ* Research species are:
- IUCN Red List category = Data Deficient (DD) **or**
- Threat Mitigation = Unknown **or**

- Protected Habitat = Unknown **or**
- Population Recovery = Unknown **or**
- Over-collection status = Unknown **or**
- Conservation role = Rescue.

Ex Situ **Research**

A species currently undergoing, or proposed for specific applied research that directly contributes to the conservation of that species, or a related species, in the wild (this includes clearly defined 'model' or 'surrogate' species).

Triggers for *Ex Situ* Research species are:
- The species has been identified as a husbandry analogue for a more threatened species **or**
- IUCN Red List category = Critically Endangered (CR) **or** Endangered (EN) **or** Vulnerable (VU) **or** Near Threatened (NT) **or** Data Deficient, **and** conserving this species depends on *ex situ* research **and** Threat Mitigation = Threats unknown or Threats are reversible in time frame **or**
- IUCN Red List category = Extinct in the Wild (EW) **or** Critically Endangered (CR) **or** Endangered (EN) **or** Vulnerable (VU) **or** Near Threatened (NT) **or** Data Deficient, **and** the species has not been successfully maintained and bred in captivity **and** the species is biologically or evolutionarily distinct.

Mass production in captivity

A species threatened through wild collection (e.g. as a food resource), which could be or is currently being bred in captivity – normally in-country, *ex situ* - to replace a demand for specimens collected from the wild. *This category generally excludes the captive-breeding of pet and hobbyist species, except in exceptional circumstances where coordinated, managed breeding programs can demonstrably reduce wild collection of a threatened species.*

Triggers for Mass Production in Captivity species are:
- IUCN Red List category = Critically Endangered (CR) **or** Endangered (EN) **or** Vulnerable (VU) **and**
- Species is suffering from over-collection from the wild.

Conservation Education

A species that is specifically selected for management – primarily in zoos and aquariums - to inspire and increase knowledge in visitors, in order to promote positive behavioural change. For example, when a species is used to raise financial or other support for field conservation projects (this would include clearly defined 'flagship' or 'ambassador' species).

Triggers for Conservation Education species are:
- The species has a high Evolutionary Distinctiveness score **or**
- The species is biologically, culturally, or scientifically significant **or**
- The species is suited to be an educational ambassador for amphibian conservation.

Supplementation

A species for which *ex situ* management benefits the wild population through breeding for release as part of the recommended conservation action.

Triggers for Supplementation species are:
- Threat Mitigation = Threats are being managed **or** Threats are reversible in time frame that will prevent further decline/extinction **or** Species is effectively protected **and**
- The (sub)population of the species in the wild is too small to recovery naturally **and**
- There is suitable habitat available for reintroduction.

Bioanking
A species for which the long-term storage of sperm or cells to perpetuate their genetic variation is urgently recommended, due the serious threat of extinction of the species.

Triggers for Biobanking species are:
- Recommended conservation role is Ark or Rescue

None
Species that do not require any conservation action at this point in time. This list may also contain species that were not evaluated during the workshop due to lack of data being available.

Triggers for these species are:
- Species does not match the criteria for any of the previous roles **or**
- Insufficient data available during the workshop to properly evaluate the species.

Appendix Two – *Ex situ* Mandate

Mandate for Ex situ Conservation
The decision about which species should be protected in *ex situ* conservation programs should not be made by the AARK community alone because such programs must be part of broader plans for species conservation. The AARK community needs to respond to needs identified by appropriate conservation authorities, especially since the decision to safeguard species in *ex situ* programs needs to follow from a careful assessment of which species cannot currently be assured of adequate protection *in situ*. A recommendation for an *ex situ* population of a threatened amphibian species can come from a number of recognised sources, such as:

- The IUCN/SSC Amphibian Specialist Group (ASG).
- The Global Amphibian Assessment (**www.globalamphibians.org**) - the authority on IUCN Red List status for all amphibian species and which recommends *ex si*tu conservation action for at least 240 species.
- The IUCN - the IUCN Technical Guidelines for the Management of *Ex situ* Populations recommends *ex situ* populations for all Critically Endangered species.
- An IUCN/SSC Conservation Breeding Specialist Group (CBSG) Population and Habitat Viability Assessment (PHVA) workshop process. (**www.cbsg.org/toolkit/phvas.scd**)
- An IUCN/SSC Conservation Breeding Specialist Group (CBSG) Conservation Assessment and Management Plan (CAMP) process. (**http://www.cbsg.org/toolkit/camps.scd**)
- An IUCN/SSC regional amphibian (and reptile) specialist group recommendation (Madagascar & Mascarene, Europe or China).
- A published Species Action Plan.
- A local, regional or national government request.