

AArk Amphibian Conservation Needs Assessment process



Based on a draft prepared by the Taxon selection and prioritisation working group –
CBSG/WAZA Amphibian *Ex situ* Conservation Planning Workshop, El Valle de Anton,
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Rationale

Conservation resources are limited, more so for amphibians than many other taxa, and with over 2,000 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 Amphibian Ark (AArk) is “*ensuring the survival and diversity of amphibian species focusing on those that cannot currently be safe-guarded in their natural environments*”. *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 the range State wherever expertise and other resources are forthcoming.

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 Group, along with a 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 assessment process

In 2006, the IUCN SSC Conservation Breeding Specialist Group (CBSG, now Conservation Planning Specialist Group, CPSG) and the World Association of Zoos and Aquariums (WAZA) held an [Amphibian Ex Situ Conservation Planning workshop](#) in Panama, and during that workshop, a taxon selection and prioritization working group developed a series of questions to select and prioritize which taxa are most in need of *ex situ* assistance. The decision tree has subsequently been further reviewed and refined, and has now been developed into the AArk Conservation Needs Assessment process, which now generates prioritized recommendations for both *in situ* and *ex situ* conservation actions. The assessment process has proven to be a logical, transparent, and repeatable procedure for guiding amphibian conservation activities within a country or region. The process is available as a standardized electronic data entry tool, using Microsoft Excel, and in late 2015, an online version of the process was developed (www.ConservationNeeds.org). All completed assessments can be viewed on the web site.

Each assessment takes the form of a series of questions with weighted scores, along with supporting narrative. The total score for each assessment 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 conservation needs assessment tool has been structured in seven sections:

Section 1 - Review of external data

Section 2 - Status in the wild

Section 3 - Threats and recovery

Section 4 - Significance

Section 5 - *Ex situ* activity

Section 6 - Education

Section 7 - *Ex situ* program authorization / Availability of animals

Most often, national IUCN Amphibian Specialist Group (ASG) Chairs will help to coordinate the assessment of all amphibian species in their country over a relatively short time period, with the subsequent assessments and recommendations for conservation actions being used as the basis for the development of a national amphibian action plan. These can be undertaken in a workshop-based situation, with appropriate experts, government representatives and other stakeholders present, or can be undertaken online at any time. Scientists, field biologists and researchers, animal husbandry experts and others are vital to the success of the Conservation Needs Assessments. Sharing expertise and experiences enhances the assessments, ensuring that appropriate recommendations for national and global conservation actions are delivered where they are most needed.

A complete Conservation Needs Assessment for each species includes current information on the status of the species in the wild; suitable habitat; the threats facing each species; cultural, scientific, socio-economic and phylogenetic significance; and past *ex situ* experience with the species, as well as information about potential authorization for any proposed *ex situ* conservation programs, and the availability of founder animals. Some of this information is best provided by field biologists and researchers, and some will be provided by people with relevant experience or knowledge of past *ex situ* amphibian conservation programs.

The assessment results in each species being assigned to one or more of ten different conservation actions. Species are listed according to their priority for the particular conservation action, and the supporting documentation provided during the assessment gives a guide for those species which have the most chance of benefiting from the prescribed conservation action(s).

The current version of the Conservation Needs Assessment process has been used to generate almost 2,700 assessments for more than 2,300 species of amphibians (31% of the 7,530 currently known species (AmphibiaWeb, 2016)), in 28 countries. The selection of species for assessment with this tool has been country-focussed, with 282 assessments for species in Eastern Africa, 213 in the Caribbean, 143 in Central America, 334 in North America, 861 in South America, 62 in Eastern Asia, 703 in South East Asia, 81 in Southern Asia, 18 in Eastern Europe, and 1 in Southern Europe. Anurans account for 2,371 assessments, 295 for newts and salamanders and 33 for caecilians. Of these assessments, 2,382 have been completed during workshops, with the remaining 317 completed online. A further 220 assessments have been started and are not yet included in online reports. Several more country-wide assessments are currently underway and it is hoped that all amphibian species will eventually be assessed.

The Conservation Needs Assessment process has been an evolving protocol. The criteria and their rankings have been adjusted as experience with the process was gained, and we continue to work with the broader conservation community to identify goals, threats, and conservation options. Assessments and prioritization of individual species are reviewed and updated as we gain knowledge and as the threats to each 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 – Review of external data

1. Extinction risk: What is the current IUCN Red List category for the taxon?

The Red List category can be modified accordingly (for the purposes of this assessment only) if new/additional information is available, or if country-level Red List assessments exist. If the assessors consider that the Red List category of threat would change if the species was re-assessed using more current data than that which was used previously, or if a more recent national Red List assessment exists, a revised estimate of the new category can be chosen, and this will be used to calculate priorities and conservation actions.

If a national Red List assessment exists, the national category of threat is used rather than the global category.

Extinct
Extinct in wild
Critically Endangered
Endangered
Vulnerable
Near Threatened
Data Deficient
Least Concern
Not Evaluated

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

2. Possibly extinct: Is there a strong possibility that this species might be extinct in the wild?

If there is a strong possibility that the species might have already gone extinct in the wild, this should be indicated, as it is also likely that the species will be included as a high priority for conservation actions, however, the likelihood of some of these actions (e.g. collection for *ex situ* rescue or research) is highly unlikely.

Yes, probably
No, unlikely

Note: If the answer is Yes, a note should be added to justify this reasoning. Information about possible extinction is used to determine conservation actions, and is not scored.

3. Phylogenetic significance: The taxon's Evolutionary Distinctiveness (ED) score, as generated by the ZSL EDGE program. (These data are added by AArk staff, and are not editable by Assessors).

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 are currently sliding silently towards extinction unnoticed. A higher ED score indicates a more unique species.

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

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

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

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. Protected habitat might be within a national system of protected areas or privately-owned land which is actively managed to protect natural biodiversity.

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

Yes, probably
No, unlikely
Unknown

Note: If the answer is Yes, a note should be added, providing details of the protected habitat(s).

Section Two – Status in the wild

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

Does enough well-managed and reliably protected habitat exist, either within or outside of currently protected areas that is suitable for reintroduction, conservation translocation or supplementation?

This question provides information on particular areas of existing habitat that are well-managed and reliably protected, and therefore suitable for reintroduction or supplementation from either captive-bred, translocated or head-started animals. When prioritizing species for possible *ex situ* conservation and reintroduction programs, priority should be given to those species that are known to have appropriate release habitat available.

Yes, probably
No, unlikely
Unknown

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

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

This question does not affect the conservation action(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.

Yes, successfully

Reintroduction or translocation attempts have been made for this species in the past, and post relocation monitoring has shown that the reintroduction or translocation was successful, with animals persisting in the wild.

Yes, but unsuccessfully

Reintroduction or translocation attempts have been made for this species in the past, and post relocation monitoring has shown that the reintroduction or translocation attempts were not successful - the relocated animals did not survive in the wild.

Yes, but outcome is unknown

Reintroduction or translocation attempts have been made for this species in the past, insufficient monitoring has been undertaken to indicate whether the relocated animals survived in the wild.

No

No known attempts have been made to reintroduce or translocate this species in the past.

Note: If the answer is Yes, a note should be added to provide details. Information about previous reintroductions is used to determine conservation actions and is not scored.

7 *In situ* conservation activities

Are any *in situ* conservation actions currently in place for this species? (Only required if a Red List Assessment has not been completed, or if new actions have been implemented since the last Red List Assessment. (Information from the Conservation Actions section of the Red List assessment should be reviewed and considered when answering this question.)

Yes, probably

No, unlikely

Unknown

Note: If the answer is Yes, a note should be added to provide information about what conservation actions are in place, where they are being undertaken, and by whom. Information about *in situ* conservation activities is used for information only and is not scored.

8 *In situ* conservation activities

Are additional *in situ* conservation actions (e.g. habitat restoration and/or protection, control of invasive species, national legislation etc.) required to help conserve this species in the wild?

Yes, probably

No, unlikely

Unknown

Note: If the answer is yes, a note should be added with information about the conservation actions required *in situ*. Information about *in situ* conservation activities is used for information only and is not scored.

9 *In situ* research

Is additional *in situ* research required to better understand the species, e.g. distribution, population trends, natural history etc.?

Yes, probably

No, unlikely

Unknown

Note: If the answer to this question is Yes, include a brief description of the type(s) of research required.

Section Three – Threats and recovery

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

It is often helpful to turn each of the answers into questions, and ask each question in turn until the correct answer is obtained, e.g.

- Does the species require conservation action at this time? If not, select answer (a).
- Is the species effectively protected? If it is, select answer (b).
- Are the threats this species is facing known? If not, select answer (c).
- Are the current threats being actively managed? If they are, select answer (d).
- Are the threats this species is facing potentially reversible before the species becomes extinct? If they can, select answer (e).
- Can the threats be reversed in time to prevent the species becoming extinct? If not, select answer (f).

(a) 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.

(b) 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).

(c) 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.

(d) 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.

(e) Threats are potentially reversible in a timeframe 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.

(f) 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.

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, probably

No, unlikely

Unknown

Note: If the species is suffering from over-collection, the reason (pet trade, food, etc.) should be included in a note. Information about collection from the wild is used to determine conservation actions, and is not scored.

12. **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, probably
No, unlikely
Unknown

Note: The size of the population in the wild is used to calculate conservation actions, and is not scored.

13. **Action plans**
Does an Action Plan for the species already exist, or is one currently being developed?

Yes, completed
Yes, currently being developed
No
Unknown

Note: If the answer is Yes or Currently being developed, a note should be added to provide details of the authors(s), publication details and date of the plan. Information about action plans is used to provide additional detail and is not scored.

Section Four – Significance

14. **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

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

15. **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

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

16. **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 (including this taxon)
No research dependent on this species

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

Section Five – Ex situ activity

17. **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

Note: Information about *ex situ* research is used to calculate conservation actions, and is not scored.

18. **Ex situ conservation activities**

Is any *ex situ* research or other *ex situ* conservation action currently in place for this species? (Information from the Conservation Actions section of the Red List assessment should be reviewed and considered when answering this question.)

Yes, probably
No, unlikely
Unknown

Note: If the answer is Yes, a note should be added to provide information about what research or *ex situ* conservation actions are in place, where they are being undertaken, and by whom. Information about *ex situ* conservation activities is used for information only and is not scored.

19. **Husbandry analog required**

If an *ex situ* rescue program is recommended for this species, would an analog species be required to develop husbandry protocols first?

Yes, probably
No, unlikely
Unknown

Note: If the answer to this question is Yes, a list of potential husbandry analog species should be included. Assessments should then be completed for each of the potential analog species. Information about husbandry analogs is used for information only and is not scored.

20. **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

Notes: 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 actions, and is not scored.

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

Yes, bred to F2

In this instance, successful captive breeding to F2 refers to animals which were bred and raised to adulthood in captivity, and they have then subsequently reproduced, with these second generation offspring also reaching adulthood. This second generation breeding and rearing to adulthood should be a repeatable event.

Yes, bred to F1

In this instance, captive bred to F1 refers to animals which were both bred and raised to adulthood in captivity. This first generation breeding and rearing to adulthood should be a repeatable event.

Maintained but no successful breeding

Animals have been successfully maintained in captivity for a long enough period of time to show that their husbandry and dietary needs are being met effectively, although the species is yet to regularly reproduce offspring that have reached adulthood.

Not held in captivity to date

Attempts to maintain this species in captivity have not yet been made.

Note: If the species has previously been maintained or bred in captivity, a note should be included providing details of institutions, zoo associations and contact person(s), if known. Information about previous *ex situ* breeding attempts is used to determine conservation actions and is not scored.

Section Six – Education

22. **Conservation education/ecotourism potential**

Is the species especially diurnal, active or colourful, or is there an interesting or unusual aspect of its ecology that make it particularly suitable to be an educational ambassador for conservation of the species in the range country, either in zoos or aquariums or within ecotourism activities?

Yes

No

Note: Information about education potential is used to determine conservation actions and is not scored.

Section Seven – Ex situ Program Authorization/Availability of animals

23. **Mandate:** Is there an existing conservation mandate recommending the *ex situ* conservation of this taxon?

Yes
No

The decision about which species should be protected in *ex situ* conservation programmes should not be made by the *ex situ* community alone because such programs must be part of broader plans for species conservation. The *ex situ* 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 species can come from a number of recognised sources, such as:

- An IUCN SSC taxonomic specialist group (e.g. the Amphibian Specialist Group (ASG)).
- An IUCN SSC Conservation Breeding Specialist Group (CBSG) Population and Habitat Viability Assessment (PHVA) workshop process. (www.cbsg.org/document-repository).
- An IUCN SSC Conservation Breeding Specialist Group (CBSG) Conservation Assessment and Management Plan (CAMP) process. (www.cbsg.org/document-repository).
- A published Species Action Plan.
- A local, regional or national government request.

Notes: If the answer is No, there is insufficient authorisation for an *ex situ* initiative at this time. Seek mandate from the appropriate IUCN taxonomic specialist group or other authority. If the answer is Yes, identify the source of the recommendation.

Information about conservation mandates is used to determine conservation actions and is not scored.

24. **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, probably
No, unlikely
Not applicable

Notes: 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 the appropriate IUCN SSC taxonomic specialist group as required) before proceeding.

Information about range state approval for *ex situ* programs is used to determine conservation actions and is not scored.

25. **Founder specimens:** Are sufficient animals of the taxon available or potentially available (from wild or captive sources) to initiate the specified *ex situ* program? It is recommended that a minimum of twenty active breeding pairs of animals be used as founder animals, ideally including several different locations or populations.

Yes, probably
No, unlikely
Unknown

Notes: 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.

Information about potential founder specimens is used to determine conservation actions and is not scored.

26. **Taxonomic status:** Has a complete taxonomic analysis of the species in the wild been carried out, to fully understand the functional unit you wish to conserve (i.e. have species limits been determined)?

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.

Yes

No

Unknown

Notes: 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 taxonomic study, including phylogenetic analyses of DNA, should be undertaken before considering an *ex situ* program for the species.

Undertake appropriate research in conjunction with local field biologists (with help from the appropriate IUCN taxonomic specialist group as required) in order to confirm that the specific program encompasses only ONE evolutionary distinct unit (ESU) before proceeding.

Appendix One – Conservation Actions

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.

Nine Conservation Roles have been defined, and these are calculated for each species, based on the data provided during the assessment 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”.

Rescue species, unlike the Ark species, still survive in the wild, but the threats being faced by them likely will result in species extinction if no action is taken. This means that the future of these species needs to be saved by managing populations in captivity, with the necessary focus on genetic variation and continued breeding. At the same time *in situ* research is needed to investigate the threats in the species' natural habitat. Only when these threats are under control can these species be reintroduced in their natural habitat.

***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:

- IUCN Red List category = EW or CR or EN or VU

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**
- Habitat for Reintroduction is Unknown **or**
- Protected Habitat = Unknown **or**
- Population Recovery = Unknown **or**
- Over-collection status = Unknown **or**
- Taxonomic Status = No **or**
- Founder Specimens = Unknown **or**
- Conservation role = Rescue **or**
- In Site Research needed = Yes.

Husbandry Research

A species recommended as a husbandry analog for more threatened species which have been recommended for *Ex Situ* Rescue. These species should be used to develop husbandry protocols which can be applied to more threatened species.

Triggers for Husbandry Research species are:

- The species has been identified as a husbandry analogue for a more threatened species **or**

Applied 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.

Triggers for *Ex Situ* Research species are:

- 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**

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 to inspire and increase knowledge in visitors to zoos and aquariums; national parks, forests and recreation areas; and in ecotourism activities, in order to promote positive attitudes and behavioural change which improve that species' chances of survival in the wild. For example, when a species is used to raise financial support for field conservation projects that directly benefit that species.

The criteria for Conservation Education species are either:

- 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.

Species belonging to this category are selected with the aim of helping people of all ages understand and appreciate amphibian diversity and learn how to conserve it for future generations. Conservation education in general enables people to realize how natural resources and ecosystems affect each other and how resources can be used wisely, through structured educational experiences and activities targeted to varying age groups and populations. Ideally, these species will contribute to encouraging people to act on their own to conserve natural resources and use them in a responsible manner by making informed resource decisions.

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:

- The (sub)population of the species in the wild is too small to recovery naturally **and**
- There is suitable habitat available for reintroduction.

Biobanking

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 situ* 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.