Version 1.1

Developing CITES Non-Detriment Findings for Snakes

IUCN SSC Boa and Python Specialist Group

Daniel Natusch, Tomas Waller, Patricio Micucci and Victoria Lichtschein

Table of Content

i) Acknowledgements

Author Affiliations:

Daniel Natusch; A08 Heydon-Laurence Building, University of Sydney, NSW 2006, Australia

Tomás Waller; Fundación Biodiversidad – Argentina, Suipacha 1311 – 3rd Floor, C1011AAC Ciudad Autónoma de Buenos Aires, Argentina

Patricio Micucci; Fundación Biodiversidad – Argentina, Suipacha 1311 – 3rd Floor, C1011AAC Ciudad Autónoma de Buenos Aires, Argentina

Victoria Lichtschein; Secretaría de Ambiente y Desarrollo Sustentable, San Martín 451, 1040 Ciudad Autónoma de Buenos Aires, Argentina

1.0 Introduction and Background

1.1 Introduction

Millions of snakes of numerous species are traded internationally every year to meet the demand for skins, food, pets, medicines, and for a variety of other purposes. Approximately 150 species of these are listed in the Appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) because international trade may become, or is known to be, a risk to their long-term survival in the wild. For many species of snakes, wild harvesting and trade have occurred for centuries, often supporting the livelihoods of rural people. Ensuring snake harvesting is sustainable and does not result in declines that could lead to extinction contributes to the conservation goal of maintaining snakes as an integral part of functioning ecosystems. Similarly, maintaining the ability of people to use local and renewable snake resources, to benefit their livelihoods, has become an increasingly recognised goal of management (CITES Res. Conf. 8.3 and 16.6).

Article IV of the CITES Convention requires international trade in CITES-listed snakes, or their parts and derivatives such as skins and meat, to be subject to Non-Detriment Findings (NDFs) by exporting Parties. Although Parties understand the importance of NDFs and are committed to complying with CITES obligations, many times they lack the capacity, tools and guidance to effectively undertake Non-Detriment Findings. This situation is often true for snakes, many of which continue to be traded in the absence of information about the impact such use is having on their populations.

In Decision 16.102 from the Sixteenth Meeting of the CITES Conference of the Parties (Bangkok, Thailand, 03-14 March 2013), the Parties requested the CITES Secretariat to:

"*compile information and develop guidance that can assist Parties in the making of non-detriment findings, management systems for wild populations and the establishment of export quotas for Appendix-II snake species in trade, by undertaking relevant research, consulting with relevant experts, examining suitable examples and case-studies, and building on the results of the International Expert Workshop on CITES Non-Detriment Findings (Cancún, 2008) and recommendations on the making of non-detriment findings from the Conference of the Parties.*" http://www.cites.org/eng/cop/16/doc/E-CoP16-57.pdf

The CITES Secretariat in turn commissioned the IUCN, through the IUCN/SSC Boa and Python Specialist Group (BPSG), to carry out this task. This report is the result of this work and aims to provide CITES Scientific Authorities with guidance in monitoring, management and implementation of effective Non-Detriment Findings for snakes, so trade can continue to benefit people while ensuring wild populations are not negatively impacted.

These NDF Guidelines are separated into two parts:

i)   The first is the proposed NDF Guidelines for snakes, which offers an overview of (1) how non-detriment is best determined, (2) the management context for snakes, and provides step-by-step guidance on (3) how to complete an NDF and (4) implement management programs for snakes. The NDF Guidelines are aimed at simplicity, and contain the bare minimum information Scientific Authorities need to complete an NDF for snakes – they are essentially the "what is needed to complete an NDF".

ii)   The second part is an Annex document providing further information, discussion of conceptual issues and more detailed guidance on how to carry out and implement NDFs, as well as monitoring and management programs. The Annex document is essentially the "how and why" to undertake NDFs using these Guidelines. Parties are encouraged to refer closely to the Annexes when using the NDF Guidance.

1.2 CITES and Snakes – NDF guidelines and challenges for their implementation

Of the approximately 3,500 recognized species of snakes in the world (http://www.reptile-database.org/db-info/SpeciesStat.html), at the time of writing 130 (3.7%) are listed in CITES Appendix II, which allows regulated sustainable trade in these species to take place. Of these, only 25% (33) are regularly found in international trade. Two thirds of CITES Appendix II listed species are representatives of the families Boidae and Pythonidae (the boas and pythons). These large-bodied and often colorful snakes are traded primarily for their skins, meat and as pets, and comprise the bulk of trade in terms of species and volume. Geographically, more than half of the CITES-listed snake species being currently traded (61%, 20) are sourced from Southeast Asia, which also accounts for 73% of the entire world's trade in snakes and their derivatives by volume (UNEP-WCMC CITES Trade Database, 2015). Many more species of snakes (e.g., Homalopsine water snakes and some rat snakes in Southeast Asia) are also traded internationally in large numbers, but are not listed in the Appendices of CITES.

Because commercial trade is largely restricted to Appendix II species, Parties are required to comply with Article IV of CITES and only grant an export permit for an Appendix II listed snake species when:

(1) The designated Scientific Authority of the exporting Party has advised that trade will not be *detrimental to the survival of the species in the wild*, and

(2) Once exports are underway, the Scientific Authority has monitored the actual levels of export to ensure that the species *is maintained throughout its range at a level consistent with its role in the ecosystem and well above the level at which the species might become eligible for inclusion in Appendix I*.

Whenever a Scientific Authority doubts that the export of Appendix II-listed specimens is non-detrimental, it shall advise its corresponding Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of that species. If the export is deemed to be non-detrimental, then it can proceed without intervention. This process is termed the CITES Non-detriment finding. Assessing the likely detriment of removing animals from the wild for trade, and making a non-detriment finding (NDF), is at the core of regulations for CITES Appendix II species and thus at the foundation of the Convention (Jenkins, 2009). Yet in practice, it is difficult for many Parties to provide robust NDFs for all exports.

An NDF can be very simple and straightforward for some species in some contexts, but highly complex and challenging for others in different contexts. Although CITES does not prescribe how Parties should determine "non-detriment", Parties are usually encouraged to review available information on the population status, distribution, population trends, harvest, trade and other biological and ecological factors of the traded species, as appropriate. Parties are also encouraged to take into account the [Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity](#) published by the Convention on Biological Diversity (2004), as well as relevant Resolutions of the CITES Conference of the Parties.

Despite such guidance, many Parties lack the capacity and resources to execute anything but the simplest of NDFs (Nash 1993; Apensberg-Traun 2009; Jenkins 2009). In many cases, the biological information available to Scientific Authorities only reflects the staff's own knowledge on the species or that of traders/industry, which is not necessarily the best information available. As a result of these cumulative difficulties, Parties often export Appendix II-listed species without undertaking sufficient evaluations of the effects of international trade on wild populations, and so in many cases are not fulfilling their obligation to ensure trade is "non-detrimental" to these species (Jenkins, 2009).

This problem is exacerbated further because in the past, NDF guidelines have almost always relied on the assumption that the population trend of the species is or should be known. In reality, this is rarely the case. For example, the IUCN Guidelines to assist CITES Scientific Authorities with conducting NDFs identify 26 criteria considered relevant to the species of interest. Criteria for assessing detriment focus on the biology, protection, incentives, monitoring, control, management and status of the species and its trade (Rosser and Haywood, 2002). Complete knowledge of these attributes can assist managers in predicting the likelihood of detriment, but provide little indication of how a species is actually fairing in the

wild. For example, a species that has life history attributes that make it resilient to use (e.g., fast growth and high fecundity), is common and well protected and occupies a large distribution may still experience unsustainable levels of harvest. This is because despite possessing multiple attributes that make the species resilient to use, the rate of harvest may be so high that declines in its abundance cannot be arrested. Without a more thorough knowledge of population change to feed into an NDF evaluation, unsustainable harvests can go unnoticed if not well monitored and can remain unchanged without good management.

1.3 Non-detriment and Captive Breeding

Captive breeding of Appendix II listed snakes for commercial purposes is common in many range States, as well as in countries outside the species' range. Furthermore, Appendix I species bred in captivity for commercial purposes are traded as if they were Appendix II species, as provided under Article VII, paragraph 4, of the CITES Convention; however, these captive breeding operations must also comply with Resolutions of the Conference of the Parties currently in force (Resolution Conf. 10.16 Rev. and Resolution Conf. 12.10 Rev. CoP15). In both cases, among other requisites, exporting Parties using the source code "C" for captive-bred animals are still required to comply with CITES Article IV and establish that exports are not detrimental to the survival of wild populations.

For species bred in captivity in compliance with national legislation and with regard to wild stocks entering captive breeding facilities, "*the method used to make a non-detriment finding for a specimen known to be of non-wild origin may be less rigorous than that for a specimen of wild origin* (Resolution Conf. 16.7). However, there are obvious difficulties in situations where captive breeding production systems are intimately linked to on-going wild harvest that is not compliant with domestic legislation. Such situations may occur when illegally harvested wild individuals are laundered through legal breeding facilities and when harvest of wild individuals as parent stock for captive breeding facilities is unsustainable. In these situations, Article IV (para 2b) requires export permits only be issued if *"a Management Authority of the State of export is satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora"*.

1.4 Non-detriment and Illegal trade

When illegal trade is occurring in contravention of national laws, international trade in such specimens is in contravention of both international law and CITES. The impact of illegal trade on wild populations is usually difficult to detect, because such trade is inherently clandestine and not reported. The situation becomes more complicated when illegal use and trade is occurring in concert with legal use and trade. Such situations occur when snakes are illegally harvested from the wild and mis-declared as captive-bred, or when individuals in excess of national quotas are simply smuggled out of a country. When volumes of illegal harvest are unknown, the methods suggested in this document can be used to infer a level of sustainability of that harvest. However, even if such a task could be achieved, the harvest is still illegal and is thus a matter of compliance and enforcement, even if deemed to be "non-detrimental".

2.0 Defining "detriment"

In many cases involving snakes, words such as *sustainability*, *over-utilisation*, *overexploitation*, *decline* and *detriment* are used interchangeably or inappropriately. Therefore, before beginning a non-detriment finding for exports of specimens of snakes it is important to define what is meant by *detriment*, and hence what the criteria are for determining when a particular export is "non-detrimental".

Although harvesting inevitably results in populations declining in abundance, it does not automatically follow that the harvest is "detrimental". The variables promoting population growth may still be greater than those causing population decline (in this case, harvest). If a new and reduced level of abundance is maintained over time by management, then the population is being harvested sustainably, and can theoretically continue to be harvested forever. The main issue concerning CITES is when neither the decline in abundance nor the harvest level can be controlled or managed, for one reason or another, and the population's capacity to recover is compromised even if harvesting ceases.

Hence, in many instances, ensuring that populations of a species in trade are being used in a sustainable way (in a way that does not result in continuing and potentially irreversible population declines) may be the most practical means of ensuring *non-detriment*. This is especially true for Appendix II species, which are not threatened with extinction by trade, because in many cases it is difficult to define and quantify *detriment* or *role in the ecosystem*. For example, for Appendix II listed species, the goal is to maintain them at levels well above those at which they might become eligible for inclusion in Appendix I (Article IV, para. 3). However, determining when a species has declined to a point where management interventions can neither prevent further declines nor control the harvest, thus rendering it detrimental, can be significantly more challenging. On the other hand, demonstrating that populations are being managed and used in a sustainable way essentially satisfies the wildlife management obligations within Article IV by offering a flexible and precautionary means of ensuring non-detriment (Webb et al. 2003).

Thus, establishing that harvests are sustainable (not-detrimental) can be achieved by satisfying two basic questions:

1) Is the use sustainable over time (are there indications of a declining trend?);

2) Are the impacts of harvest being controlled within prescribed levels?

A variety of different indices can be used to answer these questions, including: changes in distribution; changes in density; changes in population structure; collection areas (proportion of total distribution, and change of areas); catch per unit effort; legal issues; and other threats (habitat loss, climate change, pollution, etc.) (Cancún CITES NDF Workshop, 2008).

Annex A Section I to these guidelines provides a more in-depth discussion of the overview above, and the interrelationship between *sustainable use* and *detriment*.

3.0 The management context for snakes

Snakes are particular in that they possess a suite of attributes, such as their cryptic and highly sedentary nature, that make it difficult to conduct conventional assessments of population status based on field studies. The result is that for many species of snakes, there is simply not enough information available to make well-informed evaluations about whether a level of trade is detrimental or not. To complicate the situation further, the traditional, field based, scientific approach to snake management is often not able to provide answers about potential detriment in the time scale managers demand.

Although it is possible to draw conclusions about the likelihood of sustainable trade in snake populations, and make recommendations based on a set of indicative criteria (life history traits, area of occupancy, etc), the only way of knowing with certainty what will happen when a wild population is manipulated is through testing and experimentation, which requires the implementation of an appropriate monitoring system for species subject to harvest regimes.

For these reasons, and to provide the most benefit for managers and decision makers, NDFs for snakes should be:

- Precise. The information must be guaranteed in terms of quality of data, by using the best available scientific information;
- When possible, use information derived from management itself, particularly easily measured indicators (e.g., biology of harvested individuals, harvest yield, effort versus yield, proportion of sexes, harvest demography based on live animals or skin sizes, analyses of trends, etc) rather than requiring completely independent research and monitoring programs;
- Simple and cost-effective, in terms of the amount and quality of information required to examine the most important indicators.

Several challenges that make Non-Detriment Findings for snakes difficult and suggestions for improvement are discussed in Annex A Section II.

4.0 Guidelines for making Non-Detriment Findings for snakes

The CITES NDF is an evaluation of whether *a given level of harvest for international trade is non-detrimental*.

The first and most basic step for completing an NDF for exports of snakes is to (1) correctly identify the specimen(s) to be traded, (2) confirm their source (wild, ranched or captive-bred), and (3) verify their legal acquisition. If any of these three criteria are not met then exports should not proceed. It is not the aim of these guidelines to assist Parties in determining the taxonomy, source or the legality of snakes in trade. Each of these criteria should be reviewed and confirmed by the Party's CITES Management Authority, with technical input from the CITES Scientific Authority. If further expert consultation is required to assist with this process then contact should be made with national museums, local universities, relevant NGOs and other networks of experts such as the [IUCN-SSC Boa and Python Specialist Group (BPSG)](). The aim of these guidelines is to help CITES Parties determine whether harvesting and trade is non- detrimental to wild populations of snakes.

This can be achieved by following the steps laid out in **Figure 1**. The International Expert Workshop on CITES Non-Detriment Findings reptiles working group (Cancún CITES NDF Workshop, 2008), proposed a two level approach to NDFs: a) risk assessment; and b) monitoring and management. After considering various scenarios with snakes, we propose a four-step approach ranging from simple to more complex, depending on the likely impact of trade for each situation:

Step 1. Undertake a *Primary Evaluation* of the risk that harvesting for trade is threatening, or may threaten, the species with extinction.

Step 2. If on the basis of the *Primary Evaluation* it is not possible to reject detriment, then a *Secondary Evaluation* is needed. This incorporates new data, if available, or results obtained in the development of revised monitoring or management procedures.

Step 3. Where revised monitoring and management procedures are required, but not yet implemented, they should describe which monitoring and management interventions are planned, and how the results are going to be interpreted in terms of non-detriment.

Step 4. If after Steps 1 – 3 have been completed there is sufficient information to determine that trade is non-detrimental then exports can commence or continue as usual. However, if there is sufficient reason for the Party to believe the harvest may be detrimental, it may be appropriate to issue a negative non-detriment finding and voluntarily restrict exports until the non-detriment requirement can be satisfied.
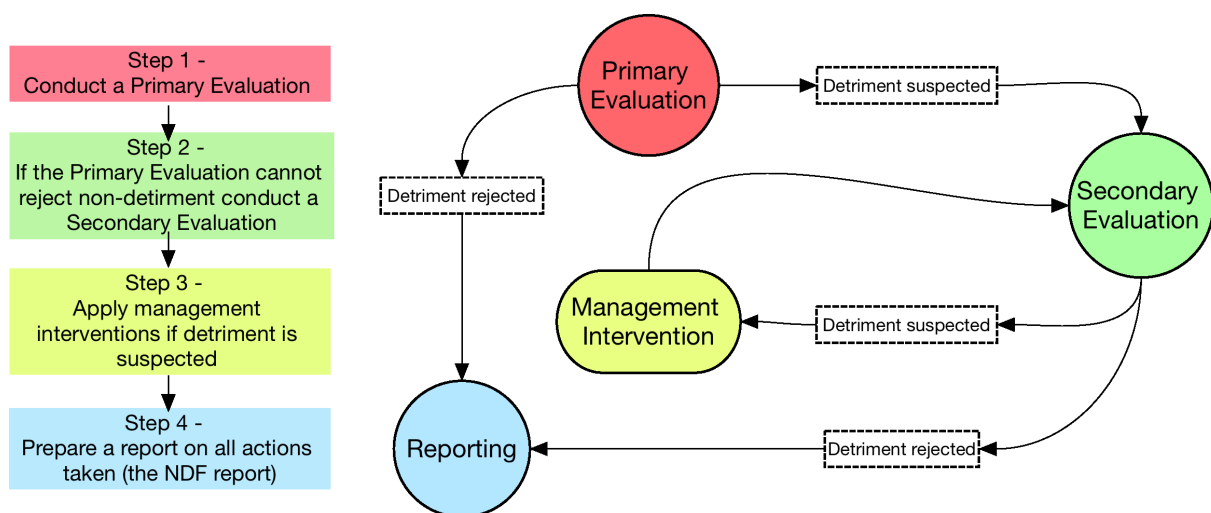
Fig. 1. The step-by-step process to be undertaken to establish non-detriment for exports of CITES Appendix II listed snakes.

4.1 Information sources for completing an NDF

A key component of the Non-Detriment Finding (NDF) is information or even inference of a species' harvest level, area of occupancy, likely extent of the population, harvest rate and life history parameters. The available information used to inform an NDF, with sources and references where appropriate, should be documented. These Guidelines are in line with CITES Resolution Conf. 16.7, which recommends the sources of information that may be considered when carrying out either a Primary or Secondary Evaluation as part of an NDF can include, but not be limited to:

A) relevant scientific literature concerning species biology, life history and distribution;

B) details of any ecological risk assessments conducted;

C) scientific surveys conducted at harvest locations and at sites protected from harvest and other impacts;

D) details of monitoring or management systems for the species of interest;

E) relevant knowledge and expertise of local and indigenous communities;

F) consultations with relevant local, regional and international experts; and

G) national and international trade information such as that available via the CITES trade database maintained by the UNEP World Conservation Monitoring Centre (UNEP-WCMC), publications on trade, local knowledge on trade and investigations of sales at markets or through the internet, for example.

4.2 Step 1 - Completing a Primary Evaluation

The purpose of a primary evaluation is to establish whether non-detriment can be established easily using basic information. This involves the provision of scores for three basic criteria:

1) Annual harvest Level
2) Area of Occupancy, and
3) Life history traits
4) Illegal trade

Scores can be applied by determining where each of the three criteria of interest belongs based on the matrix in **Table 1**, and are applicable to all species of snakes The maximum score for each category is three and the minimum score is one. ***Details on how each criterion can be assessed are provided in Annex A Section III.***

Table 1. Scoring criteria for the three variables of interest in the *Primary Evaluation* (details in **Annex A**).

Criteria	Number of points			Score
	1	**2**	**3**	
Annual Harvest level	Low (<2,000)	Medium (2,000 - 20,000)	High (>20,000)	
Area of occupancy	Large (>20,000km^2)	Medium (2,500 – 20,000km^2)	Small (<2,500km^2)	
Life-history	Fast	Medium	Slow	
Illegal trade	If known, should be included under "Annual harvest level". If unknown, and suspected to be detrimental, give a **maximum score of 1 point**			

Step 1. Once a species' harvest volume, area of occupancy, life history traits and additional threats have been established, a *Primary Evaluation* score can be assigned to determine if trade may be detrimental.

Step 2. Record the *Primary Evaluation* scores for each criterion in the *Primary Evaluation* worksheet provided (in **Annex B**), together with justification about why the particular score was attributed to each criterion.

Step 3. Based on the score from the step above, establish whether a *Secondary Evaluation* is required to reject detriment by using the guidance in the "Evaluating Detriment" box below.

Evaluating Detriment

Primary Evaluation score lower than five (5) = trade is non-detrimental (**record the score and justification in the *Primary Evaluation* worksheet provided (in Annex B). This can be used for Step 4 of the Non-Detriment Finding**).

If the *Primary Evaluation* score is equal to or greater than five (5) then the non-detriment requirement cannot be satisfied, warranting additional information based on other indices to evaluate detriment. **A *Secondary Evaluation* should be undertaken**.

The IUCN SSC Boa and Python Specialist Group has undertaken Primary Evaluations for all CITES Appendix II listed snakes in international trade. Exporting or Importing Parties requiring additional information or assistance with Primary Evaluations can contact the group here: IUCN-SSC BPSG

4.3 Step 2 - Completing a Secondary Evaluation

Having completed a *Primary Evaluation*, if non-detriment cannot be easily established then a *Secondary Evaluation* is needed. Using available information, Scientific Authorities must aim to reject the following criteria:

An observed, estimated, inferred or suspected continuing decline in any of the following:

(i) population abundance,
(ii) national area of occupancy,
(iii) number of locations or subpopulations, and/or
(iv) number of mature individuals.

If any of the criteria above cannot are met, then use may not be sustained, which may lead to detrimental trade and require management intervention to prevent further declines. Go to **Step 3**.

If sufficient information is available to reject each of the criteria above, then a positive non-detriment finding can be given and reported at **Step 4**.

Details on monitoring methodologies that can be used to inform the *Secondary Evaluation* are provided in Annex A Section III.

4.4 Step 3 - Management Intervention

Where revised management procedures are required to ensure non-detriment, but are not yet implemented, Parties should describe which monitoring and management interventions are planned, and how the results are going to be interpreted in terms of non-detriment in **Step 4**.

4.5 Step 4 - Reporting

The Non-Detriment Findings report should detail the steps taken to establish non-detriment. For many species this may simply be a completed *Primary Evaluation*, but for others requiring a *Secondary Evaluation* it may include basic analyses of harvest trends through to detailed monitoring and management protocols. **The results and explanation of monitoring protocols or management systems used to complete the Secondary Evaluation do not need to follow a specific format.**

4.6 Decision making in situations of poor data availability

When data are insufficient or unavailable to reject the criteria within the Secondary Evaluation, then Scientific Authorities should endeavor to improve monitoring protocols (using guidance on monitoring systems in **Annex A Section III**) or implement precautionary management interventions to ensure trade will not be detrimental (using guidance in **Annex A Section IV**).

5.0 Managing snake populations

Managing the harvest of snakes for trade can be simple or complex, with a system's complexity depending largely on the aims of the managers and the benefits to be derived from the resource. For example, where the probability of unsustainable harvesting is low, little or no harvest management may be required. Where detriment is suspected, simply reducing the harvest and exports may be a better use of resources than implementing sophisticated harvest management systems. On the other hand, sophisticated harvest management systems may be needed to improve the maximum sustainable yield of the resource to provide greater economic returns or to improve confidence that harvesting at a given level is non-detrimental to the species. Regardless of the type of management systems implemented, it should ideally incorporate ongoing monitoring to detect future changes in the harvested population and allow follow-up corrective action to be taken when necessary.

These NDF Guidelines do not prescribe what a management system should look like. Parties can implement different management systems to assist NDFs for CITES-listed snakes and each can be evaluated based on its respective merits. **Tools that can be used to manage harvest of snakes are presented and discussed in Annex A Section IV to these Guidelines, together with an example of an existing management system for snakes.**

5.1 Designing an appropriate management system

The design of a case-specific management system for trade in a species is often complex. The uncertainties involved and the desire to allow trade only when complete knowledge of species biology and harvest level is attained can hinder proper management. In reality, complete knowledge is often unattainable and management systems must rely on an adaptive management approach. Adaptive management is widely recommended as a means of dealing with extreme uncertainty in population management and decision-making (including within CITES Resolution Conf. 16.7 on NDFs). The basic principle is that management decisions should be treated as deliberate, large-scale experiments; hence, achieving an optimal management system is done via a constant process of trial and error. Adaptive management is particularly important for snakes, whose populations are inherently difficult to survey in the field with accuracy (discussed in **Section 3**). This difficulty is commonly compounded by a lack of information such as population immigration rates, movement patterns of snakes and age-specific survival. Nevertheless, through a process of constant testing, evaluation and refinement, it is possible to arrive at management solutions that benefit snakes, local people and the environment.

An appropriate management system should thus incorporate both monitoring and management so that management interventions can be applied if monitoring reveals potentially detrimental changes in the harvested population. Three important steps should be incorporated in the design of a holistic management system for snakes:

1) Understanding the natural history and trade dynamics of the species concerned;

2) Deciding on and implementing an appropriate and case-specific monitoring system (**Guidance in Annex A Section III**);

3) Deciding on and implementing appropriate management interventions to ensure harvesting remains within sustainable levels (**Guidance in Annex A Section IV**).

5.2 Dedicated funding

No management or monitoring system can be developed, implemented and maintained without dedicated funding. Because appropriate management can ensure the sustainability of snakes, and the economic benefits derived from them, it is in the best interest of Parties and the people involved in the harvest and trade in snakes to allocate funds to monitoring and management of species in trade. Thus, when designing a management system as part of a CITES NDF, a dedicated funding mechanism should be

included. Whether the funding is sourced from the Government allocated budget, procured from levies taken from the industry itself is not of concern. Without a strong funding framework in place, the continuity of any monitoring and management system will be jeopardized, and may prevent Parties from completing satisfactory NDFs in the future. Caution must be exercised concerning cost-effectiveness. Management or monitoring plans should be designed to fit available economic resources and implemented in harmony with potential benefits derived from the use of the resource. Some management plans become so rigorous and sophisticated that they are eventually no longer economically viable in cost-benefit terms.