

# Action Plan for *Rhampholeon chapmanorum*

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## Date of completion

Before 31-12-2019

## Coordinator and contact details

*Who are the main people responsible for ongoing development of the plan, maintaining open communications with all stakeholders, encouraging participation and documenting progress towards the goals? Include email contact for the main coordinator(s).*

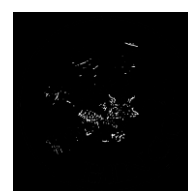
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## Background

### Species

Common and scientific names/synonyms, subspecies, if relevant.

Chapman's pygmy chameleon, (*Rhampholeon chapmanorum*)

### Photo

Include a photo (if available) and credit the photographer



Figure 1

### Conservation status

Include the global and national IUCN Red List categories, CITES, and any other national conservation status.

Critically Endangered (CR). This species is assessed as Critically Endangered, with imminent risk of extinction at the type locality, because the small remaining fragmented forest habitat has been and continues to be under intense pressure.

## Distribution, population size and trends

What is the current and historic distribution of the species globally, and within the target country? Is the size of the wild population known, and is it decreasing? What have been the population trends over the past 5-10 years? Place names and general regions of target country can be included, however exact locations of threatened species should not be included, to avoid sharing sensitive information. Include any protected areas (effectively protected or otherwise) within the distribution, and any suitable areas for potential translocation or reintroduction.

This species is endemic to Malawi, where it is found in Nsanje district only. It is known from a single location, in the rainforest remnants on Malawi Hill, within and just South of the Matandwe Forest Reserve, part of the Natundu Hills range. Although the species was only described in 1992, historically, the species must have occurred in suitable habitat covering several thousands of hectares across the Natundu Hills range. As recent as 1984, based on satellite imagery, more than 1,000 hectares of suitable habitat still remained (Google Earth, 2019). In 1998, it was estimated that less than a few hectares of degraded forest remained inside the protected forest reserve (Tilbury 2010). However, satellite imagery shows that, South of the Matandwe Forest reserve, there is approximately 0.54 km<sup>2</sup> of rainforest remnant remaining in two patches, isolated from each other since at least 1984, and averaging 0.27 km<sup>2</sup> in size (Fig. x, green circles). On average, 20 individuals were found per 400 m<sup>2</sup> plot, equating to an estimate of 28,000 individuals for the 56.4 ha suitable habitat still remaining. However, discounting juveniles (< 2 cm SVL) and taking standard deviations into account, a more conservative population estimate of 19,920 (sub)adults is put forward here (min. 5,000, max. 29,000 individuals).

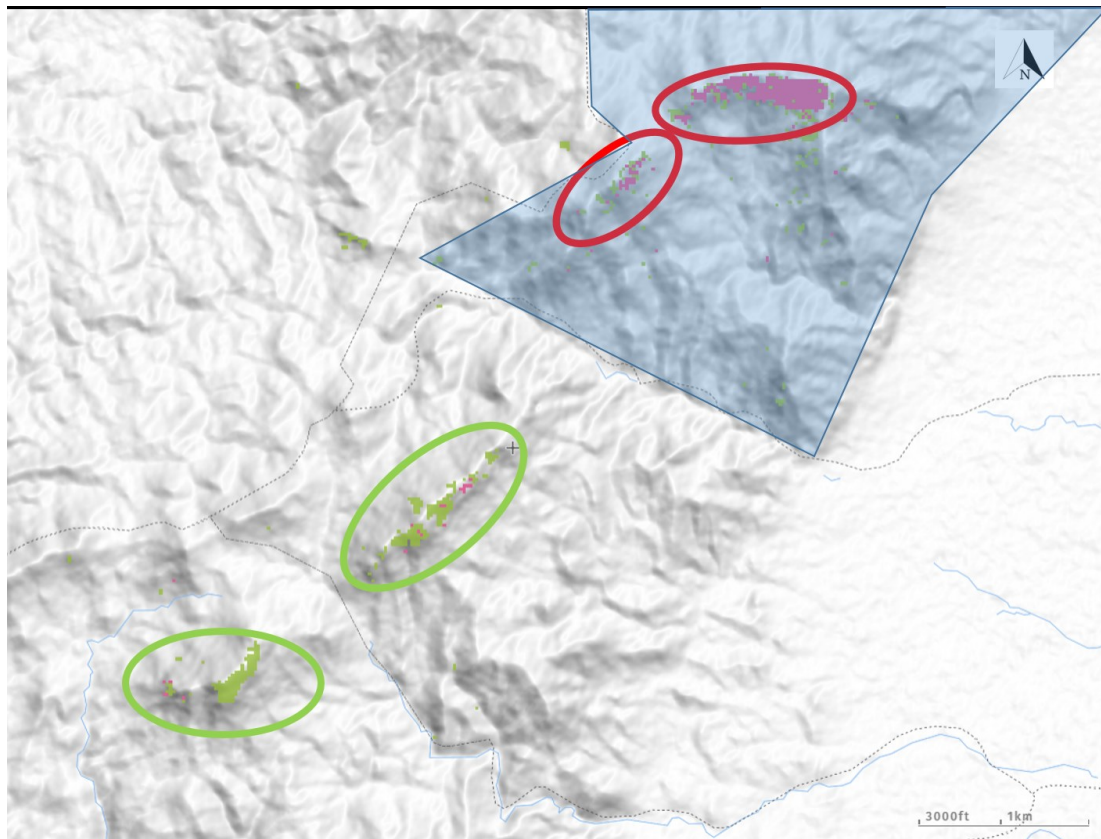


Figure 2 © Global Forest Watch, accessed 15/09/2019



Two other former forest fragments inside the protected forest reserve used to contain the largest tract of tropical lowland rainforest (50 ha up to 2010) but have been completely deforested between 2010 and 2018 and no pockets larger than 1 ha could be found (Fig. x, red circles). Given the wholesale conversion of this area for agriculture (maize and cassava on the drier slopes and bananas on the wetter side), as well as timber extraction for timber planks and conversion to charcoal, it is not believed to still occur inside the national forest reserve.

## Habitat and ecology

*Habitat preferences and general comments on ecology.*

*Rhampholeon chapmanorum* inhabits low bushes and forest floor leaf litter in rainforest on low altitude mountain slopes (between 650 and 950 m asl). This is typified by an average annual rainfall of 1,500 mm and a mean annual temperature of 21-24 °C (Chapman & White, 1970). It has not been recorded from transformed landscapes, and like other *Rhampholeons*, it is considered a forest specialist. Although these chameleons will perch on low bushes while resting during the night-time, they require intact forest floor to forage in the daytime. Therefore, they are not expected to occupy forests that are heavily impacted and have become open on the forest floor. The species has however been found to tolerate rainforest edge, and has been shown to exist and reproduce in banana plantations on the edge of the rainforest, only when large canopy trees remain. The species has not been found in drier forest, missing the typical canopy trees (*Albizia*, *Khaya*, *Newtonia*) characterizing the rainforest in that area. Of 240 individuals found, 90 were measured, resulting in an average SVL of 3.6 cm (juveniles incl.) and a mean perch height (sleeping) of 88 cm (min. 10 cm, max. 250 cm) above the ground. Smaller individuals were predominantly found on leaves (Fig. x), larger individuals predominantly on branches.



Figure 3

## Primary threats

*Brief outline of the main threats identified as being of immediate and primary concern to the species. How likely is it that the threats can be partially or completely mitigated before the species faces possible extinction?*

By far the main threat for the species is large scale habitat destruction with now more than 95% of its habitat being converted to agricultural land. Encroachment into its habitat usually starts with the felling of timber trees, followed by the planting of banana and other fruit trees, and crops such as sweet potato and pineapple in the gaps created. Slowly, intensification happens from inside the forest. At the forest edges, fires present an increasingly high risk further reducing the typical layered structure that is required for this species.



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Figure 4

## Conservation actions

### Current protection

*Are the species and its habitat currently protected? If not, will it be possible to effectively protect safe habitat for the species? How will this be achieved and within what time frame?*

There is no formal protection for the species: the two last forest fragments where this species can be found are both situated outside the boundaries of the nationally protected Matandwe Forest Reserve. However, these seem to be way less affected by deforestation compared to the forest inside the protected area. In the smaller forest fragment, an active village forest resource committee (VFRC) has been operational with a village resource map, visitors book and bylaws. Trees that were cut, were said to sponsor for management activities such as law enforcement and fire break maintenance.

### Conservation measures required

*New actions recommended during a Conservation Needs Assessment, link to the Conservation Needs Assessment for this species. Include a brief outline of planned short-, medium- and long-term actions, including the organizations or individuals responsible for the actions, and suggested timeframes.*

A survey was done in the remaining two patches of forest, finding the species in abundance both in the forest as on the forest edge. Since 1984, the two forest patches have been more or less intact compared to the intensification that has happened around it (> 95% forest reduction). The rainforest inside the protected area has all been converted to agricultural land. Therefore, the survival of this species in situ is now completely in the hands of the communities.

- In the short term, there is a high need for a VFRC to be established for the largest forest fragment that has no active management as far as we could find out.
- In the short term, there is a high need for community sensitization and awareness campaigns
- In the medium term, the VFRCs should be capable to develop a forest management plan, to get a more structured and controlled harvest of timber.
- In the medium term, the customary leaders should be engaged to avoid further encroachment for farming practices.
- In the long term, a livelihoods plan should be developed and implemented to 1) provide more alternative income sources (NTFP's) from the forest 2) introduce good land use practices through conservation agriculture and/or agroforestry and 3) where possible fight erosion to avoid increasing pressure on the forest due to land scarcity.
- In the long term, family and village planning and mapping could also alleviate some of the pressure on the forest remnants.

#### **Current and previous conservation actions**

*Are any actions currently underway to conserve this species, either in situ or ex situ? Have there been any previous actions and what is the current status of these actions? Who is currently responsible for these actions?*

In situ: In the smaller forest fragment, an active village forest resource committee (VFRC) has been operational with a village resource map, visitors book and bylaws. Trees that were cut, were said to sponsor for management activities such as law enforcement and fire break maintenance.

Ex situ: in 1998, a small number of individuals of the species was removed from the forest. These were introduced in a privately owned lowland rainforest and are confirmed to do well, having colonized most of the private forest (Tolley et al. 2016).

#### **Knowledge gaps**

*Briefly list any specific gaps in our knowledge of the species, which are relevant to conserving them. This information will then provide potential actions for additional field research, and if the data are eventually discovered, updated action plans can be developed, based on the new information.*

The species is shown to be well represented in suitable habitat (the two forest remnants) with plenty of signs of reproduction (small individuals < 2 cm SVL). However, the 2 fragments remaining have been isolated from each other, and from what used to be the main population since at least 1984 but probably earlier. The degree of genetic variation for these in situ sites, and by default also the ex situ site, is unknown and should be researched. The ex situ population originates from the large forest that has completely disappeared, therefore this can be considered very important genetically.

The degree to which this species still occurs in some of the small forest remnants inside the forest reserve is unknown, and very likely to go extinct due to further degradation in the very near future. However, small populations of the species were shown to survive in forest fragments smaller than a half an acre (0.17 ha). Therefore, these chameleons may still survive in remnant patches and translocation to the other forest fragments in situ and ex situ could be a direct conservation outcome.

## Challenges and obstacles

*Are there any challenges or obstacles that might stand in the way of achieving the goals of this plan? If so, how could they be overcome?*

There is a high pressure with a very recent intensification of the largest of the two forest fragments. This is remarkable since these relatively small fragments have been shown (due to their steepness but also community support) to withstand the deforestation that has happened at a large scale all around them. The need for agricultural land will be the biggest challenge to overcome.

However, it is possible, by working hand in hand with the communities to safeguard these last pockets of forest by 1) establishing a functional and transparent village forest resource committee, 2) further motivation of the VFRC in the smallest forest fragment, 3) focusing on restoring land lost to soil erosion and agricultural intensification around the forest to reduce the need for extra land and 4) sensitization and alternative livelihood development in the communities around the forest.

## Budget and funding sources

*Include a rough estimate of overall costs over the life of the plan, and also a summary of how long the currently available resources might last, and where additional resources might potentially come from.*

There are currently no available resources. The VFRC's have indicated during a workshop the need for funds to maintain fire breaks and do the patrolling. The estimates below are really rough calculations, based on similar projects in Malawi and is only applicable to a 1 kilometer buffer zone, stretching 4 villages, around the forest fragments (1,000 ha landscape). It is divided in a "low-cost" high priority action programme and a more extensive and sustainable "high-cost" medium priority action programme.

High priority "low-cost":

- Establishment of a functional VFRC in the largest forest fragment: 1,500 USD
- Motivation and capacity building for the VFRC in the smallest forest fragment: 1,500 USD
- Sensitization and awareness campaigns: 1,000 USD

Medium priority "high-cost":

- Land restoration project: 25,000 USD
- Agricultural intensification/conservation agriculture: 15,000 USD
- Alternative livelihood development incl. agroforestry: 15,000 USD



## Priority actions

*Include objectives (clearly defined and measurable), proposed actions and respective time frames, person(s) responsible for each of the following items.*

### In situ

#### **Habitat management, restoration and/or protection**

*What actions will be taken to manage and restore the habitat to a safe environment for the species and what is the approximate timeframe for completing this? Who is the primary person or organization responsible for restoration and management of the species and its habitat? How will the land be protected in the future?*

Habitat management through avoided deforestation is the number one priority for the survival of this species, and a relatively small amount of funding (< 3,000 USD) can already make a difference. The two forest fragments are under community forest management and, to a certain extent, this has been shown effective in protecting the last rainforest (even 35 years ago, these were not measuring more than 100 ha). This is in sharp contrast to over a 1,000 of suitable rainforest habitat inside a legally protected forest reserve that has been cleared and settled for agriculture. Therefore, in the short term, community forestry is put forward here as the best management tool.

- The first action that needs to be taken is halting the further degradation of the forest fragments. This is the most urgent intervention that is needed, and should be co-lead by the communities. The establishment of a functional VFRMC is considered essential.
- Then, the remaining degraded habitat within and at the edge of the forest fragments could be restored, allowing for the species to recolonize the habitat.
- At the same time, alternative income sources should be made available for farmers to have less need for short term cash income through the sales of timber and charcoal.
- In a later stage, when funding can be found to allow for intensified farming and/or conservation agriculture, a rehabilitation program can be set up for the steeper slopes on the hills. These are currently very degraded due to soil erosion and it will take many years to reverse that. A village mapping exercise, done by the communities in this respect would be a first step.

#### **Threat mitigation**

*How will the threats be mitigated and what is the approximate timeframe to remove the threats? Who is the primary person or organization responsible for reviewing and mitigating the threats?*

Currently, there is only one functional VFRMC looking after the smallest forest fragment, intensification for agriculture and deforestation for timber is a very high threat in the largest fragment. If funds can be found, a VFRMC can be established, bylaws created and a forest management plan implemented to take away this imminent threat in the short term.

#### **Distribution surveys**

*Are additional surveys required to be sure that the entire distribution and habitat requirements for the species are fully understood? Who will be responsible for coordinating these surveys?*

Although not a high priority, a survey can be done to some of the small (<1 ha) forest fragments remaining on one of the steep hills that used to contain the largest tract of



lowland rainforest here. Also, some of the forested streams on the east side of the forest reserve could be assessed (though emergent trees seemed to be absent there).

#### **Population and conservation status monitoring**

*Who will be responsible for ongoing monitoring of the population in the wild to ensure that the actions taken have been successful? How will the wild population be monitored?*

This is of a lesser priority since the species is abundant and present in the forest edge and interior forest, as well as in banana plantations, as long as the emergent canopy trees are left intact.

#### **Ex situ**

*Include this section if there is an ex situ component to the recovery plan.*

One ex situ population has been established in a private rainforest outside its known distribution. It is said to do well there, having colonized most of the protected forest. It can be advised to supplement this population, or exchange individuals to help militating the founder effects and potentially genetic inbreeding. This could be a direct conservation measure requiring minimum financial means.

#### **Captive management**

*What is the primary role for the ex situ population (e.g. captive breeding for reintroduction, head-starting, research etc.) How many founder animals are required, where will they come from, and what are the plans if sufficient founder animals cannot be found? What is the current captive population, and the target population? How many organizations will be involved with the captive component? How will the genetics of the captive population be managed? Refer to the IUCN SSC [Guidelines on the Use of Ex Situ Management for Species Conservation](#) for further advice.*

The primary role is the safeguarding of the species as a whole. Reintroduction is currently not a priority since the species is still well represented in the tiny forest remnants. Genetically, the species may benefit from an exchange of individuals.

#### **Capacity building for ex situ management**

*Are there enough skilled people in the country to manage captive conservation programs and which organizations are they based at? If not, how will enough people be trained to manage the ex situ programs?*

This is not considered a priority.

#### **Ex situ research**

*Is ex situ research required, either directly related to understanding or improving husbandry protocols, or for other reasons (e.g. disease testing or management). If so, outline the research and who will be responsible for undertaking it.*

This is not considered a priority.

#### **Supplementation/translocation**

*Is supplementation or translocation being considered for this species? If so, provide details of the planned actions and who is responsible for managing the actions.*

This is currently advised as one of the easiest and cheapest conservation measures. This will be done in prior consultation with the owner of the private forest, where the species has been introduced ex situ.

#### **Reintroduction strategy**

*When threats facing the species in the wild have been mitigated, and/or suitable protected habitat is available for animals to be reintroduced to the wild, how will this be managed? Include information about pre-release health and disease checks, individual identification system of animals, who will undertake the releases, how the short and long-term post-release monitoring will be carried out.*

This stage is far from being considered at the moment, if a reforestation effort can be established on the steeper slopes of the hills within the national forest reserve, and the forest is shown to have built up enough structured layers with emergent canopy trees (not expected within the next 50 years), then this can be a consideration to be made.

## Education and awareness

### **Public education and raising awareness**

*Are there any plans to help provide education to local communities, or to the general population about the threats facing the species and what actions people might be able to take to help reduce threats and protect the species? Public education could be provided via display panels in national parks and forests; in museums, libraries, zoos and aquariums; or by more traditional teaching programs in schools and local communities.*

Although the local communities were aware of the chameleon, and even had a unique name for it separating it from the more typical “Nadzikambia” (Which is the Flap-necked chameleon here), they were not aware of the threats to, status of and uniqueness of this chameleon. Apart from several meetings, one workshop was organized where traditional leaders, teachers, priests, and members of the VFRMC were invited to participate and learn more about this chameleon. This was welcomed by the community, who said they did not realize the uniqueness of the species, and the link to their forest. The importance of such workshops and meetings can therefore not be more emphasized. Therefore, education and awareness should be considered as one of the main pillars of the species action plan. This can easily be done through teachers in local schools. One of the school teachers was already involved in a workshop and acknowledged that this is important.

### **Community and stakeholder engagement**

*Have local communities, national and local governments, field researchers, the ex situ conservation community, private landholders and other stakeholders been involved with the development of the plan? What actions have been developed to ensure that they remain involved, and play their part in achieving the outcomes of the plan?*

A workshop was organized at local level to understand the threats to the forest, the local needs to protect it and the motivation of the people in general to the preservation of the forest. Although everyone understands the importance of forest, the need for arable land and timber, the erosion lower down the slopes, the increased population pressure and the lack of village planning all contribute to the pressure. Therefore, VFRMC's with financial resources and capacity were proposed by the community as a valuable conservation measure. It is necessary to keep showing involvement and potential from (inter)national stakeholders to be engaged in the conservation of the forest, to keep the VFRMC's motivated.

## Exit strategy

*What will be the triggers that cause the in situ and/or ex situ conservation actions to cease? What will happen to any remaining captive animals? How will the continued success of the conservation actions be monitored, and how often?*

A functional set up of VFRMC's that are financially and technically self-sustainable should result in a halt to further encroachment and a net growth of biomass and trees in the forest fragments remaining. This may take a few years to materialize, and should in a later stage continuously be monitored remotely (which can be captured easily through satellite imagery, e.g. Global Forest Watch).

## References

### **Literature cited**

*Include a list of any papers which are cited within the action plan.*

### **References**

*Include a list of papers, articles, journals or web pages which provide additional reference material which is of direct relevance to the action plan.*