ACTION PLAN FOR CONSERVATION OF CRITICALLY ENDANGERED BIRDS IN TAITA HILLS, KENYA

2015-2020

Taita Thrush (*Turdus helleri*)
Taita Apalis (*Apalis fuscigularis*)

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NatureKenya
THE EAST AFRICA NATURAL HISTORY SOCIETY

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FOREWORD

'Healthy populations of Taita Apalis and Taita Thrush as a global heritage benefiting the local people' is the vision of this Action Plan, in line with the Kenya Wildlife Service's vision 'to save the last great species and places on earth for humanity'.

The conservation and management of wildlife is at the core of KWS's mandate. Kenya Wildlife Service (KWS) is a state corporation established by an Act of Parliament and has the legal mandate to conserve and manage wildlife in Kenya and enforce related laws and regulations. Since its inception in 1990, KWS has achieved much in curbing poaching, enlisting support in conservation, and establishing infrastructure and human capacity development. This success has been made possible through support from the Government of Kenya, international and local donors, and development partners.

This Action Plan will guide conservation of the Taita Thrush and the Taita Apalis, both of which are Critically Endangered bird species endemic to the Taita Hills mountain block in south eastern Kenya, East Africa. The strategy has five key components that guide its implementation; the vision, goal, objectives, targets and activities.

KWS recognizes and appreciates the input and efforts of all stakeholders in the conservation and management of both bird species. Successful implementation will require the participation and collaboration of all stakeholders: the government, donors, private sector and the community.

The Board of Trustees calls upon the Government of Kenya, donors, conservation partners and all stakeholders to support the implementation of activities of this national conservation strategy.

Richard Leakey
Chairman of the Board of Trustees
Kenya Wildlife Service

PREFACE

The Kenya Wildlife Service conserves and manages Kenya's wildlife for the Kenyan people and the world. It is a state corporation established by Parliament under The Wildlife Conservation and Management Act Cap 376 with the mandate to conserve and manage wildlife in Kenya, and to enforce related laws and regulations. Kenya Wildlife Service identified the need for national species conservation strategies to ensure special attention is focused on threatened species. Consequently, KWS established the department of Species Conservation and Management to promote species conservation planning to ensure their survival.

In tandem with this, this Action Plan was developed in collaboration with stakeholders in a national workshop that included the species specialists, conservation managers from governmental and non-governmental organizations and community representatives.

The Action Plan addresses the conservation needs of two Critically Endangered bird species, Taita Thrush and Taita Apalis, found in the Taita Hills, Kenya. The populations of both species have significantly reduced in recent years due to severe habitat fragmentation, isolation and decline in quality and extent of indigenous forest in the Taita Hills, fire, habitat disturbance, conversion to exotic tree plantations, and invasive plant species.

The decline in these species' population and habitat has been of major concern to stakeholders in Kenya. The conservation of these species will require commitment and coordinated efforts among all concerned parties to ensure the future survival of these birds.

The preparation of this Action Plan has truly been a team effort. We are indeed grateful to the entire team which provided tremendous support, active participation and contributions in all processes involved in developing this Action Plan.

The implementation of this strategy will require resources and KWS calls upon donor organizations and stakeholders to support us so that we can actualize it and conserve the Taita Thrush and the Taita Apalis for posterity.

Julius Kimani
Ag. Director General
Kenya Wildlife Service

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ACRONYMS

CFA	Community Forest Association
DABICO	Dawida Biodiversity Community Organisation
DICE	Durrell Institute of Conservation & Ecology
IBA	Important Bird and Biodiversity Area
ICIPE	International Centre for Insect Physiology and Ecology
IUCN	International Union for Conservation of Nature
KEFRI	Kenya Forest Research Institute
KFS	Kenya Forest Service
KWS	Kenya Wildlife Service
NK	Nature Kenya
NMK	National Museums of Kenya
SAP	Species Action Plan
SSG	Site Support Group (local conservation organization)
TTWF	Taita Taveta Wildlife Forum
WRMA	Water Resource Management Authority
WRUA	Water Resources Users Association
WW	Wildlife Works

EXECUTIVE SUMMARY

This action plan has been developed to guide conservation of the Taita Thrush *Turdus helleri* and the Taita Apalis *Apalis fuscigularis*, both of which are Critically Endangered bird species endemic to the Taita Hills mountain block in south eastern Kenya, East Africa.

The Taita Thrush is confined to montane cloud-forest, not venturing into secondary growth, scrub or cultivated areas. It prefers well-shaded areas with a dense understorey, high litter-cover and little or no herbaceous cover. Consequently this bird is found at greater density in Mbololo, the least disturbed forest area in the Taita Hills.

The Taita Apalis inhabits the understorey of montane forest, favouring gaps and edges with thick undergrowth. It also occurs outside of forest, in dense indigenous bush with scattered trees in Vuria and Msidunyi. Both bird species show strong avoidance of plantations of exotic trees.

Severe fragmentation, isolation and decline in quality and extent of indigenous forest in the Taita Hills are major threats which affect the breeding success and survival of both species. Lack of clear boundary demarcations in some protected forest fragments may compromise conservation efforts. Fire, habitat disturbance, exotic tree plantations, and invasive tree species are also known to threaten the birds' habitat. Male-biased sex ratio in the Taita Thrush, hybridisation in the Taita Apalis, and nest predation in both species, though requiring further investigations, might also threaten these species.

There are a number of scientific knowledge gaps that limit conservation of these species. These include: species population status and trends; habitat monitoring; species genetics; species distribution, habitat use and preference; breeding behaviour; foraging behaviour; and effects of hybridisation on the Taita Apalis. Also, the drivers of decline, especially for the Taita Apalis, are not well understood.

'Healthy populations of Taita Apalis and Taita Thrush as a global heritage benefiting the local people' is the long term vision of this Action Plan. Its goal is to protect and improve habitats while enhancing their connectivity for the Taita Apalis and Taita Thrush populations. This will be achieved through undertaking a set of activities outlined under each of the following strategic objectives:
(1) Promote integrated landscape and habitat management;
(2) Improve survival of the Taita Apalis and Taita Thrush;
(3) Support implementation of policies and legislative provisions;
(4) Promote local community participation, education and awareness; and
(5) Identify appropriate climate change mitigation and adaptation measures.

The lifespan of the Action Plan is five years and it will be implemented in close collaboration of various stakeholders as outlined in a detailed action framework.

Taita Thrush. PHOTO: CHARLES DAVIES

1

BACKGROUND INFORMATION

This Action Plan addresses the conservation needs of two Critically Endangered bird species found in the Taita Hills, Kenya.

1.1. The Taita Hills

The Taita Hills rise from the surrounding drylands in southeastern Kenya. As described by Borghesio *et al*. (2010), the Taita Hills (38°20'9E 3°25'S) are an isolated massif approximately 20 X 20km in size, rising to more than 2,200m a.s.l. from the surrounding dry plains at 900m. Originally, most of the hills were probably covered with trees, but forest is now restricted to the highest peaks and steepest slopes surrounded by a dense matrix of human settlements. The total amount of closed-canopy natural forest on the hills is about 400–600 ha, subdivided into 12 fragments with a range in size of 1–220 ha (Rogo and Oguge 2000, Pellikka *et al*. 2009).

Both the physical structure and the flora of the fragments are influenced by human disturbance, which is less pronounced in the larger fragments. Logging was intense in the area up to the 1970s, and most of the commercially valuable timber species (e.g. *Ocotea usambarensis*, *Podocarpus* spp.) have been removed, resulting in sometimes discontinuous canopy cover and increased dominance by early successional trees such as *Tabernaemontana stapfiana* (Wilder *et al*. 2000, Bytebier 2001, Chege and Bytebier 2005). Between the 1950s and 1970s, the Kenya Forest Department (now Kenya Forest Service) created a number of plantations of non-indigenous trees (*Pinus patula, Cupressus lusitanica* and *Acacia mearnsii*) inside the forest fragments, aiming to reduce soil erosion and provide an alternative source of wood for the human population. Comparison between recent information and aerial photographs taken in 1955 suggest that approximately 50% of the area of natural forest has been converted to tree plantations in recent decades (Pellikka *et al*. 2009).

1.2 Taita Thrush

Information included for assessments of the Taita Thrush and Taita Apalis, unless otherwise stated, is mostly based on that provided in the BirdLife International Datazone (http://www.birdlife.org/datazone/) on factsheets for the species (BirdLife International 2015).

1.2.1 Taxonomy

Species: *Turdus helleri* (Mearns, 1913), in the Order; Passeriformes and Family; Turdidae is a medium-small size songbird with a bright red beak.

The Taita Thrush *(Turdus helleri)* was originally treated as a subspecies of the much more common Olive Thrush *(Turdus olivaceus)*, but was raised to full species status on account of its distinct appearance and song. *Turdus olivaceus* (Sibley and Monroe 1990, 1993) was split into three species: Taita Thrush *T. helleri* on the basis of its highly distinct plumage pattern, and reportedly different voice (following Collar and Stuart 1985); Somali Thrush *T. ludoviciae* on the basis of its extremely distinct plumage pattern following Collar et al (1994); and *T. olivaceus* (covering remaining populations, still known as Olive Thrush).

1.2.2 Population Size and Trend

Waiyaki and Samba (2000) estimated the population to number 1,400 individuals, roughly equivalent to 930 mature individuals. Research in 1997 indicated a total population of c.1,350 birds, with c.1,060 in Mbololo, 250 in Ngangao and 38 in Chawia (Galbusera *et al*. 2000, Waiyaki and Samba 2000, Waiyaki *et al*. 2001), although the effective population size is likely to be lower owing to a male-biased sex ratio. In 2009 surveys confirmed continued presence of the Taita Thrush in Mbololo and Ngangao fragments (M. Githiru in litt. 2008, 2009, 2010) and the species was seen also in 2014 in Ngangao and Chawia (L. Borghesio, pers. comm).

The population is suspected to be in decline as the Taita Thrush's montane forest habitat has been severely fragmented and continues to decline in both extent and quality. Existing data (2009-2014) suggests direct evidence of decline (2009-2014), but the sample size is small (L. Borghesio, pers. comm).

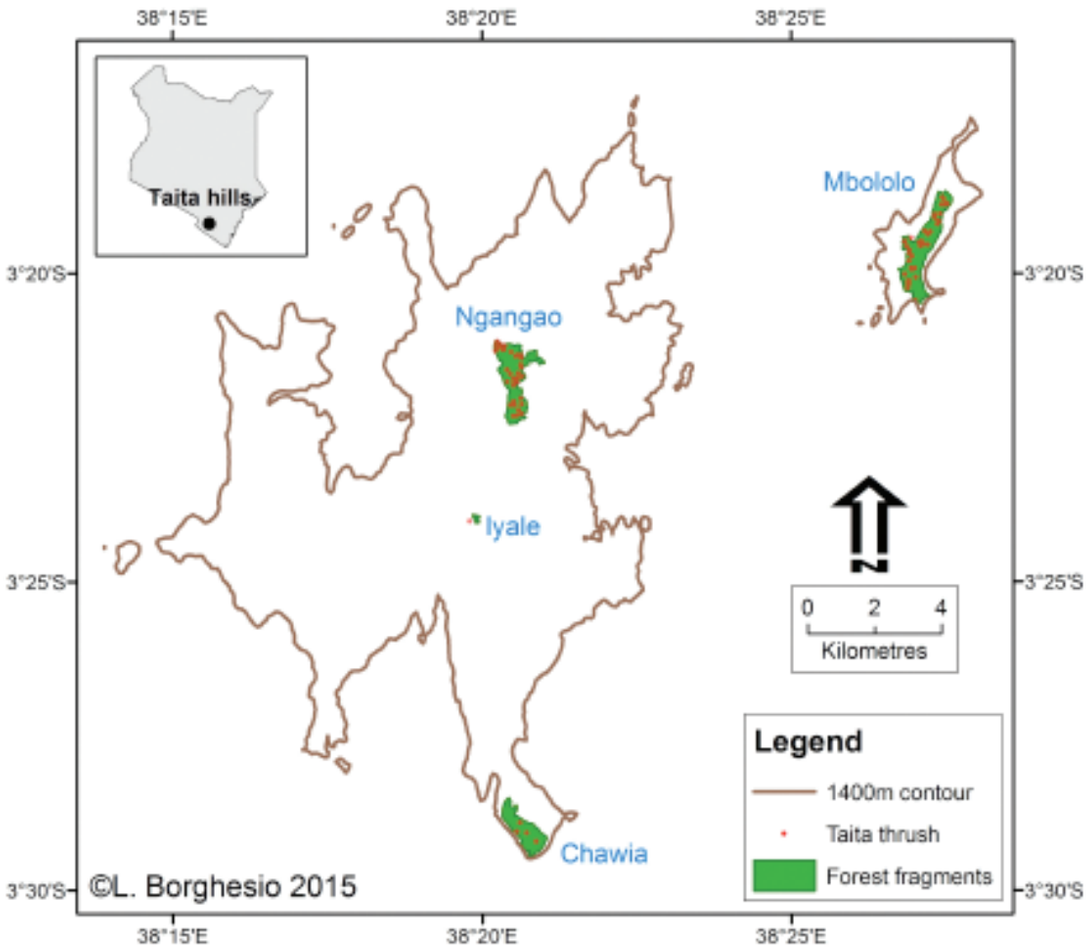


Figure 1: Map of the Taita Hills Indicating the Respective Forest Fragments where the Taita Thrush is Distributed *(by Luca Borghesio)*

1.2.3 Distribution throughout the Annual Cycle

The Taita Thrush is confined to four tiny forest patches in the Taita Hills: Mbololo (c.210 ha), Ngangao (120 ha), Chawia (86 ha) and Iyale (15.7 ha) (Brooks 1997, Brooks *et al.* 1998, L. Bennun *in litt.* 1999, Waiyaki and Samba 2000, Pellika *et al.* 2009) – Figure 1. Although there have been reported sightings at Mt Kasigau, 50 km south-east of the Taita Hills, survey work in 1998 did not record the species there (Brooks 1997, Barnes *et al.* 1999).

1.2.4 Habitat Requirements

The Taita Thrush is confined to montane cloud-forest (Waiyaki and Samba 2000), not venturing into secondary growth, scrub or cultivated areas (Zimmerman *et al.* 1996), although the areas where it occurs have been heavily logged in the past (Brooks 1997). It shows strong avoidance of plantations of exotic trees, even when these are embedded inside larger patches of indigenous forest (Borghesio *et al.* unpublished data). Despite much research, very few inter-fragment movements have been recorded (Waiyaki and Samba 2000).

This bird prefers well-shaded areas with a dense understorey, high litter-cover and little or no herbaceous cover (Waiyaki and Samba 2000), and consequently is found at greater density in Mbololo, the least disturbed forest area, and is rarest in Chawia, which has a more open canopy and a very shrubby understorey (Brooks 1997, Waiyaki and Samba 2000, Waiyaki *et al.* 2001). It rarely ascends more than 2 m above ground (Zimmerman *et al.* 1996). The diet is insects and fruits; also earthworms, snails, slugs etc. The more widespread Orange Ground-thrush *Zoothera gurneyi* often occurs in exactly the same areas as *T. helleri* (Brooks 1997).

1.2.5 Breeding Ecology, Survival and Productivity

The Taita Thrush is monogamous and terrestrial, with overlapping home ranges (Waiyaki and Samba 2000) and breeding between January and July. The clutch-size is 1-3 (Urban et al. 1997). A detailed breeding record of the species was provided by Samba *et al.* (2003), as follows: the nest was cup- shaped and built in a three-way fork on a tree, approximately 6m above the ground. The tree trunk was covered up to 60 percent by a big-leaved climber provided perfect camouflage for the nest. The nest contained three eggs, of a deep light blue colour, with rufous-brownish spots. One of the eggs was much larger than the rest, which would seem to indicate that the thrush invests more in its first egg, and that it is likely that the chick hatching from this egg automatically has greater chances for survival and its siblings will only survive if the conditions are very good.

1.3 Taita Apalis

1.3.1 Taxonomy

Species: *Apalis fuscigularis* (Moreau 1938),in the Order of Passeriformes and Family of Cisticolidae is a small sized songbird with a dark head and chest and bright pale eye.

Apalis fuscigularis was recognised following the splitting of the widespread Bar-throated Apalis *Apalis thoracica* (Sibley an d Monroe 1990, 1993) into four species: Taita Apalis *A. fuscigularis*, Namuli Apalis *A. lynesi* (of a small area in Mozambique), Yellow-throated Apalis *A. flavigularis* (of a small area in Malawi) and *A. thoracica* (remaining populations), following Collar *et al.* (1994).

The Taita Apalis A. *t. fuscigularis* (1) does not respond to tape playback of nearest neighbours. It further differs from them in having (2) an all-dark throat with brown chin (3) underparts with virtually no yellow or buffy tinge (appearing stone-white); (4) slightly darker brownish head than majority of others; (5) darkest back. Also differs from nominate *A. t. thoracica* in (1-5) and in having lores to lower cheek brown not black. Compared to morphologically closest race of thoracica *(A. t. youngi)*, it differs in having (1) white throat; (2) very slightly yellowish-washed lower flanks and rump; (3) paler lores; (4) underparts clearer white; (5) darker tail; (6) pale tips to certain tail feathers.

1.3.2 Population Size and Trend

Analysis of data from unlimited distance point counts carried out in 2001 suggested that the total population numbered 310-654 individuals (Borghesio *et al.* 2010), roughly equating to 210-430 mature individuals. However, surveys conducted in 2009-2014 suggest that a severe decline has recently taken place, at most sites (Borghesio *et al.* 2014). In particular, the species has probably disappeared from at least two sites (Chawia and Fururu). In Ngangao, the former main population stronghold the decrease has been of about 60% based on standardized counts (2009-2014 (Borghesio *et al.* 2014).

While precise estimates are lacking at this stage, it is likely that the current global population may now number only 100-150 individuals, including a subpopulation that was discovered in October 2011 in another forest fragment (Msidunyi) in the Taita Hills (BirdLife International 2010, L. Borghesio *in litt.* 2012). A detailed survey of the Msidunyi site (Borghesio *et al.* 2015) found 7 resident pairs, occurring over an area of 45-50 ha, of which only 7 ha are covered by indigenous forest, the rest being mainly degraded shrub with scattered indigenous trees and exotic plantation. Further studies and analyses are required to confirm the population trend and new population estimate.

1.3.3 Distribution throughout the Annual Cycle

The Taita Apalis has been reported from seven sites in the Taita Hills, though some of these sites might no longer be occupied now (Borghesio *et al.*, 2014) – Figure 2. Brooks *et al.* (1998) reported the presence of this species from four forest fragments, namely Ngangao (120ha, Pellikka et al. 2009), Chawia (86 ha, Pellikka et al. 2009), Fururu (8 ha, Pellikka *et al.* 2009) and Vuria (where no more than 1-2 ha of indigenous forest remains, but the species occurs in degraded bush on an area of approximately 60ha, Borghesio *et al.* unpublished). Surveys since 2009 observed the Taita Apalis at three further sites: Mbololo (220ha, where one pair was seen three times in 2009 and 2010), Iyale (16ha, Pellikka *et al.* 2009), where a single pair has been repeatedly observed 2009 to 2014, and finally, Msidunyi, a previously un-surveyed site, was found to host a small population in late 2011 (Borghesio and Wagura, 2012).

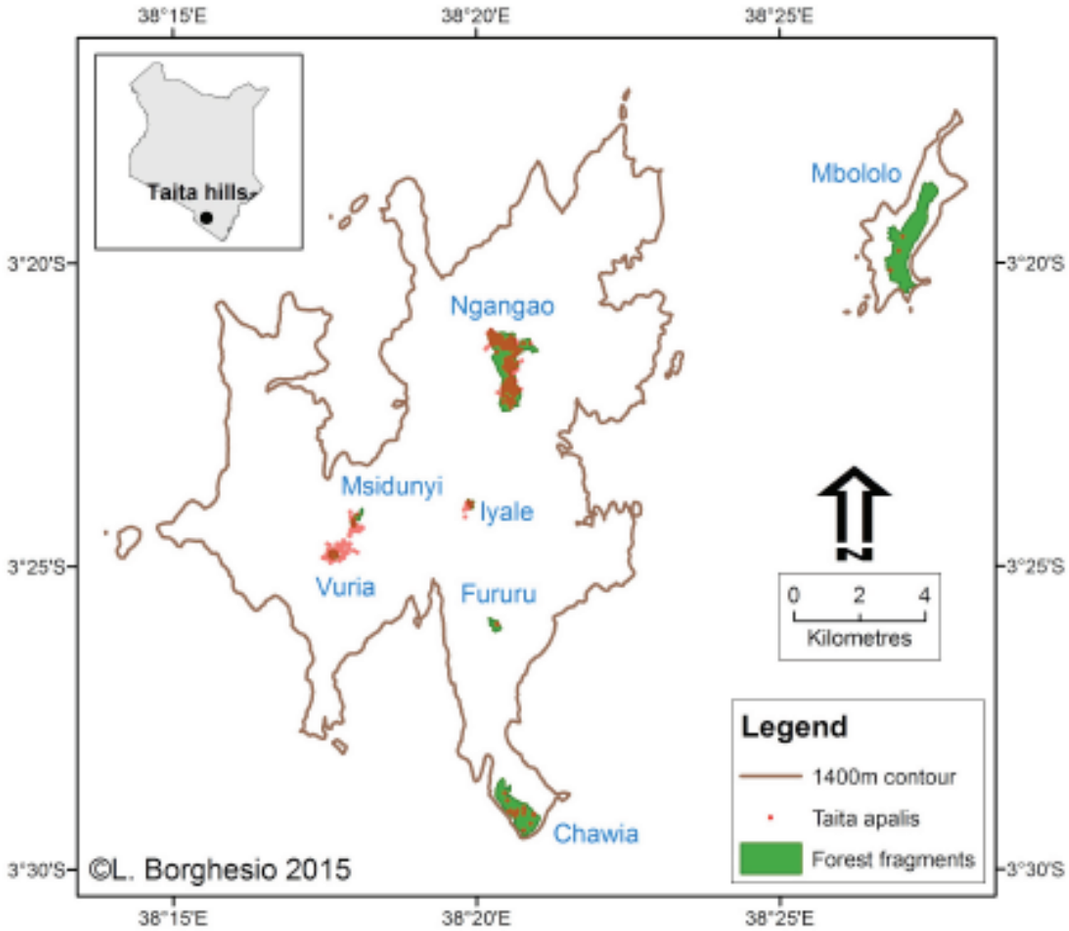


Figure 2: Map of the Taita Hills Indicating the Respective Forest Fragments where the Taita Apalis has ever been Recorded *(by Luca Borghesio)*

Monitoring carried out annually in the Taita Hills since 2009 provided strong evidence of dramatic decrease in the range size (Borghesio *et al.*, 2014). The species almost certainly disappeared in Chawia and Fururu, where it has not been seen since 2012 despite repeated searches. No sightings are available from Mbololo since 2010, but the area has not been covered by adequate survey in recent years. The new Msidunyi population is threatened by rapid conversion of habitat to agriculture (Borghesio *et al.*, 2015), while the range inside Ngangao fragment has decreased dramatically ((Borghesio *et al.*, 2014). Currently, only the Vuria population appears to be stable in its range.

1.3.4 Habitat Requirements

While in most sites the Taita Apalis appears to be restricted to indigenous forest and forest edges, current evidence suggests that it cannot be defined as a true forest specialist, because at two sites (Vuria and Msidunyi) most of the observations have been obtained up to 400m outside forest, in a dense thicket of indigenous shrubs and scattered trees, probably representing the remains of a formerly more extensive forest (Borghesio *et al.* 2015).

In summary, the Taita Apalis inhabits two types of habitat: the understorey of montane forest, favouring gaps and edges with thick undergrowth, and indigenous bush/thicket connected to, but up to several hundred metres away from, true forest.

The Taita Apalis is mostly insectivorous. It gleans insects from vegetation, mainly between 0-2 m above ground (Samba *in litt.* 1997, M. Githiru *in litt.* 2008). It shows a preference for areas with a high cover of climbers and, to a lesser extent,

of *Dracaena*, although in general the bird's occurrence in forest fragments shows only a weak relationship with habitat characteristics such as structure and floristics (Borghesio *et al.* 2010). The high frequency of this species in the disturbed, scrub-like vegetation of Vuria suggests that it is tolerant of wood-cutting and disturbance by humans (Borghesio *et al.* 2010). It normally moves singly or in pairs (rarely in small family parties of 3 to 4 individuals), searching leaves, twigs, branches and tree-trunks, sometimes descending to the ground to feed on small invertebrates and occasionally berries and seeds (Urban *et al.* 1997, M. Githiru *in litt.* 2008). It is territorial, with a clutch-size of 2-3 observed (Wagura *et al*. 2012).

1.3.5 Breeding Ecology, Survival and Productivity

Wagura *et al.* (2012) reported the first detailed data concerning the nesting biology of Taita Apalis. Four nests were observed between November 2010 and January 2011. All were located in small gaps in natural forest and contained 2–3 eggs. The nests were typical of the genus *Apalis*, ovoid domed structures with a lateral entrance, and constructed of mosses and grass stems. The nesting period, from nest building to fledging of young, lasted c.5–6 weeks. In general, the nesting biology of *A. fuscigularis* resembles that of the closely related Bar-throated Apalis *A. thoracica*.

2

2.1 Threats to Taita Thrush and Taita Apalis

Threats to the two species can be analysed as presented in the problem tree below (Figure 3). Further, during the stakeholder action planning workshop, the threats and gaps in knowledge facing the Taita Thrush and Taita Apalis were grouped as illustrated in Box 1 below. The threats are further described below.

2.1.1 Habitat Loss and Fragmentation

The Taita Hills has a human population of over 300,000, and in some places, densities reach 1,400 people/km^2. As a result the forest has been severely fragmented and continues to decline in both extent and quality, with an area of just 450 ha remaining, reflecting 98% deforestation over the last 200 years. Cultivation is intensive, and as a result of the high human pressure on land, the forest remains today only as 12 scattered fragments on the hilltops and ridges forming one IBA (Important Bird and Biodiversity Area). The size of each of the forest patches ranges from 1 to 220 ha, and all are situated above 1,350m. Most of the original forest in the Taita Hills has been cleared for cultivation and the remaining tiny area is under serious threat from both clearance and degradation (Brooks *et al.* 1998, Mulwa 1998, L. Bennun *in litt.* 1999), although habitat quality in the largest two fragments remains good (Waiyaki and Samba 2000, Rogers *et al.* 2008).

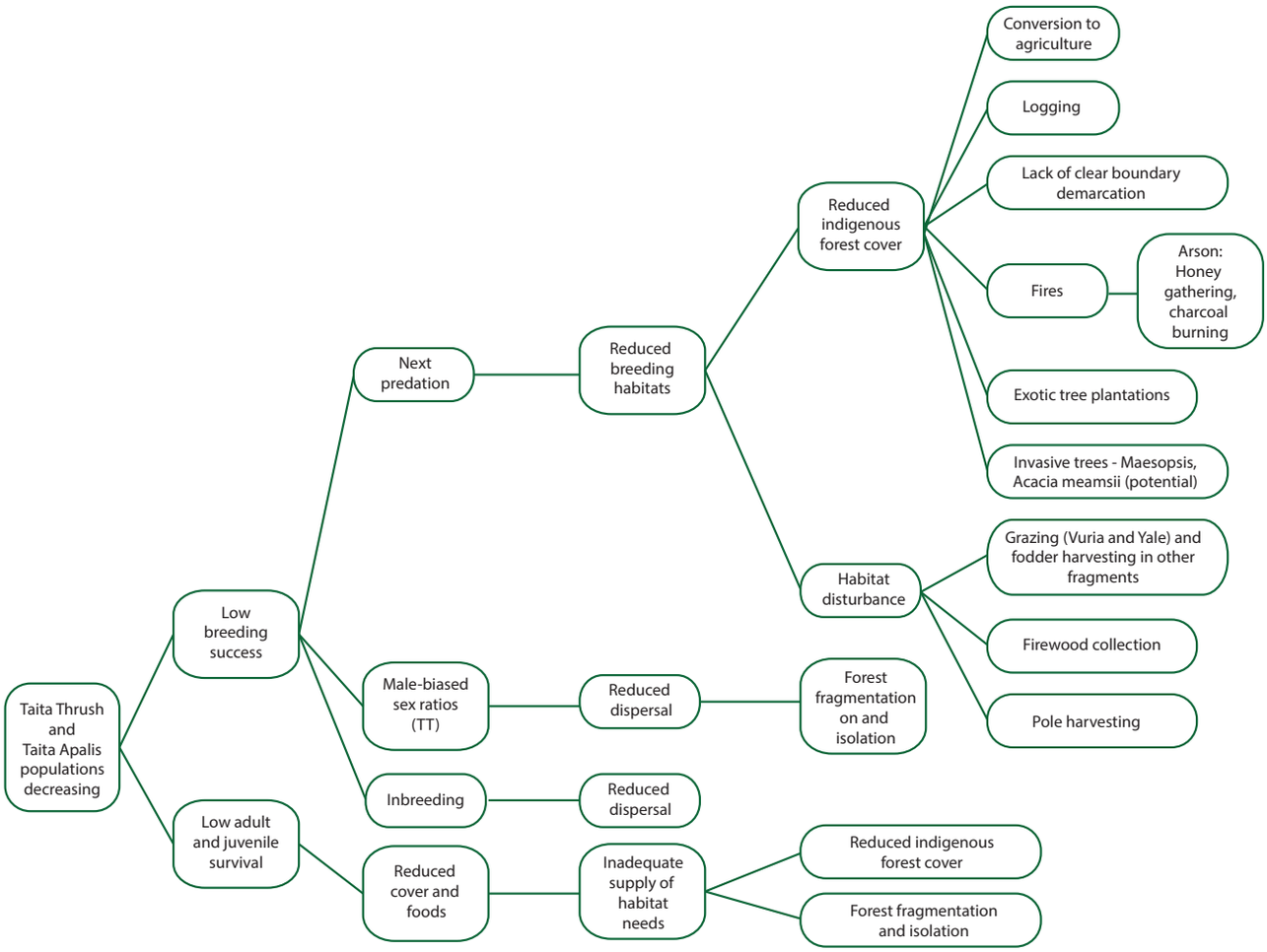


Figure 3: Problem Tree Illustrating Threats Facing Taita Apalis and Taita Thrush

Table 1: Threats facing Taita Apalis and Taita Thrush as grouped during the stakeholders workshop. Severity of threat is ranked as: Unknown (?); Low (*), Medium (**), or High (***), Sites Threats are Present (X)

THREAT	SPECIES AFFECTED		SITES AFFECTED (AND SPECIES FOUND THERE)						
	Taita Apalis	Taita Thrush	Mbololo (TT+TA)	Ngangao (TT+TA)	Chawia (TT+TA)	Iyale (TT+TA)	Vuria (TA)	Fururu (TA)	Msidunyi (TA)
Species-related threats									
Genetic inbreeding	?	***	X	X	X	X			
Demographic (Allee effects; population fluctuations)	***	***	X	X	X	X	X	X	X
Unbalanced sex ratio	?	***	X	X	X	X			
Competition (TA with Black-headed Apalis; TT with Orange Ground Thrush)	*	*	X	X	X			X	
Predation	?	?	?	?	?	?	?	?	?
Hybridisation	?		?	?	?	?	?	?	?
Habitat-related threats									
Habitat loss and isolation / lack of connectivity / Fragmentation (logging, land conversion, land demarcation)	?	***		X	X	X	X	X	X
Removal of bushy vegetation along forest edges	***			X	X			X	
Habitat disturbance	***	**		X	X	X	X	X	X
Invasive and exotic tree species (*Acacia mearnsii*, *Pinus patula*, *Eucalyptus, Maesopsis*)	*	*			X		X		X
Fires	?	?	X	X	X	X	X	X	X
Grazing	*	*			X	X	X		X
Gap closure	*			X	?				
Policy and legislation related threats									
Management plan not implemented/ outdated/ lacking in some sites	***	***	X	X	X	X	X	X	X
Lack of clear land demarcation/forest boundaries	**	**					X		X
Weak enforcement	**	**	X	X	X	X	X	X	X
Lack of clear guidelines on how to engage the Taita Taveta County government	*	*	X	X	X	X	X	X	X
Devolution of power	*	*	X	X	X	X	X	X	X
Lack of forest extension services	*	*	X	X	X	X	X	X	X
Education and awareness									
Species are poorly profiled	**	**	X	X	X	X	X	X	X
Limited education and awareness	**	**	X	X	X	X	X	X	X
Livelihoods									
Poverty putting pressure on indigenous forests	***	***	X	X	X	X	X	X	X
Some livelihood practices are incompatible with conservation of indigenous forests and the endangered birds	***	***	X	X	X	X	X	X	X
Climate change	?	?	?	?	?	?	?	?	?

2.1.2 Reforestation with Non-native Trees

Most of the original forest in the Taita Hills has been replaced with non-native, timber-tree species, and the remaining tiny area is under serious threat (Urban *et al.* 1997, Brooks et al. 1998). Exotic tree plantations are largely avoided by both bird species, and plantation expansion in the area over the last decade (Pellika *et al.* 2009) is a reason for concern (Borghesio *et al.* 2014). The removal of exotic trees could contribute to restoring habitat for the Taita Apalis, especially early successional habitats, which appear to be the preferred nesting habitat for the Taita Apalis (Borghesio *et al.* 2014).

2.1.3 Lack of Clear Boundary Demarcations

This affects some protected forest fragments and may compromise conservation efforts. However, remaining forest fragments have been reasonably well protected and habitat loss is unlikely to have caused recent declines.

2.1.4 Fire

Fires have been recorded as one of the threats. It is particularly common in the exotic tree plantations, especially pine trees, for example in Ngangao forest and Vuria.

2.1.5 Nest Predation

Nest predation in the Taita Hills may be high due to the small sizes of forest fragments.

2.1.6 Climate Change

Both species have a montane distribution that is close to the maximum altitude within the Taita Hills range and are therefore vulnerable to climate change impacts. A serious drought in 2009 may have been a factor in the apparent recent population crash of the Taita Apalis. However the effects of climate change need to be studied further.

2.1.7 Habitat Disturbance and Destruction

Where habitat disturbance leads to deteriorations in body condition, the long-term survival of sub-populations may be put at risk (Lens *et al.* 2002). Also direct destruction of habitat through human activities has been observed on several occasions along forest edges in Ngangao, Vuria and Msidunyi, thus likely affecting the Taita Apalis. Habitat disturbance along forest edges is a big problem for Taita Apalis in Ngangao, with several territories lost in the last 5 years in the forest due to the expansion of the road running along the western edge of the forest. Other territories might have been lost on the eastern side of Ngangao due to bush clearing in the farms that abut the forest edge. Tourism might become a threat for both species in Ngangao. Groups of tourists are quite frequent in Ngangao, and the guides that lead them now make systematic use of playback calls to attract the birds. This might cause disturbance to territorial pairs, especially in the northern part of Ngangao.

2.1.8 Male-biased Sex Ratio

A highly male-biased sex ratio of Taita Thrush in Chawia (only 10% of birds were female) might have significant negative consequences for the subpopulation's long-term survival (Lens et al. 1998, Waiyaki and Samba 2000, Waiyaki *et al.* 2001). However, outcome of population reinforcement in Chawia (Lens *et al.* 2009) have not been studied in detail. The species's reproductive rate may thus be lower than expected (Lens *et al.* 1998). Studies on the sex-ratio of Taita Apalis conducted in 2014 did not find evidence of biased sex ratio in the species at that time (L. Borghesio *et al.* 2015).

2.1.9 Competition with Related Species

Competition between Taita Apalis and Black-headed Apalis *Apalis melanocephala* is a possibility in Chawia, Fururu and Ngangao, while competition between Taita Thrush and Orange Ground-thrush *Zoothera gurneyi* is a possibility in Ngangao and Mbololo (L. Borghesio, pers. comm.).

2.1.10 Potential Hybridisation of Bar-throated Apalis with Taita Apalis

The Bar-throated Apalis has been recently confirmed as invading the range of the Taita Apalis, and hybridisation could potentially be happening (L. Borghesio, pers comm).

2.1.11 Gap Closure

Since the Taita Apalis is known to favour gaps and edges with thick undergrowth, the closure of the forest gaps in Ngangao forest could be negatively affecting the species.

2.3 Gaps in Knowledge

The gaps in knowledge regarding the Taita Apalis and Taita Thrush were analysed as summarised in Figure 4 opposite.

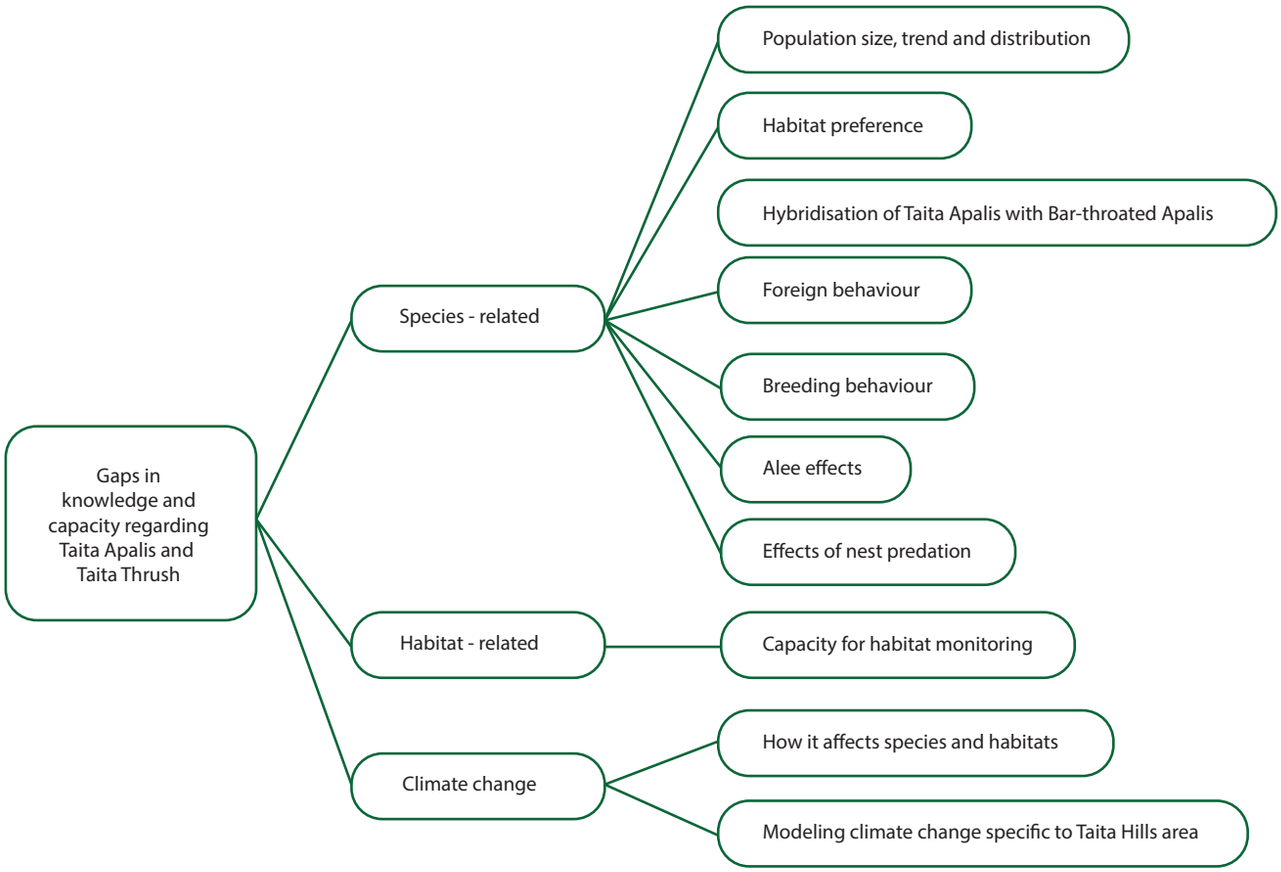


Figure 4: Gaps in Knowledge Regarding the Taita Apalis and Taita Thrush

3.1 Vision

Healthy populations of Taita Apalis and Taita Thrush as a global heritage benefiting the local people.

3.2 Goal

To protect and improve habitats while enhancing their connectivity for the Taita Apalis and Taita Thrush populations.

3.3 Objectives

1. Promote integrated landscape management
2. Improve survival of the Taita Apalis and Taita Thrush
3. Support implementation of policies and legislative provisions
4. Promote local community participation, education and awareness
5. Promote appropriate climate change mitigation and adaptation measures

Table 2: Activity Table

Strategic objective	Targets	Activities	Priority (L,M,H)	Actors	Timescale (Years)
1.0 Promote integrated landscape management	1.1 Forest connectivity improved to enhance species dispersal	1.1.1 Purchase or lease land for connectivity	H	County government, NK, community, TTWF	3 years
		1.1.2 Plant indigenous woodlots in landscapes	H	County, KFS, Community	Annual
		1.1.3 Rehabilitate riparian vegetation	M	County, KFS, Community, WRMA, WRUA	Annual
2.0 Improve survival of the Taita Apalis and Taita Thrush	2.1 Implementation of management plan (zonation) supported to improve habitat quality	2.1.1 Plant trees in degraded areas	H	County, KFS, Community, WRMA, WRUA, KEFRI, TTWF	
		2.1.2 Convert exotic tree plantations to indigenous	H	KFS, TTWF, Local community	
		2.1.3 Regulate extractive use	H	CFAs	
		2.1.4 Undertake collaborative patrols between county, local community and KFS	H	County govt, SSG, KFS	
		2.1.5 Recruit locals and build capacity for tree nursery establishment and monitoring	M	NK, SSG, Community	
		2.1.6 Recruit rangers	M	County govt, KFS	

Strategic objective	Targets	Activities	Priority (L,M,H)	Actors	Timescale (Years)
	2.2 Gaps in knowledge filled through research and monitoring	2.2.1 Undertake population surveys and monitor population trends	H	KWS, NMK, KEFRI, TTWF, WW, Taita Research Station, NK, SSG, relevant research institutions	5 years
		2.2.2 Study genetics of the species	L		
		2.2.3 Study species distribution, habitat use and preference	H		
		2.2.4 Study species home range	L		
		2.2.5 Study breeding behaviour	H		
		2.2.6 Study foraging behaviour	M		
		2.2.7 Investigate hybridisation of the Taita Apalis	H		
		2.2.8 Conduct ecosystem service assessment	M		
		2.2.9 Survey new areas for Taita Apalis	H		
3.0 Support implementation of policies and legislative provisions	3.1 Participatory forest management planned and implemented in the Taita Hills	3.1.1 Survey and gazette county forests and establish boundaries	H	County government, community, KFS, KWS	2 years
		3.1.2 Prepare, review and implement forest management plans	H		
	3.2 Legislation on species mainstreamed at county level	3.2.1 Sensitise locals and leaders on existing policies and legislation on species, forest restoration and management plans	M	NK, TTWF, SSG	
		3.2.2 Lobby county assemblies to support legislation and implementation of activities for species protection	M		

Strategic objective	Targets	Activities	Priority (L,M,H)	Actors	Timescale (Years)
	3.3 Coordination and collaboration among stakeholders supported		M		
4.0 Promote local community participation, education and awareness	4.1 Compatible livelihoods supported	4.1.1 Increase sustainable livelihood options e.g. bee keeping, butterfly farming	H	NK, Community, ICIPE, NMK, SSG, County government	Annual
		4.1.2 Implement Payment for Ecosystem Services (carbon trade mechanisms on forest land)	H	Wildlife Works	
	4.2 Capacity building and awareness creation enhanced	4.2.1 Develop awareness materials on Taita Apalis and Taita Thrush	M	County Government, NMK, NK	
		4.2.2 Use various communication media e.g. conduct barazas, visit schools and conduct lectures	M	County Government, KWS, Nature Kenya, TTWF	
		4.2.3 Establish central database / information depository	M	NMK, KWS, Nature Kenya	
5.0 Promote appropriate climate change mitigation and adaptation measures	5.1 Climate change adaptations and mitigation measures explored	5.1.1 Investigate impacts of climate change on species and habitats and water for the community	M	County Government, Research institutions, KFS, Nature Kenya, TTWF	
		5.1.2 Promote ecosystem conservation as strategy to help people and biodiversity adapt to impacts of climate change			
		5.1.3. Promote the use of energy saving technologies including use of biogas, energy saving stoves, on-farm woodlots			

4 PLAN IMPLEMENTATION AND COORDINATION

Multiple stakeholders will be involved in the implementation of this Action Plan. A coordination framework (Figure 5) is therefore necessary in order to avoid duplication of effort, optimize resource use and synergies between different efforts. Taita Taveta County Government, KWS, KFS and the other implementing agencies will mainstream the implementation of this Action Plan in their work plans.

The functions of the various committees are as follows:

Executive Committee

- Ratify all decisions concerned with conservation and management
- Develop and implement Taita Endemics conservation policy
- Ensure successful implementation of all required actions
- Advise on sourcing of funds
- Monitor funding expenditure and effectiveness

National Taita Endemic Species Management Committee

- Monitor and review implementation of the Species Action Plan (SAP) and make appropriate recommendations to the appropriate stakeholders based on advice from the technical committee
- Prioritise funding needs and advise the technical committee and donors
- Update the Taita Endemics population status and distribution
- Report on progress of strategy implementation at site levels

Taita Endemic Species Technical Committee

- Provide technical inputs to Species Management Committee
- Evaluate implications of technical recommendations before implementation
- Develop intervention protocols
- Set monitoring standards and procedures, and evaluate their implementation and effectiveness
- Review all conservation, management and research proposals

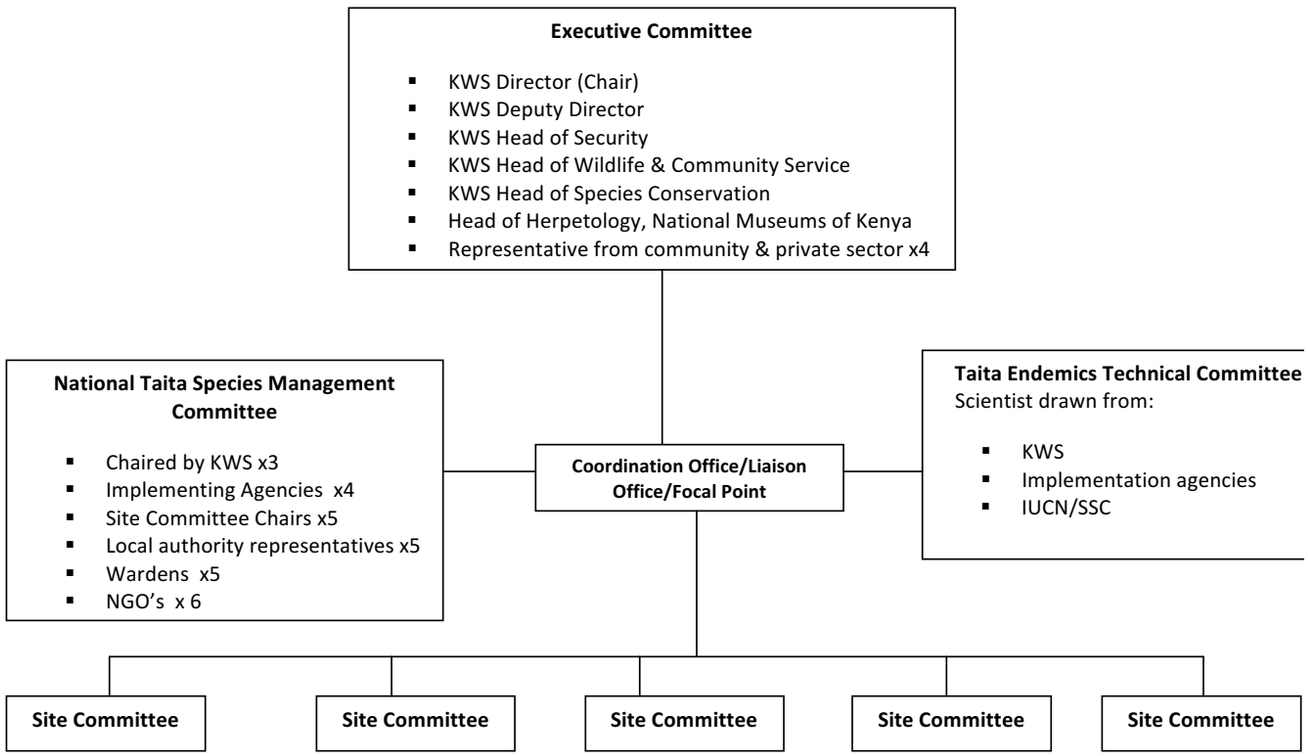


Figure 5: Action Plan Coordination Framework

- Fundraise for the conservation and management of the Taita Endemics, and implementation of the strategy
- Review and report on the implementation of the strategy

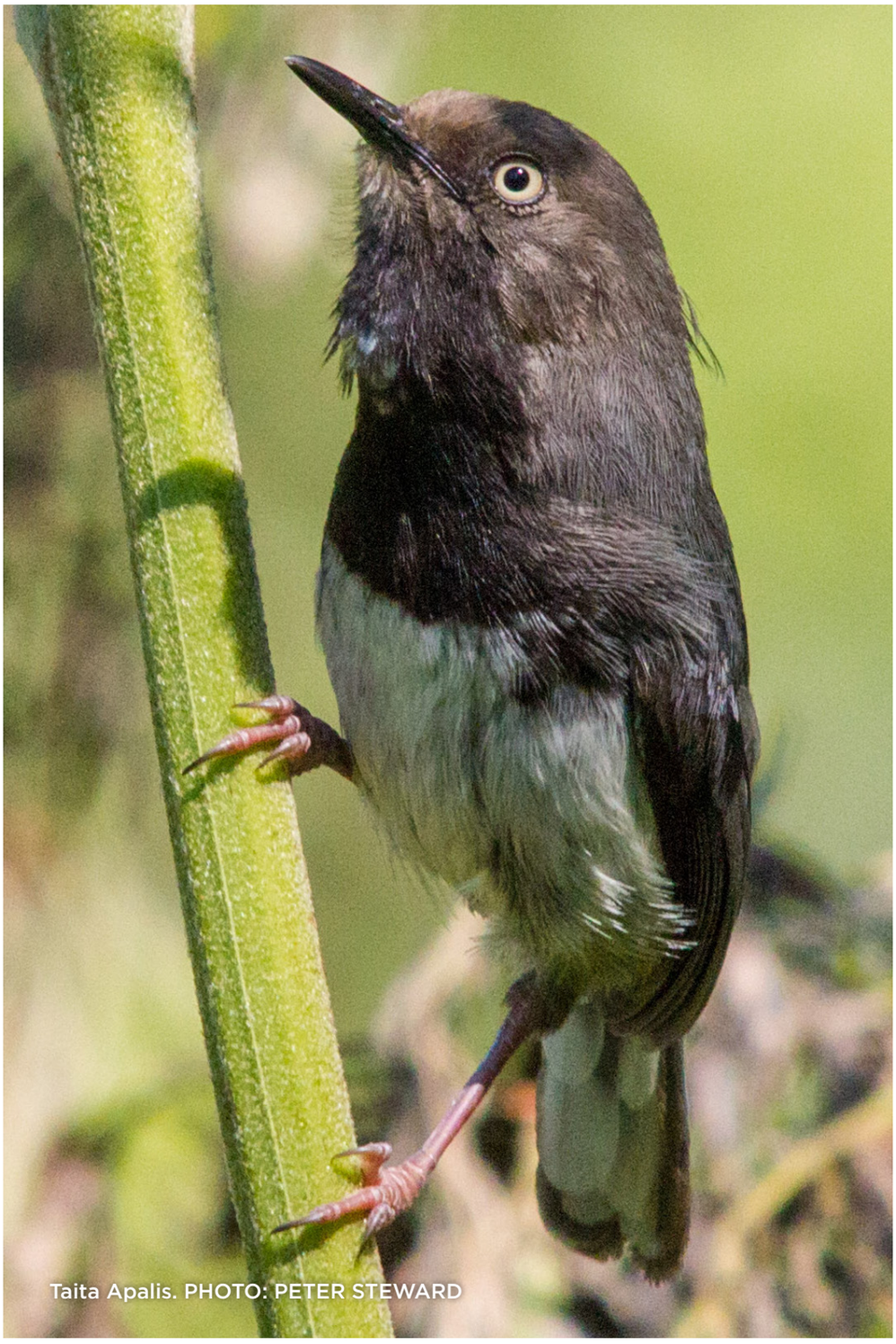
Site Committees

- Ensure cost effective implementation of site work plans
- Ensure adequate allocation of monitoring resources
- Report site specific species population status and distribution
- Coordinate linkages and working relations between research, security and management at site level
- Engage with local community groups

Coordination/Liaison Office

- Be the central information depository for Taita Endemics and other species of conservation concern through assembly of reports, data and other relevant information from collaborating agencies
- Monitor all collaborating agencies' implementation of work plans as outlined in the SAP.
- Disseminate information to and liaise with all stakeholders as identified in the Species Action Plan: Government of Kenya, County Government, Communities, NGOs & Trusts, Research & Academic Institutions and Donors.
- Coordinate meetings, management and executive committees
- Promote and publish the outputs of the SAP

The implementation table (section 3.4) prioritizes the activities, identifies the activity implementers and the expected completion time. The liaison officer will work with the technical and management committees to draw annual work plans to guide implementation of the Action Plan at the National level and with the site committees to ensure implementation at the site level. The progress at the national and site levels will be reviewed annually.



Taita Apalis. PHOTO: PETER STEWARD

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