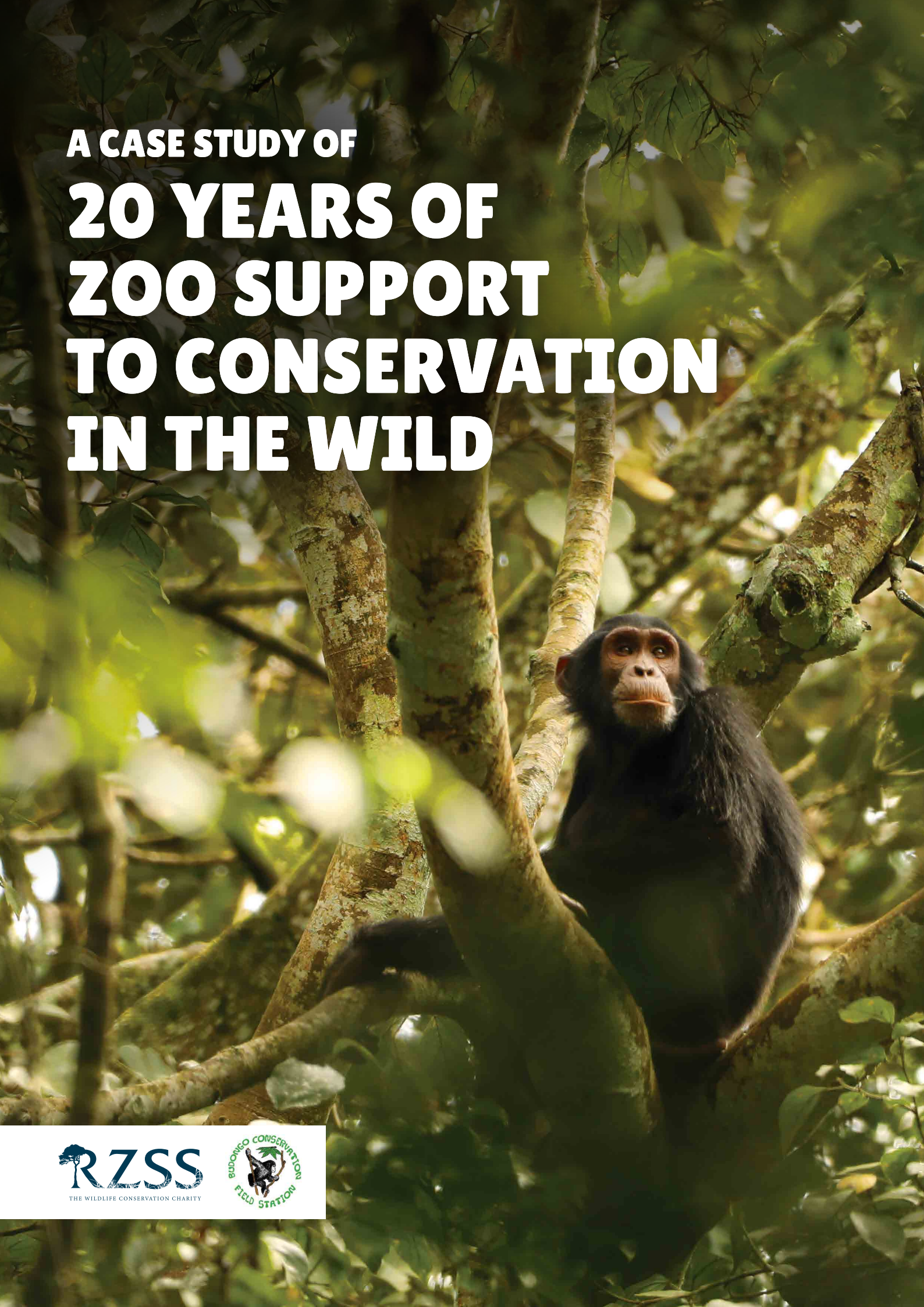

A CASE STUDY OF

20 YEARS OF ZOO SUPPORT TO CONSERVATION IN THE WILD

RZSS
THE WILDLIFE CONSERVATION CHARITY

BUDONGO CONSERVATION FIELD STATION

COMPILERS

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Arcus Foundation, Oakland Zoo, Earthwatch Institute, Zoo Augsburg, Darwin Initiative, University of St Andrews

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GLOBAL CONTEXT:
ZOO SUPPORT TO CONSERVATION PROJECTS

GLOBAL CONTEXT: ZOO SUPPORT TO CONSERVATION PROJECTS

Historically regarded primarily as recreational institutions, zoos increasingly incorporate conservation and education into their mission statements. Modern zoos have a responsibility to use their unique resources and expertise to conserve species and improve people's connectivity to nature.

Today, zoos and aquariums are the third biggest funders of conservation globally, with the reach to engage with a tenth of the planet's population annually (WAZA, 2025), making them a critical stakeholder in the conservation world.

The Reverse the Red (RtR) movement, an initiative established by partners including the International Union for Conservation of Nature (IUCN) and the World Association of Zoos and Aquariums (WAZA) aims to unite these conservation efforts. The RtR Species Pledge encourages organisations to make a commitment to actions for species recovery. The Royal Zoological Society of Scotland (RZSS) has committed to reverse the decline of 50 species by 2030, aligning with Goal A and Target 4 of the Convention on Biodiversity, to protect and restore ecosystems and species, halt extinctions and protect genetic diversity.

RZSS has pledged to reverse the decline of 50 species by 2030

RZSS' long-term commitment to fund and support the Budongo Conservation Field Station (BCFS) and its conservation work, which is protecting not only chimpanzees but a wide range of species in Uganda's Budongo Central Forest Reserve, is one of the actions RZSS are taking under their Species Pledge.

THE PARTNERSHIP

THE PARTNERSHIP

The BCFS-RZSS partnership has provided BCFS with core funding since 2005, a relationship of two decades which has offered BCFS stability and enabled it to operate continuously, providing income security and facilitating long-term planning.

Additionally, RZSS have facilitated the growth of several long-running initiatives, such as the establishment of a field veterinary programme which led to the creation of a national chimpanzee health monitoring project and treatment for wildlife injured by snares.

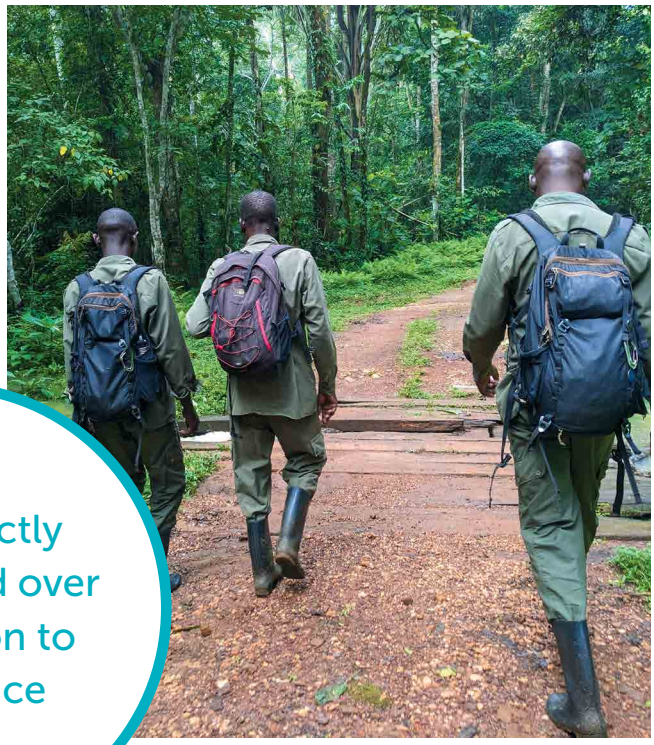
RAISING AWARENESS

RZSS raise the profile of BCFS in several ways. From the chimpanzee exhibit at RZSS Edinburgh Zoo, named the Budongo Trail after BCFS, to regular publicity on the RZSS website and talks at national and international conferences and events, RZSS have brought awareness to BCFS's important work and support BCFS in leveraging additional funding. RZSS has also offered BCFS staff opportunities for development, through specialist training, university scholarships and exchange visits.

RZSS have directly contributed over £1.2 million to BFCS since 2005

LEARNING FROM BCFS

In the time that RZSS has supported BCFS, RZSS' conservation portfolio has grown substantially at home in Scotland. Lessons learnt from BCFS's work in Uganda on issues like managing human-wildlife conflict and working with local communities have been incorporated into the development



of species recovery projects led by RZSS on species including beavers and wildcats. Additionally, many staff at RZSS have benefited from learning from the staff at the station.

THE CONSERVATION VALUE OF TROPICAL FIELD STATIONS

Research shows us that field stations in tropical regions that host primate research have a disproportionately high conservation value, improving habitat quality and reducing illegal hunting far more than comparable protected areas (Eppley et al., 2024).

THE PARTNERSHIP

Additionally, Budongo forest is located in the Albertine Rift Region, one of the most biodiverse areas in African and part of the Eastern Afromontane Biodiversity Hotspot, containing more threatened vertebrates than any other African region. By supporting BCFS, a field station working in this tropical biodiversity hotspot, RZSS are facilitating the effective conservation of a huge diversity of species and helping to protect a particularly important ecosystem.

Via BCFS, RZSS support an umbrella species approach to conservation. Chimpanzees, the flagship species of the project, are wide-ranging and charismatic, popular with audiences around the world and therefore effective for garnering support. As chimpanzees are an umbrella species, BCFS' action on the ground to mitigate threats to chimpanzees and protect their habitat simultaneously conserves the myriad other species in Budongo forest.

Budongo forest is a biodiversity hotspot. By protecting the rainforest here, BCFS are conserving thousands of species

INTRODUCTION

INTRODUCTION

Established in 1990, the Budongo Conservation Field Station is an NGO situated within the Ugandan Budongo forest, where its staff of over 40 Ugandan nationals study and protect the forest and its wildlife. The Royal Zoological Society of Scotland has core funded the charity's operations since 2005 and shares a close relationship with the organisation.

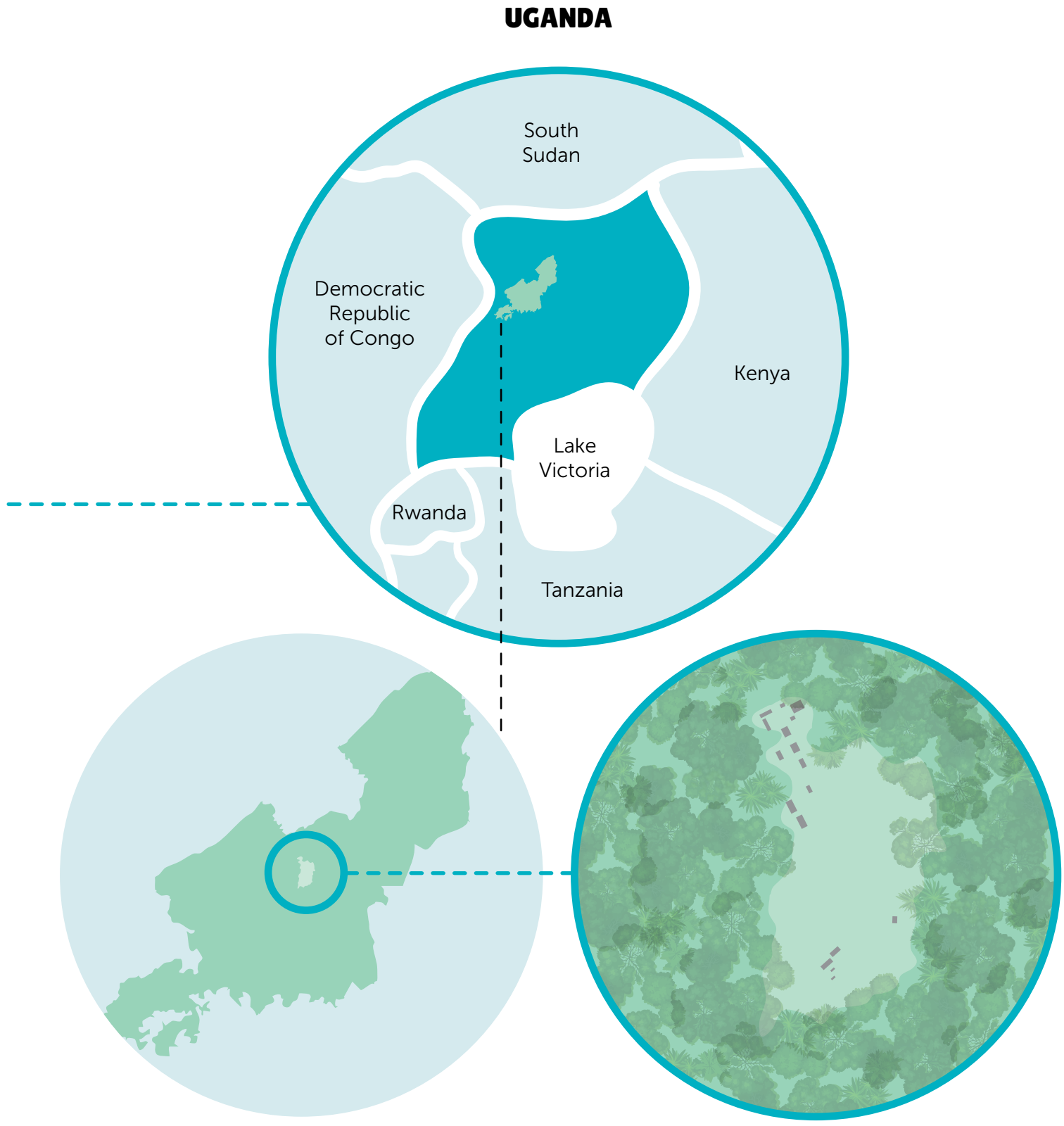
The Budongo Conservation Field Station (BCFS) was founded by Professor Vernon Reynolds after first visiting the forest in 1962 to study chimpanzees. In 1988, having read an article reporting that chimpanzee infants were being captured by humans in Budongo forest, Professor Reynolds established the Budongo Forest Project (now BCFS) in 1990 to discover whether there were still chimpanzees in the forest.

Over the course of the next five years, a community of the remaining chimpanzees were habituated by the project staff and have been observed continuously ever since, making BCFS one of few long-running chimpanzee research sites in Africa. Since then, the scope of BCFS' activities has expanded and, with the support of RZSS, the organisation has become a model for implementing conservation action alongside cutting-edge research, training of the next generation of conservation biologists and community engagement.

BCFS was established in 1990 and has been running for 35 years

MAP

MAP


UGANDA
South Sudan
Democratic Republic of Congo
Kenya
Lake Victoria
Rwanda
Tanzania
BUDONGO FOREST
BUDONGO CONSERVATION FIELD STATION

TIMELINE

2005

July
RZSS begins funding BCFS.

2006

June
Design starts for Budongo Trail (chimpanzee enclosure) at Edinburgh Zoo.

2008

RZSS funds the hiring of the first BCFS vet.

Chimpanzee health monitoring project begins.

Budongo trail opens, one of the world's largest chimpanzee enclosures.

2009

Goat scheme begins - ex-hunters are gifted goats and agree to stop hunting. BCFS vet treats livestock regularly.

January
BCFS vet begins additionally treating snared chimpanzees in other forests.

June
Vet darts chimpanzee in man trap in Rwensama Forest Reserve. Limb amputated then released.

Head primate keepers from RZSS Edinburgh Zoo assist with Budongo chimpanzee census.

2010

January
Construction begins on BCFS field lab.

Six-day snare mop-up with 50 ex-hunters. 1340 snares removed from forest.

2011

Second chimpanzee community, Waibira, habituated.

February
Pit latrine built in nearby village to improve hygiene.

Piloted giving out energy saving stoves near forest boundary.

Supported training of local farmers in modern raising of fruit trees, encouraging crops less likely to be raided by wildlife.

Seven Ugandan students trained in bird identification.

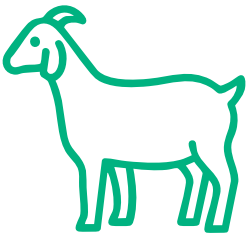
Field assistants trained in amphibian monitoring.

2012

Seven species of frog new to Budongo were recorded.

Standard chimpanzee health data collection tool and protocols developed.

2013



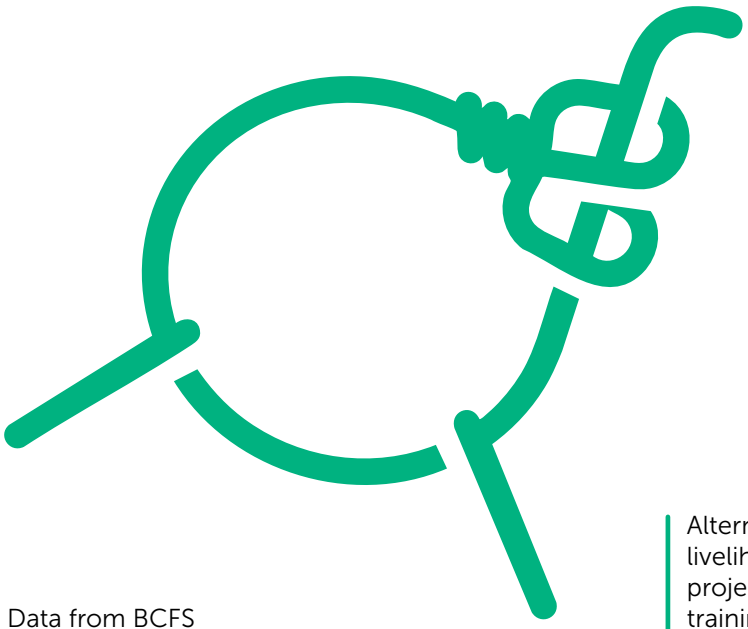
December
14 ex-hunters receive 28 goats.

Two 1-ha research plots established as part of the Global Ecosystem Monitoring Network.

2014

RZSS supports BCFS in winning major grants from ARCUS and the Darwin Initiative.

TIMELINE



2015

Amphibian monitoring team receives specialist training from RZSS' Dr Thomas Doherty-Bone.

Two frog species are newly recorded in the Budongo area.

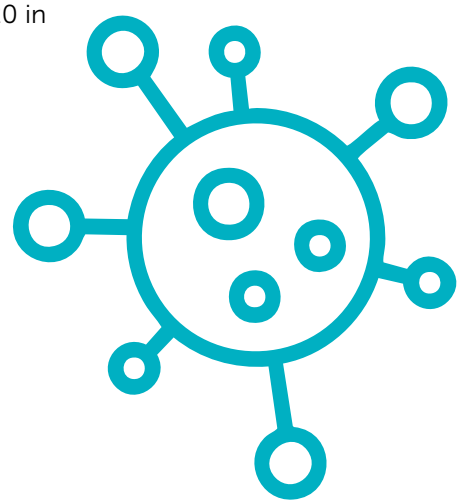
Chimpanzee health monitoring programme grows to eight sites in Uganda. Over 750 chimpanzees regularly monitored.

2017

Community outreach reduces average number of snares recovered daily from 20 in 2014 to 8.

2018

Data from BCFS amphibian monitoring program contributed to the global effort to understand the origin of the deadly chytrid fungal disease.



2019

Disease outbreak affects Budongo's chimpanzees.

2020

Illegal snare use and resource harvesting spikes due to Covid-19.

2022

Conservation competition in local schools begins.

2023

Alternative livelihoods project funds training of 15 local youths in bricklaying, mechanics and hairdressing.

2024

Project to monitor threatened Nahan's partridge begins.

13 Ugandan sites are part of the chimpanzee health monitoring programme. Over 1000 chimpanzees are regularly monitored.

New forest fragments begin to be patrolled for snares.

2025

Chimpanzee census in Budongo forest is completed.

Training in DNA sampling is delivered by RZSS WildGenes team.

SECTION 1:
THE FOREST

SECTION 1: THE FOREST

Globally, tropical rainforest is being lost at an ever-increasing rate, particularly in East Africa. As one of few tropical rainforests with nationally protected status in its entirety, Budongo Central Forest Reserve is an important haven for biodiversity and natural carbon sequestration. Like many other tropical rainforests, Budongo received high amounts of rainfall in the past which has significantly reduced due to anthropogenic activities.

Located in the western Albertine Rift of Uganda with an area of over 435km^2, Budongo is the largest rainforest in East Africa, and is home to the oldest tropical rainforest sample plots in the world, established in the 1930s. The relationship between Budongo and Scotland goes back a long way: the first studies of Budongo Forest were documented by Dr William Julius Eggeling, a renowned Scottish Botanist in the 1940s. The forest has historically been subjected to illegal and legal schemes of selective logging but remains relatively intact and, with the daily presence of up to 40 BCFS staff working in the forest and thereby discouraging illegal resource use, it is possible to see rare, mature mahogany trees over 80 metres tall including the 'Budongo mahogany' *Entandrophragma angolense* and the East African mahogany *Khaya anthotheca*. Tropical rainforests are carbon sinks, absorbing approximately double the carbon they emit. This rate of tree carbon absorption increases as trees age, making the large, old trees protected by BCFS particularly important for carbon sequestration.

The word Budongo means 'mud' in the local Runyoro language

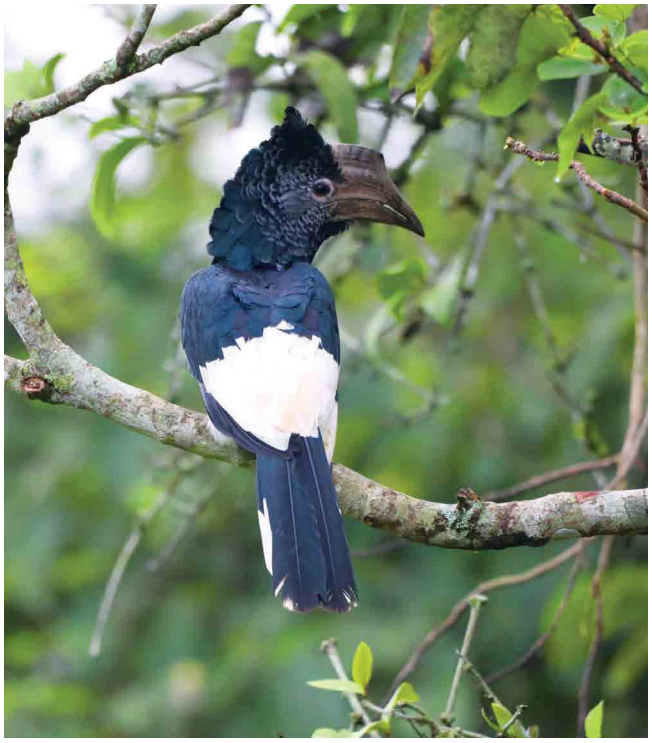
A member of the phenology team observing the fruiting on a tree

Every day BCFS staff study the forest, contributing to continuous datasets comprising over three decades of data. Climate monitoring at several locations within the forest is carried out daily, with temperature and rainfall recorded. Forest plots within the rainforest are utilised by staff to conduct experiments on tree growth and nutrient cycling. In addition, the studies have focused on impacts of decades of

selective logging on tree diversity and regeneration patterns.

The BCFS phenology (seasonality of trees) dataset is one of the oldest in an African tropical rainforest. Since 1992, field staff have visited around 5000 individual plants including over 180 different tree species a month, recording their appearance, health, growth and fruiting. This dataset has charted an 18% reduction in number of trees fruiting (currently less than 2% of adult trees) over three decades. BCFS have linked this decline to warming temperatures in Uganda caused by climate change as well as changes in forest structure caused by selective logging. This reduction in fruiting is likely to have profound implications for the survival of chimpanzees and other fruit eating species. Indeed, BCFS are already observing animals leaving the forest more often in search of food and coming into increasing conflict with humans.

Over 160 bird species are recorded every month



BUDONGO'S WILDLIFE

As a large tract of prime African rainforest, Budongo forest is home to a wealth of species, from chameleons to colobus monkeys, as well as one of the largest chimpanzee populations in the world. Several species new to science have been discovered within the forest, including a beetle, *Nebulatorpidus wagneri*, belonging to a new genus found not far from the BCFS camp.

BIRDS

Budongo forest is well-regarded for its diversity of bird species, with an estimated 360 species discovered thus far in the forest (Sande et al., 2021). Many of the species are rare and difficult to see elsewhere, such as Nahan's partridge (*Ptilopachus nahani*) and Puvel's illadopsis (*Illadopsis puveli*), found nowhere else in East Africa. At BCFS, a staff of expert ornithologists record the birdlife via daily mist netting, ringing and point counts, methods commonly used to survey bird species. Additionally, by conducting bird monitoring in the same locations as the tree phenology, the team are investigating any relationships between the reduction in trees fruiting and bird populations, as bird species can act as indicators of forest health and stability.

AMPHIBIANS

Globally, amphibians are experiencing catastrophic declines, with forest-dwelling species thought to be particularly sensitive to human disturbance (Lukwago et al., 2020). Forests like Budongo, with high amphibian

species diversity, are therefore of great conservation value (Lukwago et al., 2020). The BCFS team monitor the forest's amphibians through monthly surveys based upon specialist training received from RZSS research associate Dr Thomas Doherty-Bone. Several species new to the forest have been recorded and the team are investigating the distribution of amphibian species across logged and disturbed areas of forest, comparing them to areas of pristine forest.

This regular monitoring has been important to understanding worldwide threats to amphibians, with data collected by BCFS contributing to global efforts to understand the origin of the chytrid fungus (*Batrachochytrium dendrobatidis*), a deadly disease affecting amphibians globally.

PRIMATES

Budongo Forest is home to five species of diurnal primates including the flagship chimpanzees. Other species include black and white colobus monkeys, red tailed monkeys, blue monkeys, olive baboons and nocturnal species of pottos and galagos. BCFS conduct periodic primate surveys which have revealed that Budongo is one of the forests with the largest density of primate species in Uganda.

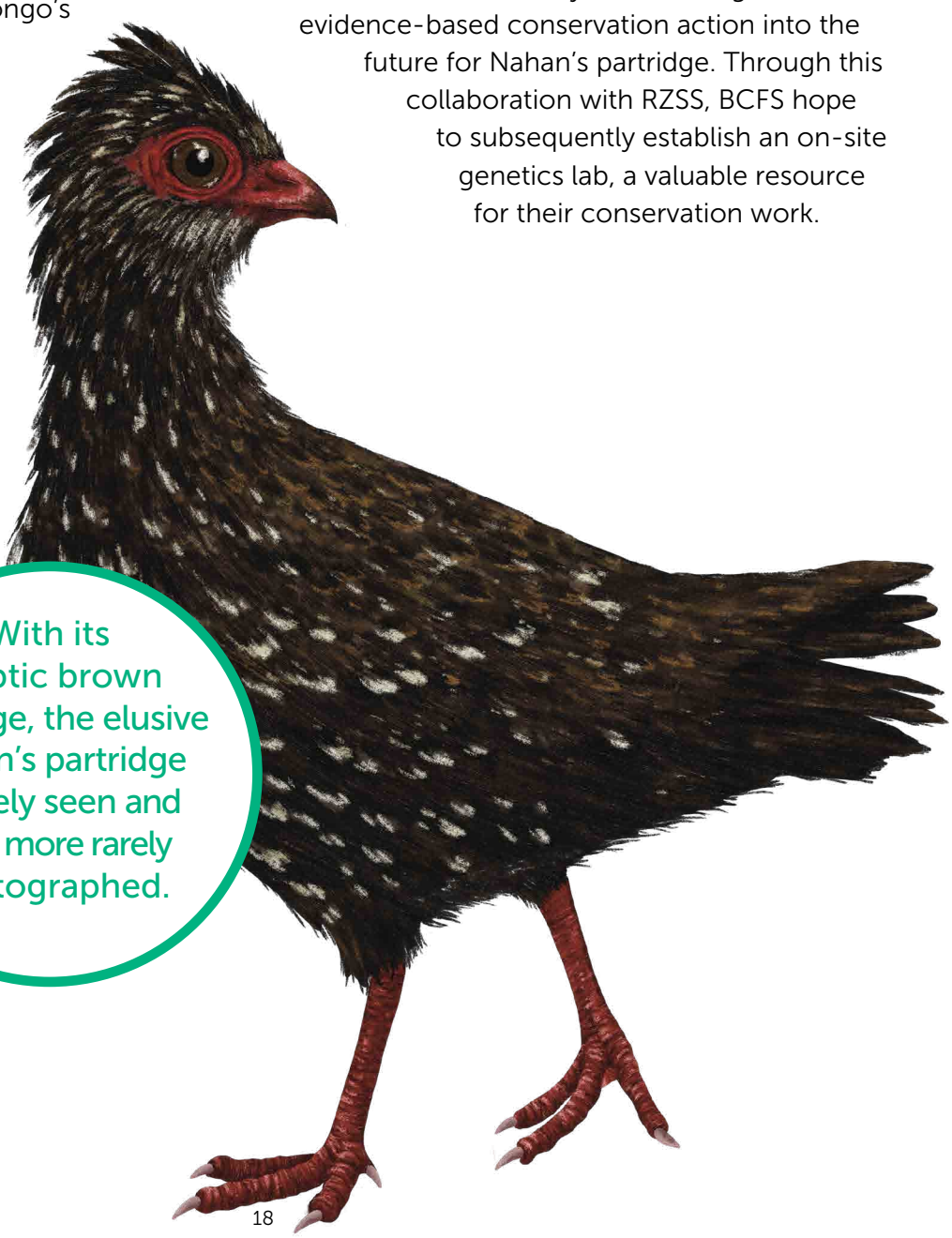
A NEW PROJECT: NAHAN'S PARTRIDGE

Nahan's partridge is a declining species with a severely fragmented population restricted to a few localities in Uganda and the Democratic Republic of the Congo. The species is thought to be one of only two African New World quails, is classified as Vulnerable by the IUCN and is in the top 6% of the most evolutionarily distinct birds globally (EDGE, 2020). Budongo forest is thought to be home to the world's largest population (Sande et al., 2016) and is one of the species' few localities which is politically secure

with protected status. The greatest threats to Nahan's partridge have been identified as poaching, timber harvesting and charcoal burning, all activities which have intensified in Budongo forest post-Covid. Given that the last survey of the species here was conducted in 2016/17, it is unclear how this sustained upsurge in illegal activity may be impacting this stronghold population.

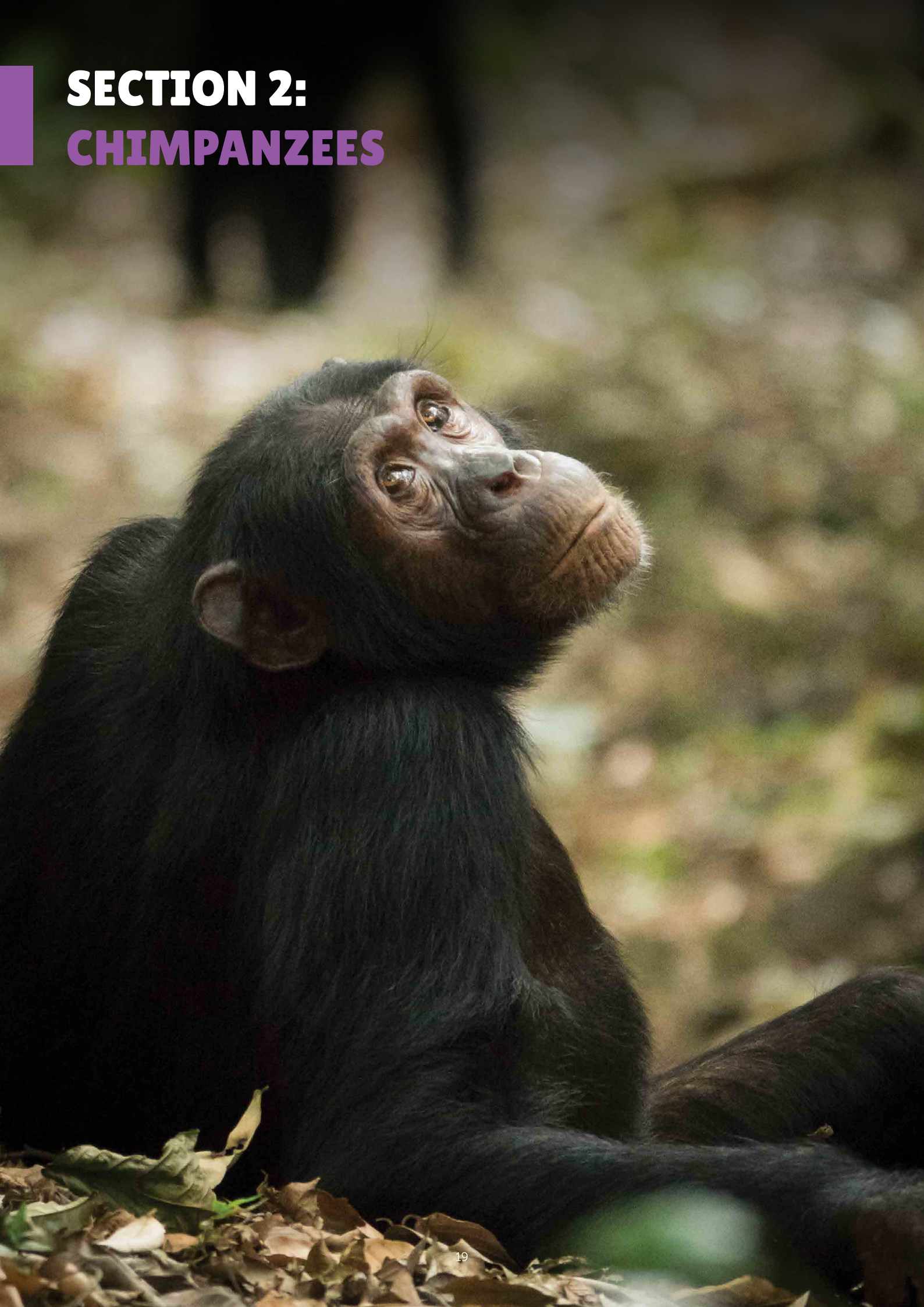
BCFS and RZSS' latest initiative aims to understand the status of Budongo's population of Nahan's partridge. With the support of the World Pheasant Association, this project will engage two Ugandan master's students and several young Ugandans as field assistants to survey for the species and subsequently develop a framework for long-term species monitoring.

Additionally, for the first time, RZSS WildGenes, a team of expert conservation geneticists based at Edinburgh Zoo, the only zoo-based genetics lab in the UK, will collaborate with BCFS on this project. WildGenes will provide BCFS staff with training in genetic sequencing and sampling, building capacity and providing the genetic tools needed to establish the species' genetic diversity and generate a full genome in country, a first for this species. This novel information will be key to informing effective, evidence-based conservation action into the future for Nahan's partridge. Through this collaboration with RZSS, BCFS hope to subsequently establish an on-site genetics lab, a valuable resource for their conservation work.



With its cryptic brown plumage, the elusive Nahan's partridge is rarely seen and even more rarely photographed.

SECTION 2:
CHIMPANZEES



SECTION 2: CHIMPANZEES

Chimpanzees are social animals living in communities, typically of 15-80 individuals.

Chimpanzees (*Pan troglodytes*) are declining across Africa and listed as Endangered on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. Budongo Central Forest Reserve is home to an estimated 800 chimpanzees and, as one of few relatively stable populations, is considered an important stronghold for the species. Maintaining the protection of populations like Budongo's is essential to the overall survival of chimpanzees.

Every population, subpopulation, and even community, of chimpanzees exhibits different behaviours, such as the use of different tools, giving them unique cultures. This diversity of behaviour across the global population means that any loss of a group results in a loss of cultural as well as genetic diversity.

Budongo's chimpanzees have a diet of primarily fruit and young leaves as well as, more occasionally, insects, honey, and various species of monkey. They have also been known to self-medicate with various plants, including *Aneilema aequinoctiale*, a herb which may help remove intestinal worms. Chimpanzee home ranges vary, but the Sonso group, one of two communities studied by BCFS, is thought to have the smallest home range of any in the world at just 6km^2. Their unusual density is believed to be due to the high productivity of the forest and accumulation of fruiting trees year-round within this range.

After passing through a chimpanzee's gut, seeds are more likely to germinate

Seeds which have passed through a chimpanzee

RZSS funds the employment of field staff at BCFS who observe the chimpanzees daily, recording their movements and behaviour. As well as being important research, this continuous monitoring is critical to the chimpanzees' protection, as the presence of the field staff protects the chimpanzees from exploitation by humans.

ECOLOGICAL FUNCTION

During the Ugandan civil war in the 70s and 80s, elephants were extirpated from Budongo forest, leaving chimpanzees as the largest mammal remaining. Many of Budongo's trees depend upon seed dispersal via digestion by

SECTION 2: CHIMPANZEES

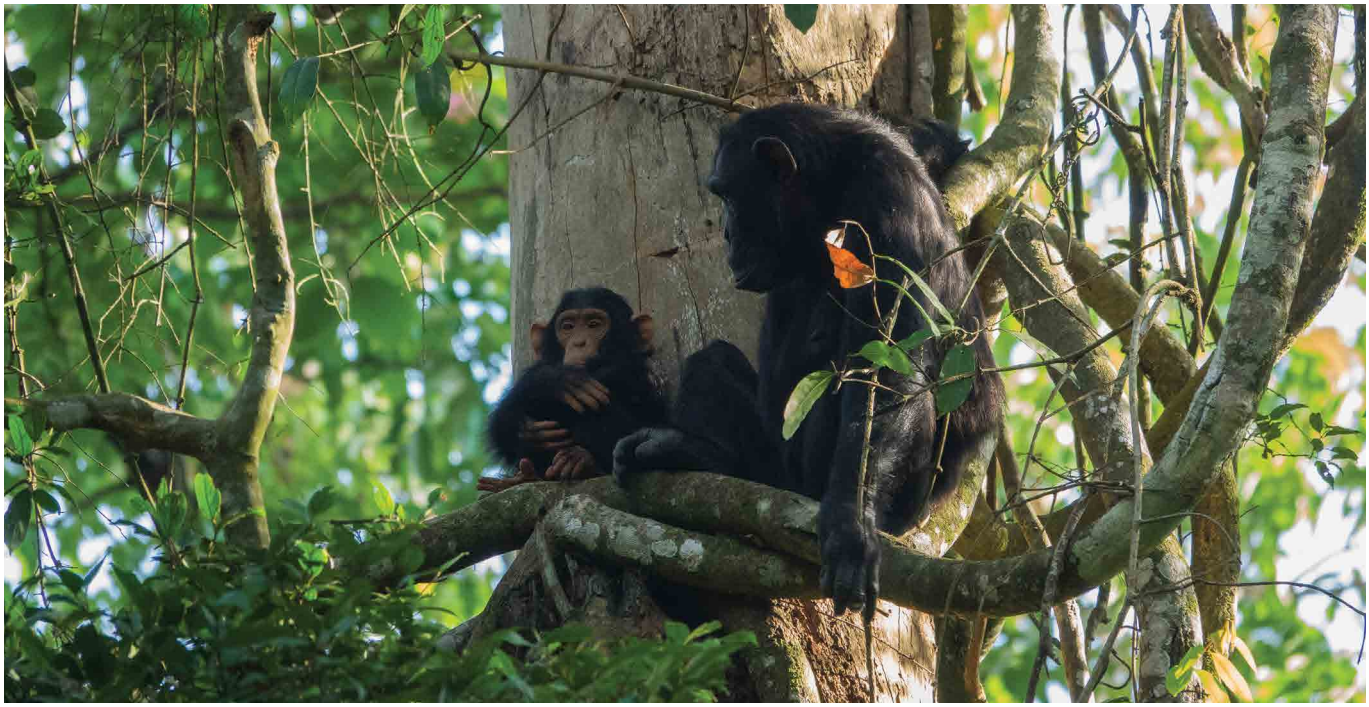
large mammals, making the chimpanzees' ability to eat and deposit many seeds across large distances important to the health of the forest. By fulfilling this dispersal mechanism, chimpanzees can improve the health and diversity of trees in the forest, benefitting all the species within, as well as people, to whom many of these trees are important for medicine and other traditional uses. Studies by staff at Budongo have demonstrated that loss of large animal seed dispersal can lead to local extinction of tree species (Babweteera 2009; Babweteera and Brown 2010)

The main threats to chimpanzees are poaching, habitat loss, and disease

PRIMATE RESEARCH

The Budongo Conservation Field Station is one of the longest-running chimpanzee research sites in the world. For over 30 years the 'Sonso' community of approximately 70 chimpanzees has been observed daily. An additional community of over 100 chimpanzees, 'Waibira', was habituated more recently in 2011, offering an important opportunity for comparison studies and inter-community interactions. Through providing research access to these chimpanzees BCFS has a rich history of hosting local and international primatologists, giving rise to the publication of hundreds of scientific papers and reports.

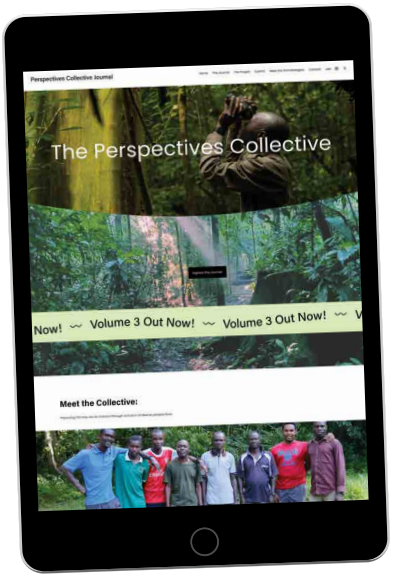
The study of Budongo's chimpanzees has contributed significantly to our understanding of their species, and our own. Through his initial research in the forest, BCFS founder Prof. Vernon Reynolds described chimpanzee dietary preferences and sexual behaviour for the very first time. BCFS have continued this legacy, maintaining the study of these chimpanzees



SECTION 2: CHIMPANZEES

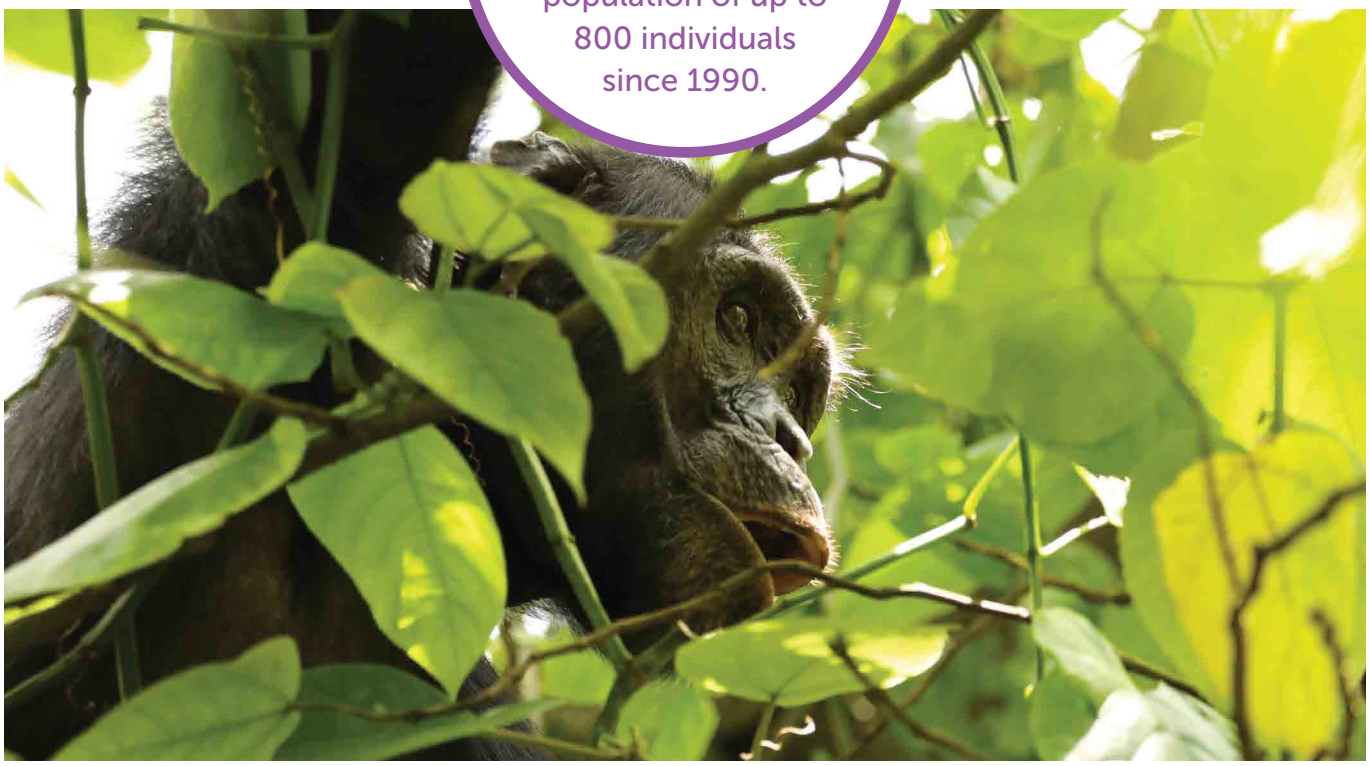
since the 90s, research which is important to informing effective conservation action. For example, it is only by observing chimpanzee social interaction that BCFS can understand why conflict arises between humans and chimpanzees. BCFS uses this knowledge to share ideas with local people living near the forest about how to avoid negative interactions with chimpanzees.

BCFS' field staff are experts in chimpanzee ecology and behaviour, with some individuals having observed Budongo's chimpanzees for over three decades. The team publish their research in independent journal, Perspectives Collective, which aims to showcase the voices of local and indigenous experts in primatology and to build capacity through training in key skills such as computer literacy and video making. The voices of local and indigenous experts are often the quietest in the field of primatology, though many Western scientists depend upon their knowledge to guide their research. The Perspectives Collective aims to address this by providing indigenous experts an avenue with which to share their knowledge and research.



By maintaining a constant presence in the forest, BCFS have secured a stable chimpanzee population of up to 800 individuals since 1990.

BCFS has always aimed to have as minimal an impact upon the forest and its wildlife as possible, choosing to habituate the chimpanzees to humans without using food



SECTION 2: CHIMPANZEES

(provisioning), which can affect their natural feeding behaviour and increase aggression. Additionally, BCFS enforces strict health regulations for primate research. Sick staff members or researchers are not allowed into the forest and new arrivals must quarantine for three to five days, minimising the chances of any disease transmission to the chimpanzees. Invasive primate research is not permitted and a distance of at least seven metres from the chimpanzees is always maintained by staff and researchers.

SCIENTIFIC IMPACT

Primate research at BCFS covers a diverse range of topics, but the site is widely known for leading research on chimpanzee communication and culture. Over 370 pioneering research papers have been published, contributing to our understanding of chimpanzees and helping to inform effective conservation action, some key papers are:

Wild chimpanzees inform ignorant group members of danger, Crockford et al., 2011, *Current Biology*

This groundbreaking study was key to our understanding of intentional communication in chimpanzees. Authors found that Budongo chimpanzees were more likely to make alarm calls in the presence of a snake when unaware community members were nearby, rather than when they were around those who had already seen the snake. This study demonstrated that chimpanzees can recognise their companions' mental states and understand something about the knowledge of others.

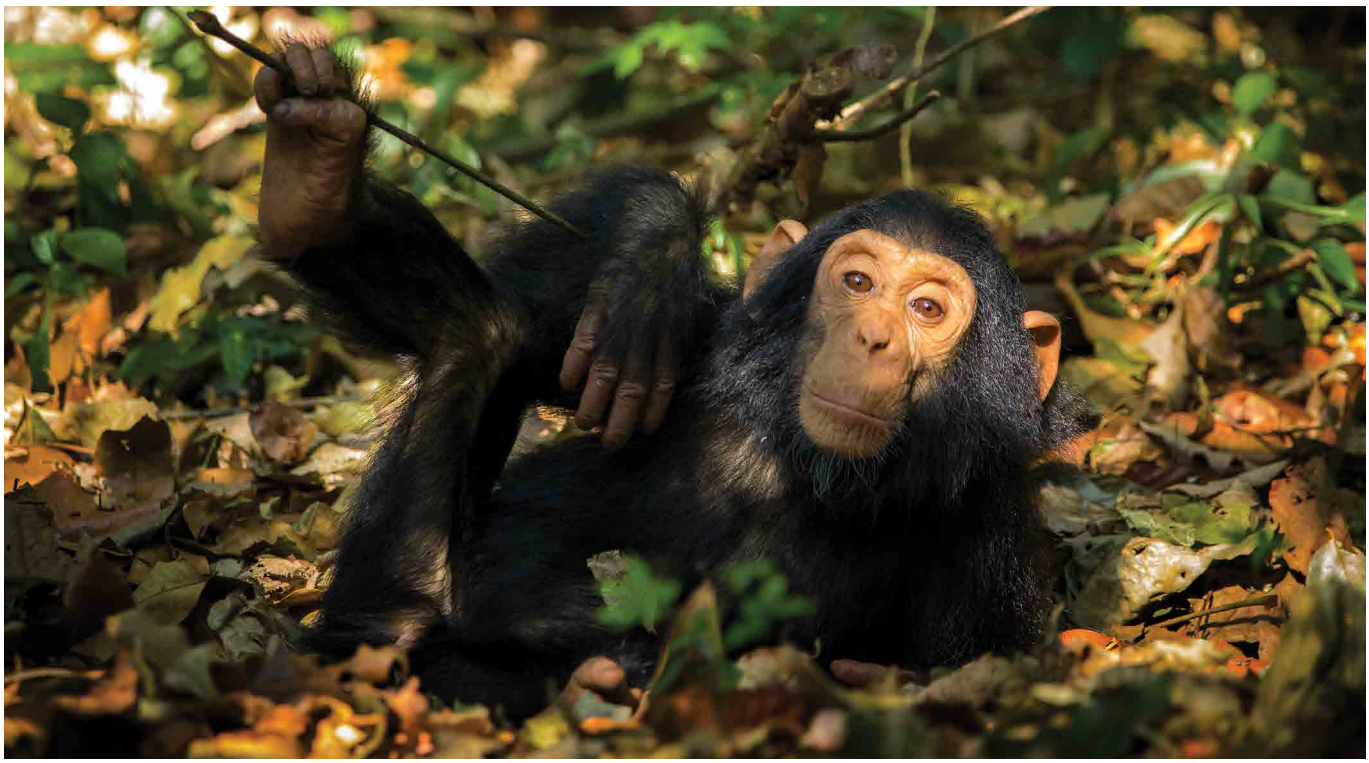
Social network analysis shows direct evidence for social transmission of tool use in wild chimpanzees, Hobaiter et al., 2014, *PLoS Biol*

In this pioneering publication, researchers provided the first direct evidence that wild chimpanzees can learn to use tools from one another. Researchers observed Budongo's Sonso chimpanzee community using 'moss-sponges' to extract water from waterholes for the very first time. Initially exhibited by the alpha male, this behaviour spread to six other individuals who had all first observed another individual using the moss-sponges, before trying them out. The researchers could track who learned from who and how for the first time in the wild.

Well-digging in a community of forest-living wild East African chimpanzees (*Pan troglodytes schweinfurthii*), Péter et al., 2022, *Primates*

This paper documented a new chimpanzee joining the Waibira community and bringing a new behaviour with her which then spread throughout the group. Well-digging had never been observed in Waibira until this new adult

SECTION 2: CHIMPANZEES



female introduced the behaviour. This study is another example of social learning and shows that migrants from other communities can bring useful behaviour with them. This highlights why, along with enabling genetic transfer, connected habitats that facilitate inter-group migration is so important.

Human impact erodes chimpanzee behavioural diversity, Kühl et al., 2019, *Science*

Research conducted at BCFS has also contributed to large-scale Africa-wide studies including via the Pan African Programme which aims to link research sites across the continent and facilitate knowledge sharing. This paper, published in Science, found that higher levels of human disturbance were associated with a greater loss of chimpanzee behaviours, many of which are important to survival. This study was novel in showing how human disturbance can limit chimpanzee behavioural diversity which, similarly to genetic diversity, may reduce a species' capacity to adapt to environmental change.

Many academic researchers spend months or even years at BCFS. Camp fees from research staff contribute to the financial running of the station. In addition to this many visitors have personally supported different initiatives over the years, including contributing to the staff welfare fund.

SECTION 3:
SNARES

SECTION 3: SNARES

Snares are one of the greatest threats to chimpanzees in Budongo forest, often causing severe injuries and death. Approximately a third of all Budongo's chimpanzees have a snare injury. BCFS's dedicated snare removal team patrol the forest daily, confiscating snares laid illegally by poachers. Annually, the team remove thousands, saving the lives of countless chimpanzees and other wildlife.

Snares are laid by poachers in Budongo forest to catch wild animals for consumption or trade. These traps, usually made from wire or nylon, tighten when stepped into, causing severe pain and often death. Whilst chimpanzees are not targeted for human consumption, the snares do not discriminate. Disfigured chimpanzees with missing fingers and limbs are common, permanently impacting an individual's health and lifestyle by inflicting pain, affecting social status, increasing disease risk and decreasing foraging capacity. Young juvenile chimpanzees are particularly vulnerable, making up approximately half the victims.

Pictured here with her baby is adult female Deli from the Sonso chimpanzee community. A snare injury sadly led to the loss of her right foot.

The vet team have treated 6,893 goats and other livestock reared by 2,018 households over the course of the project.

The BCFS snare patrol team

To mitigate this threat, BCFS established a snare removal team in 2002 who patrol the forest daily to remove snares. Additionally, recognising that hunters often represent a community's poorest members with the fewest livelihood opportunities available to them, BCFS pioneered their goat scheme in local communities in 2009. Hunters are provided with goats and veterinary support based upon the agreement that they take up goat rearing instead of poaching. With support from organisations including RZSS and Oakland Zoo, the scheme has grown, with many recipients taking great pride in farming their goats and denouncing poaching. Several former hunters have even chosen to join the

SECTION 3: SNARES

snare patrol during joint patrol activities, illustrating how effective community engagement can be to wildlife conservation.

Since the establishment of the snare patrol and goat scheme, BCFS have recorded a decline in the number of snares being found, falling from a daily average of 45 in 2004 to just seven in 2019. Sadly, since the onset of the Covid-19 pandemic there has been a surge in snare use in Budongo forest, making the work of the snare patrol more important than ever. With support from RZSS and Oakland Zoo, the number of patrolmen (eco-guards) was increased from two to six.

BCFS have successfully reformed 172 hunters since 2009

HEALTH MONITORING

There are currently 13 sites in Uganda participating in the BCFS-led chimpanzee health monitoring project, an initiative which grew from the health monitoring of approximately 80 chimpanzees at BCFS in 2009 to over 1000 chimpanzees across the country in 2024. The project aims to detect and minimise the threat of disease transmission between humans and chimpanzees to ensure the long-term survival of viable chimpanzee populations in Uganda.

In the late 2000s BCFS recognised the need to monitor disease spikes and unexplained deaths in Budongo's chimpanzee population;

The patrol team have removed 54,826 snares since the start of the project in 2002.

SECTION 3: SNARES

it is estimated that chimpanzees are vulnerable to more than 140 human diseases. Funds contributed by RZSS in 2008 finally enabled BCFS to employ their own veterinarian, who began recording various health and disease measures in the chimpanzee populations to build a long-term picture of disease. The vet also provides emergency treatment to snared chimpanzees who might otherwise not survive.

In 2010, construction on a field lab began, enabling post-mortems, disease sampling and parasitology and bacteriology tests to be carried out on-site. Post-mortems are used to understand mysterious deaths, an important early warning system of human-wildlife conflict, such as in cases where chimpanzees may have been poisoned. With an established team and field lab, BCFS are also able to respond to novel issues, such as investigating recently observed depigmentation in the skin of the chimpanzees, which the team suspect may be caused by agri-input runoff into the forest's rivers.

With support from the Arcus Foundation, the reach of the project has grown exponentially, setting the standard for chimpanzee monitoring in Uganda. BCFS have spearheaded the development of national protocols which have since been implemented at 13 sites where chimpanzees are habituated for research and/or tourism across Uganda. Additionally, BCFS have built capacity for an emergency response within other chimpanzee and conservation projects, training national and international vets in wild and domestic animal health.

Number of chimpanzees regularly monitored at different sites in Uganda over time

Site	2009	2010	2011	2012	2013	2014	2015	2016	2024
Sonso (Research)	68	60	62	74	78	82	74	75	78
Kaniyo Pabidi (Tourism)		73	72	77	79	98	101	103	Missing data
Kanyawara (Research)			55	57	55	60	58	58	69
Kanyanchu-Kanyantare (Tourism)				97	100	101	101	102	109
Kalinzu (Tourism)				15	22	33	36	36	59
Waibira (Research)						80	86	88	102
Sebitoli (Research)						72	72	79	84
Ngogo (Research)						198	204	224	226
Tooro-Semuliki (Research)									43
Kanyanchu-Buraiga (Tourism)									50
Bugoma (Research)									72
Kasokwa (Research)									35
Kasongoire (Research)									52
Total monitored	**68**	**133**	**189**	**320**	**334**	**724**	**732**	**765**	**1,010**

SECTION 4:
COMMUNITY

SECTION 4: COMMUNITY

Community engagement, widely considered to be key to effective conservation action, is at the heart of BCFS's work. Simply through their everyday operations, the station employs up to 50 Ugandan staff, overwhelmingly from villages adjacent to the forest. With RZSS's commitment to funding, BCFS offers stable employment and boasts high employee retention, with their longest-serving employee, head primatologist Geresomu Muhumuza, having worked for the charity for over three decades.

Since BCFS's establishment in 1990, community outreach has been a key tenet of the station's work. Much of Budongo forest is bordered by small communities mostly comprised of low-income households with frequent food insecurity. With limited alternative sources of income, people local to Budongo often utilise the forest's resources. However, given their proximity to the forest edge, these households are vulnerable to crop raiding from wildlife including chimpanzees. Improving welfare in these communities by boosting incomes and reducing human-wildlife conflict is a priority for BCFS. From delivering microenterprise schemes to helping villages improve sanitation and install latrines, BCFS has a diverse portfolio of outreach and initiatives that aim to benefit local communities.

Approximately 80% of Uganda's population practise subsistence farming and over 90% of households cook over an open fire

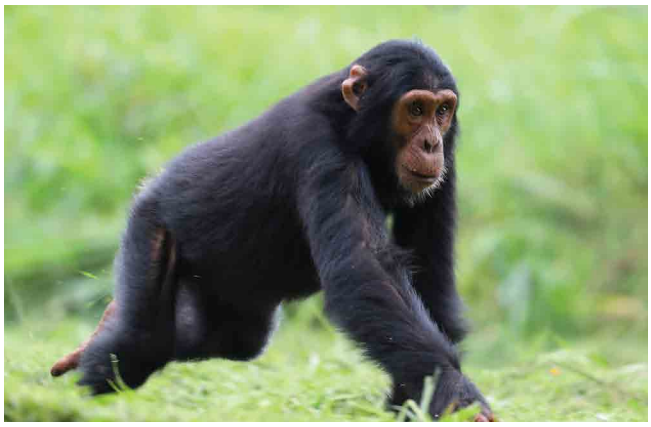
FIREWOOD

Local communities overwhelmingly depend upon wood for cooking, which is usually collected from the forest. Collection of certain woods is permitted on select days of the week, a restriction which limits overcollection without depriving communities of their fuel source.

BCFS works in these communities teaching people to grow woodlots, small parcels of quick-growing trees which provide a source of firewood. As well as reducing forest harvesting, having a source of wood so readily available saves hours of valuable time, particularly for women and children who do most of the wood collection.

CROP RAIDING

Most households near the forest grow their own crops, crucial for feeding their families.



SECTION 4: COMMUNITY

BCFS veterinary team treating livestock

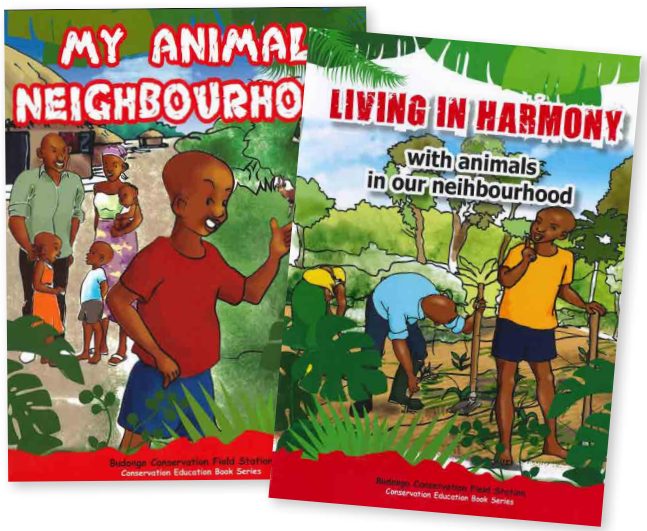
Unfortunately, certain crops are very attractive to wildlife and are regularly raided and damaged by species including primates. For families which depend upon these crops, raiding can be devastating and sometimes leads to conflict and injuries for both parties. BCFS have worked with the Darwin Initiative to help resolve this. They have provided households with resources and training to improve crop buffer zones and diversify agricultural outputs to instead grow crops which are less attractive to wildlife but still high value, such as soybeans, onions and peppers.

VETERINARY SUPPORT

To sustain the positive effects of the anti-snare goat scheme (see Section 3), BCFS provide veterinary care to local communities, improving the health of their livestock and reducing disease spread. Every few weeks the vet team visit local villages, offering an open clinic for livestock. The team provide worming treatments, health examinations and perform surgeries, often treating hundreds of animals at each clinic. This is part of the one health programme aimed at ensuring health of wildlife and domestic animals.

SCHOOLS

BCFS regularly host and visit local schools, teaching children about Budongo's wildlife and the value of conservation. BCFS have produced materials including storybooks which convey important messages, such as how to avoid aggression in chimpanzees, thereby helping to reduce human-wildlife



conflict. BCFS find engaging with children to be particularly effective as the children often pass on what they have learned to their parents, facilitating multi-generational education. In 2022, supported by Augsburg Zoo, BCFS launched the Budongo Chimpanzee Conservation Innovation Challenge. This initiative aimed to engage school children in developing innovative projects which provided solutions to specific threats to chimpanzees. The challenge was a success, with several schools participating and the initiative repeated in subsequent years.

ALTERNATIVE LIVELIHOODS

In 2023, RZSS secured funding from the Charities Aid Foundation for BCFS to fund traineeships for 15 young local people, offering them a livelihood alternative which doesn't depend upon resources from Budongo forest. The recipients were trained in either hairdressing, mechanics or bricklaying at Kyema college. The programme was a great success, with all 15 students successfully completing the training. The recipients left with a great regard for BCFS and an eagerness to share their newfound knowledge and experience with their families and peers. It is hoped this programme will be repeated in years to come.

Participants in the 2023 Alternative Livelihoods programme

TRAINING CAPACITY

Over the course of the RZSS-BCFS partnership the field station's facilities have grown enormously, enabling BCFS to host more students and facilitate more research in the forest, with more transects maintained and a larger area of the forest covered by all teams. BCFS regularly host visits from local universities, providing training to forestry students from Makerere University and conservation biology students from Gulu University. BCFS also provide training and research opportunities to international universities, including the Universities of Edinburgh, Gottingen, McGill, Neuchâtel and Salford. Hosting these visits benefits local communities, via BCFS' contributions to the local economy through the purchasing of food and other commodities for their visitors. Additionally, as the number of students has increased, so has the number of maintenance and field staff, employed at BCFS from local communities.

	In 2004, prior to partnership	In 2024
Capacity to host researchers/ students	8 people	35 people
Water storage capacity (station depends on this)	34,000 litres	<100,000 litres
Solar power for lighting and equipment charging	600AH	1,700AH
Field trails	125km	240km
Core research area	550ha	1,450ha

SECTION 5:
BUDONGO AT EDINBURGH ZOO

SECTION 5: BUDONGO AT EDINBURGH ZOO

RZSS owns and leads Edinburgh Zoo, which is home to a population of 13 chimpanzees. To raise the profile of BCFS and highlight the partnership between the organisations, the enclosure was named the Budongo Trail.

The chimpanzees, many of whom were rescued from research labs, enjoy a large, stimulating enclosure with several rooms and an outdoor space. Upon opening in 2008, the enclosure contained the world's largest primate climbing frame, a design which simulates the chimpanzees' natural environment and enables them to display wild behaviours. The troop enjoys high standards of care and in 2023, their keeping team at RZSS won a bronze BIAZA (British and Irish Association of Zoos and Aquaria) Welfare and Behaviour award for their innovative fission-fusion management of the troop which emulated wild chimpanzee behaviour.

In 2018, the Budongo Research Unit (BRU), a research facility run by the University of St Andrews, opened within the Budongo Trail. The unit enables cutting-edge scientific research into chimpanzee cognition and behaviour to be carried out. The research is entirely voluntary for the chimpanzees, who can enter the BRU from their main enclosure through several doors and take part in games and puzzles to win food rewards, an excellent form of enrichment.

BRU has a substantial scientific output, producing several peer-reviewed scientific publications each year and hosting

Inside the Budongo trail at Edinburgh Zoo, where one wall is a photo of the field site in Budongo forest.

SECTION 5: BUDONGO AT EDINBURGH ZOO

BCFS director David Eryenyu with RZSS chimpanzee keeper team

approximately 30 undergraduate, masters, PhD and post-doctoral projects annually, both from the University of St Andrews, and collaborating universities further afield.

The BRU enables innovative research into chimpanzee cognition. For example, some researchers have been studying how chimpanzees learn about and navigate their environments, using touchscreen technology and creating virtual environments for the chimpanzees to explore. A 2022 paper by BRU researchers highlighted the importance of zoo facilities for supporting research into primate cognition, something that is very difficult to study in the wild (McEwen et al, 2022).

Past observational research projects have also compared in-situ research at BCFS with the ex-situ research at the Budongo Trail. For example, one 2020 research project compared captive pant-hooting vocalisations at the zoo with pant-hooting from the Budongo Forest. Research such as this helps us to understand the similarities and differences between primate behaviour in the wild versus in zoos.

A vital aspect of the BRU is the engagement that zoo visitors can have with research, and how much they can learn about chimpanzees. All research is visible to the public and explanations about each research project are available for visitors to read.

THREATS TO BUDONGO FOREST

THREATS TO BUDONGO FOREST

COVID–19

During and since the Covid-19 pandemic BCFS have recorded an ongoing surge in illegal activity including snaring, pit sawing for timber and charcoal burning, likely due to people losing their livelihoods during national lockdowns. In 2020, the number of snares found by the patrol team each day had doubled compared to before the lockdowns. Numerous chimpanzees have been permanently disfigured and several killed. The need for BCFS' work to prevent illegal activity is more urgent than ever. BCFS continue to monitor and protect the forest's wildlife, altering their patrol patterns to maximise their presence in the forest.

CLIMATE CHANGE

Climate change is increasing the frequency and severity of extreme weather events in Uganda. More erratic rainfall is causing increasingly frequent bursting of rivers, mudslides and landslides which can lead to the loss of lives and property. Equally, prolonged dry seasons are becoming more prevalent, affecting crop survival and causing inflations in food prices. It is expected that during these extreme weather events, reliance by local people upon Budongo forest for resources will increase.

Additionally, the Intergovernmental Panel on Climate Change (IPCC) recognise the study of tree phenology as an important indicator of climate change. BCFS' phenology research in Budongo forest has highlighted an important connection between rising temperatures and a decline in the number of fruiting trees, including those many primates rely on for food. Already BCFS have observed a shift in the diet of primates from fruit to more leafy foods and have seen increases in crop raiding by chimpanzees close to human settlements. Crop raids from wildlife make life much harder for already struggling households on the forest edge and negatively impact the attitudes of communities towards forest and chimpanzee conservation. Climate models for East African regions suggest this warming trend is likely to continue, a large-scale shift BCFS expect to have significant impacts for both human and natural systems in and around Budongo forest.

OIL PIPELINE

The world's longest heated crude oil pipeline is being constructed in Uganda. The pipeline will span nearly 1445km, with the largest oil field located adjacent to Budongo forest on the shores of Lake Albert. Many roads are being constructed, one of which goes through Budongo forest. The pipeline's construction is expected to displace over 100,000 people as well as attract more people into the region seeking employment opportunities from the oil and gas industry. This is expected to exert an increased demand for forest resources, especially wood for energy. Indeed, recent surveys of illegal activity conducted by BCFS are finding increased rates of charcoal burning due to this growing demand.

BCFS & RZSS:
THE FUTURE

BCFS & RZSS: THE FUTURE

For twenty years RZSS has been proud to core fund BCFS operations. As the scope of both charities' conservation action has grown, the achievements of both organisations have solidified the relationship which will continue for years to come.

The partnership between RZSS and BCFS is an example of the substantial progress that can be made for conservation when zoos provide long-term, consistent funding to conservation NGOs.

Most funding cycles for conservation last just three to five years but committed core funding is necessary for the growth of NGOs to develop expert staff capacity and for the effective protection of species and habitats.

Looking to the future, BCFS have ambitions to:

- Continue to safeguard the Budongo Forest, its chimpanzee communities and the wide array of species that call the Budongo Forest home through the work of the field station and close partnership with local human communities.
- Through the field station expertise continue to support and develop national initiatives.
- Establish a new dedicated training facility at the field station's lower camp which will allow for enhanced ability for the to train Ugandan nationals.
- Increase the scientific infrastructure onsite and develop partnerships to incorporate use of novel technology in monitoring

BCFS director David Eryenyu with RZSS Head of Conservation & Science Helen Senn

FURTHER READING

FURTHER READING

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PEOPLE'S
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POSTCODE
PLANET
TRUST
RZSS
THE WILDLIFE CONSERVATION CHARITY
BUDONGO CONSERVATION
FIELD STATION