

# GOUGH EXPLORER 2019

Scientific Exploration Society



## RANGERS FIRST FINAL REPORT

ZAMBIA

04 Sep – 03 Oct 19



## 2019 EXPLORER AWARDS

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DISCOVER • RESEARCH • CONSERVE

## GOUGH EXPLORER 2019 – SCIENTIFIC EXPLORATION SOCIETY – RANGERS FIRST

### Part 1 – SUMMARY OVERVIEW

1. The Gough Explorer 2019 designated expedition entitled Rangers First was led by Dr Scott Pallett and conducted primarily within the Republic of Zambia between 04 Sep 19 and 03 Oct 19. Team mates deploying to Zambia included Stephanie Wong and Dr Charles Handford, with Dr Kim Findley-Cooper providing on-site advice and clinical reach-back support to the UK.
2. The need for improving provision for emergency medical aid within the Kafue National Park and the surrounding Game Management Area is dire. Recent injuries include snake bite, significant road traffic accidents with multiple casualties and fatal gun-shot wounds.
3. Rangers First has been a successful and rewarding expedition for the team where the combination of high health risks and poor access to immediate first aid response has enabled significant improvement to be made beyond initial intent through application of basic interventions. On leaving, we have successfully implemented training and equipment to employ a first response network throughout the Park that will be sustainable following the delivery of further medications prior to the end of 2019. The course successfully trained 25 instructors from 4 NGOs and the government.
4. Uptake and investment from local non-governmental organisations and the Government anti-poaching police force has been high, enabling integration of the Rangers First programme into the national training school and propagation of effect to future generations of qualifying officers that will be sent to National Parks throughout Zambia.
5. Key outcomes:
  - a. **Snakebite in sub-Saharan Africa.** Snakebite is a significant issue, with the location indigenous to 3 of the most venomous known species. Local traditional medicine hinders treatment and risks loss of limb and life. Snakebite teaching was well received and <C>ABCDE dissemination offers a potential mechanism by which to tackle remote snake bite.  
**Recommendation:** Scientific publication of study using data gathered on teaching of <C>ABCDE (Catastrophic haemorrhage, airway, breathing, circulation paradigm) and augmented snake bite teaching in order to improve general approaches.
  - b. **Trauma network.** Teaching was successful with clear demonstration of skill-set in second phase. Completion allows workable trauma network at reach for site of injury care but lack of sufficient medication stock leaves rangers vulnerable. **Recommendation:** Advise key stake-holders of required emergency drug list and provide access to adequate supply chain.
  - c. **Intelligence.** Analysis of injury pattern and factors associated with poor outcomes suggests a combination of poor access/communications/overview as a key area for concern. Terrain is difficult to cross and poachers have easy access to cover from view.  
**Recommendation:** discussion had on second project to trial an increase in situational awareness through the use of an aerial fixed-wing unmanned device, range 400sq km, solar powered. British engineer contracted with American technical support agreed. Bonus: allows greater accuracy and reach for conservation monitoring projects across the park. WildCross to provide 50% funds, Local NGO 50%.

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## Part 2: ACKNOWLEDGEMENTS

6. **Lord Gough.** As patron for the Gough Explorer Award, the support of Lord Gough has been the cornerstone of enabling Rangers First to be, not just completed, but to the highest standard with the provision of world class equipment currently employed by leading military medical personnel in the field. The support of Lord Gough has undoubtedly changed the face of anti-poaching activity within Africa's second largest conservation area for the future.
7. **Scientific Exploration Society (SES).** The tireless efforts of the SES in supporting the expedition have been integral in their assistance, proving vital in their assistance honing the planning phase and enabling the expedition through to fruition.
8. **5.11 Tactical.** 5.11 Tactical have provided personal protective equipment to the team in recognition of the UCR Slingpack use as the cornerstone of the Rangers First field-pack. This has been in return for social media tags/exposure and publication across their own social media platforms with reach to 1.2 million followers.
9. **Musekese Conservation (MK).** MK through their founder, Phil Jeffreys, provided invaluable on-the-ground advice and network connections. Running their own anti-poaching team, it was through discussion with MK that Rangers First was integrated into the National Training school and introductions made with the Zambia's Department of National Parks and Wildlife (DNPW) government officials. MK provided land-rover vehicles for the expedition and deployed one of their own wildlife police officers to join the team as a Zambian advisor for the duration of the expedition.
10. **Dr Shakira Nathoo.** Dr Nathoo (Anaesthetics) provided specialist input advice into the final development of the pre-hospital emergency care aspects of the course. Dr Nathoo further advised on final selection of appropriate medical kit and assisted in production of the Rangers First field packs prior to deployment.
11. **Dr Luke Moore.** Dr Moore (Consultant Infectious Diseases and Microbiology for North West London Pathology network/Chelsea and Westminster Hospital) has kindly provided senior academic support and vetting of proposed publications.

## Part 2: PERSONAL – the Pioneer with Purpose

12. Prior to deploying on the Rangers First expedition, my experience working with anti-poaching task forces in East Africa had left me passionate about providing access to better medical teaching and finding a way to improve access to emergency medical care in the event of a traumatic injury that faces a protracted evacuation cycle. The Rangers First expedition has only compounded these feelings further. While each ranger puts on their boots for different reasons every morning, each one steps out into a life-threatening environment in their line of duty in the unsavoury knowledge that a gun-shot wound, road traffic accident or snakebite is quite likely going to be fatal. Interestingly, while a western romantic idea of anti-poaching game rangers may well exist in that each ranger is working purely to protect endangered mammal species, it was apparent that a more holistic approach is taken by most rangers, including protection of the land or a sense of duty to the country and/or local history.

For a normally stalwart collection of individuals that values the outward demonstration of a brave approach it was humbling to hear them talk of very real concerns for themselves and their junior rangers to such poor access to emergency medical care. Their interest throughout was genuine and questions both in-depth, hungry for more knowledge and appropriate. It was of absolute importance to me that we left Kafue National Park (KNP) with a feeling that we had genuinely imparted game-changing teaching and equipment rather than a box-ticking exercise for basic first aid. Throughout the first week I was concerned that in-fact we were being unsuccessful in achieving this but by the moulage testing period was consistently excited to find that individuals had absorbed the information and were able to demonstrate a suitable skill set under pressure. Of vital importance, they were able to provide sound reasoning behind the limitations of what they had been taught and were not tempted to overstep techniques in an unsafe manner but in-fact had a healthy idea of the boundaries of these new skill sets.

The hierarchal nature of the rangers was very evident and closely followed African Nation military structure. To begin with this was a considerable issue in terms of validation for the team and true engagement from the more senior rangers. A short discussion aside of our background led to a complete switch in attitude, excited engagement and adoption of the team in a “one of us” capacity. In a way this is disappointing but it highlights the rather unique ability for the WildCross team to be able to impact teaching of ranger and police forces in Africa and the importance of being seen as credible in the eyes of the students from a military perspective rather than a medical one. The wide, experienced skillset of the team in difficult, remote areas offers scope for working with rangers on the very frontline of deployment.

Following the completion of the expedition I am left feeling that the work is more important ever with the threat of serious injury from road-traffic accident and dangerous animals previously grossly underestimated. Integration of the course into the Ranger school has been a big plus as it allows for sustainable integration into the Force as a whole rather than the limited number of instructors we have directly taught. It is very important that we return to observe and support this element of the new 6-month ranger curriculum.

In terms of a sense of purpose, the expedition has increased a feeling of necessity in providing medical assistance to anti-poaching rangers not just to increase their capacity and reach but also to provide the minimum that I would expect to be able to offer my own juniors when asking them to step off and risk their lives on a daily basis. There is a very real chance that professionalising teaching, delivered by their own instructors, is one of the best chances we have to impact community response and thinking toward snakebite in the region and for this reason alone teaching at further sites should be encouraged.

Looking forward, there is an identifiable opportunity to solidify teaching in Zambia and early work has commenced in conjunction with FirstAid Africa. I remain deeply concerned for those rangers currently

working within the Democratic Republic of Congo but am unable, with the current political situation, to enter and provide support. FirstAid Africa have presented an idea of bringing rangers across the border to be taught in a large programme alongside Kenyan rangers and feel that as an experienced team, if politically agreeable, would be a fantastic opportunity to support rangers facing the highest death rates in the world while protecting their parks.

Overall, it has been an incredibly humbling but inspiring experience. The success has been rewarding, but it is now vital that we capitalise on this train-the-trainer course as a proof of concept and ensure it is widely disseminated in order to recruit similar minded organisations to the massive task of upgrading the skillset and changing the mind-set across sub-Saharan Africa. The interest of large organisations such as African Parks makes me very hopeful for a wide reaching impact over the next 5 years and it is vital to not lose momentum at this stage.

Being the Gough Explorer for 2019 has been an incredible honour. I feel that we have achieved lasting change across the second largest National Park in Africa, entirely thanks to Lord Gough and the support of the SES, and am hopeful that future follow up will see that at least some of this change is seen across the outlying Parks as future rangers rotate through the National Training school. It is in situations like these that one simple decision can make the difference between death and a life saved, time will show the degree to which we have been successful but if it has made the difference for a single life it will have been time well spent, and there can be no better reward.



## Part 2: EXPEDITION OVERVIEW

### LOCATION

13. The initial expedition location choice had been to deploy to the northern reaches of the Republic of Zimbabwe, due to the highly kinetic and aggressive poaching activity facing anti-poaching ranger units there. UK Foreign Commonwealth Office guidance following civil unrest in the capital during early 2019 however precluded safe deployment of the team and efforts were directed towards Kafue National Park as the second largest National Park in Africa.

Kafue National Park is located in the central province of the Republic of Zambia and choice was largely driven by direct access to the National Ranger training school for the whole of Zambia and so hope of dissemination of teaching not just through the Kafue National Park, but also as a sustainable intervention that would eventually cascade throughout each of Zambia's National Parks.

Kafue National Park: Covering an area of 22,400km<sup>2</sup>, the majority of the core Park remains mostly inaccessible. By road, only 20% of the Park is estimated to be reachable. Kafue sits over the south-western extension of the Hook granite massif, lying within the inner part of the Lufilian arc. For the most part, the terrain is vast, undulating and gently sloping plateau. The vegetation is largely a mix of semi-deciduous mixed woodland interspersed by grassy plains and typically comprising three different genera of tree (Brachystegia, Julbernadia and Isoberlina). The north-west of the park in particular is a large flood basin that drains into the Lufupa River tributary of the Kafue River in an area known as the Busanga plains. During the wet season (November-April), vegetation is lush and green and ranging from mixed woodland and grasses in the south to broad grasslands punctuated by evergreen forests in the north. Some of these plains may become flooded and can then hold some small volumes of water well into the dry season.

Key features are undoubtedly the North-South Kafue River which culminates in the formation of the Itezhi-tezhi Lake. The Kafue River loops back on itself as it meets the key West-East road that bisects the park running from Angola in the West to the capital, Lusaka, in the East. The crossing point lies on the eastern edge of the park at the Hook Bridge[14°56'40.7"S 25°54'48.9"E], which allows for passage of one vehicle at a time across an approximately 150m temporary bridge alongside a long-stalled repair project of the main bridge. Access across this bridge is monitored by a small detachment of the Zambian Defence Force of approximately 12 personnel stationed on the western bank.



*Large portions of the land are ravaged by fire throughout the dry season.*

14. **Human activity:** There are a number of safari lodges that are situated predominantly in the Game Management Area near the periphery of the Park, of which most are found along the western edge. Within the Park itself a number of key organisation operate and have established permanent bases with which to work from. For those wishing to work within the Park in the future the key elements comprise:

a. **The National Ranger Training School** [15°00'17.1"S 26°00'16.8"E]. Found on the western bank of the Kafue River, to reach the Ranger School you must cross the Hook Bridge and proceed on the West-East metal road for a further 15 minutes before following signs for Chunga to the south (left turn) and entering the Park proper via a DNPW mounted gate [14°56'53.4"S 25°51'09.5"E]. The School itself is on the same road a further 15 minutes' drive south on a dirt road that has experienced a number of high speed road traffic accidents in the last year. The Ranger school is discussed separately below.



b. **Game Rangers International (GRI)**. A non-profit organisation running in Zambia since 2008. GRI support several anti-poaching ranger teams working within KNP and share a small forward operating base in the Game Management Area with the government Special Anti-poaching Unit at Mukambi about 10 minutes east of the Hook Bridge [14°58'01.1"S 25°58'51.1"E].

“Game Rangers International (GRI) is a non-profit organisation established in Zambia in 2008. GRI works in close partnership with the Department of National Parks and Wildlife (DNPW) to empower Rangers and Local Communities to conserve nature. We embrace a holistic approach to conservation, and empower Rangers across three core thematic areas: Resource Protection, Community Outreach, and Wildlife Rescue.” - <https://www.gamerangersinternational.org/>

- c. In addition GRI also hold a second larger camp in the south as well as their bespoke elephant research orphanage. [15°56'40.4"S 25°53'21.3"E]

“GRI Wildlife Rescue Programme works with the Department of National Parks and Wildlife Veterinary Unit to support welfare provisions for Zambia’s wildlife. Our efforts began in 2007 with the establishment of GRI’s Elephant Orphanage Project, and has grown to support a number of additional wildlife species over the years. The Elephant Orphanage remains GRI’s primary project with an Elephant Nursery in Lusaka and a Release Facility in Kafue National Park. Here, the orphans are gradually reintegrated back into the wild.” - <https://www.gamerangersinternational.org/>

- d. **Panthera** is a large NGO focused on the research and conservation of Big Cat species. KNP is a vital research location for its Cheetah Programme as well as for working with lion prides, leopard and some of the last populations of African wild dog. Panthera support anti-poaching teams that operate close to the main graded road running through the centre of KNP.

Panthera is the only organization in the world devoted exclusively to the conservation of the world’s wild cats. Our team of leading biologists and law enforcement experts develop innovative strategies to address the dire threats facing cheetahs, jaguars, leopards, lions, pumas, snow leopards, and tigers.

a. [Panthera.org](http://Panthera.org)

- e. **Musekese Conversation** have a lodge in the North of the Park and are primarily responsible for anti-poaching cover of the north-eastern region of KNP. Musekese currently support 2 teams of anti-poaching rangers.

Musekese Conservation is a conservation organisation focused on securing core areas of the Kafue National Park, Zambia, from illegal poaching activities through the support and funding of dedicated on-the-ground anti-poaching teams. We recently completed the construction phase of a permanent anti-poaching base that houses two recently trained full-time patrol teams permanently engaged in the field.

b. [Musekese Conservation](http://Musekese Conservation)

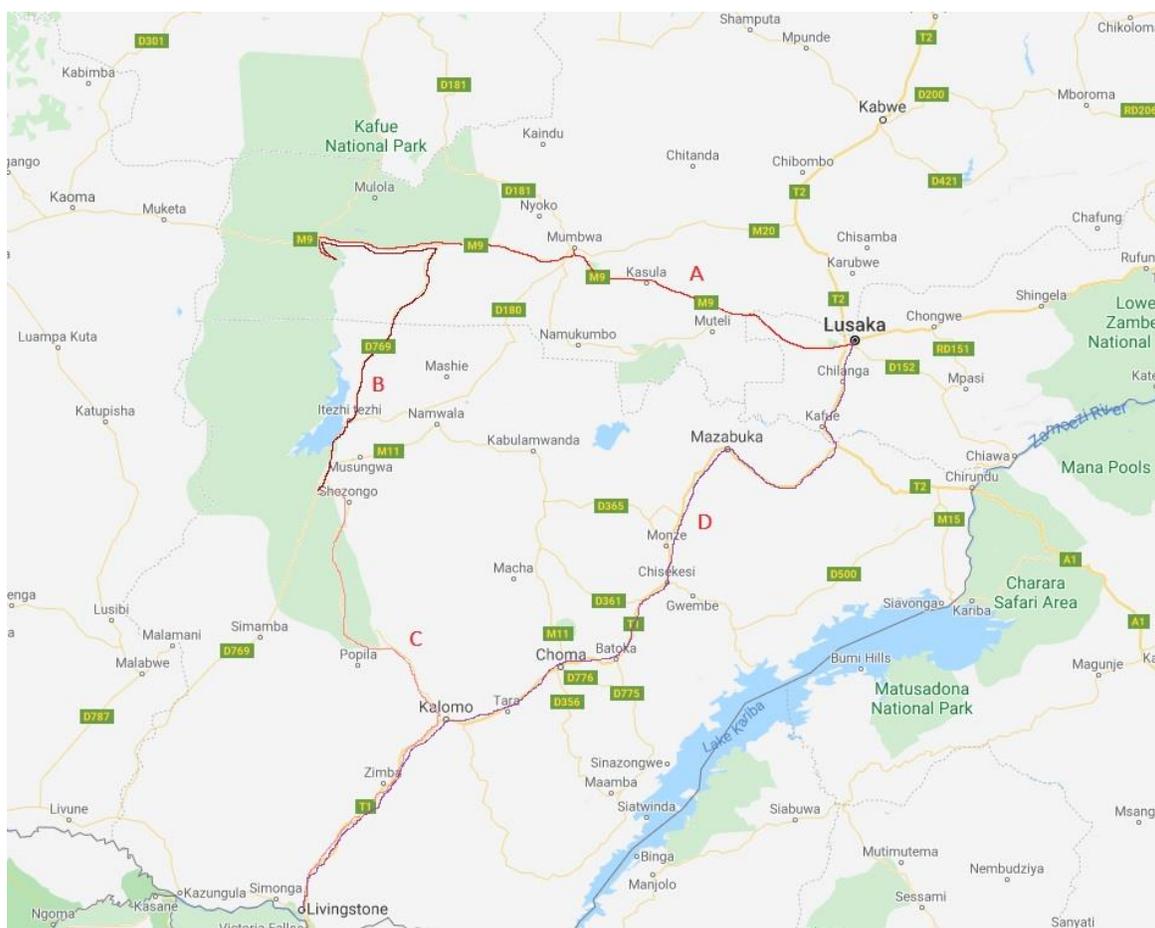
- f. The **Zambian Carnivore Programme** works in conjunction with each of the above organisations in order to help conserve KNP’s carnivores. They also run a primary and small secondary school for those living in the Park.

“Snaring and human encroachment pose a serious threat to large carnivores and ungulates in Greater Kafue. Working with local and international conservation bodies such as the DNPW, Panthera, and Game Rangers International, ZCP contributes to a rapid-action response team to remove snares and treat wounded animals as quickly as possible.” - [www.zambiacarnivores.org](http://www.zambiacarnivores.org)

- g. **Village/clinic**. 15°03'09.9"S 26°00'18.0"E. The Chunga village has grown in response to the need to house families associated with the Ranger school and subsequent activity. There is up to 1000 people living here and attending the ZPC school during the teaching seasons. There is a small, 3 room clinic that provides for the entire KNP, with further emergency care

approximately 3 hours east in at the district hospital of Mumbwa. Importantly, medication stock at the district hospital is very poor and personal medication requirements need to be acquired and brought with the patient. This has historically been a considerable issue for analgesia and has been addressed in conjunction with GRI/Musekese during this expedition.

h. **Dam** 15°46'00.4"S 26°01'07.8"E. The Itezhi-tezhi dam is an important government site at which it is strictly prohibited to observe or stop at on the road south from Site A to Site B and is worth being aware of in terms of both a considerable landmark and of avoiding confrontation with local security services.



**Generalized route.** A. Lusaka to base camp at Mukambi, Site A (283km). B. Route from Site A to Site B [193km]. C. Route from Site B to Livingstone (325km). D. Retire from Livingstone to Lusaka (485km).

## RATIONALE

15. While KNP has shown considerable improvement over the last decade in terms of initiatives to overcome poaching, the rich wildlife and relative difficulty in navigating the terrain makes it an attractive prospect for would be poachers. Combined efforts have led to some small recovery in populations or

larger mammals but risk remains high. Several high profile and costly incidences across the preceding 12 months, including death following gun-shot wounds, road-traffic accident and snakebite stress the importance of adequate provision for medical care and training in the application of forward, remote medical care.

KNP was additionally chosen as the specific site of training due to the opportunity provided for integration of the train-the-trainer course into the National ranger curriculum and so provide sustainability and exploitation beyond KNP through the deployment of future students and instructors to each of the remaining Zambian National Parks. Uptake into the National Curriculum also provided for discussions at the government level via direct-contact with high ranking officials within the Department of National Parks and Wildlife and so provide greater opportunity for expanding the project in the future.

Poaching remains a constant threat, and while conservation projects are reporting successes, the tiny population numbers are a far cry from the thousands that once wandered the plains. Signs of poaching are evident and are a stark reminder of the work undertaken by the rangers and the very real danger of encountering armed poachers.



*Poached elephant remains, with those on the left having been burnt after cutting away of the tusks. Of the elephant on the right, rangers managed to arrive in time to save the calf and are working on releasing her back into the wild to integrate with a new herd.*

## THE SITE

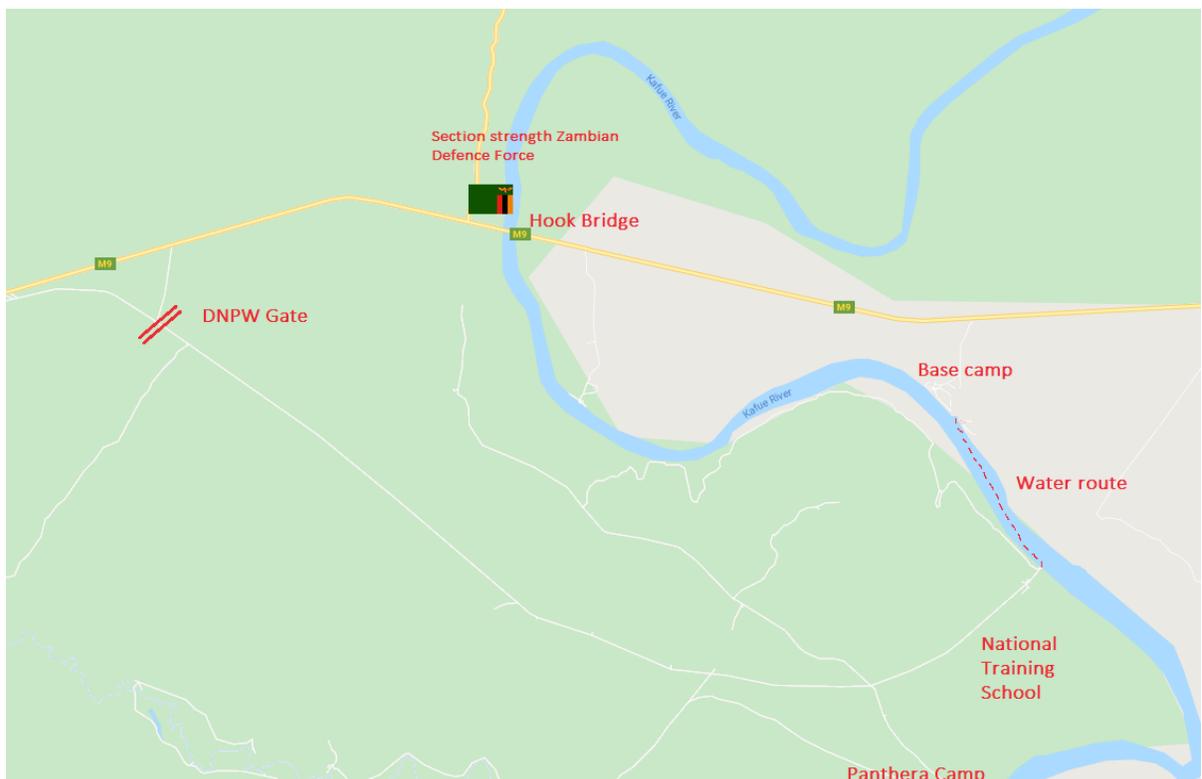
16. The team primarily worked out of the anti-poaching ranger forward operating base close by to Mukambi, within the Game Management Area and approximately 15 minute drive east of the Hook Bridge. The initial teaching was conducted daily out of the National Ranger school at XX, with testing carried out on patrol in the surrounding area bushland. Access to and from the training school was either by a 45 minute land-rover drive across dirt roads or 15 minutes downriver by an improvised small barge.

Mukambi was a tented camp situated on the riverside. Solar panning provided some limited electricity and a small mobile aerial mast provided intermittent communications. The camp was open to wild animals at night and would be frequented by elephants and hippopotamus each night with rare visits by a pride of lions or leopard. Large crocodile were a water side risk. Tented accommodation was raised off of the ground on wooden platforms and movement outside during night hours was discouraged.

### Site A. [15°00'17.1"S 26°00'16.8"E]

Initial training was conducted at the National Ranger Training school in Chunga within the KNP and was raised on a hill 30m above the riverbank and made up of small single story buildings including instructor's accommodation, a parade square and a series of single level concrete classrooms. Similar accommodation was available for recruits. Furnishings were simple with limited electricity supplied by solar panels or fuel-run mobile generators. Fuel needed to be supplied and collected prior to leaving Lusaka. A single projector was available with screen for use in classroom based teaching.

Close up Site A (base camp). Central KNP and highlights position in relation to Hook Bridge and the National Training School. 4-wheel drive time from Base Camp to National Training School via road 40 minutes. Time from Base Camp to the Hook Bridge 10 minutes.



**Site B.** [15°56'40.4"S 25°53'21.3"E]

Game Ranger International permanent southern camp on the banks of the Itezhi-tezhi Lake. Accommodation was tented and mobile phone communications was severely limited. Communication among team members and rangers was primarily carried out via 2-way short wave radio which was satisfactory due to the flat terrain. The camps were circled by fences with attached warning bells and chilli pellets available to deter lions or large lone Bull elephants entering the camp as this site housed the elephant orphanage. This was the primary operating base for the GRI supported anti-poaching ranger teams.



**Close up of Site B:** Progress from the DNPW controlled gate to Site B is slow, taking at least 1 hour on what is rarely driven, soft, sandy narrow tracks with encroaching vegetation to most of the road. Importantly the dam is a government high security site and stopping/photography is strictly forbidden. Itezhi-tezhi offers the last opportunity to acquire food supplies before progressing on to Site B.

**Site C.** [17°55'28.4"S 25°51'52.6"E]

Following the completion of the main intent, the team retired to Livingstone and stayed in a lodge before heading to the Chobe flood plains of Botswana via the Republic of Zimbabwe by crossing the bridge at Victoria Falls. Visit to Botswana was as a recce for future expeditions in order to deliver a similar package across Botswana. Physical evidence of poaching obvious during visit and early contacts made for return to Botswana at a later date.

## LOGISTICS

### Needs analysis

17. KNP is a logistically challenging environment both in terms of resupply and navigation or personnel and equipment. The main West-East metal road is open throughout the year but outside of this highway, timelines can be severely affected by weather, fire and migration of large animals. The Spinal (north-south) road running along the eastern edge of KNP is currently undergoing development and is open during the dry season being sections of metal road interspersed with poor quality dirt roads. The spinal road is accessed from the main road approximately 10km west of the Hook Bridge. The road passes a number of small settlements on the way south and here, as with the main road from Lusaka vehicles are subject to impromptu road blocks mounted by the Zambian Police Force.

Fires and deterioration of poorly tended roads can further isolate people in need and increase timelines for evacuation. Only a limited proportion of KNP is directly accessible via road and whenever venturing off of the key graded routes this should be by 4-wheel drive with high clearance. Fuel supply within the Park is unreliable. An option is to acquire resupply at the Itezhi-tezhi township, but this is only possible mid-week.

Medical response within the park is virtually non-existent with a nurse-led clinic, grossly under-supplied, located at Chunga. Rangers operating at reach on foot within the Park are beyond any reasonable evacuation timelines to receive any effective pre-hospital care. Discussion with lead NGOs within KNP has resulted in placement of Ranger's First field kits at key locations, and plans have been decided for emergency medicine caches in order to significantly reduce the risk of access to early effective emergency medical care while working remotely.



12 Rangers First  
Trauma packs



Clinical outreach  
across 25,000km<sup>2</sup>



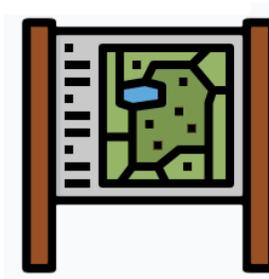
5 NGO Partners



25 instructors trained



600 rangers trained  
within 2 years



Medics within 20  
National Parks at 2 years

## Ranger's First Field packs

18. A total of 12 Ranger's First field packs have been distributed to various teams. GRI have received 4 packs to distribute among the southern-working anti-poaching teams. 2 packs are available to use on foot operations, 1 to remain within a rapid response vehicle and 1 to remain at their permanent southern camp. 3 further packs have been provided to Musekese for use in the northern areas of the Park. 3 packs have been provided to Panthera with 1 to be kept at their camp in the centre of KNP, 1 to be used with their deployed anti-poaching team and 1 with their specialist anti-poaching unit. The final 2 packs have been provided directly to the National Training school with intent for use purely for teaching the next generation of ranger recruits (600 across 2 years). Each new recruit will be expected to complete the course as part of their training programme, with this having been integrated already by the chief instructor.

Re-fill supplies have been provided that, on estimate of injuries over the last 12 months, provide a year's supply of necessary kit, with redundancy for teaching within each team. GRI, Panthera and Musekese have approached the team for further resupply companies in order to be able to sustain this capability going forward.

The table to the right shows requirements for delivery of one course to 22 instructors with lasting capability for 6 ranger teams.

Category	Item	Number
Big C	Tourniquet	24
	Celox	10
	Blast bandage	43
	Abdo bandage	14
	SAM splint	12
Airway	Oropharyngeal airways	42
	Nasopharyngeal airways	12
Breathing	Pocket mask	12
	McGills	12
	Bag-valve mask	12
	chest seals	28
	chest seals training	6
Circulation	sling	12
	simple bandages	100
	alcohol wipes	14
	Steri-strips	300
	plasters	400
	large safety pins	14
Disability	thermometer	12
	eye pads + saline	14
	spray bottle	12
	pen torch	12
Enviroment	tough cuts	12
	seat belt cutter	12
	collar	14
	space blanket	12
Docs	MISTAT cards	14
Other	Malaria RDT	100



### **Local clinic**

19. The local clinic was assessed and inventory taken for broad capability. Of significant concern is the provision of antivenom without the option for adrenaline cover and this was addressed directly with the nurse-in-charge. There is reasonable capacity for wound management and a broad array of available oral antibiotics but a distinct lack of medications required to respond to medical emergencies. Liaison with GRI/Musekese is underway to advise on supply of necessary medications and options for safe storage. Sites have been allocated, at Musekese in the North, the Ranger Training school in the central park and GRI in the south for the safe storage of emergency response medications under the supervision of the KNP nurse.

In terms of infectious diseases, the local clinic capability has been increased through the provision of up-to-date rapid diagnostic kits for falciparum, ovale and vivax strains of malaria. Based on records over the last 3 years, supply has been provided for a 5 year period.

### **Emergency funds**

20. No use of emergency funds was required and the provision of kit fell within the budget.

### **Transport**

21. All transport was conducted via 4 wheel drive, the necessity of which is clear once off the key graded roads. The terrain is undulating and in places considerably soft and sandy within KNP. Outside of the park the roads are suitably well maintained. The key risk travelling on main roads is due to poorly kept vehicles and very poor lighting at night. Multiple accident sites witnessed and recent high trauma accidents had befallen rangers within the Park travelling at low-moderate speeds.

All travel routes were planned in advance, including options for alternate routes if required and planned into fuel needs. There was no driving to occur after dark. Driving was primarily carried out by DNPW personnel with navigation provided by the team.

## **Blood**

22. Due to the high risk of accident, provision for the delivery of blood was made with the Blood Care Programme ([www.bloodcare.org.uk](http://www.bloodcare.org.uk)), which would have supplied blood from the Foundation emergency supply of screened, sterile blood if required. No such provision was required. The team would highly recommend the security provided by insurance with Blood Care and the ease with which they were able to provide initial support when planning.

## **Flights and visa access**

23. All key flights arrive and depart via the capital city of Lusaka, with small internal flight options available to Livingstone. No concerns with international flights. Internal flights are very difficult to book and unreliable. Entry visas were secured upon arrival with no concerns after provision of the letter of invitation supplied by the DNPW.

## **Security**

24. Security risks were assessed in line with FCO guidance. Large and wild animal risks were mitigated through accompanying local rangers and no untoward events occurred throughout the expedition. Dangerous animals, including elephant herds, hippos, lions, leopards and buffalo herds were closely encountered but safe distance maintained. Locking of supplies within 4 wheel-drive vehicles overnight and keeping important documents/electronics and emergency funds on ourselves overnight precluded any theft although the risk was high throughout and should be a strong consideration in any future deployments. As per the risk register, no attempt was made to approach north of the KNP boundaries towards the Democratic Republic of Congo due to risk of small arms fire and kidnapping.

### Part 3: ITINERARY

Stage	Morning	Afternoon
Part 1	WildCross team course preparation	
	Intro/overview to course Approach to a scene: Road traffic accident, small arms fire, effective clinical communication	Basic Life Support Catastrophic haemorrhage
	Airway and breathing Drowning	Circulation and disability Improvising medical equipment
	Exposure and evacuation	Moulage testing
	Heat injury Snake bite Fever	Common medical problems on patrol
Part 2	Care-under-fire scenarios Mass casualty scenarios	Student teaching presentations Final testing of core skills as required Summary
	Debrief, allocation of med kits and training guides	Survey, interviews, testimonials (photo and video)

4 Sep 19	Expedition members to move to central location
5-6 Sep 19	Kit checks and rehearsals
7 Sep 19	Deployment via London Heathrow-Dubai-Lusaka
9 Sep 19	Road move (300km) to landing stage
10 Sep 19	Slow road move over difficult terrain to centralised position for the 6 lead police scout teams
11-14 Sep 19	Part 1 Site A
15-16 Sep 19	Community engagement (local clinic/projects/sanctuary)
17-20 Sep 19	Part 2 Site B. Main effort complete.
21-22 Sep 19	Patrol activity/visit to separate ranger team at the southern Zambia border.
23 Sep 19-2 Oct 19	Extract back to Lusaka, initial debrief with key in-country stakeholders, return to the UK, team full debrief, preparation of exploitation initial plan, kit check and sign off.
3 Oct 19	Final close down 3 Oct 19 and return to respective home sites.

### **Part 3: TEAM**

#### **Dr Scott Pallett: Expedition Lead and Gough Explorer 2019**

Scott is a doctor with specialist interest in infectious diseases and tropical medicine who has spent the last few years delivering medicine to remote conflict areas. Having developed a focused interest in the clinical and socio-economic impact of neglected tropical diseases through an undergraduate degree at King's College, he went on to acquire a medical degree from Barts and The London School of Medicine and Dentistry.

Over the last few years, Scott has gained unique experience in tropical and jungle medicine whilst leading small teams in South East Asia and throughout East Africa.

Following this SES supported expedition Scott has been elected as a Fellow of the Linnean Society.



#### **Dr Charles Handford: Clinical Programmes Lead**

Charles is a surgical doctor with an interest in Trauma and Orthopaedics. He has travelled widely across Africa providing expeditionary medical care, designing and delivering pre-hospital and remote medicine courses while advising organisations on medical matters.

Charles believes that conservation alongside education is the key to preserving Africa's unique beauty and wonder. He hopes by training those at the front line of conservation he can contribute to the safeguarding of Africa's future.

Following Charles's involvement in the SES supported Rangers First expedition he has been accepted as a Fellow of the Royal Geographical Society.



#### **Stephanie Wong: WildCross Founder. Expedition Communications lead.**

Stephanie founded the organisation WildCross as a result of the dramatic decline in wildlife species and the deterioration of global ecosystems, and believed that she could play a positive role in reducing the effects. With a marketing and communications background, she has worked in International Development and Humanitarian Aid with Save the Children, and most recently with Fairtrade.

She is a strong believer in consolidated efforts to reduce illegal wildlife trade, and is currently working with other like-minded organisations to boost overall efforts. She is an avid photographer and is most happy when taking pictures in the wild.

Following joining the SES-supported Rangers First expedition Stephanie has joined as a Fellow to the Zoological Society of London.



### **Dr Kim Findlay-Cooper: Programme Instructor and UK clinical reach-back support**

Kim is a GP with specialist interest in Tropical Medicine, has an MSc in Parasitology and Control of Vectors and a Zoology degree. She was born and raised in Zambia and has a deep love of the African bush and remote outdoors.

Kim has experience in remote medicine delivery, having provided medical care on expeditions in the Asian jungle and the remote Sahel region of Africa. Kim has interests in Tropical and infectious disease medicine, remote medicine and delivering medical care in developing regions of the world. She loves insects and birdlife of the tropics.



#### Part 4: RESEARCH AIMS AND OBJECTIVES

25. **Research aims for teaching programme.** Expedition was led to Zambia in order to deliver training in combat related emergency medical response with support from the Scientific Exploration Society. Equipment was provided as per the WildCross first responder kit utilising the 5.11 Tactical UCR Slingpack.
26. **Broad methodology overview.** Greater detail is provided in the abstract that follows.
- a. A pre-course questionnaire was conducted to assess knowledge. Previous teaching in the area had been conducted by the charity *Walking with the Wounded* on catastrophic haemorrhage and depth of knowledge and specifically any retained skill was pre-assessed.
  - b. Teaching was initially delivered in class room style with a combination of lecture format and small group practical sessions.
  - c. Uptake of knowledge and translated new skills were assessed in a second phase through staged moulage while out on patrol within the National Park. Intensity of moulage was increased throughout phase 2 and included incident snakebite, road traffic accident, care-under-fire utilising training rounds and mass casualty.
  - d. Training was reassessed prior to course closure with a post-course questionnaire and individual student presentation.
  - e. Course was run as a train-the-trainer, with pre-selected high performance senior rangers as well as National training school instructors, to ensure longevity among the ranger cadre.
27. **Abstract.** An abstract has been constructed with the aim for presentation at pre-hospital care and conservation conferences throughout the second half of 2020 and first half of 2021. The intent is to press the success of the train-the-trainer concept to a wide and targeted audience for anti-poaching rangers and increase uptake of similar models across sub-Saharan Africa. The abstract has been vetted and is supported as senior author by Dr Luke Moore (Consultant Infectious Diseases and Microbiology for North West London Pathology/Chelsea and Westminster Hospital).

## Tackling early snakebite management in rural sub-Saharan Africa: a train-the-trainer model

Pallett SJC<sup>1,2</sup>, Handford CG<sup>3</sup>, Wong SMY<sup>4</sup>, Gough S<sup>1</sup>, Moore LSP<sup>2,5,6</sup>

<sup>1</sup>Scientific Exploration Society, Expedition Base, Motcombe, Dorset, United Kingdom,

<sup>2</sup>Chelsea and Westminster Hospital, London, United Kingdom,

<sup>3</sup>Walsall Healthcare NHS Trust, Birmingham, United Kingdom,

<sup>4</sup>WildCross, The Keep, London, KT2 5UF, United Kingdom,

<sup>5</sup>NIHR/Wellcome Trust Imperial Clinical Research Facility, London, United Kingdom,

<sup>6</sup>Imperial College Healthcare NHS Trust, London, United Kingdom.

**Background:** Snakebite envenoming has the potential for life and limb threatening consequences and is an important consideration in tropical medicine. Sub-Saharan Africa faces up to 32,000 deaths and 6,000 amputations annually.

Early management of snakebite in remote environments is complicated by a lack of available medical expertise, poor access to suitable facilities for the delivery of anti-venom, and traditional medicine approaches to care.

An emergency first responder, train-the-trainer course incorporating a basic ABCDE model for non-medical professionals, with core teaching for snakebite, was developed with Wildlife Police Officers in Zambia. Training competencies were assessed in order to determine the potential for improving capacity of remote snakebite management at the site of injury.

**Materials/methods:** 24 students participated, comprising training school instructors and team leaders from 3 non-governmental organisations responsible for anti-poaching patrol activity across Zambia's Kafue National Park (22,500km<sup>2</sup>). A 10 item pre-course questionnaire assessed prior knowledge and health beliefs around snakebites.

In September 2019, 36 person-hours were delivered via class-room based learning, individual skill stations, teach-back and complex moulage-scenarios. A post-course matched 10 item questionnaire was conducted to assess development. An additional 10 item post-course questionnaire was conducted to assess snakebite specific learning.

**Results:** Mean matched questionnaire scores almost doubled from 45.8% pre-course to 89.2% post-course, with improvement across each of the ABCDE areas. All post-course safety critical questions scored 100%. Most significant improvement was shown in prioritising catastrophic haemorrhage control (16.7% pre to 100% post).

For the 10 snakebite specific management questions, mean post-course score was 87.4%. Competencies for WHO guided initial management (including compression bandaging and immobilisation, understanding risks of anti-venom treatment) scored 100%.

**Conclusions:** This course provides a proof of concept, where a train-the-trainer emergency first responder course appears achievable for delivery to non-medical professionals working within rural sub-Saharan Africa. It is effective at challenging traditional models of snakebite management and providing safe initial care until further assessment at a medical facility is achievable. Further development is required to identify suitable, supported individuals and develop basic infrastructure within rural communities in order to maximise the availability of trained personnel in areas of high risk.

#### Part 4: OUTCOMES

28. **Publications.** Several academic publications are planned for submission in Q2 of 2020 and are at various stages of preparation.

29. **Publication 1.** Working title: **The side-ways striking stiletto – effective management of *Actroctaspis* bites. Pallett SJC, Handford CG, Wong SMY, Gough S, Moore LSP.**

- a. **Content.** A snakebite from the venomous *Actroctaspis bibronii* snake shortly after the course ended with some initial management secondary to new knowledge is discussed. The *Actroctaspis* snakebite has no known antivenom and is commonly mistaken for non-venomous ground snakes. Scientific literature is out-dated and the case provides the first photographic evidence of the long-assumed injury pattern associated with this snakes' unique envenoming technique.
- b. **Current state.** Literature review is complete and copy is currently with the patient (United States national) for review of accuracy before passing on to Lord Gough for review prior to submission.
- c. **Journal.** Publication will be aimed at the *Transactions* journal of the Royal Society of Tropical Medicine as they had published one of the earliest scientifically reported cases in the 1950s.

30. **Publication 2.** Working title: **Tackling early snakebite management in rural sub-Saharan Africa: a train-the-trainer model. Handford CG, Pallett SJC, Wong SMY, Gough S, Moore LSP.**

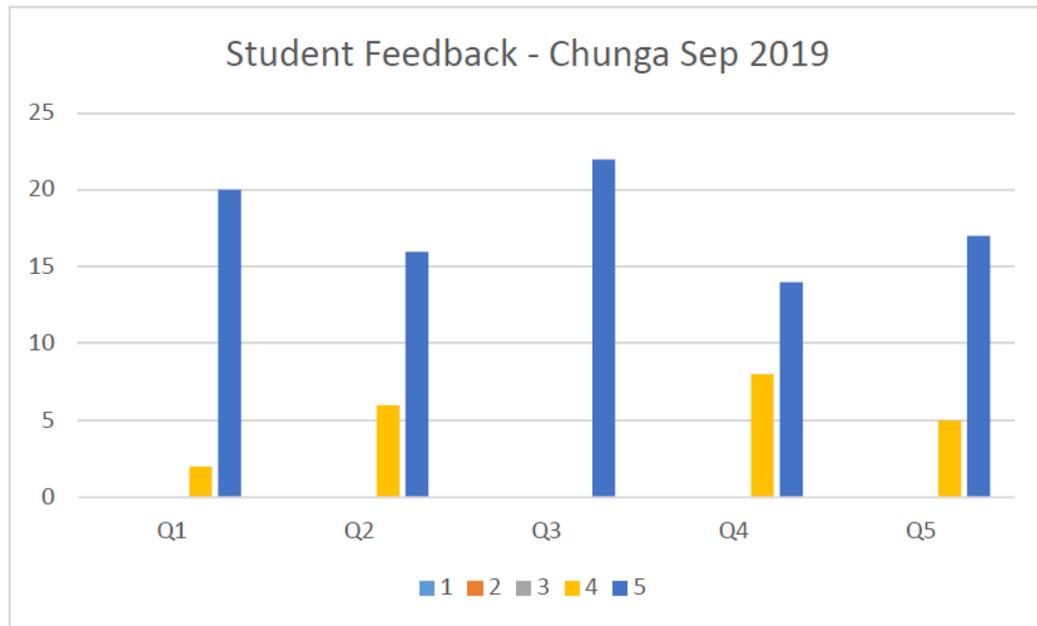
- a. **Content.** Broadly as per abstract.
- b. **Current state.** Introduction, methods and results complete. Dr Handford is leading with first draft of discussion with aim for completion for team review by mid-April 2020 and aim to submit for publication May 2020.

31. **Publication 3.** Working title: **Effect of utilising rapid diagnostics for differentiating malaria species in remote central Africa versus conventional testing. Handford CG, Pallett SJC, Wong SMY, Gough S, Moore LSP.**

- a. **Content.** Data is to be collected across a 12 month period utilising the new rapid diagnostics and compared against the previous 12 months of data for presumed malaria cases in central province of Zambia. The hypothesis is that a) patients are being overtreated for presumed, unconfirmed malaria, b) accurate identification of malarial subtype is leading to inappropriate treatment strategies and increasing the burden of malaria infection.
- b. **Current state:** data collection will complete in October 2020. Single point of contact in Zambia identified.

32. **Feedback.** Structured and anonymous feedback was sought from the students following the training and collected for improvement of future courses. An open question on desired further teaching was asked at the end of the questionnaire and the results provide useful insight to the self-perceived

needs of rangers in the region. Feedback was overall very positive and has been included as a small measure of apparent initial impact.



Scoring system: (1) Very Poor (2) Poor (3) Neutral (4) Good (5) Very Good

- Q1. The course was useful in preparing me to provide emergency first aid in a remote environment.
- Q2. The course was useful in helping to develop my skills in teaching others about emergency first aid in a remote environment
- Q3. I felt the instructor was professional and knew their material well.
- Q4. I felt the instructors were engaging and easy to understand.
- Q5. I felt the feedback I received helped to develop my skills in teaching emergency first aid.

Recommendations to improvements from the course included:

- Discussion on practical techniques when rescuing someone from the water
- Longer discussion on malaria
- The making of emergency stretchers
- First aid in the event of a fire

A selection of comments for your own reflection included:

- The instructor had very good materials, well simplified. The powerpoint were very helpful for understanding to a new learner, with good demonstrations by the instructor
- The practical sessions were very helpful, particularly the instructors knowledge of care under fire as this is not on our current syllabus
- Every lesson in the course was very useful
- The catastrophic haemorrhage and snakebite was taught very well.
- All of the course was useful and well taught and will help me in the working area of operations
- The snakebite and catastrophic haemorrhage lessons now make me feel I have a better chance to save people
- The catastrophic bleeding lesson was the best

Reflections: It is highly encouraging that the catastrophic haemorrhage and snakebite lessons were singled out as the most useful lessons as the view from the team is that these are the vital elements of the course where teaching is likely to lead to a saving of life or limb in the future. Interesting, despite relatively advanced infantry tactics forming a core element of their instruction, care-under-fire had not featured before.

It was very surprising how inquisitive the rangers were on the correct management of febrile illnesses, particularly malaria. They were clearly very open to discussion of infectious diseases and further time dedicated to environmental health and vector-borne disease is likely to be well received. The interest in augmenting drowning care with, effectively, swimming lessons is unsurprising. While evident it is certainly needed this has been fed back to the ranger instructors as there is no safe option for entering the crocodile infested water nearby during such courses.

Workload for Dr Handford and Dr Pallett was high throughout and delivery to such a group in the future would benefit by a 3<sup>rd</sup> deployed doctor, trauma nurse or medical student, and also provide for some course redundancy.

33. **Conservation.** In addition to the main effort the team were proud to be involved in active conservation efforts. The team provided tactical support to the release of previously poached and rehabilitated pangolins to undisclosed locations. Following this, the team supported research analysis of lion prides (alongside the Zambian Carnivore Programme) and provided support through tracking of reintroduced rhinoceros populations within south-western Zambia for observational research.



*Tracking reintroduced White rhinoceros in the Mosi oa Tunya. The characteristic print is easy to find once you come to soft ground around the remaining sources of water. The population is small (11 seen), with 2 further rhinos lost in 2018 to poaching.*

#### **Part 4: OUTREACH**

34. Data collection on impact of malaria rapid diagnostics is ongoing and being run from the nurse-led clinic at Chunga. The chief area of exploitation is in the successful roll out of a train-the-trainer initiative specifically for non-medical personnel with our current findings providing a proof of concept.

Initial success has been exploited by integration into the National Training school and thereby ensured future propagation not just to future recruits within KNP but also those that will be deployed to 20 National Park sites across the country.

The team has been approached by FirstAid Africa and James Dyer FRGS to expand the programme in collaboration with their team and deliver to a wider audience. Initial follow up will be a return to KNP to observe the standard of onward teaching at the National Ranger school and run a refresher workshop for previous students in order to measure sustainable effect.

In addition, in collaboration with Musekese, who field 2 qualified fixed wing pilots, the team aim to launch an aerial AI reconnaissance capability utilising an unmanned mini-plane that is charged via solar-panel and uses an artificial intelligence programme to highlight unusual activity within KNP as a further deterrent to poaching activity. Current state of planning is sat with Musekese who are in negotiations with the Zambian Defence Force to acquire clearance. If successful a secondary benefit to this auxiliary programme will be the invaluable data collected on migration patterns of endangered animals as well as provide a much more accurate and up-to-date assessment of species numbers. This data will largely be used by Panthera to feed into their large carnivore programmes, and particularly be helpful in protecting one of the last locations to have a sustained population of wild dog packs.

In the UK elements have been adapted to provide teaching to individuals that may find themselves first on scene at serious road traffic accidents and, particularly in London, knife wounds. The team have been approached to carry the methodology forward for selected tube drivers and stadium staff, with proposed funding offered from the charity Chelsea+ once liability concerns have been addressed. In each of these future projects the integral support of Lord Gough and the SES will be highlighted as a driving force behind the initial concept.

#### **Part 4: COMMUNICATION AND REACH**

35. Several initial talks have been organised following the completion of the expedition. Dr Scott Pallett and Stephanie Wong were both invited to support the Royal Geographical Society in delivery of the desert and savannah workshop following the expedition with presentation of this recent SES supported project as the opening example. There was a very positive reaction from the audience both in terms of the project itself and several follow up questions afterwards about the 2020 and 2021 application process to SES.

Dr Pallett and Dr Handford are to provide a teaching seminar to junior doctors from the Chelsea and Westminster Hospital at which the SES Gough Explorer 2019 Rangers First abstract results will be presented, followed by targeted teaching for addressing knife crime in the community in February 2020. If feedback is positive, we plan to then expand this across each of London's key acute hospitals.

Dr Pallett and Stephanie Wong will join James Dyer FRGS at his first Venture Beyond – An Evening of Adventure talk in London Bridge to present the SES Gough Explorer 2019 Rangers First project and join a question and answer session on poaching, conservation and exploration in Africa. This will be taking place on 26 Feb 2020.

Publications are planned and currently underway. The first publication on *Atractaspis* snakebite management is of priority due to the fact that snakebite is the key focus of the World Health Organisation this year and as research is severely lacking in this particular species we feel is highly likely to be published. The publication is the final review stage by the patient that forms the case basis

for initial discussion and a copy of the draft text will then be forwarded to Lord Gough for approval of affiliation.

Following this paper, the next focus is to complete the abstract conversion to a full academic paper and the aim is to have this completed by May 2020. The 3<sup>rd</sup> paper on malaria rapid diagnostics impact on treatment choices is due following the completion of data collection in Q4 2020.

Difficulty in securing academic clearance has meant the submission to multiple conferences of the abstract data has had to be delayed until Q2 2020 but as this is now secure the aim is to present the abstract at targeted conservation and pre-hospital care conferences throughout Q3 2020 – Q2 2021.

#### **Part 4: ADVERSITIES AND CHALLENGES**

##### **36. Key Challenges:**

- a. **Environment.** A harsh and particularly dry environment at present, there is a significant risk of fire (estimated 87% park coverage over the last year). Heat injury for non-acclimatised, with further increased risk due to altitude at 1000m, is present, particularly when working during the middle of the day.
- b. **Flora and fauna.** The very nature of the Park means that there is an inherent and constant risk from indigenous animals. Elephants, hippos, lions and hyenas often wander through the camps at night and it is not safe to drive, or move beyond the edge of camp boundaries after dusk. The Black mamba, spitting cobra and puff-adder are present in large numbers, while large crocodiles remain a risk when close to water sources. The park hosts a species of *Actroctaspis* snake that closely resembles non-venomous ground snake species in appearance but is highly venomous and for which there exists no known anti-venom.
- c. **Movement.** Road access is poor and must be planned for. Accidents are common and roads have often deteriorated beyond use. Travel by foot to access areas is commonly required and due to the nature of the thick bush, GPS navigation is a must.
- d. **Culture.** The nature of the local culture meant that there was deep-seated initial opposition to confront traditional snake-bite treatment ideas. Brief discussion with the rangers over previous military experience within sub-Saharan Africa led to a significant shift in ranger approach to our advice, having initially shown a range of willingness to engage, and we feel this was likely the key reason behind the overall success of the course uptake.

##### **37. Adventure:**

- a. **Survival.** The course required travel across over 1500km (maps to follow in full report) through a combination of Land Rover, canoe and foot. All food and water had to be planned and carried in advance. Fire was a significant risk. Route adjusted on 2 occasions due to bush fire.
- b. **Navigation.** Mostly carried out using compass (on foot) and GPS.
- c. **Fauna.** Close interaction with large and endangered wild animals was common, with advice provided by local rangers where required.

d. **History.** Visiting of the 3<sup>rd</sup> site, and recce of Chobe (Botswana) allowed the team to visit Livingstone and Victoria Falls in the footsteps of renowned missionary and explorer Dr David Livingstone.

## **PART 5 Risk register**

38. **Risk Management: Risk register.** Post-expedition of the risk register was undertaken by the team. No adverse events or injuries occurred during the expedition and comment is made on those elements that were deemed either impact high risk or probability high risk prior to setting out.

- a. **Risk register number 1.** Travel associated gastrointestinal infection (D&V). No members of the team suffered diarrhoeal or vomiting illnesses while deployed. Redundancy supply of water was collected prior to leaving Lusaka and re-supply organised for collection enroute from Site A to Site B. On one occasion, when away from base camp longer than expected due to route change secondary to fire, water was sourced from local running water and run through a Milbank prior to being sterilized. No ill effects seen. Medication in case of severe diarrhoeal illness was supplied to the team prior to departure.
- b. **Risk register number 2.** Tropical febrile illness. No symptoms of tropical illness felt by any member of the team. Insect bites were minimal following suitable use of anti-bite strategies and sleeping within permethrin dipped nets. In addition, clothing supplied was impregnated with insect repellent. Anti-malarial prophylaxis was taken and the expedition leader was a tropical diseases doctor. Follow-up clinic once home was added to the risk register.
- c. **Risk register number 4.** Requirement for medical evacuation. Evacuation not required and unable to be tested. Airstrip seen and suitable for Learjet evacuation.
- d. **Risk register number 7.** Accidental injury. No injury occurred during the expedition to either the expedition team or ranger students. Use of appropriate personal protective equipment and prior military training provided for safe interaction with ranger teams. As expected, rangers are not keen to be without their weapon systems but introduction of British approach to unloading and making safe weapon systems prior to all lessons was achieved. Training systems were used during serials and no real-life weapons systems were allowed to be involved.

Number	Type	Description of risk	Description of impact	Impact of event	Notes on Impact	Probability of the Risk	Notes on Probability	Residual risk after mitigation	Open date or closed	Choice of action	Summary of approach
1	Operational	Travel associated gastrointestinal infection (D&V)	Reduces ability to deliver course for up to 48 hours.	LOW	Redundancy within team and small numbers	HIGH	Travelers diarrhoea associated with high rate, low impact	MEDIUM	1/21/2019	Accept	Bottled water only. Take own water filter device. Supply of appropriate medication to reduce impact and duration.
2	Operational	Tropical febrile illness including malaria	Zambia is high risk for malaria, including falciparum.	HIGH	Falciparum increases risk of severe malaria	LOW	Team experienced in prevention measures	MEDIUM	1/21/2019	Reduce	Travel clinic review 3 months prior to departing. Bite prevention and antimalarial prophylaxis
4	Operational	Requirement for medical evacuation	Risk of requiring high level of medical care and the ability to access in UK evacuation timelines to a higher standard of hospital care	HIGH	Would require splitting of small team	LOW	Clinical ability in team to deal with injury high	LOW	1/21/2019	Reduce	MEDEVAC insurance and evacuation via Puku Pan airstrip at Kafue NP. Level 3 hospital with intensive care at Lusaka - WHO/CDC partnered.
7	Operational	Accidental injury	Accidental injury from gun shot wounds (rangers weapon systems) or animals.	HIGH	Any injury would likely be serious	LOW	Professional rangers, no use of weapon systems even for teaching by UK personnel.	LOW	1/21/2019	Reduce	Team will not utilise, even for teaching purposes, any ranger weapon systems. Use of personal protective equipment, including ballistic glasses and chest plate whilst out with rangers that are carrying personal weapons.

39. **Risk management: Insurance.** Suitable insurance was provided by 3 providers. Cedar Tree Insurance [CT19DSTG-1070746] covered travel arrangements, personal medical liability, personal kit and electronics. Military grade equipment was covered by PAX insurance. An additional insurance policy was taken out with BCF Travel Club [UA609380P 0] in order to provide and deliver screened blood products as required. None of the above policies were required to be acted on.

40. **Risk management: Medical arrangements.** Medical arrangements pending injury or sickness were robust. All team members were either fully qualified doctors or had undertaken the Royal Geographical Society Expedition medic course. Real-life support medical packs were organised and carried throughout, able to respond to trauma, medical emergencies (including anaphylaxis and cardiac arrest), non-battle injury and sickness. Blood products and emergency evacuation provision was planned for as described above. Team members carried 4 levels of communication throughout, including mobile phones (international and local enabled), short wave radio and satellite phone.

41. **Budget analysis.** £4,000 were awarded to Dr Scott Pallett as the Gough Explorer Award for Medical Aid and Research 2019. The initial budget was focused on a single ranger organisation participation with larger proportion given to the initial estimation for rapid diagnostics in order to have sufficiently powered methodology. Recognition of the expedition at Zambian government level tied the course in with the National Training school, significantly increasing reach and sustainability but also requiring an increase in the budget focused on real-life support medical kit. Training was then delivered to 3 NGO organisations as well as National instructors. Release of new malaria rapid diagnostics with high sensitivity and specificity as commercial products, rather than having to source from pharmaceuticals allowed for re-allocation that would allow for achievement of both aims.

Of the initial full budget, funding from the Gough Explorer Award 2019 was allocated to only 6 areas as shown below. The first 4 focus predominantly on teaching and real-life support tactical medical kit, the 5<sup>th</sup> on rapid diagnostics to be used for analysis of subtypes and treatment choices and the last 2 focused on media and conference fees. Initial estimates placed £4,050 requirements for the first 5 project activities and £500 for the work of the last 2 activity categories (media and dissemination).

With focused effort and ordering of single items from different providers, the task was completed with the spending of **£2,808.97 invoiced costs**. The £500 media fees remain unspent at the time of this report, meaning a total of £691.03 of the award is to remain unspent.

PROJECT ACTIVITY	DETAILS
Teaching material	Training props, manuals, RIGs
Real-life use combat medical equipment 1	Bespoke ranger medical field packs designed for use in real-life situations.
Real-life use combat medical equipment 2	Bespoke ranger medical field packs designed for use teaching by trainers
Real-life use combat medical equipment 3	Stock of key disposable items used in medical packs
Rapid diagnostics	Malaria
Conference posters/publications costs	ECTMITH, ECTMID, FIS. RGS
Development and dissemination of photography/footage and case studies	(including at SES, RGS, RSTMH, CW and other events as appropriate)

A full breakdown of the money spent is provided for record, accountability and detailed reporting. The invoice reference column details to which invoice evidence can be found for confirmation of monies spent.

Category	Item	Total items	Total cost	Proportion teaching	Proportion real-life	Invoice reference
Rangers First Trauma Response bags	5.11 Tactical UCR Slingpack (real life)	8	836.07	0	836.07	REF 1
	5.11 Tactical UCR Slingpack (teaching)	3	252.47	252.47	0	REF 2
Badges	WildCross emblems for bags	9	45.5	13.65	31.85	REF 3
Teaching RIG	Teaching RIGs	2	130.06	130.06	0	REF 4
	Teaching RIGs - compass	2	10	10	0	REF 5
	Teaching RIGs - aerial signal emergency	2	6	6	0	REF 5
	Teaching RIGs - LED HEAD red lense	1	2	2	0	REF 5
	Teaching RIGs Commander's pouches	8	86.26	86.26	0	REF 6
Big C	Tourniquet	24	100	30	70	REF 7
	Celox	10	100	30	70	REF 8
	Blast bandage	36	158.22	47.466	110.754	REF 9
	Abdo bandage	14	89.91	26.973	62.937	REF 10
	SAM splint	12	57.46	17.238	40.222	REF 11
Airway	Oropharyngeal airways	36	17.95	5.385	12.565	REF 12
	Nasopharyngeal airways	12	54	16.2	37.8	REF 13
Breathing	Pocket mask	12	42.82	12.846	29.974	REF 11
	McGills (large training)	4	22.36	6.708	15.652	REF 14
	McGills	8	35.42	10.626	24.794	REF 11
	Bag-valve mask	12	122.26	36.678	85.582	REF 11
	chest seals	8	45.3	13.59	31.71	REF 15
	chest seals training	6	21.42	6.426	14.994	REF 13
Circulation	sling	18	14.5	4.35	10.15	REF 11
	training bandages	10	4.95	1.485	3.465	REF 14
	simple bandages	50	12	3.6	8.4	REF 12
	alcohol wipes	600	6.7	2.01	4.69	REF 12
	Steri-strips	200	11.56	3.468	8.092	REF 16
	plasters	No invoice	0	0	0	
	saline wash	25	5.99	1.797	4.193	REF 17
	zinc oxide	12	13.25	3.975	9.275	REF 18
	camouflage bandage	No invoice	0	0	0	
	camouflage bandage (training)	No invoice	0	0	0	

Disability	thermometer	12	28.86	8.658	20.202	REF 12
	eye pads	24	5.45	1.635	3.815	REF 12
	spray bottle	12	8.26	2.478	5.782	REF 19
	pen torch	10	15.98	4.794	11.186	REF 20
	torch commanders	2	18.58	18.58	0	REF 21
	markers	10	13.98	4.194	9.786	REF 22 (receipt)
Environment	tough cuts	10	18.84	5.652	13.188	REF 23
	seat belt cutter	12	31.8	9.54	22.26	REF 24
	collar	11	123.6	37.08	86.52	REF 14
	space blanket	12	10.51	3.153	7.357	REF 11
	Kendrick traction device	3	77.94	0	77.94	REF 25
Training materials	Manuals	3	17.97	17.97	0	REF 22 (receipt)
	Manuals - printing	1	21.18	21.18	0	REF 26 (BSt)
	Projector	No invoice	0	0	0	
Diagnostics	Malaria RDT	100	111.59	0	0	REF 27

<b>Totals</b>			<b>2808.97</b>	<b>916.175</b>	<b>1781.205</b>	
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## Part 5: SUMMARY

42. The Rangers First expedition, led by the Gough Explorer 2019 (Scientific Exploration Society) has had an initial strong success. Exploitation of lessons learnt must include scientific journal publication in order to advise potential stake-holders throughout sub-Saharan Africa carrying out or supporting anti-poaching conservation activity, particularly as this offers a shift in upgrading front-line medical expertise among anti-poaching units.

## PART 5: PRESS RELEASE



### **‘Rangers First’ Pilot launched in Kafue National Park**

WildCross team rolls out advanced medical training for park rangers across 6 anti-poaching units in Zambia’s largest conservation park.

The train-the-trainer programme is the beginning of a holistic effort with local organisations and Government to combat poaching and illegal wildlife trade through educating local rangers that patrol the park on foot and increasing their capacity to work at reach.

#### **Bespoke tactical medical training for anti-poaching units**

Designed by WildCross and delivered by the **Scientific Exploration Society Gough Explorer for 2019, Dr Scott Pallett**, a Australian-British team brought a bespoke tactical- style level of training, based on their military, NGO and UN experience to anti-poaching efforts in Zambia. The Rangers First programme targets simple and improvised methods for enabling rangers to act fast to save lives in the event of gun-shot wounds, explosive injuries and road traffic accidents which are a constant risk. Also covering infectious disease mitigation and injuries from wildlife such as snake bites and human-animal conflict.



*Ranger carrying out breathing assessment on an injured colleague*

“We understand that there is very limited healthcare in the region, covering the park rangers and the local community. Our programme aims to support rangers with advanced emergency first aid training and medical equipment, tailored for their fieldwork, providing them with the capability to share this knowledge with others,” says WildCross Founder Stephanie Wong.

### **Medical kits will enable rangers to respond quickly in emergencies**

Through training locals on the ground and equipping them with essential medical kit and knowledge, rangers have a higher success rate at reducing injury and subsequent death. The partnership with the **Scientific Exploration Society and Lord Gough** allowed the team to procure emergency first aid kits for the rangers and deploy to Zambia in 2019. Weighing less than 2kg, the kits provide life-saving equipment to tackle catastrophic haemorrhage and compromised breathing as well as aids to stabilise and assist in the evacuation of severely injured patients. Kits have been procured for both further teaching and active use in the field.

The delivery of the pilot was well-received by the rangers, with feedback suggesting this was in part due to the credible tactical experience and expertise that WildCross brings with them. The team partnered with local organisations **Musekese Conservation**, **Game Rangers International** and **Panthera**, along with the Department of Parks and Wildlife (DNPW). Due to the extremely positive results and feedback, DNPW will now be including the train-the-trainer Rangers First programme as part of their general ranger course curriculum at the Chunga Training School, which all park rangers need to undertake in order to graduate as an officer.



*Classroom session – heat injury*

### **Empowering rangers with knowledge to share with local communities**

Rangers First not only gives trainers the ability to cascade and improve medical response across their entire teams, but also to spread their knowledge among the communities in which they live and work. The course empowers rangers to respond to medical emergencies and following accidents while out on patrol as well as throughout the community, thereby binding the community closer to the conservation goals.

*“Together with our partners on the ground, we hope to tackle poaching and illegal wildlife trade at the forefront, through the individuals that protect the wildlife at Kafue National Park. By helping to enable the rangers, we can reduce injuries and death that go hand-in-hand with the work they take on with confidence.”*