

## CONSERVATION CASUALTIES: AN ANALYSIS OF ON-DUTY RANGER FATALITIES (2006–2021)

Chris Galliers<sup>1</sup>, Roger Cole<sup>2</sup>, Rohit Singh<sup>1\*</sup>, Jeff Ohlfs<sup>3</sup>, Hamera Aisha<sup>4</sup>, Amon Benoit Koutoua<sup>1,5</sup>, Carlien Roodt<sup>1</sup> and Mónica Álvarez Malvido<sup>1</sup>

\*Corresponding author: rsingh@wwfnet.org

<sup>1</sup>International Ranger Federation, 11 Veronica Court, Leongatha, Victoria, 3953 Australia.

<sup>2</sup>Countryside Management Association, 87 Chapel Farm Cottage, Gussage St Andre Blandford, Dorset, DT11 8DL, UK.

<sup>3</sup>Mount San Jacinto Winter Park Authority, 1 Tram Way, Palm Springs, CA, 92262, USA.

<sup>4</sup>WWF-Pakistan, behind Ali Institute of Education, Main Ferozpur Road, Lahore, Pakistan.

<sup>5</sup>International Ranger Federation, BP 9 Cidex 01, Abidjan, Côte d'Ivoire.

### ABSTRACT

The ranger profession is diverse and challenging, requiring individuals to operate in risky and often life-threatening situations. The International Ranger Federation's Roll of Honour presents an opportunity to review the dangers surrounding the ranger profession by analysing the number and causes of ranger deaths on duty. Over a 16-year period (2006–2021), a total of 2,351 on-duty ranger fatalities have been recorded. Of the data analysed, felonious deaths, such as homicide, accounted for 42.2 per cent with the others a result of accident, illness, wildlife attack or other unintentional work-related casualties. Ranger casualties appear to be increasing over time and may reflect phenomena such as increasing human and wildlife conflicts, as well as changing climatic conditions. Recommendations to address these risks include improved recognition of the role of rangers, improved working conditions and access to adequate insurance.

**Key words:** wildlife, rangers, wildlife crime, protected area, poaching

### INTRODUCTION

Rangers are at the frontline of biodiversity conservation and ecosystem management (IRF, 2019a; IRF, 2021; Singh et al., 2021). The term ranger refers to “any individual or group of individuals that play a critical role in conservation; they are responsible for safeguarding nature; cultural and historical heritage and protecting the rights and well-being of present and future generations” (IRF, 2021a). The multifaceted role of modern rangers includes law enforcement for biodiversity and habitat protection, biodiversity monitoring, conservation education, visitor management, community engagement and empowerment, firefighting, managing and controlling environment risk and providing assistance during natural calamities (IRF, 2021a; Singh et al., 2020).

Rangers often perform their duties in harsh field conditions with limited capacity and resources. Their work can involve life-threatening encounters with wildlife and armed poachers, militias or criminal groups, making it a potentially dangerous profession (Belecky et al., 2019; Belecky et al., 2021; Prakash et al.,

2021; Moreto et al., 2019; Warchol & Kapla, 2012; Eliason, 2011a; Gambarotta, 2007). The Department of Justice, USA, includes rangers in the list of most assaulted law-enforcement officers (Gould & Duncon-Hubbs, 2004). The consequences of ranger fatalities are multifaceted and affect not only the families of rangers but also their co-workers and eventually the entire profession (White et al., 2019; Fridell et al., 2009). Findings of the Global Ranger Perception Survey (GRPS), a landmark research study which assessed occupational challenges of protected area rangers, indicated that being a ranger is a dangerous job due to encounter with poachers (84.8 per cent) and wildlife (68.2 per cent) (Belecky et al., 2019).

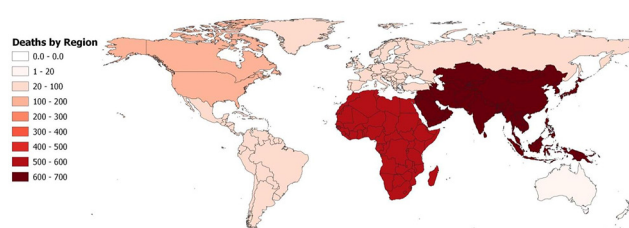
Recently there has been an increase in ranger-centred research, which brings various aspects of the dangerous and challenging nature of their work into focus. These dangers gained attention due to higher rates of loss of life in the ranger workforce (Appleton et al., 2021; Moreto et al., 2021). The studies have primarily focused on Africa and the USA, with limited research in Asia and Latin America (Leaky & Morrell, 2001; Ogunjinmi et al.,

2008; Meduna et al., 2009; Eliason, 2011b). These latter regions also face high levels of threats to wildlife and rangers (Warchol & Kapla, 2012). In 2003, at the World Parks Congress, an award symbolising the ranger line of duty deaths highlighted the fatal nature of ranger work. The International Ranger Federation (IRF) has been acknowledging this issue in its triennial World Ranger Congress from 2011 through the release of an annual Roll of Honour (IRF, 2018; IRF, 2019b; IRF, 2021b).

A combination of empirical research, combining data related to felonious and accidental casualties, offers a better reflection on the ways policies and action plans, both international and national, can contribute to making the ranger profession safer (Fridell et al., 2009). While data on non-felonious causes of death suggest that these could outnumber homicides (White et al., 2019), assessing all those factors that contribute to ranger deaths requires more research. The purpose of this paper is to provide an insight into the major causes of rangers losing their lives in the line of duty and aims to serve as a baseline by providing evidence to underpin future targeted action.

## METHODOLOGY

The primary data source used for this study is the Ranger Line of Duty Death (RLODD) data gathered and owned by the IRF. These records have been actively gathered, maintained, analysed and verified by the Roll of Honour (ROH) working group of the IRF since 2006, and since 2011 have been released annually on World



**Figure 1. Ranger casualties in 2006–2021 for the ROH database from the IRF regions: North America, Central America, South America, Europe, Africa, Asia and Oceania**

Ranger Day (31 July) to commemorate the dedicated effort of the world's rangers. It is the only systematic source of information on ranger casualties maintained on a global scale.

The RLODD data covers both state-employed and non-state-employed in-service rangers reported to have died in the line of duty. That means any person who has died as a direct and proximate result of a personal injury or illness sustained while carrying out their duties (IRF, 2021b) as per the definition of a ranger. Whilst the IRF has been collecting, analysing, verifying and maintaining ranger deaths for the past 30 years, the data presented herein cover the 16 years from 2006 to 2021.

The data is procured through reports received from national and regional member associations of IRF, partner organisations (e.g., conservation non-governmental organisations), periodical government reports, social media reports and from data available in public forums through news websites. Each incident is recorded in the standard RLODD report with details of the person, location, cause of death and verified by the ROH working group.

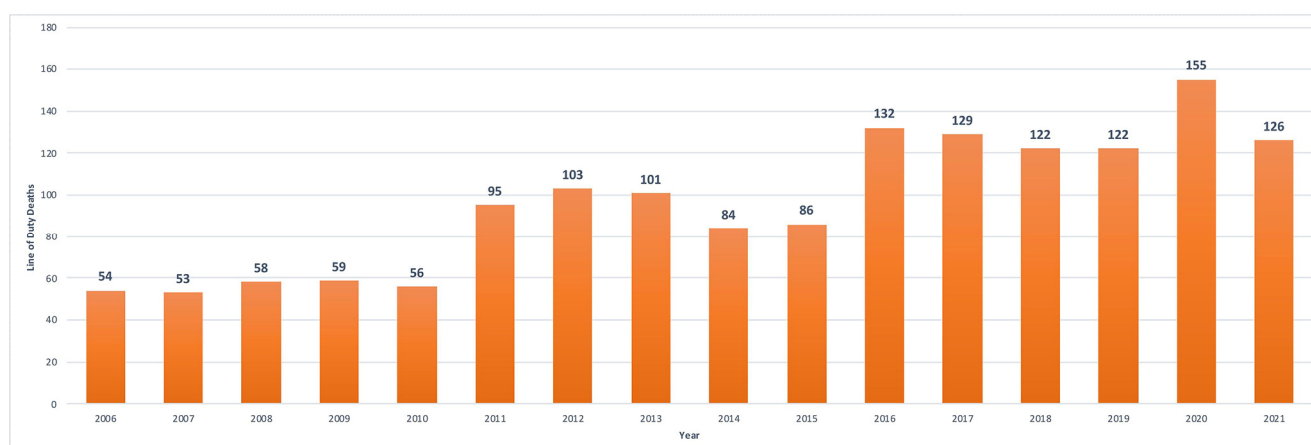
**Data analysis:** A total of 2,351 casualties were recorded from 82 countries between 2006 and 2021 (Figure 1). However, it must be noted that 281 cases could not be included in the ROH as it was unclear if they occurred in the line of duty. In addition, 30 suicides were recorded but not included in the ROH. It is important to note here that suicide cases have been increasing year-on-year, reflecting a potential higher level of work-related stress as a possible contributing factor. We have recorded over 500 ranger deaths due to COVID-19 in the year 2020–2021, and whilst a proportion of these are likely to have been contracted in the work environment, it has not been possible to definitively link such deaths to working conditions or indeed to lack of follow-up medical treatment. However,



A graveyard for fallen Rangers at the Mutsora Ranger station in Ruwenzori, Virunga National Park © Brent Stirton / Reportage by Getty Images / WWF

**Table 1. Causes of death in the line of duty**

Category	Explanation
Homicide	Any death at the hand of another person or persons with intent. This also includes cases in which the deceased was off duty but killed because of their ranger work.
Deaths from occupational and work-related accidents	Any death recorded due to occupational hazards such as firefighting; drownings; falls; equipment failure and other such incidents.
Transport-related accidents	Any on-duty death due to vehicle accidents or other forms of transportation from bicycle to aircraft. Those obviously outside of the work situation, or on the way to and from work, or if alcohol was involved, are not included.
Wildlife attack	Any death of a ranger due to attack from wild animals.
Deaths-in-service due to occupational illnesses/diseases as a result of working conditions; exposure; stress, etc.	Any deaths arising because of illness or medical conditions arising due to the nature of work, e.g., dengue, malaria, rabies, hypothermia, pneumonia, heart attack in workplace/stress-related scenarios and other similar conditions. Conditions such as cancer and other 'natural causes' are excluded as these are not directly work-related.



**Figure 2. Trends in loss of ranger lives recorded in 2006–2021 from the Roll of Honour (ROH) database indicating an increase in ranger casualties over a temporal scale. Comparison between the early years vis-à-vis later years is indicative only, due to possibly non-recorded data in the early years.**

both these factors may have negatively impacted the situation. The data was disaggregated based on region, country, year and cause of death. The causes of death were further categorised into five sub-categories (Table 1).

**Data limitations:** Gathering data on ranger deaths has been a challenging task, especially in the earlier years of the study when access to the internet and use of social media was much more limited. In 2006, membership of IRF, with 38 ranger associations as members, was not as widespread as it is now. The lack of direct communication with rangers in places like Asia, Africa and Latin America meant that many ranger deaths went unrecorded. The lack of clear definition of rangers perhaps also contributed to the missing cases. The possibility of some ranger casualties intentionally being unreported cannot be denied. Matters have improved in recent years with IRF membership of over

100, which includes ranger associations (sub-national, national, regional) and conservation organisations that support rangers, together with enhanced global communication systems. However, some parts of the world such as China, the Russian Federation and parts of Central Asia and the Caribbean are still difficult to communicate with and thus it is difficult to obtain reliable information from these regions. Therefore, these results should be seen as indicative only, as cases might have been missing during the early years of recording.

## RESULTS

We analysed 1,535 ranger fatality records covering the period 2006–2021. A gender-level disaggregation of the records was not possible for this analysis (Figure 2). The average loss of rangers' lives for the period was 95.9 rangers per year. Recorded rangers' deaths peaked in 2020 with the total number of casualties recorded for



that year being 155; whereas 2007 had the lowest number of recorded casualties, 53. The lowest number may be due to data gathering limitations as highlighted in the Methodology. Felonious deaths including homicides contributed to 42.2 per cent (n=648) of the total ranger lives lost, whereas the remaining 57.8 per cent (n=887), accounting for the non-felonious deaths, include all other causes (vehicle accident, aircraft accident, firefighting, drowning, illness and others).

### Regional comparisons in ranger loss of life

Based on the recorded data, Asia has witnessed the highest number of losses of rangers' lives during the past 15 years, with a total of 643 rangers losing their lives, comprising 41.9 per cent of the overall loss. Africa was second with 591 ranger losses during this period making up 38.5 per cent of the overall ranger death toll. North and South America were third and fourth with

121 and 82 ranger losses making up 7.9 per cent and 5.3 per cent respectively of the total losses. The remaining rangers were from Europe (n=57, 3.7 per cent), Central America (n=26, 1.7 per cent) and Oceania (n=15, 1 per cent) (Figure 3).

### Homicides

Homicide is defined as the killing of a person by another person with intent to cause death or serious injury, by any means (WHO, 2015). With 84.8 per cent of rangers stating that being a ranger is a dangerous job due to encounter with poachers, homicide remains the most common cause of death among rangers. Homicides included the killing of rangers by poachers, militias, combatants, rebels and other belligerents (Figure 4). The majority (88.5 per cent) of the cases were reported from Asia and Africa which reflects the high level of threats rangers are facing in protection of wildlife and their habitats.






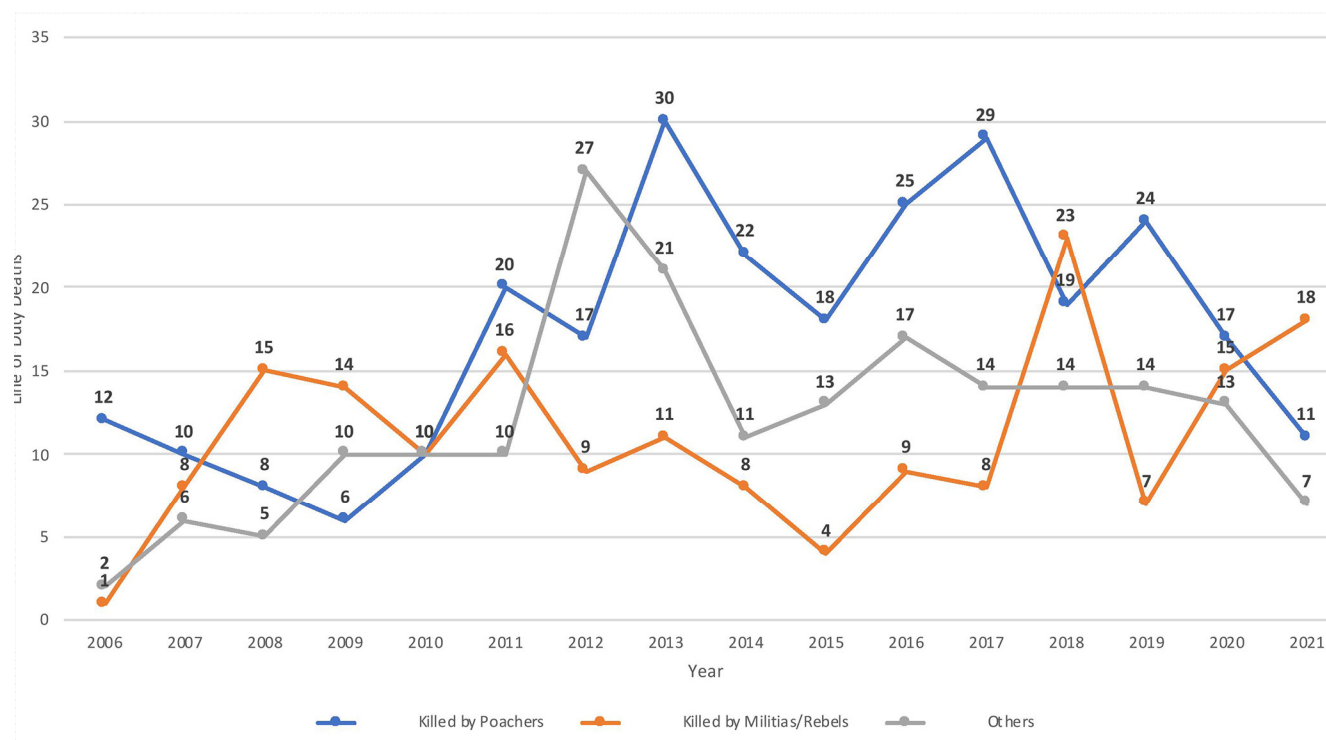
	HOMICIDES 	ANIMAL ATTACKS 	VEHICLE ACCIDENT 	DROWNING / FIRE & OTHER RELATED ACCIDENTS 	ON DUTY DEATH IN SERVICE 	
AFRICA	352	55	67	64	53	591
ASIA	222	151	103	108	59	643
CENTRAL AMERICA	13	0	1	12	0	26
EUROPE	17	0	6	14	20	57
NORTH AMERICA	11	1	40	36	33	121
OCEANIA	1	1	7	6	0	15
SOUTH AMERICA	32	1	15	14	20	82
	648	209	239	254	185	

Figure 3. Regional breakdown of line of duty deaths



**Figure 4. Ranger casualties linked to felonious deaths in 2006–2021**



Wildlife rangers in the northern sector of the Selous Game Reserve carry out a boat patrol on the Rufiji river © Greg Armfield

### Deaths from occupational and work-related accidents

Drowning and firefighting both accounted for approximately 10.2 per cent of rangers' lives lost respectively (n=83, 74) (Figure 5). Although comparatively more minor in the proportion of overall ranger casualties, the annual ratio of ranger casualties due to firefighting increased substantially from no deaths in 2006 to 15 in 2021. Lack of data availability in earlier years may be one of the reasons behind the low numbers in early years, but the impact of extreme weather events (IPCC, 2022) that have been occurring in the past few years cannot be discounted.

Other work-related accidents, such as falls; electrocution; falling trees/rocks; accidental weapon discharge/friendly fire; avalanche/landslide and others accounted for 97 deaths during the 16-year study period. The worrying incidents of several deaths from accidental weapon discharges and friendly fire suggests weapons training needs to be given more attention.

### Transport-related accidents

Accidents on duty were the second major contributor to the loss of lives of rangers making up 15.5 per cent (n=239) of the total casualties. Most accidents were caused by vehicles such as cars, bikes and planes/helicopters. The data indicates an increase in transport-related deaths with the highest number of cases reported in 2020 (31). Homicides and accidents, altogether, were responsible for 57.7 per cent of overall ranger deaths occurring in 2006–2021.

### Wildlife attacks

Dangerous encounters with wildlife are an important aspect of the life-threatening situations that rangers face and contributed to the loss of 14 per cent of rangers' lives (n=209) in 2006–2021. Of these, elephants were responsible for the killing of 118 rangers, which continues to increase over time. Attacks from other wild animals including rhinos, big cats, hippo, snakes and crocodiles have not shown any clear increase or decrease (Figure 6). There might be several reasons for the increase in elephant attacks such as the increase in human–wildlife conflict (HWC) due to habitat fragmentation or a simple lack of data availability in early years from Asia and Africa. This would need further investigations.

### Occupational illnesses/diseases and other work-related deaths-in-service

Illnesses contracted on duty, including heart attacks, work-related illness and other diseases were the fourth

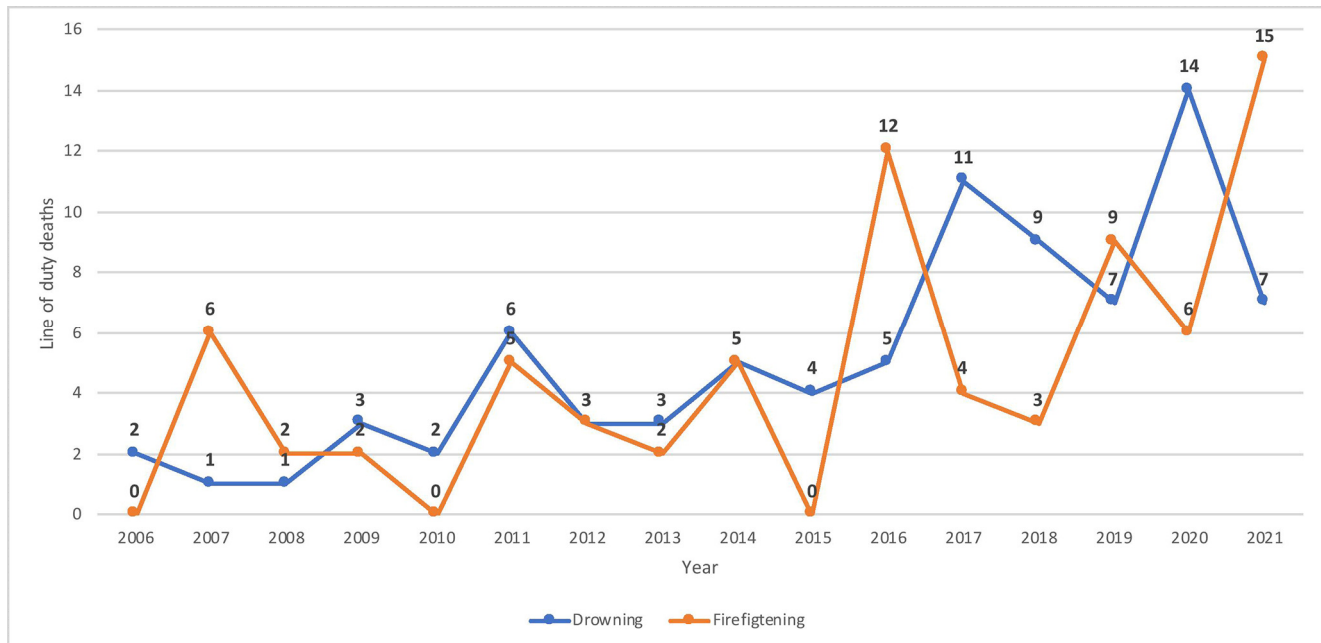
most common cause of death for rangers. When considered together, these three causes of death were responsible for 12 per cent (n= 185) of all rangers' deaths. The results also indicate a linear increase in ranger deaths linked to illnesses contracted on duty and heart attacks over a temporal scale from 2006 to 2021. However, these should be approached with caution as data availability is likely to also have increased over time. Though we do not have the exact numbers, malaria may have contributed to some of these casualties. According to the Life on the Frontline Survey conducted in 28 countries, 31.1 per cent of rangers had malaria in the past 12 months with Africa being the most impacted region (93.3 per cent). The relative risk shows that rangers in all regions are at much higher risk for malaria than the general population (Rerolle et al., 2022).

### DISCUSSION

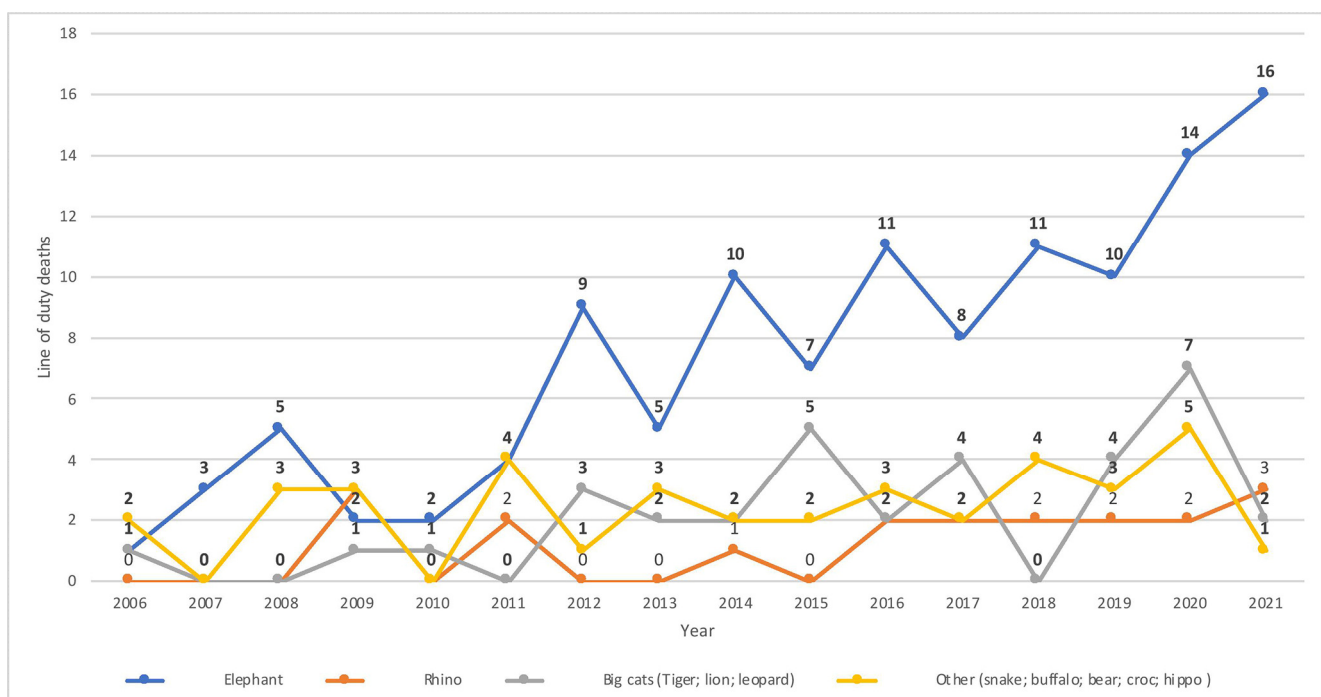
Results of our study show that at least 1,535 rangers died in the line of duty from 2006 to 2021 due to felonious homicides, accidents, wildlife attacks and occupational illness. Contrary to initial beliefs, the analysis demonstrates that death in the line of duty is not a rare event for rangers and, while there are considerable regional differences, such deaths occur across all regions. Asia and Africa experienced the highest number of ranger fatalities, with 80.3 per cent of the overall total. This finding is consistent with prior studies that have highlighted these regions as being amongst the most dangerous places for the ranger workforce (Belecky et al., 2019; Singh et al., 2020).

Wildlife poaching and the illegal wildlife trade (IWT) represent a serious extinction threat to wildlife globally. Results presented in our study also revealed that felonious homicides (poachers, militants/rebels, organised crime groups) are the most common cause of death for rangers. IWT continues to persist as the fourth largest transnational organised crime (UNODC, 2020). Poachers are often well armed and are willing to resort to violence if approached by rangers, due to the high incentives of poached wildlife for trade (Warchol & Kapla, 2012). The decades-long legacy of civil war in parts of Africa have contributed to an increased availability of firearms (Reyntjens, 2009; Rothmann, 2008). These are used not just by the militants, but also by poachers, which leads to a higher probability of the loss of life (Beyers et al., 2011). Africa's oldest nature reserve and a World Heritage Site, the Virunga National Park in the Democratic Republic of Congo, lost 12 rangers during 2020, killed by suspected members of rebel groups. This brought total ranger fatalities in





**Figure 5. Line of duty deaths due to drowning and firefighting**



**Figure 6. Categories of wildlife attacks related to ranger fatalities recorded in 2006–2021: a) Elephants, b) Rhinoceros, c) big cats and d) other animals**

Virunga National Park alone to over 200 (Virunga, 2020).

There is a growing amount of data now available that sheds light on the significant role that rangers play as the first line of defence to protect wildlife, on the level of their job satisfaction and the challenges they face during

the course of their duties (Belecky et al., 2019; Singh et al., 2020; Warchol & Kapla, 2012; Leaky & Morrell, 2001; DigunAweto et al., 2019). These studies show a consensus that inadequate capacity, equipment and resources, and limited salaries are the key contributors impacting on ranger duties. The landmark Global Ranger Perception Survey covered these aspects further

quantifying voices of rangers from the field and showing the scale of vulnerability and danger rangers face (Belecky et al., 2019). This further indicates that 85 per cent of rangers interviewed in Asia, Africa and South America feel that being a ranger is a dangerous job (Belecky et al., 2019; Singh et al., 2020; Rothmann, 2008). Wildlife crime and wildlife enforcement are therefore increasingly important areas of study in the fields of criminology and wildlife conservation (Moreto et al., 2017).

Deaths from occupational and work-related accidents was the second major reason for ranger casualties, claiming 254 lives in the study period. The data indicates that deaths related to drowning and firefighting are on the increase. Globally the impact of extreme weather, climate and water-related events has significant impact on the global population and economy. According to the World Meteorological Society 2019 report, there were more than 11,000 reported disasters attributed to these hazards globally, with just over 2 million deaths and US\$ 3.64 trillion in losses (WMO, 2019). The increase in the number and extent of such extreme weather events may have contributed to the ranger casualties.

Accidents appear to be a common factor contributing to line of duty deaths in law enforcement agencies globally (White et al., 2019) and rangers are no different with 239 casualties reported since 2006. In the USA alone, motor vehicle-related incidents have been recognised as the leading cause of deaths for law enforcement officers (Bureau of Labor Statistics, 2020; White et al., 2019).



Dja River crossing in Nki National Park © Daniel Nelson / WWF

While the issue is pervasive, there is little attention given to addressing this adequately, and the vast majority of rangers also believe the existing medical treatments are inadequate. The data generated through the Global Ranger Perception Survey showed that less than 25 per cent of rangers are trained in basic first aid and emergency skills and nearly 52 per cent lack access to adequate medical treatment at the time of need (Belecky et al., 2019; Singh et al., 2020). With the high prevalence of accidents, often in remote locations, there is a need for first aid skills, first aid equipment and rapid medical response systems to be put in place.

Fatal encounters with wildlife were the fourth major reason that contributed to the loss of ranger lives in the workplace. Elephant attacks have been by far the most common and are increasing, which may indicate that Human–Elephant Conflict (HEC) is becoming a more serious wildlife management issue. Wildlife attacks have been listed as the key reason by most rangers (78.2 per cent) for the ranger profession being dangerous (Belecky et al., 2019).

The overall higher proportion of ranger casualties linked to non-felonious causes also highlights the need for specialised training, increased access to resources, and improvement of emergency response mechanisms (Eliason, 2011a; Belecky et al., 2019). Deaths from occupational and work-related accidents, especially drowning and firefighting, also stood out as prominent causes of loss of life. The vast majority of rangers receive only minimal job training or no training at all (Singh et al., 2020) which fails to meet the requirement of the modern ranger's responsibilities (Conservation Assured, 2018).

Illnesses contracted on duty due to working conditions were the fifth most common cause of death for rangers. A noteworthy finding is that of an increased number of heart attacks and other illnesses contracted on duty. Eliason (2011a) found a similar trend in the increase of heart attacks of game wardens in the USA post-1960 and regarded this as an outcome of increased stress. Additionally, findings of the Global Ranger Perception Survey highlighted underlying factors such as lack of access to basic field equipment and amenities like drinking water and mosquito nets which might help avoid diseases contracted on the job (Belecky et al., 2019; Singh et al., 2020). Diseases such as yellow fever, hepatitis and COVID-19 can be addressed by providing adequate vaccinations and adequate personal protective equipment (PPE).



Our present work is among the most comprehensive assessments of dangers associated with loss of life in the ranger workforce to date. Findings from our study help to paint a clear picture of the dangers of the job of a ranger based on the analysis of line of duty deaths records and provides several areas for future research. The motivation and performance of rangers is severely affected by life-threatening situations and the loss of colleagues in addition to the aforementioned challenges.

Future work and research should include investigations of ranger casualties and the relationship with the working conditions of rangers including training, equipment, welfare, and the political and governance environment under which rangers operate. It is also pivotal to do further research on the wider role rangers play and how this is impacted by the changing intensity of extreme climate events, zoonotic diseases, etc. The need for a stable long-term funding mechanism to support rangers with adequate training and equipment remains critical. While acknowledging the difficulties associated with gathering data on the permanent and temporary injuries caused to rangers in the line of duty, we consider that it is crucial to begin gathering this type of information as well. Future studies might also expand to the economic, emotional and social impacts of a ranger's death on the deceased's family.

## RECOMMENDATIONS

**Recognition of the ranger profession:** Rangers do not only play a crucial role in the protection of wildlife, habitats and ecosystems but also protect cultural heritage, act as first responders in case of natural hazards, and help to maintain ecosystems' carbon storage and sequestration. As 'managers' of the relationship between people and wildlife, they can even play a role in lowering the likelihood of future zoonotic disease events. Despite the pivotal role that rangers play, the recognition of the ranger profession is not at the same level as other similar first responder – or essential worker – professions, such as firefighters and police. As per the International Standard Classification of Occupations (ISCO), rangers are listed along with agriculture, forestry and fisheries workers (ISCO, 2012); a grouping that does not appropriately align with the unique responsibilities of rangers. Lack of recognition of the multifaceted and critical roles rangers play seriously impedes the ability to bring needed policy and regulative reforms, and limits the ability to establish a mechanism for sustainable and long-term funding to support the sector (see below). Enhancing awareness amongst the public, ranger employers and key government ministries (health, labour, etc.) is of critical importance in this regard, starting with a more

appropriate ISCO classification of the ranger profession, but also including rangers as key stakeholders in relevant policy and decision-making processes at international and national level.

**Improve working conditions and welfare of rangers:** Many ranger on-the-job deaths especially from occupational illness can be minimised by improving their working conditions and welfare. Inadequate hygiene conditions such as lack of clean drinking water and limited access to toilets further threatens the life of rangers. 17.1 per cent of rangers in the Life on the Frontline report (Belecky et al., 2019) indicated that their existing health problems have worsened due to their working conditions over the prior 12 months. Providing an adequate supply of basic equipment and training on topics such as human–wildlife conflict, first aid, survival tactics and firefighting can help in saving the lives of rangers. Given the mental and physical stress rangers have to endure in order to perform their duties, it is pivotal to provide interventions aimed at improving the mental well-being of rangers along with their physical well-being. The employment and welfare standards that are currently under development by the Universal Ranger Support Alliance will set the framework to address these welfare needs (URSA, 2021). Governments and conservation organisations must come together to support the uptake and implementation of these standards, including integrating them into relevant policy frameworks, strategic plans and support schemes.

**Access to adequate insurance scheme:** On average, two rangers lose their lives in the line of duty every week, yet only 37.7 per cent have access to adequate life insurance and only 44.7 per cent have access to insurance schemes that cover serious on-the-job injuries (Belecky et al., 2019). According to the Life on the Frontline report, 94.5 per cent of rangers have no other source of income, being a ranger is their full-time profession with no support available to their families in the case of on-duty deaths. The situation in Africa and Asia is worse in comparison to other regions with regards to insurance access (Long et al., 2016), even though these two regions report the highest ranger casualties globally. This is a considerable demotivating factor for individuals working, or considering working, in the ranger profession. Ranger employers need to be lobbied to provide adequate health and life insurance coverage to all rangers. However, this may take time. Conservation NGOs can provide interim support to rangers. Good examples are the Thin Green Line Foundation's support to the families of deceased rangers

(Thin Green Line Foundation, 2021), the Ranger Foundation's (USA) support to Latin American rangers since 2017 (Ranger Foundation, 2021) and WWF-India's partnership with Apollo Hospitals for the free treatment of rangers (WWF-India, 2018).

**Enhance mechanisms for systematic recording of ranger casualties:** The IRF has been recording ranger casualties since 2006, and remains the only global data source for such incidents. Although the IRF has a wider reach through its member associations, there is a high possibility of cases being missed. Ranger associations that are not members of the IRF are unlikely to be aware of the existence of the Roll of Honour – and there are many countries that do not even have dedicated ranger organisations. We recommend that such data should be maintained at the national level by ranger employers, ministries or departments to understand the challenges faced by rangers and to draft adequate solutions to address these challenges. It is also recommended that such data should be shared with IRF through national and regional ranger associations to ensure that the database is robustly maintained and updated. The Last Line of Defence report by Global Witness (2021) recommends identifying rangers as land defenders and those who support the environment through their work. Alignment between the ROH and Global Witness database will further highlight the issue and clarify the frequency of such incidents.

**Strengthening community relations:** Rangers work in remote locations in low numbers without access to adequate medical treatment and basic equipment (Belecky et al., 2019). Local communities can play a pivotal role in supporting rangers in delivering their duties and managing emergency situations such as human–wildlife conflict, fire management, and in limiting the ability of wildlife criminals to operate in their territory. However, in some conservation areas there is a lack of trust between rangers and communities, which has been highlighted by various sources, including the URSA Action Plan (URSA, 2021). Establishing processes that can increase dialogue and build trust between rangers and Indigenous people and local community members will benefit all involved; and to this end, ranger employers should actively assess how they can provide tangible benefits and opportunities to local peoples as part of these engagements.

## ACKNOWLEDGEMENTS

We are thankful to all national, provincial and regional ranger associations for their constant support in maintaining and verifying the information. We would

also like to thank conservation organisations that not only help in verifying the information but also help the families of deceased rangers. We are also thankful to all IRF Presidents, especially founding President Gordon Miller, for their commitment towards the ranger cause. We are also highly indebted to rangers across the world who work non-stop under extremely difficult and dangerous conditions to protect nature for current and future generations.

## ABOUT THE AUTHORS

**Chris Galliers** is the President of the International Ranger Federation (IRF), having been on the IRF Committee since 2012.

**Roger Cole** worked in R&D internationally for 30 years prior to becoming Park Operations Manager for Lee Valley Regional Park in the UK where he managed the park ranger service. He is currently Vice President of the Countryside Management Association in the UK.

**Rohit Singh** has over 15 years' experience in wildlife law enforcement, anti-poaching and ranger related work. He is the Asia representative of the International Ranger Federation.

**Jeff Ohlfs** is a Director of the Mount San Jacinto Winter Park Authority and retired USNPS Chief Ranger, having worked in parks since 1979, and was involved in the formation of the IRF since 1989.

**Hamera Aisha** has been working on wildlife conservation including on poaching and illegal wildlife trade for over 10 years in Pakistan.

**Amon Benoit Koutoua** is the Western Africa Representative of the Game Rangers Association of Africa and the Africa Representative of the IRF.

**Carlien Roodt** is the Executive Officer of the International Ranger Federation (IRF) and has over 16 years' experience in wildlife management and ranger-related work.

**Mónica Álvarez Malvido** is the Development Officer of the International Ranger Federation (IRF) and has over 10 years of experience in biodiversity conservation and protected areas in Latin America.

## REFERENCES

- Appleton, M.R., Cary-Elwes, J., Fritze, C., Galleries, C., Long, B., Lawton, M., McCallum, J., Singh, R., and Stanciu, E. (2021). What will it take to professionalize rangers? *Parks Stewardship Forum* 37(1). <https://doi.org/10.5070/p537151748>

- Belecky, M., Parry-Jones, R. and Singh, R. (2021). Employment conditions of public sector rangers: A major under-addressed problem. *Parks Stewardship Forum* 37(1). <https://doi.org/10.5070/p537151749>
- Belecky, M., Singh, R. and Moreto, W.D. (2019). *Life on the frontline 2019: A global survey of the working conditions of rangers*. WWF Report, pp. 1–70.
- Beyers, R.L., Hart, J.A., Sinclair, A.R., Grossmann, F., Klinkenberg, B. and Dino, S. (2011). Resource wars and conflict ivory: the impact of civil conflict on elephants in the Democratic Republic of Congo: the case of the Okapi Reserve. *PloS one* 6(11): e27129. <https://doi.org/10.1371/journal.pone.0027129>
- Bureau of Labor Statistics (BLS) (2020). *Injuries, illnesses, and fatalities, fact sheet*. Accessed 5 January 2022. <https://www.bls.gov/iif/oshwc/cfoi/police-2018.htm>
- Conservation Assured (2018). *CA|TS Manual*, Version 2 June 2018. Singapore: Conservation Assured. ISBN: 978-967-0237-27-5. <http://zeropoaching.com/pdfs/cats-manual-version-2.pdf>
- Digun-Aweto, O., Fawole, O.P. and Saayman, M. (2019). Constraints to conservation at Okomu National Park: a ranger's perspective. *International Journal of Comparative and Applied Criminal Justice* 43(2): 173–187. <https://doi.org/10.1080/01924036.2018.1509012>
- Eliason, S.L. (2011a). Death in the Line of Duty: Game Warden Mortality in the United States, 1886–2009. *American Journal of Criminal Justice* 36(4): 319–326. <https://doi.org/10.1007/s12103-010-9087-x>
- Eliason, S.L. (2011b). Policing natural resources: Issues in a conservation law enforcement agency. *Professional Issues in Criminal Justice* 6(3): 43–58.
- Fridell, L., Faggiani, D., Taylor, B., Brito, C.S. and Kubu, B. (2009). The impact of agency context, policies, and practices on violence against police. *Journal of Criminal Justice* 37(6), 542–552. <https://doi.org/10.1016/J.JCRIMJUS.2009.09.003>
- Gambarotta, J.C. (2007). Protecting the protectors of wilderness. In: A. Watson, J. Sproull, L. Dean, (eds.) *Science and stewardship to protect and sustain wilderness values: Eighth World Wilderness Congress symposium*; September 30–October 6, 2005; Anchorage, AK. Proceedings RMRS-P-49. Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 339–348 (Vol. 49).
- Global Witness (2021). *Last Line of Defence: the industries causing the climate crisis and attacks against land and environmental defenders*. London: Global Witness.
- Gould, L. and Duncon-Hubbs, D. (2004). *Analysis of assaults upon national park rangers: 1997–2003*. Northern Arizona University, College of Social and Behavioural Sciences and Cabrillo College, Human Arts and Social Sciences.
- International Ranger Federation (2021a). *Ranger Code of Conduct*. Version 1.0. Victoria, Australia: International Ranger Federation.
- International Ranger Federation (2021b). *Roll of Honour 2021*. Victoria, Australia: International Ranger Federation.
- International Ranger Federation (2019a). Who Is A Ranger? Available at: <https://www.internationalrangers.org/>
- International Ranger Federation (2019b). 2019 Roll of Honour Available at: <https://www.internationalrangers.org/>
- International Ranger Federation (2018). 2008–2019 Roll of Honour Map. Available at: <https://www.internationalrangers.org/meet-our-rangers/>
- International Standard Classification of Occupations (2012). ISCO-08/International Labour Office. Geneva: ILO. Available at [https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms\\_172572.pdf](https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_172572.pdf)
- IPCC (2022). *Summary for Policymakers* (H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller and A. Okem (eds.)). In: H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem and B. Rama (eds.) *Climate Change 2022: Impacts, Adaptation, and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press. In Press.
- Leaky, R. and Morrell, V. (2001). *Wildlife wars: My fight to save Africa's natural resources*. New York, NY: St Martin's Griffin.
- Long, B., Grein, G., Boedicker, N. and Singh, R. (2016). Are rangers adequately protected by insurance schemes? *PARKS* 83. doi:10.2305/IUCN.CH.2020.PARKS-26-1RS.en
- Meduna, A.J., Ogunjinmi, A.A. and Onadeko, S.A. (2009). Biodiversity conservation problems and their implications on ecotourism in Kainji Lake National Park, Nigeria. *Journal of Sustainable Development in Africa* 10(4): 59–73.
- Moreto, W.D., Brunson, R.K. and Braga, A.A. (2017). 'Anything we do, we have to include the communities': law enforcement rangers' attitudes towards and experiences of community-ranger relations in wildlife protected areas in Uganda. *British Journal of Criminology* 57(4): 924–944. <https://doi.org/10.1093/bjc/azw032>
- Moreto, W.D., Gau, J.M., Paoline, E.A., Singh, R., Belecky, M. and Long, B. (2019). Occupational motivation and intergenerational linkages of rangers in Asia. *ORYX* 53(3): 450–459. <https://doi.org/10.1017/S0030605317001041>
- Moreto, W.D., Gau, J.M., Singh, R., Belecky, M., McVey, D., Avino, F.S. and Ononino, A.B. (2021). Self-legitimacy among rangers in Africa, Asia, and Latin America: An empirical assessment. *Biological Conservation* 260. <https://doi.org/10.1016/j.biocon.2021.109220>
- Ogunjinmi, A.A., Umunna, M.O. and Ogunjinmi, K.O. (2008). Factors affecting job satisfaction of rangers in Yankari Game Reserve, Bauchi, Nigeria. *Journal of Agriculture and Social Research* 8(2). <http://dx.doi.org/10.4314/jasr.v8i2.43332>
- Prakash, S.L., Samarakoon, G.V., Madurapperuma, B.D., Karunaratna, S. and Surasinghe, T.D (2021). Defenders of wildlife conservation in Sri Lanka: a cautionary note for the future of rangers. *PARKS* 27(2): 57–62. <https://doi.org/10.2305/IUCN.CH.2021.PARKS-27-2SLP.en>
- Ranger Foundation (2021). Ranger Foundation. Accessed 15 January 2022. <http://www.ranger.foundation/home.html>
- Rerolle, F., Singh, R., Mascari, T., Belecky, M., Mcvey, D., Aisha, H., Avino, F., Gajardo, O. and Ononino, A. (2022). Health Challenges of Planetary Health Workers [unpublished manuscript]. World Wide Fund for Nature.
- Reyntjens, F. (2009). *The great African war: Congo and regional geopolitics, 1996–2006*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511596698>
- Rothmann, S. (2008). Job satisfaction, occupational stress, burnout and work engagement as components of work-related



- wellbeing. *South Africa Journal of Industrial Psychology* 34: 11–16. <https://doi.org/10.4102/sajip.v34i3.424>
- Singh, R., Galliers, C., Appleton, M., Hoffmann, M., Long, B., Cary-Elwes, J., Fritze, C., McCallum, J. and Parry Jones, R. (2021). The vital role of rangers in conservation. *Parks Stewardship Forum* 37(1). <https://doi.org/10.5070/p537151745>
- Singh, R., Gan, M., Barlow, C., Long, B., McVey, D., de Kock, R., Gajardo, O. B., Avino, F. S. and Belecky, M. (2020). What do rangers feel? Perceptions from Asia, Africa and Latin America. *PARKS* 26(1): 63–76. <https://doi.org/10.2305/IUCN.CH.2020.PARKS-26-1RS.en>
- Thin Green Line Foundation (2021). Stand with the Families of Fallen Rangers. Available at <https://thingreenline.org.au/fallen-ranger-appeal-lp/>
- United Nations Office on Drugs and Crime (UNODC). (2020). *World Wildlife Crime Report: Trafficking in protected species*. Available from: [https://www.unodc.org/documents/data-and-analysis/wildlife/2020/World\\_Wildlife\\_Report\\_2020\\_9July.pdf](https://www.unodc.org/documents/data-and-analysis/wildlife/2020/World_Wildlife_Report_2020_9July.pdf)
- Universal Ranger Support Alliance (2021). *Universal Ranger Support Alliance-Action Plan for Supporting implementation of International Ranger Federation's Chitwan Declaration and Furthering the Professionalisation of rangers (2021–2025)*. Available at [www.ursa4rangers.org](http://www.ursa4rangers.org)
- Virunga (2020). Update on armed attack on Rumangabo Village. Virunga National Park. Accessed 5 January 2022. <https://virunga.org/news/update-on-armed-attack-on-rumangabo/>
- Warchol, G. and Kapla, D. (2012). Policing the wilderness: A descriptive study of wildlife conservation officers in South Africa. *International Journal of Comparative and Applied Criminal Justice* 36(2): 83–101. <http://dx.doi.org/10.1080/01924036.2012.669911>
- White, M.D., Dario, L.M. and Shjarback, J.A. (2019). Assessing dangerousness in policing: An analysis of officer deaths in the United States, 1970–2016. *Criminology and Public Policy* 18 (1): 11–35. <https://doi.org/10.1111/1745-9133.12408>
- WMO (2019). Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970–2019). WMO-No-1267. [https://library.wmo.int/doc\\_num.php?explnum\\_id=10989](https://library.wmo.int/doc_num.php?explnum_id=10989)
- World Health Organization (2015). Homicides, WHO Global Health Estimates. <https://apps.who.int/violence-info/homicide/>
- WWF-India (2018). Apollo Hospitals Foundation and WWF-India partner to provide free medical support to frontline forest staff across 16 states. Available at: <https://www.wwfindia.org/?17041/Apollo-Hospitals-Foundation-and-WWF--India-partner>

## RESUMEN

La profesión de guardaparque es diversa y desafiante, y requiere que las personas actúen en situaciones de riesgo y a menudo de peligro para la vida. El Cuadro de Honor de la Federación Internacional de Guardaparques ofrece la oportunidad de examinar los peligros que rodean a la profesión de guardaparques. Analizando el número y las causas de las muertes de guardaparques en actos de servicio durante un periodo de 16 años (2006–2021), se han registrado un total de 2.351 muertes. Las muertes por delitos, como el homicidio, representaron el 42,2 por ciento, mientras que las demás fueron a consecuencia de accidentes, enfermedades, ataques de la fauna silvestre u otros accidentes laborales. El número de las víctimas parecen estar aumentando en el tiempo y pueden ser el reflejo de fenómenos como el aumento de los conflictos entre el ser humano y la fauna silvestre, así como del cambio de las condiciones climáticas. Las recomendaciones para hacer frente a estos riesgos incluyen un mayor reconocimiento del papel de los guardasparques, mejorar las condiciones de trabajo, y dar acceso a un seguro adecuado para los guardaparques.

## RÉSUMÉ

La profession de garde-forestier est diverse et stimulante, et exige des individus qu'ils opèrent dans des situations risquées et souvent mortelles. Le tableau d'honneur de la Fédération internationale des gardes-forestiers offre l'occasion de passer en revue les dangers qui entourent la profession de garde-forestier en analysant le nombre et les causes des décès de garde-forestiers en service. Sur une période de 16 ans (2006–2021), un total de 2,351 décès de garde-forestiers en service a été enregistré. Parmi les données analysées, les décès d'origine criminelle, tels que les homicides, représentent 42.2 %, les autres étant dus à des accidents, des maladies, des attaques d'animaux sauvages ou d'autres accidents non intentionnels liés au travail. Le nombre de victimes des gardes-forestiers semble augmenter au fil du temps et pourrait refléter des phénomènes tels que l'augmentation des conflits entre les êtres humains et la faune sauvage, ainsi que l'évolution des conditions climatiques. Les recommandations pour faire face à ces risques comprennent une meilleure reconnaissance du rôle des gardes-forestiers, l'amélioration des conditions de travail et l'accès à une assurance adéquate.