

## Final Evaluation Report

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We ask all grant recipients to complete a project evaluation that helps us to assess the success of your project.

We understand that projects often do not follow the predicted course, but knowledge of your experiences is valuable to us and to others who may be undertaking similar work—remember that negative experiences are just as valuable as positive ones if they help others to learn from them.

**Please DO NOT fill in and submit this form until the project has been completed.**

Please complete this evaluation report in English and refer to the reporting guidelines. We may ask for more information or a revised report if we have follow-up questions or feel information is missing. Note that edits may be made before posting on our website, so please provide the report in **MS Word format** (not PDF).

Your final budget should be submitted separately, using the Excel template sent with your offer letter.

Please email both the completed report and budget to [jane@rufford.org](mailto:jane@rufford.org).

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Your Details	
<b>Full name</b>	Catherine Bérénice Chantal Hauw
<b>Project title</b>	Safeguarding Predators: Investigating Lead Exposure in Mammalian Carnivores as Indicators of Environmental Health in Southern Africa.
<b>Application ID</b>	45703-1
<b>Project start date</b>	1/04/2025
<b>Project end date</b>	10/04/2026
<b>Date of report submission</b>	10/04/2026

Outcomes, indicators and activities

**1. Indicate the level of achievement of the project's original expected outcomes. Include a brief explanation of the activities conducted and your key findings, providing specific, measurable outputs, based on the indicators in your project proposal (e.g. number of camera traps deployed).**

Expected outcome (as per project proposal)	Level of achievement	Indicator (as per project proposal)	Summary of activities and outputs
Assess lead levels in predators (Brown Hyenas)	Fully achieved	High lead levels detected in bone and blood; source identified as a diamond mine in Elizabeth bay, Namibia	<p>Fieldwork was conducted with the Brown Hyena Research Project (BHRP) in Lüderitz. Historical bone samples collected by BHRP researchers were analysed to assess lead exposure (25 hyena bones, 32 hyena bloods).</p> <p>We could not analyse liver and kidney tissues as we had planned, as the Brown Hyena Research Centre did not collect liver or kidney samples as part of their historical dataset. In future sampling, we plan to include hair alongside blood samples, which will be even more valuable, as hair can reflect up to a year of chronic lead exposure and can be collected from live animals.</p>

<p>Assess lead levels in other predators (Cape Fur Seals)</p>	<p>Fully achieved</p>	<p>High lead levels detected in bone; sources identified as a diamond mine in Elizabeth Bay and potentially marine pollution from the Orange River (e.g. boat-related contamination spillage).</p>	<p>Sampling was conducted at seal colonies in collaboration with BHRP researchers. Bone samples were collected opportunistically from Baker's Bay and Atlas Bay seal colonies (23 adult and 12 pup samples collected).</p> <p>Cape Fur Seal pups are the main source of food to Brown Hyenas on the Baker's Bay coast of Hyena, and the samples collected are to assess contaminant exposures through the trophic pathway.</p>
<p>Assess lead levels in predators (Cheetahs and Leopards)</p>	<p>Partially achieved</p>	<p>Low lead levels detected in bloods and hair of wild lions and cheetahs in low hunting pressure zone in Kwazulu-Natal, South Africa and low lead levels in bloods of wild leopards and Brown Hyenas in the AfriCat reserve, Namibia.</p>	<p>Sampling was conducted in collaboration with Wildlife Act and Ezemvelo Wildlife Veterinarians in KZN, and Africat Director.</p> <p>Samples collected:          Leopard bloods: 21          Cheetah bones: 21</p>
<p>Increased awareness and policy changes</p>	<p>Partially achieved</p>	<p>Stakeholders meeting completed, policy still being decided.</p>	<p>Three meetings were held with key stakeholders, including Riaan Burger (De Beers Diamond mine director on the Namibian coast), where findings were presented. Engagements were also conducted with the Ministry of Environment, Forestry and Tourism (MEFT), as well as a</p>

			workshop with the Namibian Lead Wildlife Working Group.
Strengthened Local Conservation Capacity and Networks	Partially achieved	New partnership established.	New collaborations were initiated, with additional partnerships in progress, including Etosha National Park, the Cheetah Conservation Fund, and AfriCat. In South Africa, permits were obtained to begin a related study with Wildlife ACT in KwaZulu-Natal.

**2. If relevant, describe any other important or unexpected outcomes of your project. Feel free to include evidence (e.g. maps, tables and figures).**

The first year of the project focused on assessing lead exposure in brown hyenas and seals, while also initiating sample collection from additional species with support from Ezemvelo KZN Wildlife (EKZNW) permits and field collaborators. We also analysed lion and cheetah blood and hair samples from South Africa and Namibia, and this component is ongoing.

Due to a shift in fieldwork to Namibia, we collaborated with the Brown Hyena Research Project along the Skeleton Coast near diamond mining areas. This led to several significant and unexpected outcomes, including the first-ever assessment of lead and heavy metal exposure in brown hyenas.

In addition, we recorded exceptionally high contaminant levels in the ecosystem, including the highest lead and zinc concentrations ever documented in seals globally. These findings reveal a previously unrecognized level of environmental contamination in the region and highlight the broader ecological significance of the project.

## Challenges

### **3. Explain any challenges that arose during the project (e.g. severe weather, broken equipment, delay in obtaining research permits, etc.). Were you able to overcome these? If so, please explain how.**

The main challenge encountered during the project was administrative delays in obtaining the necessary permits to conduct fieldwork in South Africa. This included both regional permits and Section 20 permits required for the collection, analysis, and transport of biological samples.

As a result, broader fieldwork in South Africa could not be conducted as initially planned (in February we were still waiting for the permits for South Africa can take up to 1 year). However, we were able to partially overcome this by completing sampling in KwaZulu-Natal and redirecting efforts to Namibia, where fieldwork could proceed. This adaptive approach allowed the project to continue productively despite constraints.

Further sampling across additional regions of South Africa is planned for the second year, which will focus on expanding geographic coverage and comparing lead exposure in areas with high versus low hunting pressure. We now have most of permits for sampling in KZN, South Africa, and will only need Agriculture 20 permit for publication.

### **4. Were there any changes to the project plan or any activities that you were unable to carry out or had to adapt? (If these changes impacted your budget, please include amounts in the budget section only.)**

Yes, some adaptations to the original project plan were necessary. The initial objective included mainly fieldwork on leopards and cheetahs in South Africa; however, due to the inability to secure all required permits in time, this component could only be carried out partially.

To address this, we redirected our efforts toward Namibia, where we focused on brown hyenas as a primary study species. In addition, we expanded the scope of the project to include seals, which serve as valuable sentinels of environmental contamination, particularly in relation to marine pollution and heavy metal exposure. Because Brown hyenas prey on seal pups, they serve as valuable indicators of heavy metal bioaccumulation across the trophic chain.

This adaptation not only allowed us to continue the project effectively but also broadened its scientific scope, providing important insights into both terrestrial and marine ecosystems.

#### Community and other stakeholder involvement

**5. Were any local community members or other stakeholders involved in the project (e.g. fishers assisting with data collection)? Please describe who and their involvement. Disaggregating gender data is important for highlighting diversity, equity and inclusion. When quantifying stakeholder engagement, please state how many women and men were involved.**

Yes, local stakeholders were actively involved in the project. Two women researchers Dr Marie Lemerle and Dr Ingrid Wiesel from the Brown Hyena Research Project (BHRP), based between Lüderitz and Windhoek, played a key role in fieldwork activities, including tracking, darting, and sample collection. Their involvement was essential to the success of the Namibia component of the study.

In addition, one male stakeholder, Riaan Burger, Director associated with the diamond mining sector, also contributed to the project. His support facilitated access, logistics, and coordination in the Lüderitz region.

In KZN, Lucy Chimes from Wildlife Act and wildlife veterinarian Dr Jenifer Lawrence from African Wildlife Vets have been collecting samples in Ezemvelo wildlife parks. In total, five stakeholders were directly involved: four women and one man, all based in Namibia. This collaboration highlights the importance of local expertise and cross-sector partnerships in conducting effective and inclusive field-based research.

**6. Describe if local communities and other stakeholders have benefitted from the project. Did local communities present any resistance to the project at any stage?**

Local communities showed strong interest in the project, particularly those living near the diamond mining areas around Lüderitz. Many community members rely on locally sourced fish for food, which may be affected by heavy metal contamination. As a result, our findings raised awareness and generated meaningful discussions about potential risks to both environmental and human health.

We also engaged with the Namibia Conservation of Marine Wildlife (NamCoB), sharing our preliminary results. This has sparked interest in expanding investigations to other coastal species, such as penguins, to better understand the broader ecological impact of contamination along the Namibian coast.

While most interactions were positive, some resistance was encountered at the institutional level, particularly from certain ministries, which presented challenges in communication and collaboration.

**7. If you have observed any behaviour change by stakeholders as a result of your project, please explain the change and how you have measured this. We understand that behaviour change can take a long time, but any progress towards this is useful to include.**

Although long-term behaviour change takes time, we observed encouraging early signs of increased awareness and engagement. Initially, some stakeholders and community members showed limited interest in the project. However, once the implications of lead and heavy metal exposure were clearly explained, particularly in relation to food sources and ecosystem health, their level of interest increased significantly.

In addition, the project has stimulated new collaborations and research momentum. Stakeholders in both Namibia (AfriCat and Cheetah Conservation Fund and Etosha National Park) and KwaZulu-Natal (KZN) in South Africa have expressed strong interest in future work on lead exposure in terrestrial predators, including cheetahs, leopards, and African wild dogs in hunting areas. The project has also been presented and discussed in multiple meetings in KZN, where partners have already begun collecting biological samples, demonstrating a tangible shift toward proactive engagement and data collection.

Communications and results dissemination

**8. Have you or will you share your findings with relevant stakeholders? Please fill in the table below to explain who with and how.**

Type of stakeholder	Name of stakeholder	What you have or will share	How you have or will share this
Local government	Ministry of Environment and Fisheries	Will share: Data of lead in wildlife and soils around diamond mines, recommendation as to how to mitigate these issues.	Report and Workshop
Local authority	Diamond Mine Director	Will share : Data and Key Results and	Meeting (already done) and

		Recommendations	Scientific Publication when out.
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**9. Do you plan to share your data or findings with the relevant IUCN Species Survival Commission Specialist Group? If so, which group?**

Yes, we plan to share our findings with the relevant IUCN Species Survival Commission Specialist Groups. This includes the IUCN Hyena Specialist Group, given the focus on brown hyenas, as well as the IUCN Pinniped Specialist Group, due to the results relating to Cape fur seals.

**10. Do you plan to submit a manuscript to a peer-reviewed journal? If you have already published a paper/s relating to this or a previous Rufford Small Grant, please include the DOI link here.**

Yes, we are currently writing up the Brown Hyena and Seal in Namibia work, planning to submit it in Environmental journals, with acknowledgement & mention in fundings section of Rufford Foundation.

**11. Have you or do you plan to present your project findings at any conferences?**

Yes, Oppenheimer Conference in South Africa 2026

**12. Did you develop any outreach materials, and have you shared your project on social media, websites or through other media? Please fill in the table below and, where possible, provide links or images.**

Item	Type	Target audience	Level of dissemination	Link (if relevant)
Social Media posts	Social media post	Public	Instagram/ Linkedin Facebook	<a href="https://www.instagram.com/p/DlyYAjQo9CR/">https://www.instagram.com/p/DlyYAjQo9CR/</a> <a href="https://www.instagram.com/p/DlqbC6hlsHq/?img_index=1">https://www.instagram.com/p/DlqbC6hlsHq/?img_index=1</a>
Documentary (pending)	Video	Public (festivals) but not yet finalized	N/A	<a href="https://www.instagram.com/p/DQ65SL6ilf3/">https://www.instagram.com/p/DQ65SL6ilf3/</a>

Going forward

**13. Are there any plans to continue this work? Outline the important next steps.**

Yes, I fully intend to continue and significantly expand this work. This project represents an important first step in understanding lead exposure in apex predators and scavengers in Southern Africa.

Encouragingly, we have recently obtained permits in KwaZulu-Natal, South Africa, where several reserves have expressed strong interest in collaborating. This will allow us to sample species including cheetahs, lions, leopards, and African wild dogs, with a particular focus on assessing the relationship between hunting pressure, metapopulation management, and lead exposure in bomas of large predators.

Additional funding will be required to support travel, living expenses, as well as the collection and analysis of blood, bone, and hair samples across multiple species. While a substantial number of samples have already been collected in KwaZulu-Natal and Namibia, limited funding has restricted the scope of this work. Additional funding will be needed to support mitigation efforts, including raising awareness through workshops and advancing policy and legislative initiatives.

Our aim is to obtain at least 20 samples per species per region, enabling robust comparisons between areas with high and low hunting pressure to better understand how these factors influence lead exposure.

In addition, leading conservation organizations such as the Cheetah Conservation Fund (CCF) and AfriCat in Namibia have indicated their willingness to collaborate, providing access to cheetahs and leopards under their care. These partnerships will significantly strengthen the comparative dimension of the study across different management systems and ecological contexts.

The next steps will therefore focus on increasing sample size and geographic coverage across multiple regions and management settings. I also plan to deepen the analysis by correlating lead levels in blood, bones, and tissues with clinical health parameters and reproductive success.

In parallel, I aim to strengthen collaborations with wildlife veterinarians, conservation authorities, and local communities to better understand exposure pathways. A key priority will also be translating these findings into actionable conservation outcomes, including policy engagement and advocacy for the transition to non-lead ammunition.

**14. Do you intend to apply for another Rufford Small Grant or funding from another donor?**

Yes, I intend to apply for further funding to support the continuation and expansion of this research.

Given the scale and interdisciplinary nature of the project, additional funding will be essential to extend fieldwork, laboratory analyses, and stakeholder engagement. I plan to apply to both Rufford for a continuation grant and to other funding bodies that support conservation, One Health, and environmental health research. Application to Oppenheimer grant has been sent, and more applications (Taronga Zoo Wildlife Grant and Wildlife Disease Association Grants) have been sent and are pending approval. These funds will enable me to build on the current findings, increase the impact of the project, and ensure that the results contribute meaningfully to conservation policy and practice in Southern Africa.

#### Personal capacity and professional development

#### **15. Has the project helped you personally or in your career?**

a) **Experience** (e.g. time in the field, stakeholder engagement):

Yes, this project has been highly impactful for both my personal and professional development, strengthening my experience, skills, and academic progression. This project has significantly expanded my field experience across Southern Africa, including work in remote and logistically challenging environments in Namibia and South Africa. It has also strengthened my engagement with a wide range of stakeholders, including wildlife veterinarians, conservation organizations, researchers, and local communities. These interactions have been essential in understanding the complex socio-ecological dimensions of lead exposure, particularly in relation to hunting practices and human-wildlife interfaces.

b) **Skills** (e.g. technical skills, leadership skills, fundraising, proposal and report writing):

Through this project, I have developed and refined a broad set of skills. Technically, I have strengthened my expertise in sample collection (blood, tissues, bones) and handling within a wildlife toxicology framework. I have also enhanced my leadership and project management abilities by coordinating fieldwork, building collaborations, and managing logistics across multiple sites. In addition, the project has improved my capacity in scientific writing, proposal development, and fundraising, as well as my ability to communicate complex scientific concepts to both academic and non-academic audiences.

c) **Qualifications** (academic or other):

This project directly supports my PhD in wildlife toxicology at the University of the Witwatersrand, contributing essential data and field experience to my doctoral research. It also builds on my previous Master's work on lead exposure in captive cheetahs, allowing me to expand my academic expertise into a broader, ecosystem-level and One Health approach.

Other

**16. Which of the Global Biodiversity Framework [2030 Targets](#) does your project address? List as many as applicable (e.g. Targets 2 and 4).**

TARGET 9: Manage Wild Species Sustainably To Benefit People

TARGET 14: Integrate Biodiversity in Decision-Making at Every Level

TARGET 15: Businesses Assess, Disclose and Reduce Biodiversity-Related Risks and Negative Impacts

**17. Did you use the [Conservation Evidence](#) website when planning your project, and was this helpful? If your project provides useful information about what worked or did not work, please consider sharing it through Conservation Evidence.**

We did not use it, but we will do so in the second part of the project – second year.

**18. Did The Rufford Foundation receive any publicity during your project (such as including the Foundation logo on outreach materials)? If yes, please describe how.**

Yes, The Rufford Foundation received publicity throughout the project. The Foundation's logo was included in all presentations delivered during the project, including a workshop conducted with Namibian lead wildlife authorities, as well as presentations to local communities, the Brown Hyena Research Centre, and representatives from diamond mining operations.

**19. Provide a list of all the members of your team and briefly describe their role in the project.**

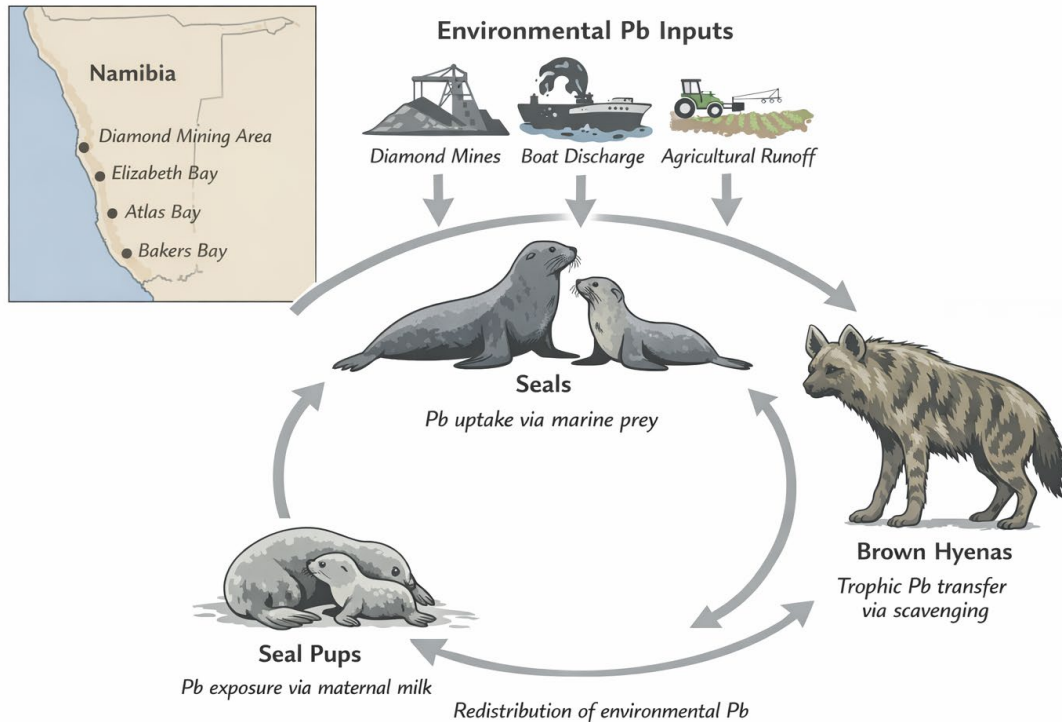
The project team consisted of Marc Humphries and Jordan Hampton, who both served as supervisors. Marc Humphries contributed his expertise as a chemist, while Jordan Hampton provided veterinary oversight. Dr Marie Lemerle, from the Brown Hyena Research Project, was involved as a researcher and supported fieldwork and data collection, as well as Karen Colding, Director of AfriCat, for the blood and hair sampling of brown hyenas and leopards of the reserve.

**If not already provided, please include some photos from your project, along with brief captions and copyright information.**

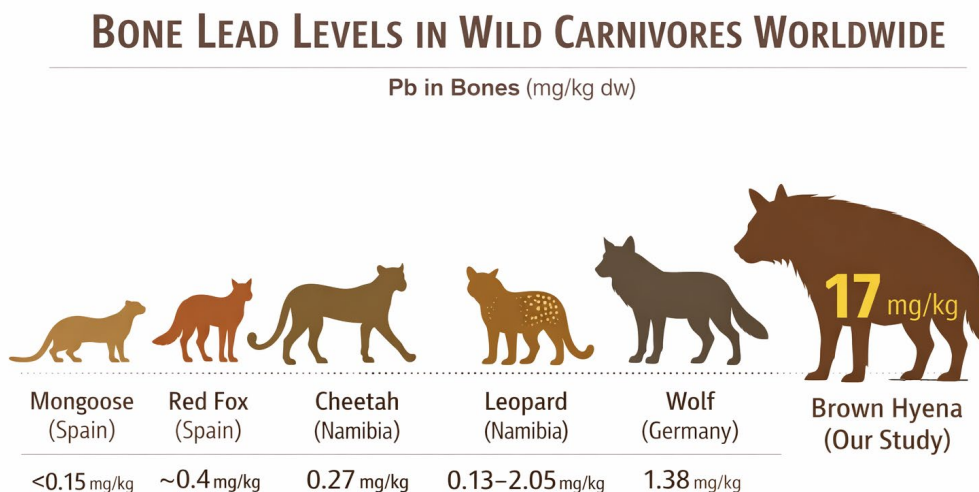
Already provided photos in 2 reports during the year.

First hand diagrams from the work we have done on brown hyena and seals for publication:

**Figure 1:** Environmental Pb inputs in Brown Hyenas and Seals in the Skeleton Coast of Namibia.



**Figure 2:** Bone Lead levels in Wild Carnivore Worldwide (Cheetah and Leopards Haw's study, Brown Hyena this study)





**Please ensure you also submit a final budget, using the Excel template sent with your offer letter.**

Any other comments?

We would like to sincerely thank you for this grant. Without it, this pioneering research would not have been possible. Building on these findings, we will now be working toward mitigation strategies and contributing to future policy and legislative efforts. We are very excited about the next phase of the project!