Terms of Reference – Camera Trap Data Management and Analysis Consultant

The Wildlife Conservation Society (WCS) is a world leader in on-the-ground wildlife conservation. Founded in 1895 as the New York Zoological Society, WCS is an international organization dedicated to conserving and protecting the Earth's wildlife and ecosystems. WCS has been working in partnership with the Royal Government of Cambodia since 1999, providing technical advice and support for the conservation of key habitats and species across the country. Within Keo Seima Wildlife Sanctuary (KSWS) our collaborative projects with the Ministry of Environment focus on law enforcement, ecotourism, biodiversity monitoring and community land use planning which are funded by a wide range of bilateral, multi-lateral and foundation donors.

Directed by the KSWS Strategy (2021-2026), WCS is putting in place systems to support an effective adaptive management approach for KSWS. Output 2.1 and activity A2.1.4 focus on biodiversity monitoring, including with camera traps, and on the analysis and publication of the data to national databases. WCS has been conducting camera trap studies inside KSWS since 2000. Over the years, a large database containing hundreds of thousands of images has been compiled. In order to improve the usability and safe storage of this valuable source of data and to improve the time-efficiency and accuracy of camera trap data base management, WCS plans to use Wildlife Insights. Wildlife Insights provides open access tools and technologies to manage, analyse, and share camera trap data. Wildlife Insights developed the largest camera trap database globally, advancing conservation science and decision-making.

In addition to wildlife, camera traps also capture images of domestic dogs. Domestic dogs are the most commonly reported hunting method in KSWS. Illegal hunting inside KSWS, especially with dogs, has led to dramatic declines of ground-dwelling mammals. The next step after camera trap data organization is data analytics. WCS plans to evaluate methods for systematically monitoring dog presence/occupancy in KSWS using camera trap data. Dog monitoring data will help evaluate the impacts of management strategies to reduce the threat of dogs to wildlife and to adapt them where needed.

Responsibilities

The main aim of the consultancy is to improve the KSWS camera trap data base management by using Wildlife Insights and to assess the feasibility of using camera trap data for the monitoring of domestic dogs inside KSWS. The consultancy is divided over the following three components:

1. *Improve the quality and usability of the recent (2018-2022) KSWS camera trap database using Wildlife Insights*
   1.1. Use R and other tools to clean, structure, integrity-check, and process KSWS camera trap data (2018-2022), and to format it for compatibility with Wildlife Insights standards;
   1.2. Complete metadata and record tables for each survey year between 2018-2021;
   1.3. Batch-upload all data to Wildlife Insights;
   1.4. Provide training/technical guidance to relevant KSWS technical teams on data preparation and formatting for Wildlife Insights.

2. *Improve the quality and usability of the historical (2000-2017) KSWS camera trap database using Wildlife Insights*
   2.1. Identify and correct gaps in compatibility between existing record tables and stored images;
   2.2. Systematically check and record the level of completeness and fix key missing information;
   2.3. Keep meticulous records of the screening processes for future use;
   2.4. Use R and other tools to clean, structure, integrity-check, and process KSWS camera trap data (2000-2017), and to format it for compatibility with Wildlife Insights standards;
   2.5. Batch-upload all data to Wildlife Insights;

3. *Assess the feasibility of using (recent) KSWS camera trap data for the monitoring of domestic dogs inside KSWS*
   3.1. Compile data from dog images from the 2018-2022 KSWS camera trap datasets and produce descriptive statistics;
   3.2. Assess the feasibility of using different statistical frameworks to monitor dogs inside KSWS (e.g. occupancy/indices for relative abundance index/site-structured models etc.);
   3.3. Develop a decision-making framework and recommendations for the appropriate tool matching managers' information needs;
   3.4. Develop/adapt R-code and conduct the analysis applying the selected method to the 2018-2022 dataset;
   3.5. Ensure repeatability by publishing code on Github and producing Rmarkdown files;
   3.6. Interpret results and produce a short technical report, heatmaps, and a presentation to disseminate the results to relevant WCS teams;
   3.7. Produce a peer-reviewed publication in coordination with WCS technical teams.

Deliverables and estimated timeline

The consultant is expected to conduct the work within an estimated <mark>100</mark> working days between June 2023 and June 2024. The work may be conducted remotely or in WCS offices in Cambodia.

No.	Deliverable	Estimated duration (days)	Estimated date of completion
1.1	KSWS 2018-2022 camera trap data cleaned and record tables produced	<mark>15</mark>	July '23
1.2	KSWS 2018-2022 data and metadata uploaded to Wildlife Insights		
1.3	Training to relevant KSWS technical teams on Wildlife Insights uploading protocol completed		
2.1*	Complete and correct record tables produced for the KSWS 2000-2017 camera trap data	<mark>50</mark>	February '24
2.2*	KSWS 2000-2017 data and metadata uploaded to Wildlife Insights		
3.1	Brief overview of methods evaluation and decision-making framework on using camera trap data for domestic dog monitoring	<mark>35</mark>	June '24
3.2	R-code, data files, and technical report on camera trap based dog monitoring produced		
3.3	Peer-reviewed publication submitted		

*Activities under component 2 will be conducted in reversed chronological order

Qualifications and Experiences

Essential

- At least MSc in environmental sciences, zoology/ecology, conservation science or related field;
- At least 10 years' professional experience in biodiversity monitoring and/or conservation science;
- Data manipulation and analysis skills;
- Proficiency in Excel and R;
- Experience working with large biodiversity datasets, in particular camera trap data;
- Experience in technical/scientific writing;
- Excellent attention to detail;
- Pragmatic and solution oriented, the ability to learn quickly and adapt to solve new challenges;
- Ability to work independently with limited supervision;
- Fluent in written and spoken English.

Desirable

- Experience with Wildlife Insights;
- Understanding of and experience with the conservation context in Cambodia, preferably in the Eastern Plains;