

Summary of Remote Camera Meeting, 27-28 September 2018 (contact: cole.burton@ubc.ca)

Meeting Title: Improving wildlife monitoring and management in British Columbia with a provincial remote camera network.

Location: University Centre, University of British Columbia, Vancouver BC.

Participants: (* denotes those in attendance both days)

- Cole Burton*, Joanna Bugar*, Erin Tattersall*, Caroline Seip – UBC Vancouver
- Adam Ford* – UBC Okanagan
- Jason Fisher* – U. Victoria and InnoTech Alberta
- Roland Kays – North Carolina State University and North Carolina Museum of Natural Sciences
- Tyler Muhly*, Melissa Todd*, Holger Bohm – BC Ministry of Forests, Lands, Natural Resource Operations & Rural Development
- Leah Ramsay, Corey Erwin, James Quayle, Rob Wilson, Joanna Hirner – BC Ministry of Environment and Climate Change Strategy
- Markus Merkens – Metro Vancouver
- Dexter Hodder* – John Prince Research Forest
- Barb Johnston* – Parks Canada
- David DeRosa, Addison Fosbery – Okanagan Nation Alliance
- Robin Naidoo – World Wildlife Fund and UBC Vancouver
- Peter Haswell* – Bangor University

Summary:

Two key objectives for this meeting were to:

1. Share experiences and ideas about the role of remote cameras in wildlife monitoring and management in British Columbia and elsewhere.
2. Initiate development of a vision and implementation plan for a coordinated camera network.

Thursday morning's presentations provided context on potential goals of a camera trap network, and specific examples of current camera trap projects. Some highlights included:

- Camera trapping is exploding as a wildlife survey tool, and camera trap networks are emerging in many jurisdictions. A network could serve many functions, from developing and communicating best practices, to centralizing data management, to coordinating sampling designs and data analyses for broader inferences. Coordinated camera trap surveys hold great promise for addressing large-scale issues in wildlife management (e.g. range shifts, population trends, cumulative effects of landscape and climate change).
- [eMammal](#) is a powerful example of a camera trap network to facilitate data management and involve citizen scientists. Successful initiatives related to this program include North Carolina's [Candid Critters](#) citizen science surveys (collecting state-wide biodiversity data), and assessments of the effects of hunting and hiking on mammal distributions across protected areas (Kays).
- [Wildlife Insights](#) is a new collaborative camera trap data platform, bringing together organizations and projects around the world. It is expected to be available for external users in the coming year.

- British Columbia has developed RISC (Resource Information Standards Committee) standards for camera trap metadata, modelled on those presented by [Forrester et al. \(2016\)](#). These standards will be finalized soon and are available from [Tyler Muhly](#). Adherence to the standards will facilitate acceptance and synthesis of camera survey results in the province.
- There are many camera projects already happening in and around BC. Some of those discussed in the presentations included:
 - Mammal populations, climate change, recreational impacts in South Chilcotin Mountains and Cathedral provincial parks (Naidoo, Burton, BC Parks Living Lab).
 - Black bear distribution and conflict on southern Vancouver Island and in Metro Vancouver (Burton, Todd, Merkens).
 - Combined collars and cameras to assess mule deer in southern Interior, and combined cameras and acoustics to assess wolf populations (Ford).
 - Effects of introduced species on Haida Gwaii, and monitoring of ectotherms: coastal tailed frogs and western toads (Todd).
 - Rocky Mountain Parks (Banff, Jasper, Waterton) – large-scale sampling, many questions (e.g. human-wildlife conflict, recreational impacts, road crossings, species status and trend) (Johnston).
 - Kootenay camera grid to assess occupancy patterns of multiple species, building on Rocky Mountain parks survey design and analysis (Bohm).
 - Skagit Valley Provincial Park citizen science camera program (linked to Wildlife Camera Network Northwest and eMammal) (Wilson).
 - Fine-scale wildlife dynamics and landscape management in John Prince Research Forest (Hodder).
- Some common challenges identified by participants included:
 - Consistency in survey designs, protocols, analytical covariates and methods.
 - Funding, particularly for long-term monitoring.
 - Efficient data storage, processing and analysis (cost-effective, accessible, stored in Canada).
 - Potential solutions to data management under development were discussed, including BC’s SPI system (Erwin), Wildlife Insights (Kays), and a program being developed at UBC (Burton).

Thursday’s discussions covered many topics (see detailed meeting notes) and identified several potential values of a camera network, including:

- Camera data can contribute data toward species status assessments (e.g. Conservation Data Centre), including harnessing “bycatch” (incidental) photos from camera surveys (particularly for understudied species).
- BC Parks have knowledge gaps on species status and impacts (e.g. visitor use, park connectivity, management effectiveness); a network could help fill gaps by coordinating data across individual projects/parks.
- Camera monitoring may be cost-effective relative to other methods, particularly if informing proactive decisions that help avoid costs associated with reactive management (e.g. identifying threats before species become at risk).
- A network could help provide capacity for analyzing data that is accumulating (i.e. help turn data into knowledge to inform management), including value-added analyses (new questions). It

could also provide training in camera methods to many groups, including First Nations, park rangers, citizens, etc.

- Survey coordination will help uncover spatial variability in species-habitat relationships, and provide broader context for interpretation of local results. It can also help identify gaps in coverage that could be prioritized for sampling.
- Scaling up surveys across large areas will provide opportunity to address key management questions that are too big for single projects, such as:
 - Wildlife responses to disturbance (e.g. fire, timber harvest, climate change, cumulative effects).
 - Management effectiveness (e.g. recovery of caribou and other species at risk; harvest quotas; park protection).
 - Population status and trend.
 - Habitat quality (e.g. ungulate winter ranges).
- Data management tools could increase accessibility and transparency, e.g. turning image data into understandable metrics of population/community status that could be reviewed jointly among stakeholders. The images themselves are also a powerful tool for public engagement and communicating science.

Friday's discussions included several proposed actions that could follow from the meeting including:

- Share presentations and notes from the meeting.
- Develop a short (1-page) vision statement for the emerging network. This will be shared more broadly to raise interest and recruit additional partners (including other complementary networks).
- Seek funding asap to hire a coordinator (e.g. postdoc) to lead further development of the network.
- Create a name and identity to encourage broad buy-in to the network (this should be inclusive rather than the domain of one organization).
 - Some potential names were proposed and will be circulated for feedback.
- Solicit information on people and projects to develop a digital directory of remote camera efforts in and around BC.
 - Include location information to create an online map.
 - Use the directory and map to summarize current coverage of camera sampling (e.g. across BEC zones, priority species ranges, management areas), and identify priority areas for new sampling.
- Create a website to host and share information, such as the directory of projects, recommendations on best practices, and ultimately image data and project metadata.
 - Develop and discuss potential models of data sharing.
- Develop larger proposals to advance the network (e.g. for coordinated sampling and analysis across multiple partners).
- Organize an annual meeting to share knowledge about camera trapping and advance the network ideas (e.g. in conjunction with annual meeting of BC Chapter of The Wildlife Society).
- The meeting organizers (Burton, Muhly, Fisher, Ford, Bugar) agreed to form an initial "Steering Committee" to advance these ideas and report back to the broader group.

