Ungulate monitoring methods workshop
June 4-6, 2024. ONLINE {web link; insert logos}

DRAFT AGENDA (last updated May 5, 2024).

WORKSHOP OBJECTIVE:
To collectively explore **current and prospective** monitoring methods for ungulates, considering **opportunities, challenges, and barriers to implementation**, and **identify next steps towards application** of best methods to improve ungulate population management.

June 4 Day 1 9 AM – 16:30 PM MST (all times are in Mountain Standard Time)

Session Facilitator: **TBD** (role of facilitator: introductions, session intent)
9:00 – 9:20 AM (20 min)**Workshop Introduction – Dan Farr and Mark Edwards (Alberta Environment and Protected Areas, EPA)**

(Notes- purpose, scope, newer methods – value of staying current, "monitoring" definition, intended outcomes, format, benefits of working together and identify deliverables of mutual interest to find solutions, state jurisdictions & depts represented on slide, mention lit review and materials provided pre-workshop- note removed "state of technology for sessions b/c lit review and some speakers will touch on)

Session Facilitator: **TBD (Dan? Jonathan Thompson? Stan Boutin?)**
9:20 – 10:40 AM MST **Ungulate Population Monitoring Needs**

9:20 – 9:30 (10 min) **Jurisdictional Survey Results – Information Needs** – **TBD** (EPA)

Are accurate and precise population estimates needed everywhere? What other options may suffice?

9:30 – 9:50 (20 min) **1. Management Agency Perspectives - TDB** [Jim Heffelfinger, Arizona Game & Fish Dept. and Chair WAFWA Mule Deer Working Group? But see his Hunt & Fish presentation & beyond allocation] [Dave Hervieux?] [Jonathon? Want science-based agency person who works with a lot of jurisdictions]

9:50 – 10:10 (20 min) **2. Researcher Perspectives - Mark Boyce (University of Alberta/ Alberta Conservation Association)**
(Notes- Challenge concept of everything everywhere; not 1 method; required precision)

10:10 – 10:40 (30 min) **Panel – Q & A** (all speakers to date; open up to audience to enter questions in chat, questions read, behind scenes group)

10: 40 – 11:00 (20 min) **COFFEE BREAK** (if Panel – Q & A longer it can go into break)

Session Facilitator: **Emily Herdman (Alberta Innovates)? Marcus?**
11:00 – 12:30 PM MST **Ungulate Monitoring Methods and Manned Aircraft**

What Methods are agencies currently using, or plan to use, to monitor ungulate populations?

11:00 – 11:20 (20 min) **Jurisdictional Survey Results – Monitoring Methods (Anne Hubbs, EPA)**

Manned Aircraft (Non-Infrared)

11:20 – 11:40 (20 min) **Addressing sources of error in aerial data: what are common pitfalls and solutions (Kayla Davis, Michigan State)**

11:20 – 11:40 (20 min) **Addressing Detection Bias (Mike Russell, EPA)**

[1]11:40 – 12:00 (20 min) **Where should we survey and how frequently? When can model-based estimates replace surveys? (Pauline Priadka, B.C. Water Lands and Resource Stewardship)**

12:00 – 12:30 (30 min) **Panel – Q & A**

12:30 – 13:00 (30 min) **LUNCH BREAK**

Session Facilitator: **Erin Bayne? Monica Kohler (ABMI)?**

[1] Could add Jon Horne presentation (at his request; covers flexibility in survey design, improving sampling efficiency- elk)- see "Is random sampling all it's cracked up to be?"

13:00 – 14:50 PM MST **Aerial Infrared Imaging and Drones**

Manned Aircraft (Aerial Infrared Imaging (AIR)

13:00 – 13:20 (20 min) **State of AIR technology. How can AIR inform ungulate management? (Daniel Melody, Owyheeair, Idaho)**

Drones (Unmanned Aerial Vehicle / Remotely Piloted Airborne Systems)

13:20 – 13:40 (20 min) **State of Drone technology. How can drones inform wildlife management? (Kanwar Johal, Superwake, Ontario)**

13:40 – 14:00 (20 min) **Applying AIR and drone technology to wildlife management (Todd Whiklo and Kirsten Solmundson, Manitoba Fish and Wildlife)**

14:00 – 14:20 (20 min) **Evaluating drone technology in Alberta (Nicholas Coops, University of British Columbia and Gord Stenhouse, Foothills Research Institute)**

14:20 – 14:50 (30 min) **Panel – Q & A**

14:50 – 15:10 (20 min) **COFFEE BREAK**

Session Facilitators: (IT, organizing committee, ABMI notetakers)
15:10 – 16:10 (60 min) **Facilitated Break-Out Sessions**

Potential Topics (in development) (use MENTI surveys including for ranking; 5 break-out rooms; they select; record & note-takers & facilitators in each)

1. What information do agencies need to inform management decisions, and what levels of precision are required to make good decisions?
2. What types of errors, biases or assumption violations are most common and likely to lead to poor inference or management decisions?
3. What are recommended approaches (e.g., statistical) and characteristics of sampling designs that can address these issues?
4. How often should we monitor? How do we best determine this? How does this fit within an adaptive management cycle?
5. How can researchers, wildlife managers and others (e.g., Indigenous Peoples, citizens) align data collection for dual purposes and mutual benefits?

6. What are the opportunities, benefits, and challenges of incorporating Indigenous and citizen-science information to inform wildlife management decisions?

16:10 – 16:20 (10 min) **Daily Wrap-Up**

16:20 **END DAY 1**

UNGULATE MONITORING METHODS WORKSHOP

June 5 Day 2 9 AM – 15:00 PM MST (all times are in Mountain Standard Time)

Session Facilitator:

9:00 – 10:00 AM **Day 1 Recap and What we heard in the Break-Out Sessions (facilitators/ 1 person from each room)**

Session Facilitator: Cassandra Stevenson (ABMI and University of Alberta)

10:00 – 12:20 AM MST **Remote Cameras and Telemetry**

10:00 – 10:20 (20 min) **Could camera trap surveys fill knowledge gaps in aerial ungulate survey programs, improving the science that guides wildlife management? (Jamie Clarke (University of British Columbia)** (ask Tyler Muhly / Joanna Burger to speak to B.C.'s intent re cameras)

10:20 – 10:40 (20 min) **How do camera estimates compare with those from other methods? (Marcus Becker (Alberta Biodiversity Monitoring Institute;** speak to cameras vs AUS broadly; correction factors; cover off Laura Finnegan's?)

[2]10:40 – 11:00 (20 min) **Comparing composition between remote cameras and aerial surveys in Dall sheep in Indigenous-led community-based program (Sydney Gowan (University of Victoria, B.C.) and Steve Anderson (Gwich'in Renewable Resources Board, Inuvik, NWT))**

11:00 – 11:20 (20 min) **Using remote cameras to inform Idaho's wildlife management program** (https://idfg.idaho.gov/press/game-cameras-provide-new-methods-counting-and-managing-wildlife) (Jon Horne/ Mark Hurley) (broaden scope of Jon Horne's "Further development of camera based estimates…" to how understand State program and then few of details on methods)

11:20 – 11:40 (20 min) **How telemetry can meet the multiple needs of wildlife agencies (Randy Larsen, Brigham Young University, Utah)** (Note- ask Randy to include benefits of collars for evaluating detection bias with different methods/ detectability/ sight-ability correction)

[2] [Maybe add - 10:10 – 10:40 (20 min) FRI Laura Finnegan? Caribou density and sub-sampling methods (camera vs AUS 1:1)]; suggested by 2 people but don't want to many camera presentations; would push session to 11:40 then 20 min Panel Q & A only unless lunch 12:15

11:40 – 12:20 (40 min) **Panel – Q & A**

12:20 – 13:00 (40 min) **LUNCH BREAK**

13:00 – 14:00 (60 min) **Facilitated Break-Out Sessions**

Potential Topics (in development) (**use MENTI surveys including for ranking)**

1. Should we be comparing results from the different methods? Can we? What is required (e.g., estimating detection bias)?
2. How do we address issues with "big data"? What tools are available? What is the state of AI and what's required to move this forward?
   (Notes- e.g., Mega-detector, AI work in Ontario and elsewhere; tools to knowledge gaps – e.g., Design Support Tool, WildCAM)
3. What are key considerations when selected a monitoring method (e.g., species, landscape, cost, scale, training)?
4. Do we need to evaluate each technology in each landscape for each species? How broadly can we infer information in similar landscapes to elsewhere? What is needed to increase the scale of inference (e.g., metadata)?

14:00 – 14:50 (50 min) **What we heard in the Break-Out Sessions and general discussion (facilitators/ 1 person from each room)**

14:50 – 15:00 (10 min) **Daily Wrap-up**

15:00 **END DAY 2**

Option B FOR AFTERNOON DAY 2 (JUNE 5) - FOLLOWING IS IDEAL BUT LAYLA MAY ONLY BE AVAILABLE June 6 not 5

Session Facilitator:

13:00 – 14:00 PM MST **Genetics / DNA**

13:00 – 13:20 (20 min) **Using DNA to estimate woodland caribou populations (Lalenia Neufeld, Jasper National Park, Alberta)**

13:20 – 13:40 (20 min) **Using DNA and citizen science to estimate goat populations in Glacier National Park (Tabitha Graves, United States Geological Survey,**
Montana; Mark Biel and Jami Belt, National Park Service)

13:40 – 14:00 (20 min) **Panel – Q & A**

14:00 – 14:20 (20 min) **COFFEE BREAK**

Session Facilitator:
14:20 – 15:20 (60 min) **Facilitated Break-Out Sessions**

Potential Topics (in development)(use MENTI surveys including for ranking)

5. Should we be comparing results from the different methods? Can we? What is required?
6. How do we address issues with "big data"? What tools are available? What is the state of AI and what's required to move this forward?
   (Notes- e.g., Mega-detector, AI work in Ontario and elsewhere; tools to knowledge gaps – e.g., Design Support Tool, WildCAM)
7. What are key considerations when selected a monitoring method (e.g., species, landscape, cost, scale, training)?
8. Do we need to evaluate each technology in each landscape for each species? How broadly can we infer lessons learnt elsewhere? What is needed to increase the scale of inference (e.g., metadata)?

15:20 – 16:00 (40 min) **What we heard in the Break-Out Sessions (facilitators/ 1 person from each room)**

UNGULATE MONITORING METHODS WORKSHOP
June 6 Day 3 9 AM – 15:30 PM MST (all times are in Mountain Standard Time)

Session Facilitator: Anne Hubbs (EPA) / Other?

9:00 – 9:10 AM **Day 2 Recap and What to Expect on Day 3**

9:10 – 10:10 AM MST **Genetics / DNA**

9:10 – 9:30 (20 min) **Using DNA to estimate woodland caribou populations (Lalenia Neufeld, Jasper National Park, Alberta)**

9:30 – 9:50 (20 min) **Using DNA and citizen science to estimate goat populations in Glacier National Park (Tabitha Graves, United States Geological Survey,**
Montana; Mark Biel and Jami Belt, National Park Service)

9:50– 10:10 (20 min) **Panel – Q & A**

10:10 – 10:30 (20 min) **COFFEE BREAK**

Session Facilitator: Mark Edwards (EPA) / Other?

10:30 – 12:10 AM MST **Bringing It All together: Using Integrated Population Models and Multiple Monitoring Methods**

10:30 – 10:50 (20 min) **Integrated Population Models (IPMs) and Cost: Benefit Analyses for Wildlife Agencies (John Novaks / Paul Lukacs, SpeedGoat Wildlife Solutions, Montana)**
(Notes- what are they …? Most imp. variables to collect], challenges of IPM, and cost: benefit analyses; examples some projects- not Jasper caribou, harvest reconstruction, opportunities to collaborate to advance work)

10:50 – 11:10 (20 min) **TBD (John Boulanger, Integrated Ecological Research, B.C)**
(collaring, photo surveys, modeling, challenges and recommendations/key considerations to others undertaking similar work)

11:10 – 11:30 (20 min) **Using multiple methods to estimate population size and composition of mule deer (Brett Furnas, California Dept. of Fish and Wildlife)**

(Note- they use FDNA – overall sex ratios, cameras- differentiate fawns from adults, telemetry – inform home ranges sizes for SCR & N-mixture modeling to improve precision of density & population size estimates; costs and recommendations for monitoring program, challenges & opportunities)

11:30 – 12:10 (40 min) **Panel – Q & A**

12:10 – 13:00 (50 min) **LUNCH BREAK**

Session Facilitator: TBD

13:00 – 14:00 (60 min) **Facilitated Break-Out Sessions – Opportunities and Challenges**

Potential Topics (in development) (**use MENTI surveys including for ranking)**

1. Which methods are most applicable to address each and all consideration(s)?
2. What are key data and knowledge gaps that need to be filled (prioritize list)?
3. What actions and resources would be required to fill these gaps (in successive order)?
4. What are challenges / barriers that must be overcome (e.g., capacity), and possible solutions?
5. Do you see opportunities to collaborate to conduct adaptive management projects or other, and if so, what would this look like?

Session Facilitator: TBD

14:00 – 15:00 (60 min) **What we heard in the Break-Out Sessions and general discussion (facilitators/ 1 person from each room)**

15:00 – 15:30 (30 min) **Next Steps and Workshop Wrap-up (Dan Farr and Mark Edwards, EPA)**

15:30 **WORKSHOP ENDS**