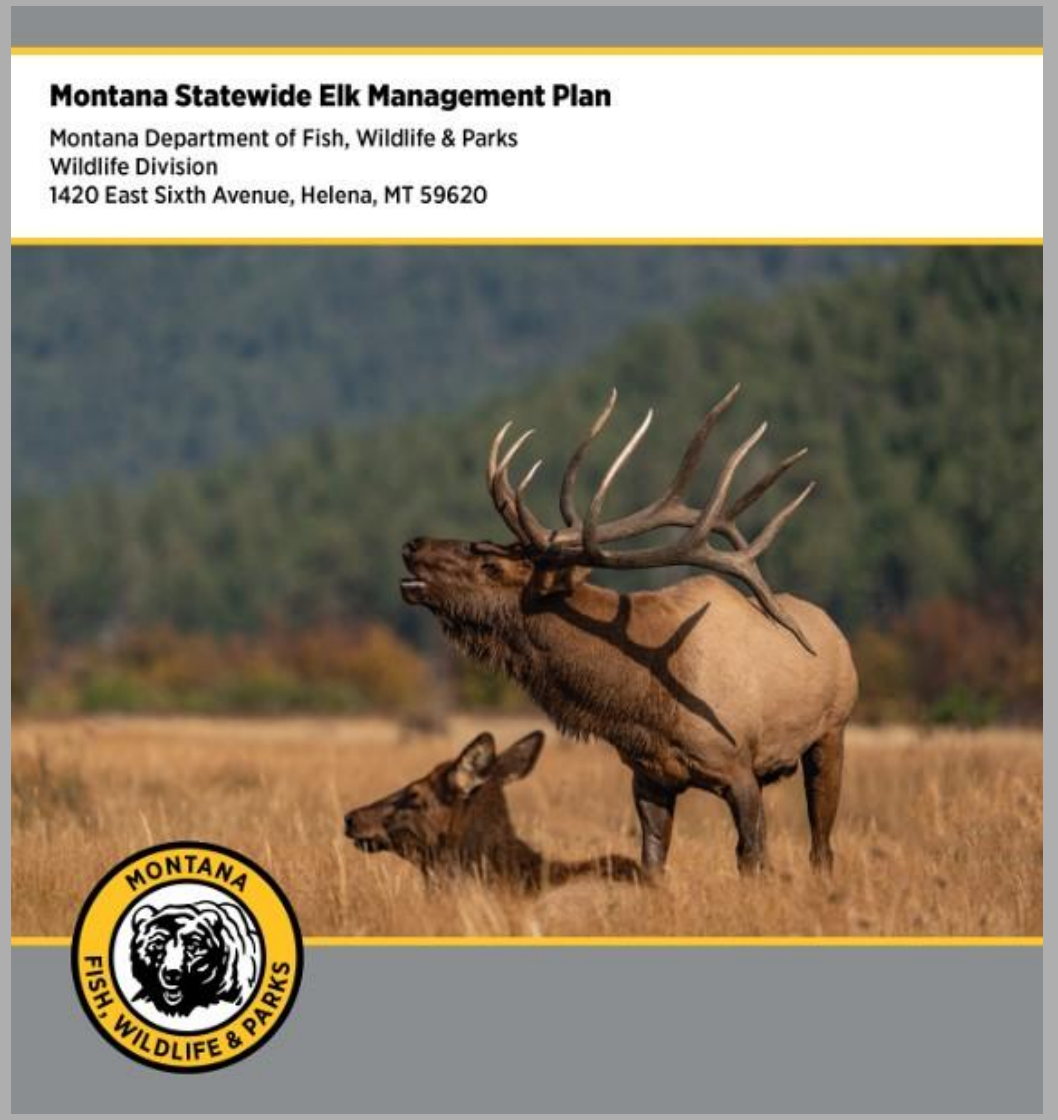
Integrating Research and Management to Better Understand Elk Population Dynamics and Abundance

Why do we need abundance and vital rates?

- Monitor Population Trend
- Measure effectiveness of management actions.
  - If we reduce carnivore numbers to increase elk herds, is it working?
- Manage elk in an adaptive manner
  - Integrate habitat and predation into elk management.
  - Requires information populations and vital rates
- Inform public and decision makers.
- Identified in 2023 Elk Plan

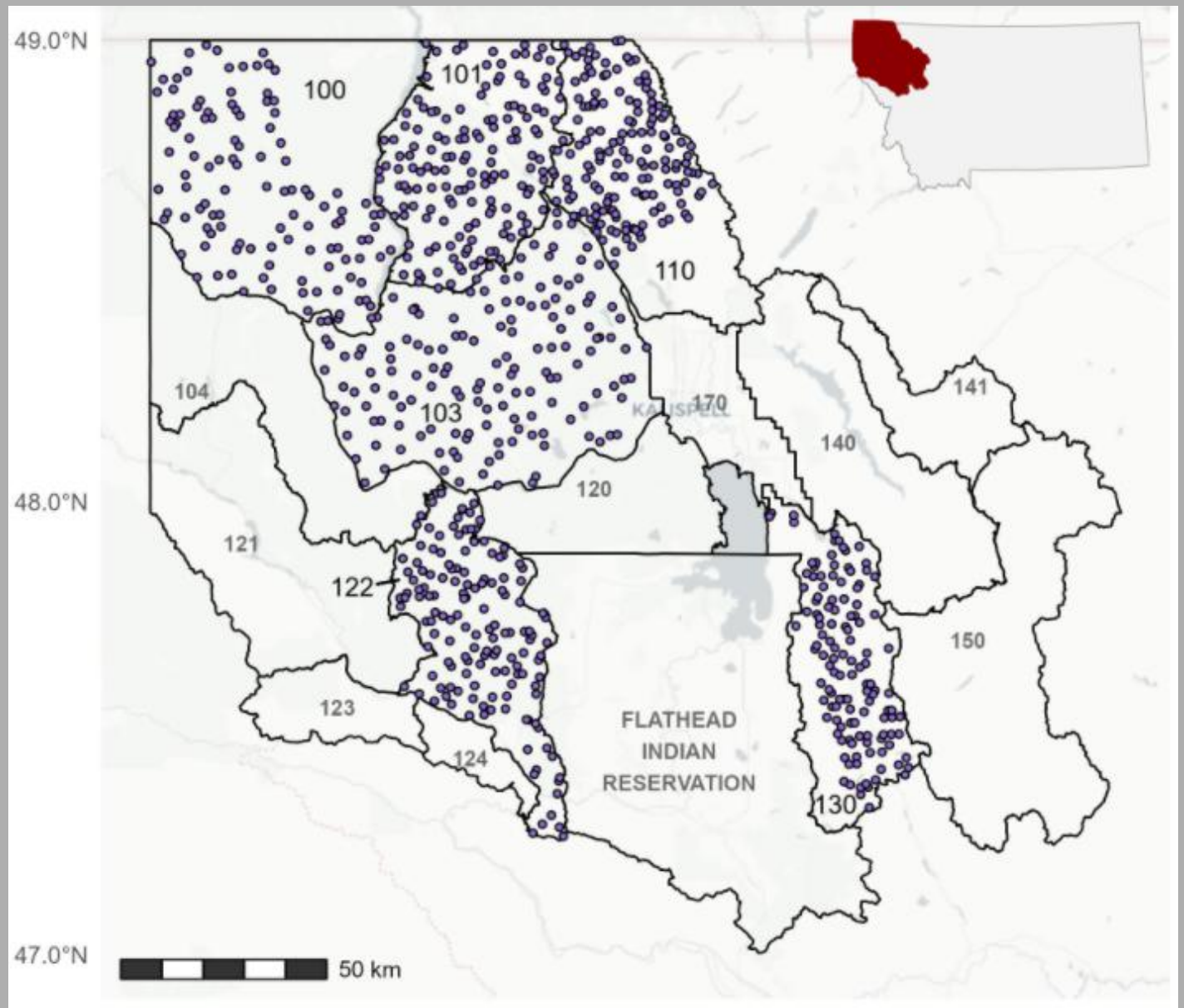


Surveys vs Abundance

- **What we know?**
  - Aerial surveys and harvest data
    - Aerial = minimum count
    - Information about calf survival
    - Harvest = highly variable
- **What don’t we know?**
  - Method for collecting abundance/density estimates for elk under canopy cover
- **How do we do this?**
  - Trail cameras

Using trail cameras to produce population estimates

- Not as easy as putting out a few cameras
  - Requires a grid of 100+ randomly placed cameras
  - Takes team of 6 technicians 1 month to deploy in couple HDs.
  - Cameras take a picture every 10 minutes
  - Recover SD cards/cameras
  - Millions of pictures to sort and review

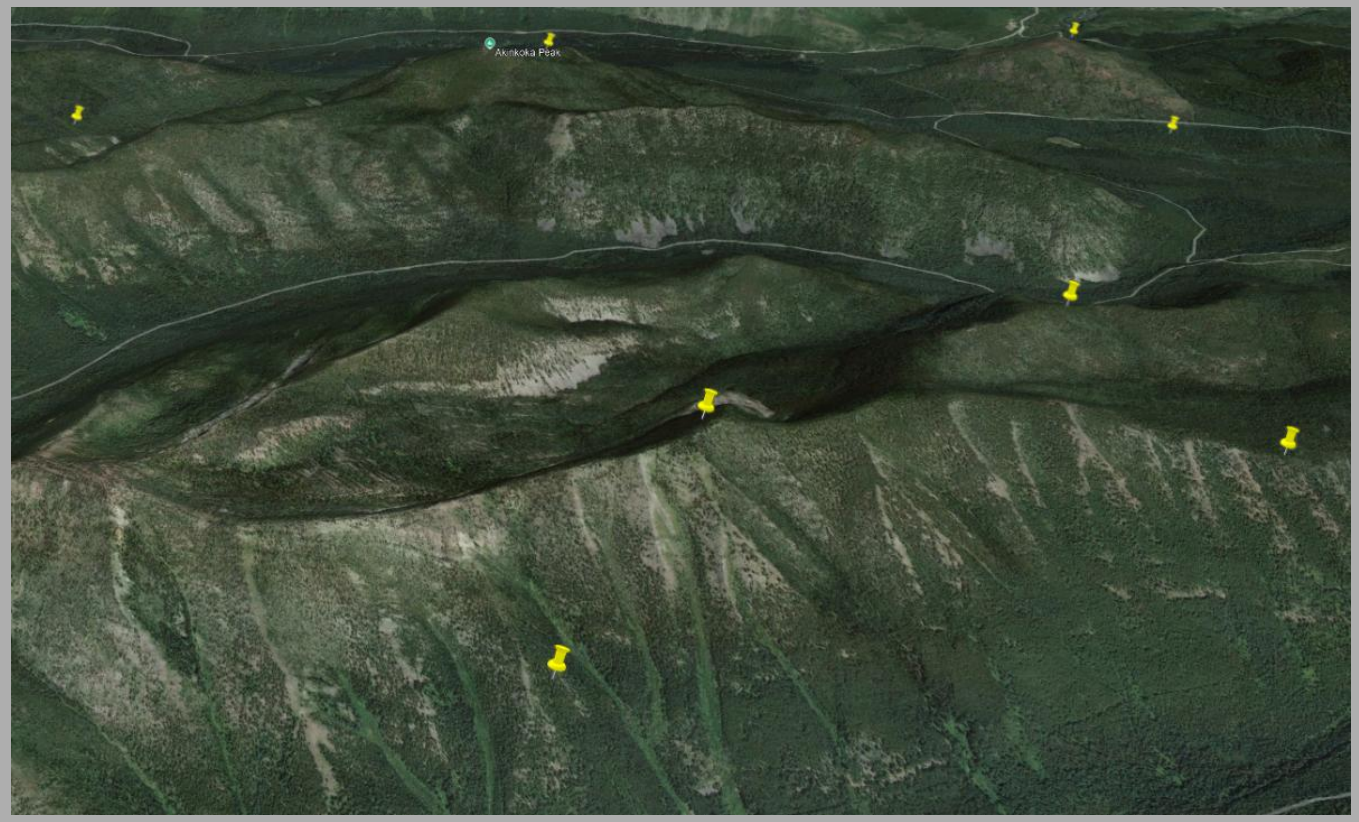


Methodology

- Each camera samples a small area
- Cameras synchronized to take picture every 10 minutes
- Many photos have no animals
- Sample over a 3-month period to improve detection
- Estimate is based on number of cameras detecting elk over sampling period

Challenges

- Method still in development
  - Need to determine accuracy
- Labor intensive
  - Need determine minimum number of cameras
  - Identify most efficient method of camera deployment
  - Effectively store and process millions of photos
- Can’t sample every HD every year
  - Need a method for estimating population between sampling periods.



Federal Aid in Wildlife Restoration Grant W-188-R

Annual report, September 2025

Integrated Elk Management in Montana

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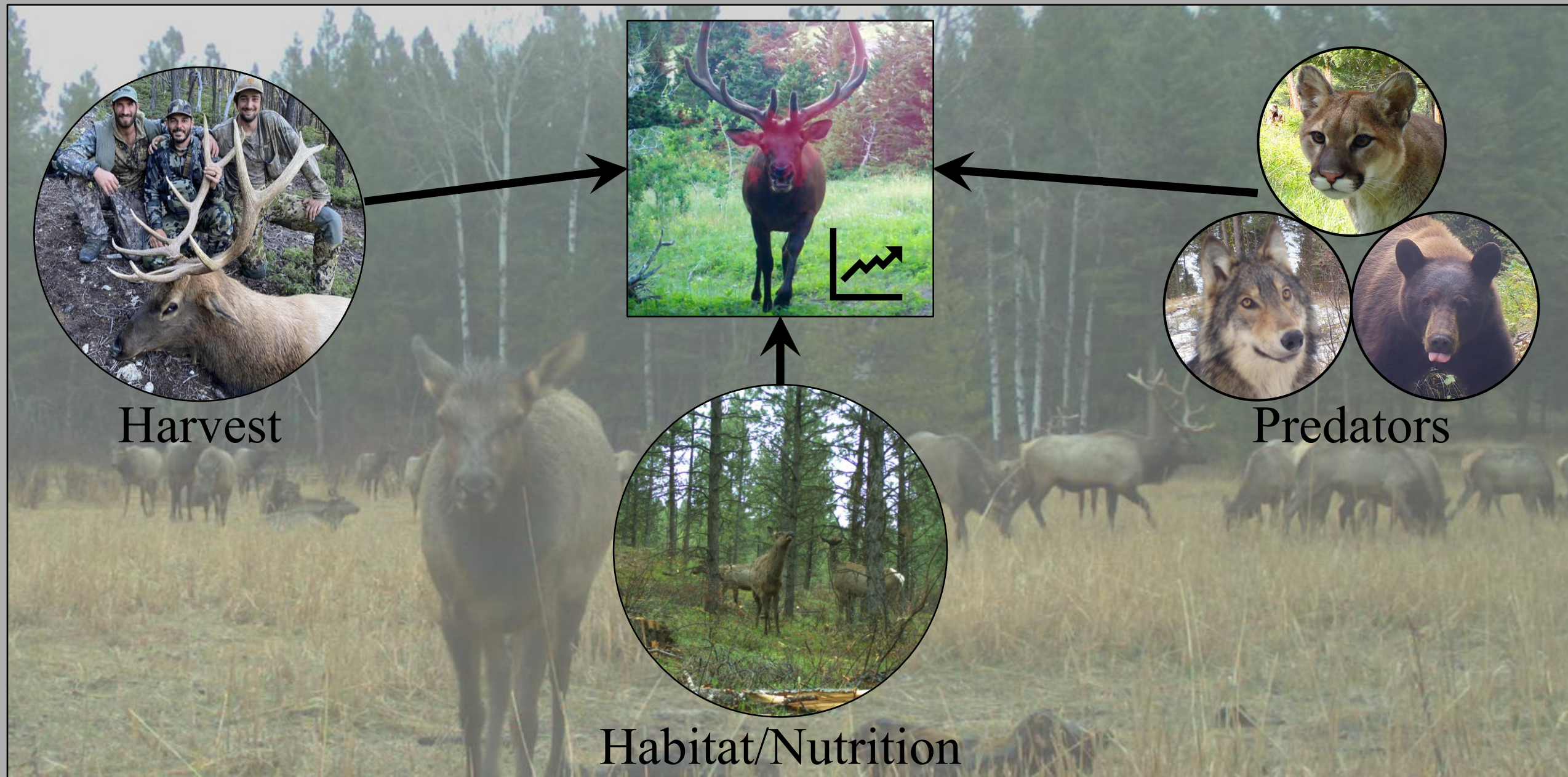
Identify factors affecting elk populations and distribution



Information on elk population dynamics

- Vital Rates
  - Adult cow survival rates
  - Calf recruitment/survival
  - Bull survival/harvest rate
- Integrate information with camera data to estimate populations between camera surveys
- Inform adaptive management
  - Habitat
  - Predation rates/species

Integrated Population Model

Harvest

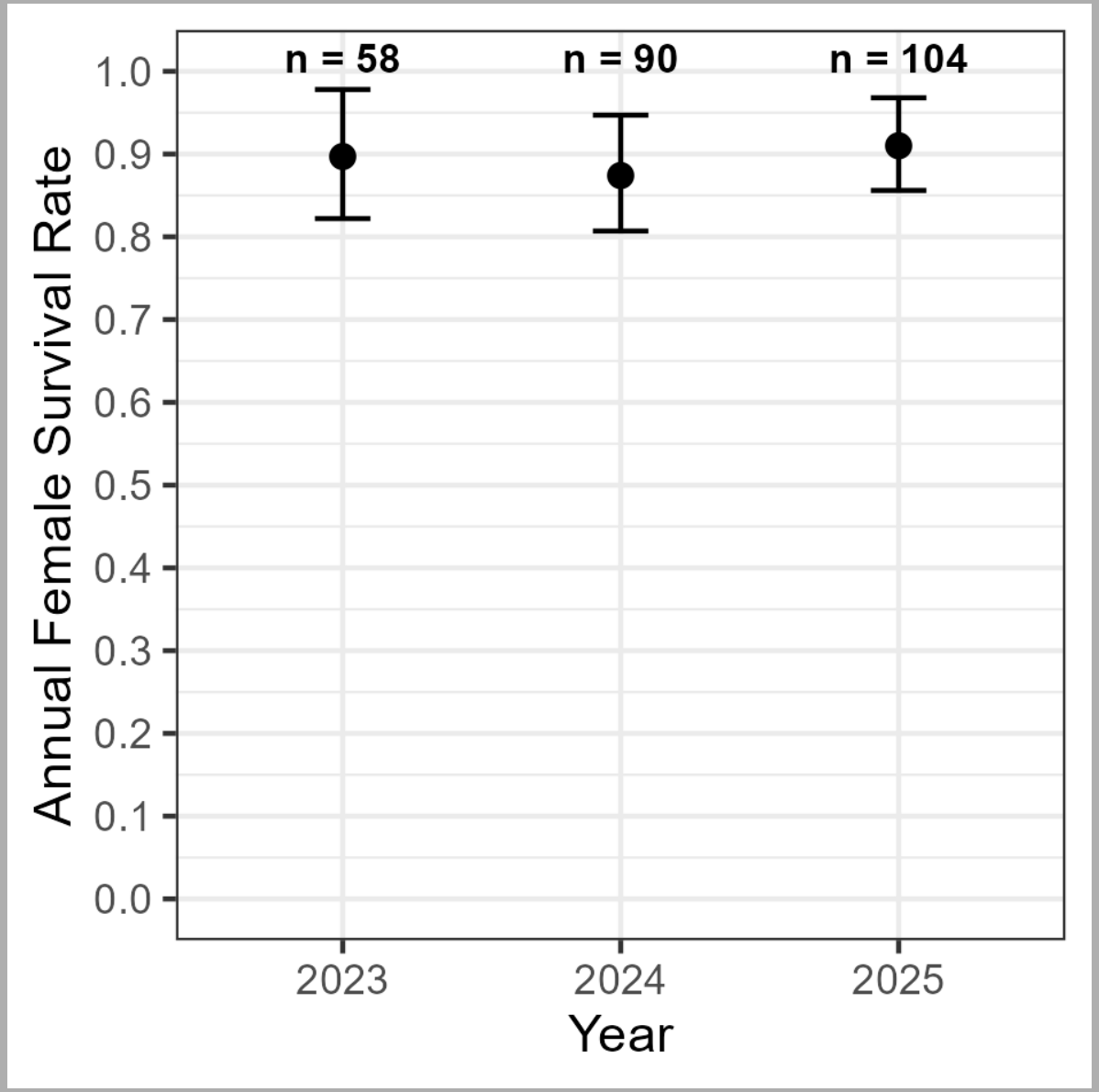
Counts

Abundance

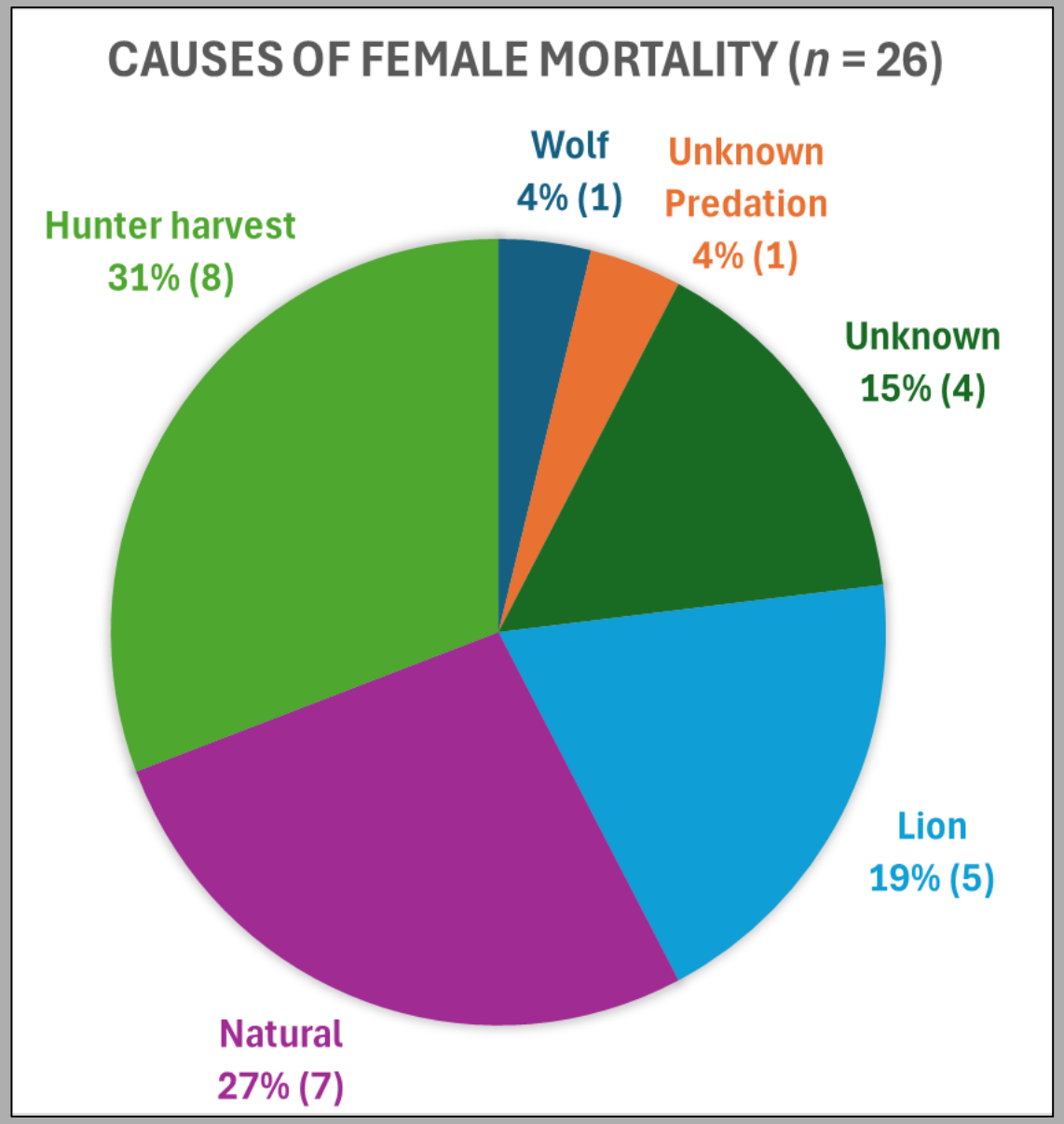
Vital Rates

Habitat

Preliminary results – Noxon Project: Female Survival



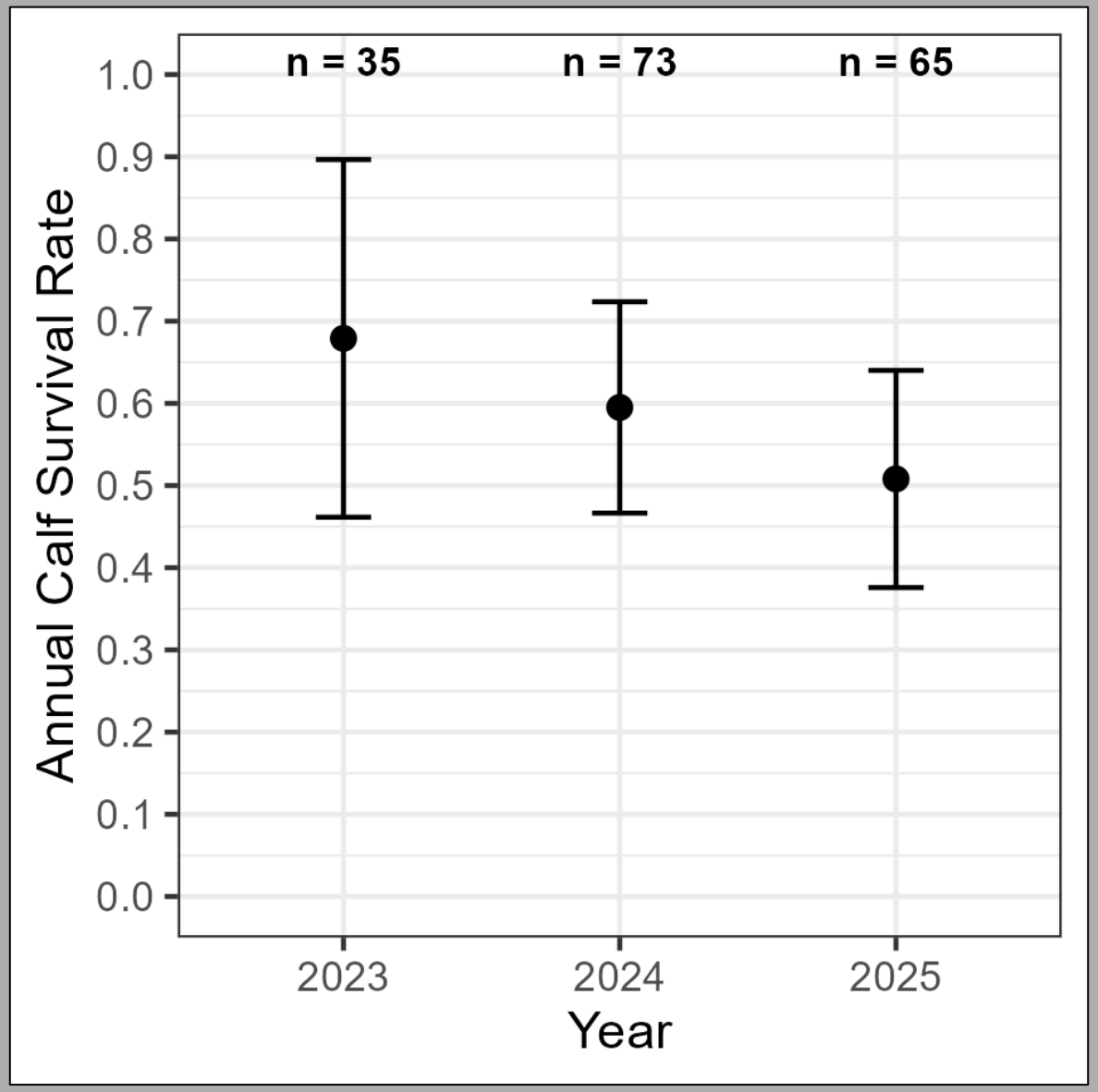
Preliminary results – Noxon Project: Female Survival



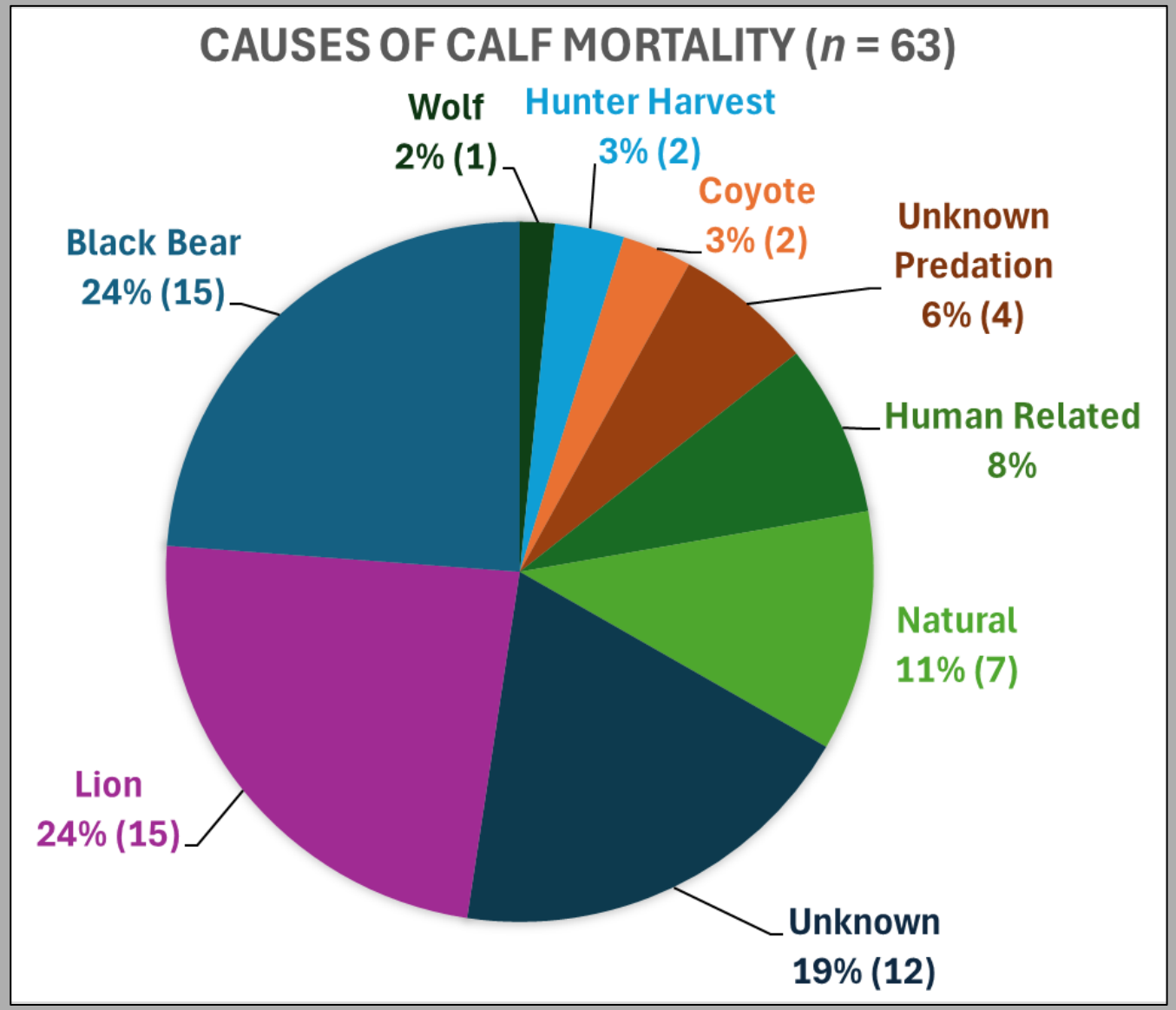
Annual probability of mortality from:

Wolf: 0.5% (0% - 1.4%)
Lion: 2.5% (0.2% - 4.7%)
Hunter harvest: 3.4% (1.1% - 5.7%)

Preliminary results – Noxon Project: Calf Survival



Preliminary results – Noxon Project: Calf Survival

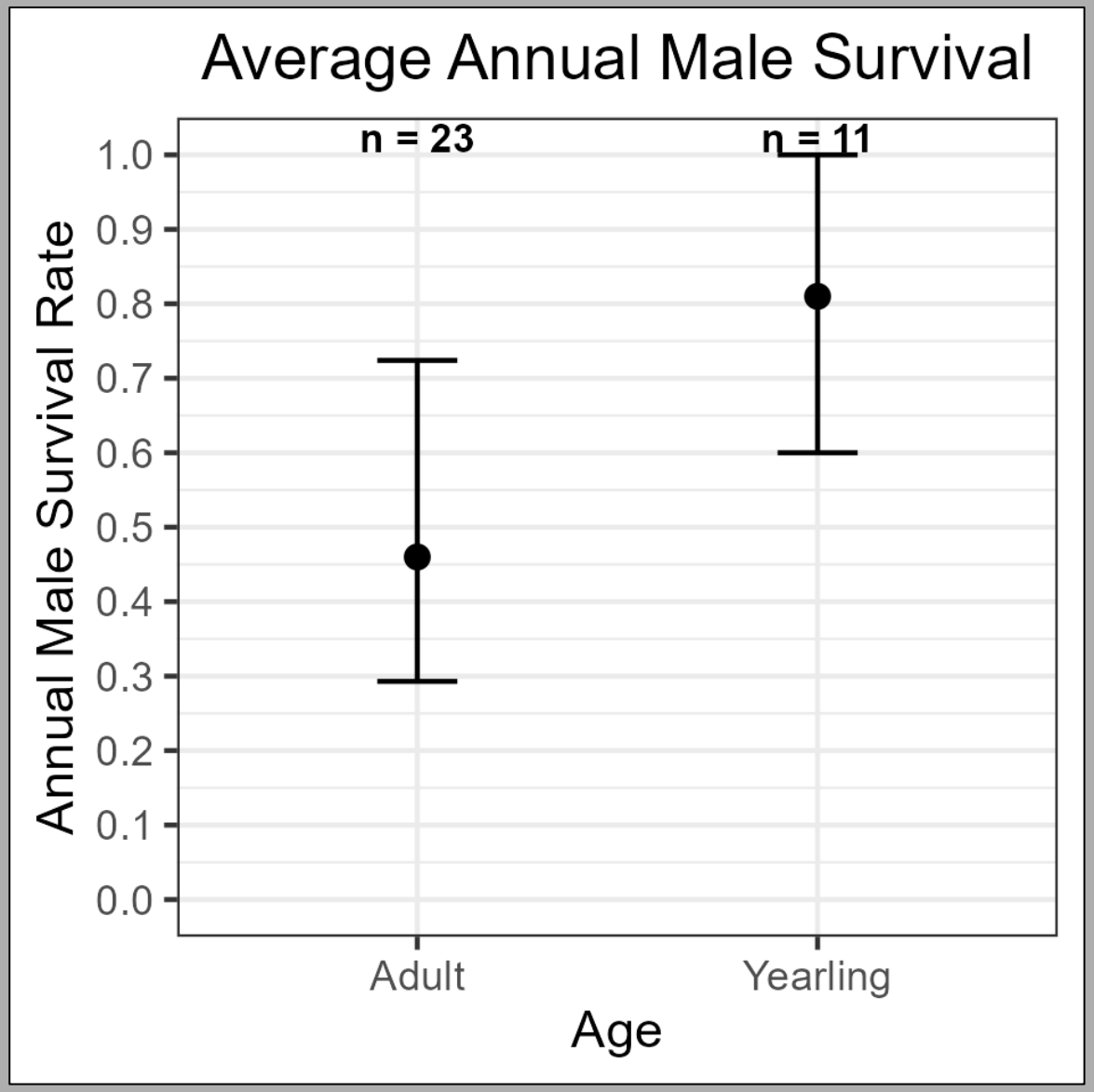


Annual probability of mortality from:

Wolf: 1.9% (0% - 5.5%)
Lion: 14.4% (7.6% - 21.3%)
Black Bear: 11.1% (0% - 29.4%)

Calf recruitment drives populations

Preliminary results – Noxon Project: Male Survival



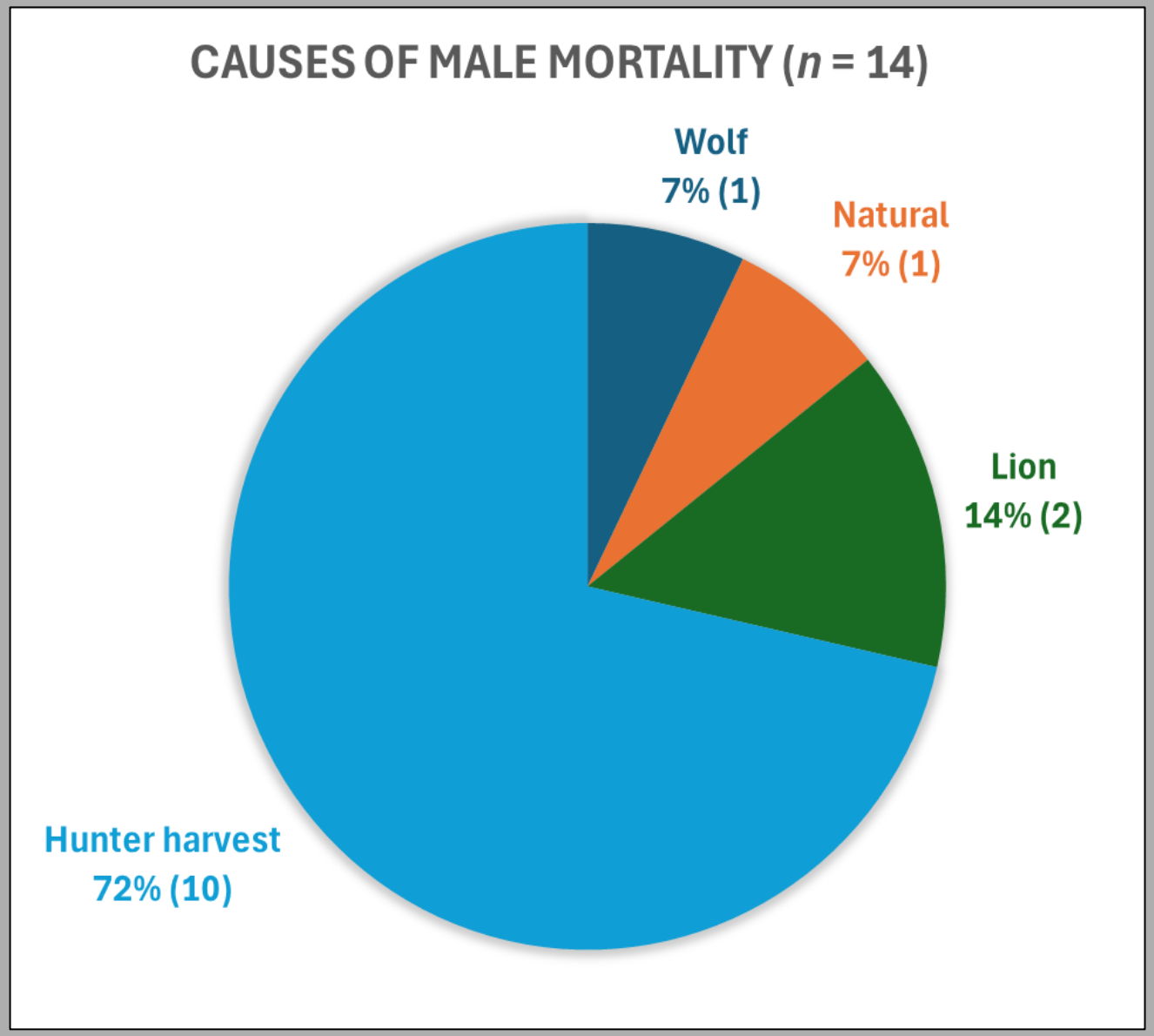
Adult Bull Harvest

2023: 3/6 = 50%

2024: 0/3 = 0%

2025: 7/12 = 58%

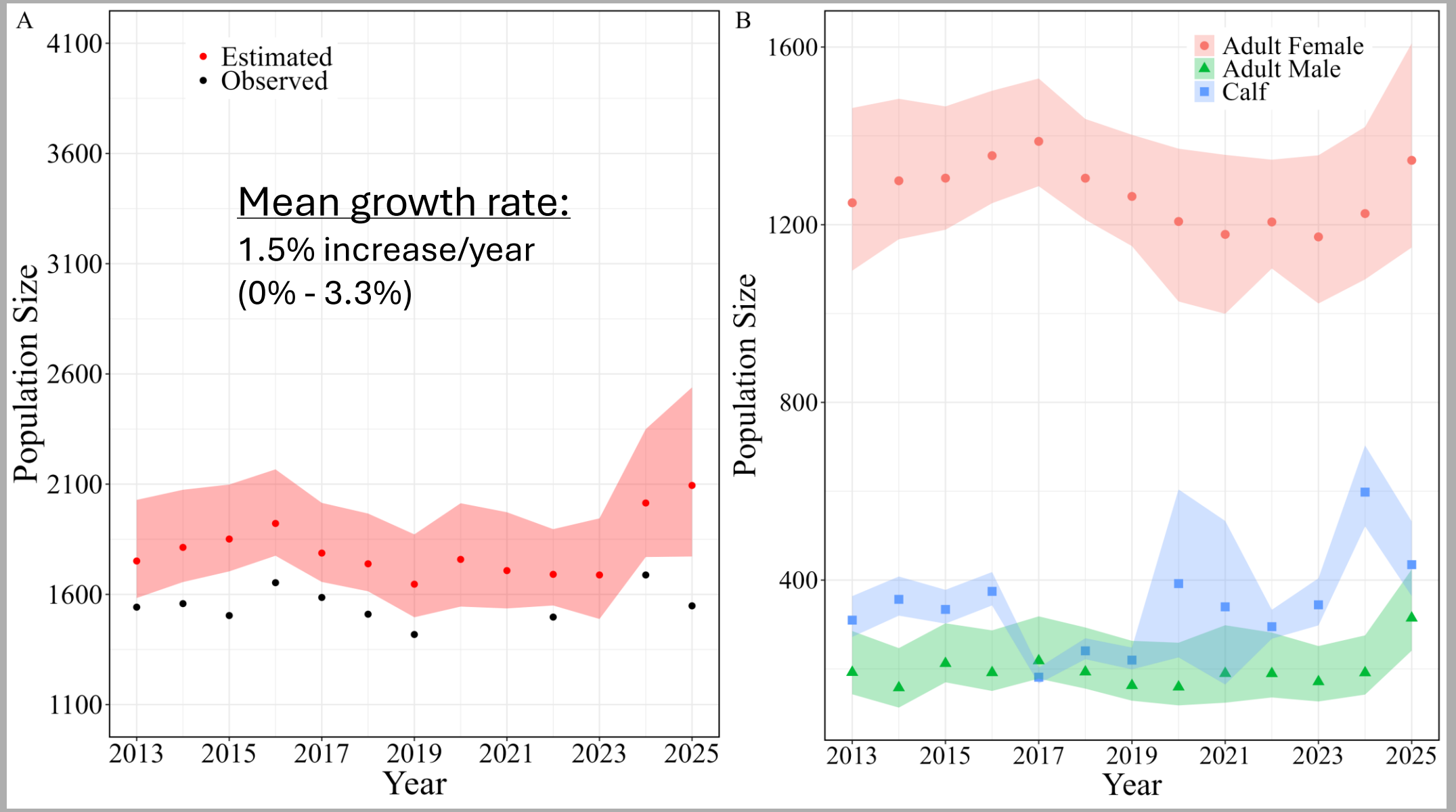
Preliminary results – Noxon Project: Male Survival



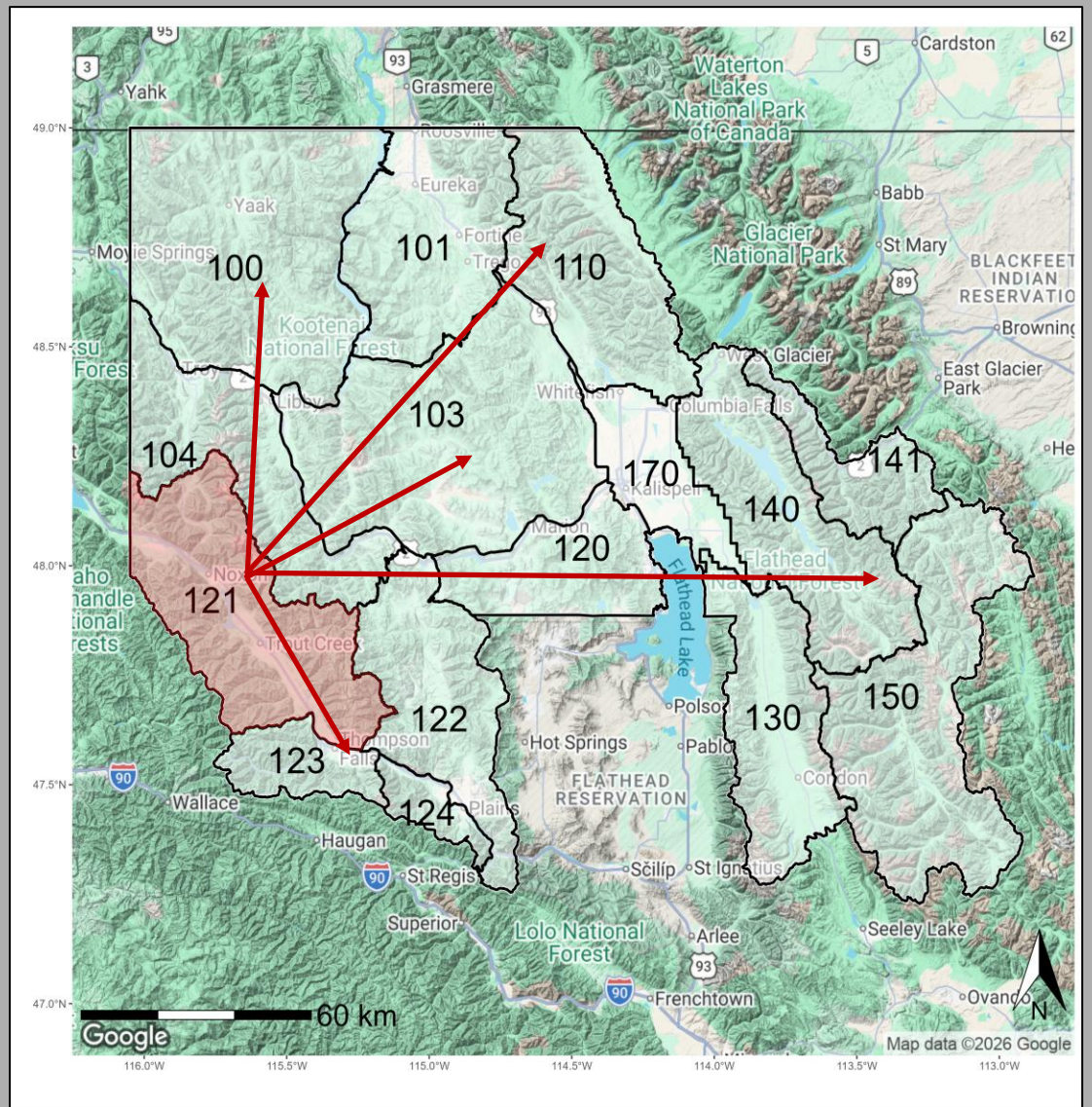
Annual probability of mortality from:

Wolf: 3% (0% - 8.7%)
Lion: 7.8% (0% - 17.9%)
Hunter harvest (adult): 47.1% (20.8% - 64.6%)

Preliminary results – Noxon Project: Abundance



Apply findings to other HDs in Region 1



Addressing predation

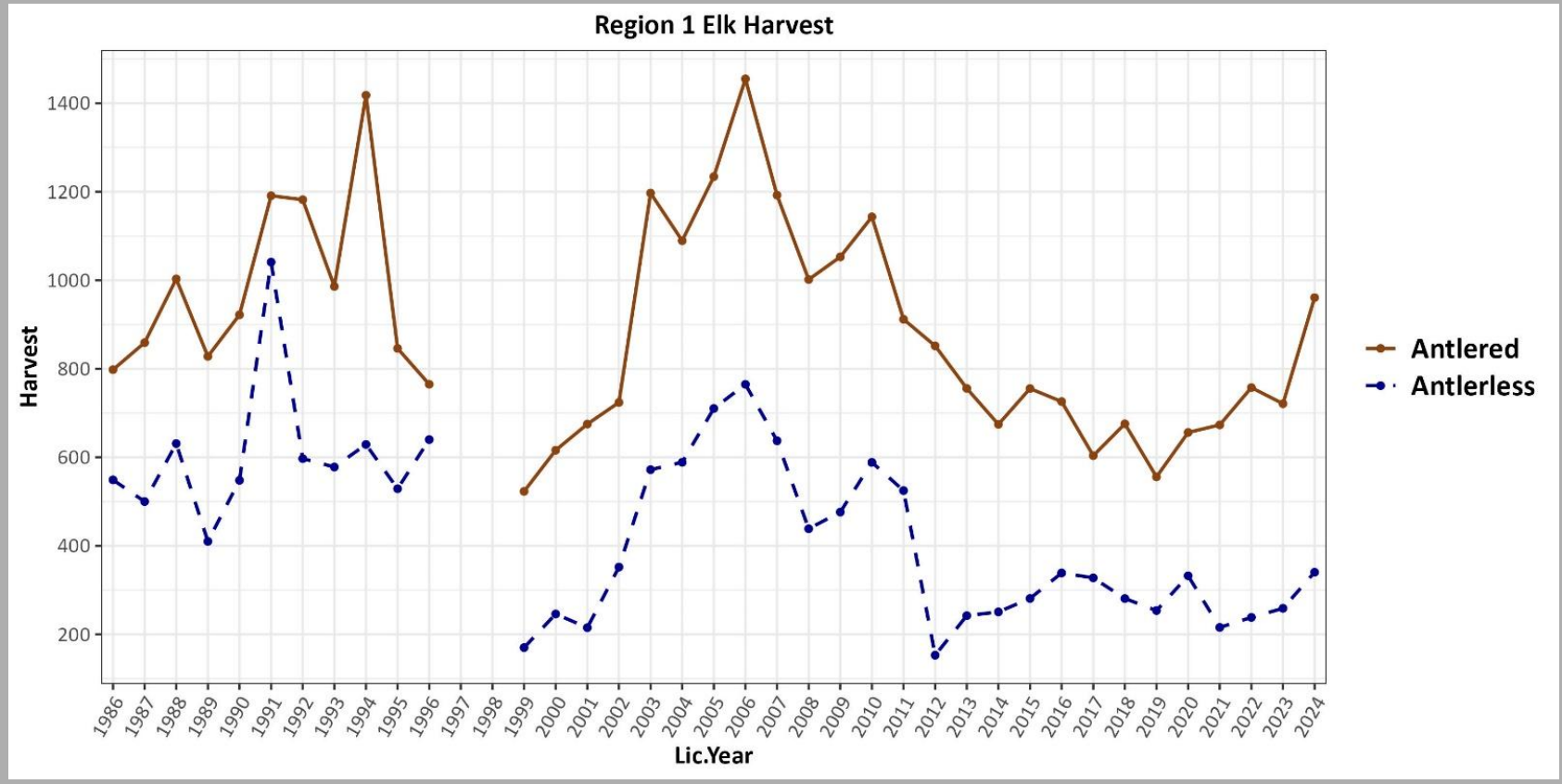
- 30% - 40% reduction in lion populations
  - In process of getting population estimate
- Trapping setbacks – looking at eliminating trap setbacks in parts of Lincoln County
- Black bear season extended to June 15
  - Analysis of DNA population estimate ongoing

Where are we at?

- Noxon elk project
  - Final field season for Noxon Elk Project
    - Still collecting information on mortalities
  - Habitat work is completed
    - Working to apply to rest of region
  - PhD student working on analysis
  - FWP research staff working with R1 staff to apply findings
- Camera Project
  - Final field season summer 2026
  - Project completed summer 2028

Assess elk populations now

- Utilize best available information
  - Surveys where we have them
  - Track harvest
- Assess status based on Elk Plan goals



Region 1 elk harvest from 1986-2024.

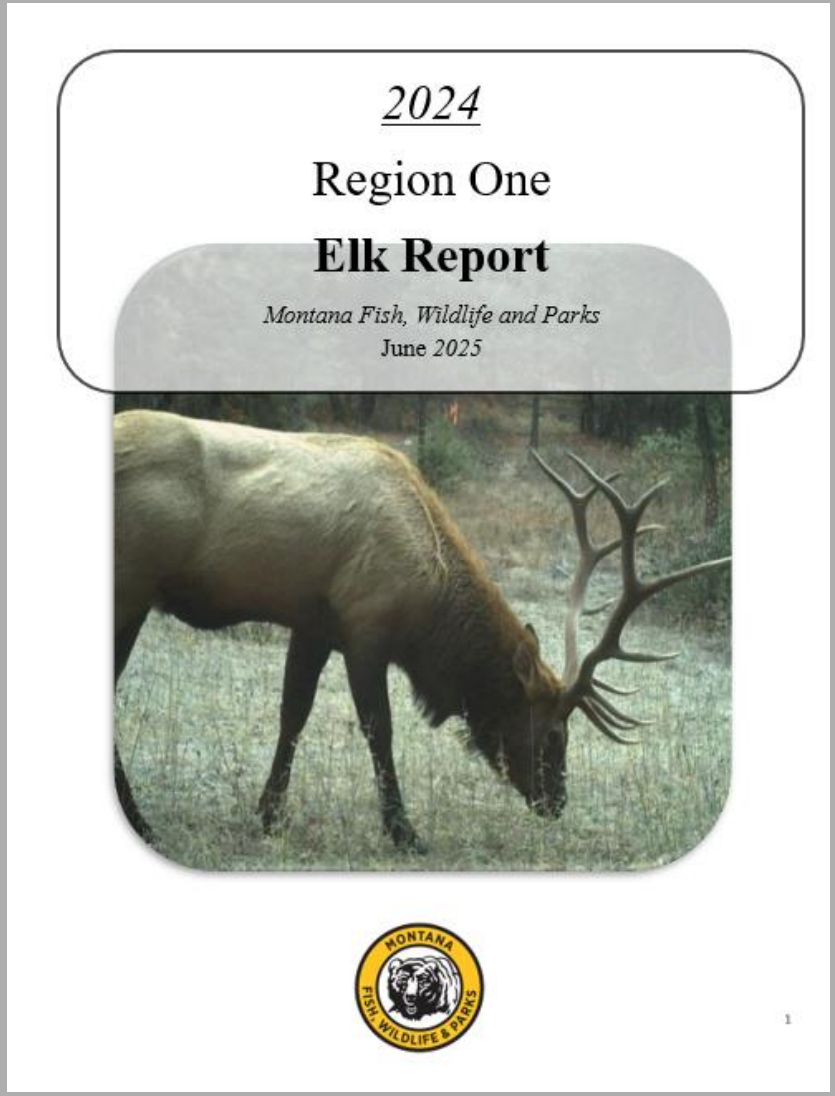
Table 1. 2024 Harvest Goals for R1 Elk Hunting Districts

HD	Prior 5yr Avg. Bull Harvest (2019-2023)	Current 5yr Avg. Bull Harvest (2020-2024)	Meeting Increasing 5yr Avg. Bull Harvest Goal	LTA Bull Harvest	Meeting 5yr Avg. ≥ LTA Bull Harvest Goal	2024 Bull Harvest	25% of 2024 Bull Harvest	2024 ≥ 6pt Bull Harvest	Meeting Yearly 6pt Bull Harvest Goal
100	66	68	YES	77	NO	51	13	21	YES
101	58	88	YES	53	YES	200	50	33	NO
103	71	76	YES	71	YES	93	23	27	YES
104	43	51	YES	62	NO	60	15	30	YES
110	20	29	YES	43	NO	49	12	20	YES
120	36	41	YES	26	YES	42	11	18	YES
121	140	150	YES	193	NO	154	39	43	YES
122	67	70	YES	52	YES	75	19	27	YES
123	26	26	NO	40	NO	38	10	12	YES
124	14	17	YES	16	YES	23	6	3	NO
130	32	31	NO	52	NO	33	8	12	YES
140	19	16	NO	58	NO	12	3	3	YES
141	9	10	YES	29	NO	9	2	9	YES
150	51	60	YES	111	NO	97	24	45	YES
170	17	20	YES	6	YES	23	6	6	YES

Table 2. Region 1 Elk Survey Goals (2025)									
HD	3yr Avg. Calf:100 Cows (2023-2025)	3yr Avg. Calf:100 Cows Goal Minimum	Meeting Calf:100 Cows Goal	3yr Avg. Total Count (2023-2025)	Total Count Goal Range	Meeting Total Count Goal	3yr Avg. Bull:100 Cows (2023-2025)	3yr Avg. Bull:100 Cows Goal Minimum	Meeting Bull:100 Cows Goal
103	26	25	YES	212	NA	NA	11	NA	NA
121	36	25	YES	1618	1350-1890	YES	14	10	YES
123	36	25	YES	348	360-510	NO	13	10	YES
140	16	25	NO	112	250-350	NO	22	NA	NA
150	16	25	NO	169	450-630	NO	14	10	YES

Annual Reports and Research Summaries

- Annual reports on Region 1 website
  - https://fwp.mt.gov/aboutfwp/regions/region1
  - Provide information on population status
  - Multiple species
- Research summaries provided in EQC packet



Questions