Big Hole Watershed Committee
Monthly Meeting Minutes
November 20, 2024 – 6:00 pm at the Divide Grange
Zoom option also provided

In Attendance

In-person: Tana Lynch, BHWC; Kim Giannone, UMW; Tom Bowler, Butte Resident; Betty Bowler, Butte Resident; Katelin Killoy, MFWP; Kaitlin Boren, DNRC; Roy Morris, GGTU/BHWC; Jenna Dohman, MBMG; Jim Griffin, Butte Resident; Jim Olsen, FWP; Dave Ashcraft, Rancher/BHWC; Jesse Newby, FWP; Luke Lutz, FWP; and three Butte High School students.

Zoom: Pedro Marques, BHWC; Jim Keenan, BSB Water Utility/BHWC; Cassandra Kohler, TNC; Mike Gurnett; Randy Smith, Rancher/BHWC; Steve Luebeck, Sportsman/BHWC.

Meeting Minutes

BHWC monthly meetings are held at the Divide Grange with a virtual (Zoom) option provided thanks to Southern Montana Telephone Company, who donated the internet service. Meeting minutes and recordings are available at https://bhwc.org/monthly-meetings/ (scroll down for meeting minutes archive). Printed copies are available during in-person meetings. Contact Tana Lynch, BHWC Associate Director, at tlynch@bhwc.org or (406) 267-3421 to suggest additions or corrections.

Reports

Streamflow and Snowpack Report – Kaitlin Boren, Department of Natural Resources and Conservation

- *Streamflows: (November 20th, 2024):*
  - Wisdom (06024450): seasonal
  - Mudd Creek (06024540): seasonal
  - Big Hole River near Wise River (41D 08000): seasonal
  - Maiden Rock (06025250): seasonal
  - Melrose (06025500): ice
  - Glen (06026210): ice
  - Hamilton Ditch (06026420): seasonal
  - Stream And Gage Explorer (StAGE): https://gis.dnrc.mt.gov/apps/stage/

Station	Network	Elev. (ft.)	Obs	NRCS Median	% NRCS Median
Barker Lakes	SNOTEL	8,250	1.3	3	43%
Basin Creek	SNOTEL	7,180	1.5	1.6	94%
Bloody Dick	SNOTEL	7,600	1.4	1.8	78%
Calvert Creek	SNOTEL	6,430	0.8	0.6	133%
Darkhorse Lake	SNOTEL	8,945	3.6	5.7	63%
Moose Creek	SNOTEL	6,200	1.9	1.9	100%
Mule Creek	SNOTEL	8,300	1.1	3	37%
Saddle Mtn.	SNOTEL	7,940	2.8	3.6	78%
Slagamelt Lakes	SNOTEL	8,620	3.7		
Basin Index					68%

- *Snow Water Equivalent:* 68% of median (1991-2020)
- *Hypsome-SWE (HUC8: 10020004):* 113% of Normal
- *Precipitation:* 60% of median for SNOTEL sites (1991-2020)
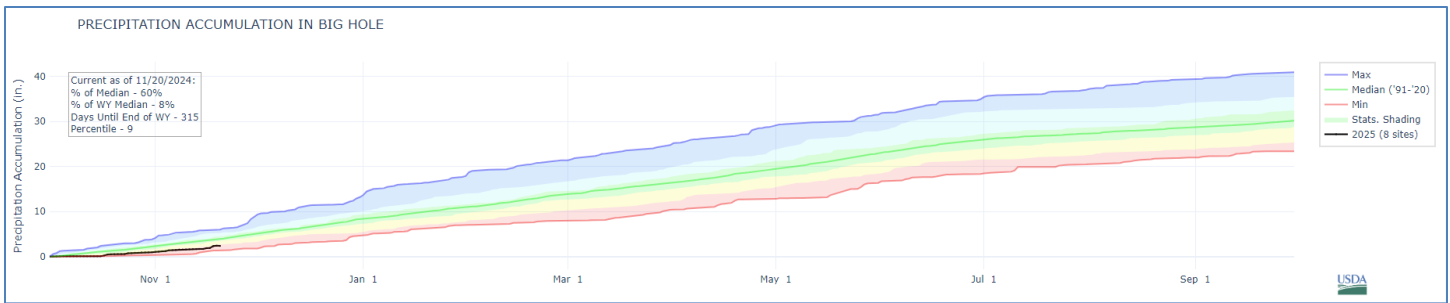
- *Climate Outlook (NOAA):*
  - *Outlook: The 8-14 day outlook predicts slightly below normal temperatures and above normal* precipitation.
  - *Seasonal Outlook*: The seasonal outlooks predicts equal chances of above or below normal temperatures and above normal precipitation.
  - *La Niña watch*: La Niña Watch La Niña is most likely to emerge in October-December 2024 (57% chance) and is expected to persist through January-March 2025. La Nina is likely to remain weak and have shorter duration than other historical episodes. A weak La Niña would be less likely to result in conventional winter impacts, though predictable signals could still influence the forecast guidance.
  - *U.S. Drought Monitor:* The Big Hole watershed is currently under extreme drought.

Director's Report – Pedro Marques, Executive Director
- Water and Fish:
  - Montana Beaver Working Group
    - Army Corps permitting rule changes moving forward
    - Beaver Presence Dataset
    - Invitation from Broad Reach Fund and participation in Beaver/Fish Working Group
  - RFPs out on the street (or soon to be out*)
    - Rock Creek Fish Barrier
    - California Creek "demo area" design
    - Smith Springs ditch siphon*
    - High Meadow Storage capacity
  - Future Fisheries Project Monitoring Report
  - Mt. Haggin Uplands SOW '25 and '24 summary
  - Elkhorn Mine ranked 6th in RDG funding round! ($300,000)
- People:
  - Thank you, Kim Giannone, for helping out with our monthly meetings!
  - Beaverhead Watershed Committee change of ED
  - Farmers Conservation Alliance
  - Science Communicator/Content Creator RFP
- Admin:
  - All bills paid
  - Newsletter and Annual Appeal out soon

Steering Committee Report – Jim Hagenbarth, Chair; Dean Peterson, Vice-Chair; Steve Luebeck, Treasurer; and Roy Morris, Secretary
- The Steering Committee is pleased with the progress BHWC is making.

Communications and Wildlife Report – Tana Lynch, Associate Director
- Communications:
  - Events:
    - Recent:
      - Patagonia tabling event
        - October 24th, Dillon
    - Upcoming
      - UMW Community Water Conversations panel
        - December 3rd, Dillon
  - Publications:
    - *Ripples of Change: The Impactful Work of the Big Hole Watershed Committee*
      - International Business Times, May 31st
    - *The Fish: An Uncertain Fate of Arctic Grayling in Montana*
      - Montana Kaimin, November 4th
    - Fall Newsletter coming soon!
- Wildlife Program Update:
  - Funding:
    - *Partnership Provides Historic Funding for Conflict Prevention in Montana*
      - Montana Fish, Wildlife and Parks, October 29th
    - NRCS Regional Conservation Partnership Program (RCPP)
      - 5-year funding:
        - Range Riding (starting 2025)
        - Carcass Removal (starting 2026)
      - Reimbursed directly to producer
        - Could potentially sign over portion of payment to BHWC in exchange for range riding/carcass services
      - Contact Tana if interested in learning more
    - NFWF America the Beautiful Challenge grant
      - 4-year funding

New Business
- None

Break – 10 minutes

Meeting Topic:
Wildlife in the Big Hole Watershed

Presented by:
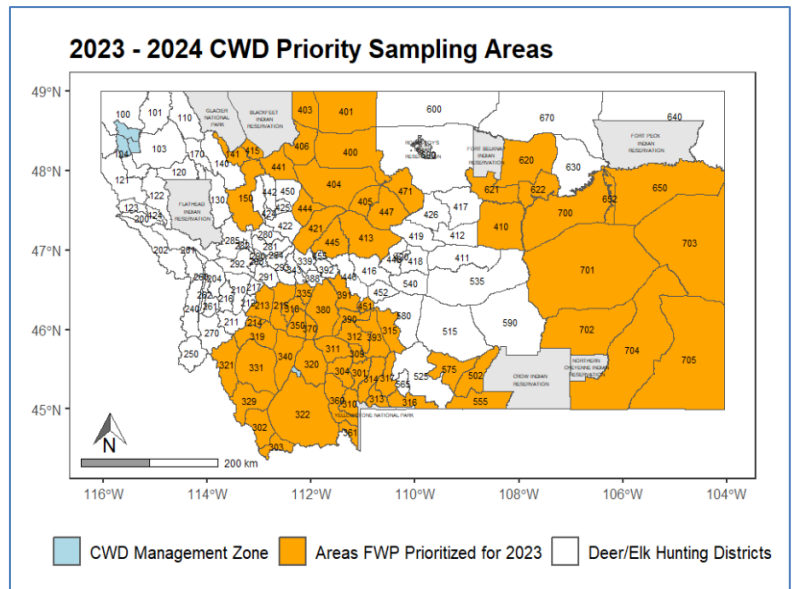Vanna Boccadori and Jesse Newby
Montana Fish, Wildlife and Parks

Vanna Boccadori, Butte Area Wildlife Biologist – Montana Fish, Wildlife and Parks
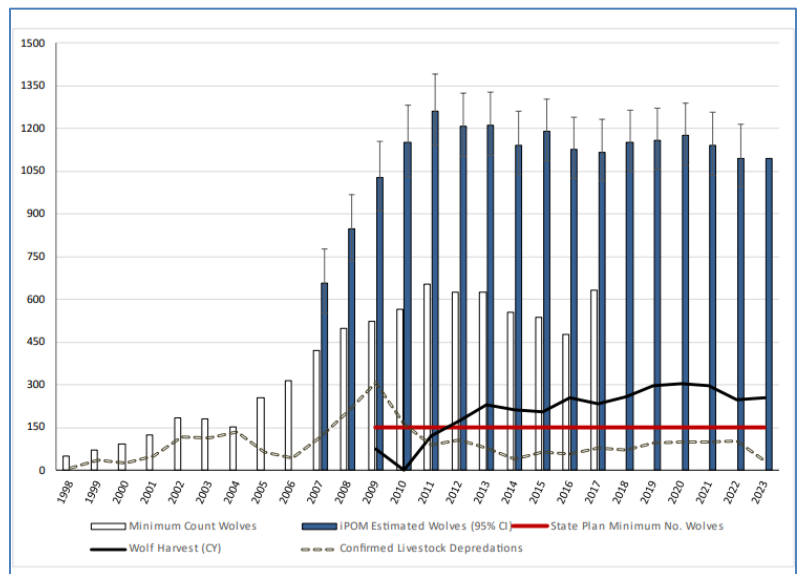- Highland Bighorn Sheep Project

- o Collaborators:
  - Dr. Kelly Proffitt, FWP
  - Dr. Dan Walsh, Wildlife Coop Research unit
  - Kaitlyn Vega, U of M PhD student
- o Problem: Chronic pneumonia suppressing Highlands bighorn sheep population
- o Objective: Evaluate the effects of test and removal of animals chronically shedding *Mycoplasma ovipneumoniae (M. ovi)* bacteria.
- o Desired Outcome:
  - Increased lamb survival
  - Improved population performance
- o Five sub-herds:
  - Foothills (est. group size 25)
    - 17 adults/0 lambs/10 neonates collared
    - 13F/13M adults sampled
  - Red Mountain (25)
    - 18 adults/4 lambs/8 neonates
    - 14F/5M
  - Notch Bottom (30)
    - 20 adults/4 lambs/26 neonates
    - 19F/7M
  - Lamarche (11)
    - 10 adults/ 0 lambs/ 12 neonates
    - 8F/1M
  - Sheep Mountain (20)
    - 13 adults/1 lamb/19 neonates
    - 10F/3M
- o Methods:
  - ***Mycoplasma ovipneumoniae (Movi)*** = predisposes animal to pneumonia
  - **ELISA** – serum test for antibodies = exposure
  - **PCR** – nasal/tonsil swab for bacteria = active infection
  - ***Movi* Strains –** BHS-029 Yellowstone   BHS-092 not previously known in MT
- o Timeframe:
  - YEARS 1-3: capture, collar and test
  - YEARS 3-4: remove chronic shedders
  - YEAR 5: monitor lamb survival and herd health

Subherd	Year	Samples	ELISA Positive	Movi Detected	NInd	BHS-029	BHS-092
Foothills	2022	13	0.615	0.154	0	1	0
La Marche	2022	7	0.714	0.286	0	0	1
Notch Bottom	2022	21	0.476	0.143	4	0	1
Sheep Mountain	2022	13	0.692	0.154	1	1	0
Foothills	2023	15	0.667	0.467	1	1	4
La Marche	2023	7	0.714	0.571	1	1	2
Notch Bottom	2023	26	0.500	0.308	3	3	1
Red Mountain	2023	22	0.818	0.636	2	12	0
Sheep Mountain	2023	16	0.562	0.438	1	1	4
Foothills	2024	7	0.143	0.286	0	1	1
La Marche	2024	10	0.800	0.700	0	6	0
Notch Bottom	2024	25	0.200	0.120	1	0	0
Red Mountain	2024	14	0.500	0.000	1	0	0
Sheep Mountain	2024	11	0.818	0.273	0	1	0

- o Currently in Year 3:
  - Identified 7 chronic shedders (all ewes)
  - 3 died (various causes)
  - Removed 4
- o Next immediate steps:
  - Winter capture, sample and collar

- Neonate captures in spring
- Chronic Wasting Disease (CWD):
    - In 2023-24, FWP tested 7188 samples:
        - Mule deer (n=2926)
        - White-tailed deer (n=3258)
        - Elk (n=968)
        - Moose (n=36)
    - Of these, 238 animals tested positive:
        - 86 Mule deer
        - 151 White-tailed deer
        - 1 elk
    - In 2023, CWD was detected in 3 new hunting districts: 213, 471, 703.
    - CWD prevalence in white-tailed deer (WTD):
        - 30% in HD 322
        - 13% in HD 340
    - Patterns in prevalence:
        - Ad Male MD = Ad Male WTD
        - Ad Female MD 0.3 x Ad Female WTD
        - Ad Males slightly higher risk than Ad Female
        - Adults > Yearlings > YOY
- Wolf Management 2023
    - Population:
        - iPOM (occupancy, territory size, pack size)
        - 1,096 wolves (95% C.I. = 993 – 1,210)
    - Harvest:
        - 254 wolves (144 in spring, 110 in fall)
        - Wolf hunting licenses generated $285,282
    - Livestock Loss:
        - 32 (23 cattle, 8 sheep, 1 guard dog)
        - $42,842 paid out
- Sarcocystosis:
    - Protozoan infection. Affects muscles. Looks like grains of rice.
    - Has been seen in McCartney Mtn elk herd.
    - 2-host lifecycle
        - Definitive host (carnivore/scavenger) – sheds parasite oocysts in feces
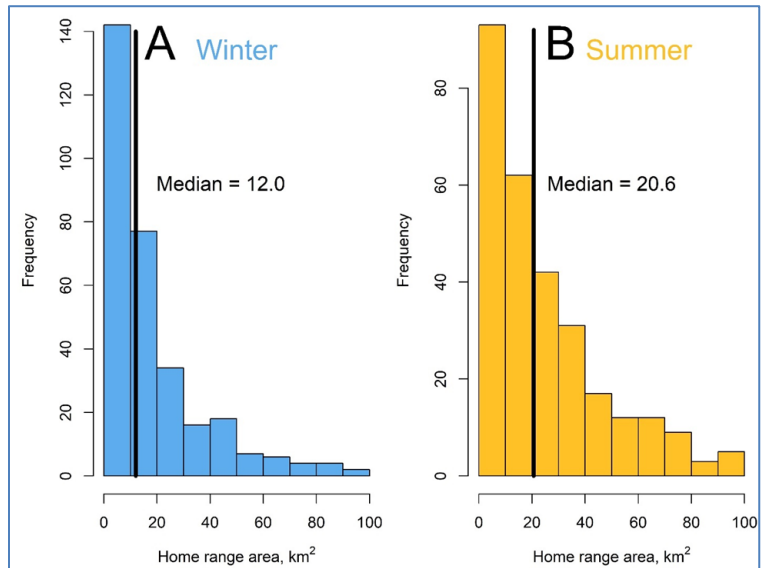   - Intermediate host (prey)-ingests oocysts which transform and eventually migrate to muscle.

2023 - 2024 CWD Priority Sampling Areas

CWD Management Zone | Areas FWP Prioritized for 2023 | Deer/Elk Hunting Districts

Minimum Count Wolves | iPOM Estimated Wolves (95% CI) | State Plan Minimum No. Wolves
Wolf Harvest (CY) | Confirmed Livestock Depredations

o   Humans – definitive host. Not likely to get infected if meat cooked properly.

<u>Jesse Newby, Dillon Area Wildlife Biologist, Montana Fish, Wildlife & Parks</u>
- Montana Mountain Lion Monitoring and Management Strategy
- Highlights from 10-year moose research project

   o   2011 FWP report prompted study by showing:
       - Lower hunter success
       - Increased effort to harvest moose
       - Kills per efforts had fewer kills per effort
       - Reduction available permits since the 1990s
   - Decline in calf to adult ratios
   o   Final report is now out:
       - DeCesare NJ, Peterson CJ, Newby JR, Harris RB. 2024. Ecology, population dynamics, and monitoring of moose in Montana. Final report for Federal Aid in Wildlife Restoration Grant W-157-R. Montana Fish, Wildlife and Parks, Helena, Montana.
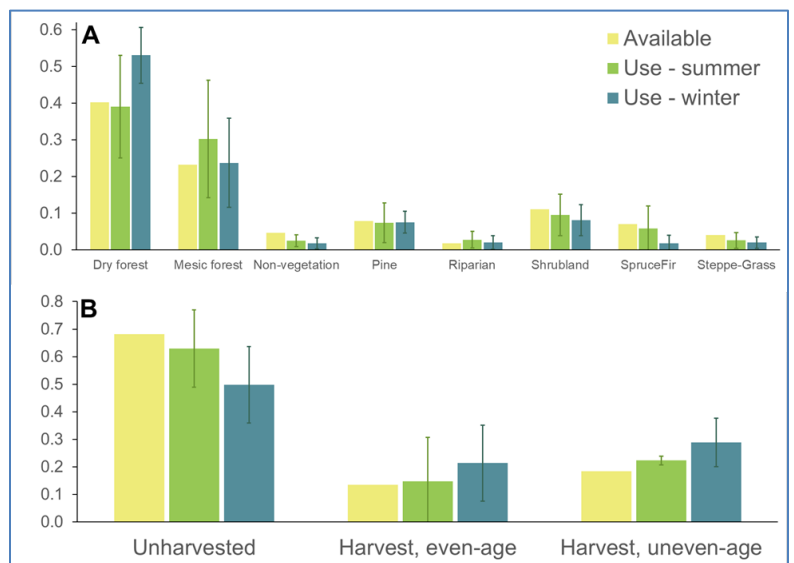

   o   FWP Montana moose study (2013-2023):
       - Monitoring: Evaluate monitoring strategies
       - Population dynamics: Vital rates and limiting factors
   o   Three study areas:
       - Cabinet-Salish Mountains
       - Rocky Mountain Front
       - Big Hole Valley
   o   Capture and monitoring:
       - Protozoan infection. Affects muscles. Looks like grains of rice.
       - Has been seen in McCartney Mtn elk herd.
       - 2-host lifecycle
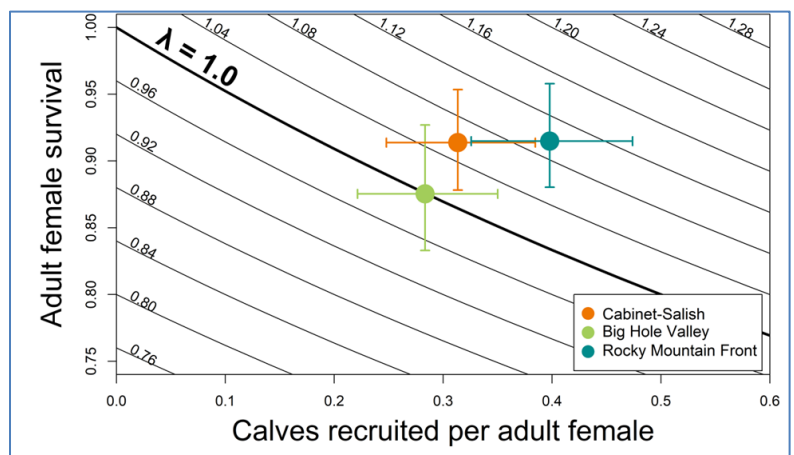
- Definitive host (carnivore/scavenger) – sheds parasite oocysts in feces
- Intermediate host (prey)-ingests oocysts which transform and eventually migrate to muscle.
- Humans – definitive host. Not likely to get infected if meat cooked properly.
  - Cow moose space use
  - Seasonal habitat use in NW Montana
    - Resource Selection Function:
      - Topography
      - Vegetation
      - Distance to water
      - Distance to highway
      - Timber harvest
    - + Functional response to burns
    - + *Ceonothus* and willow growth
    - + Thermal Landscape
  - Population growth rates: 2013-2023
 - Questions for Montana's moose
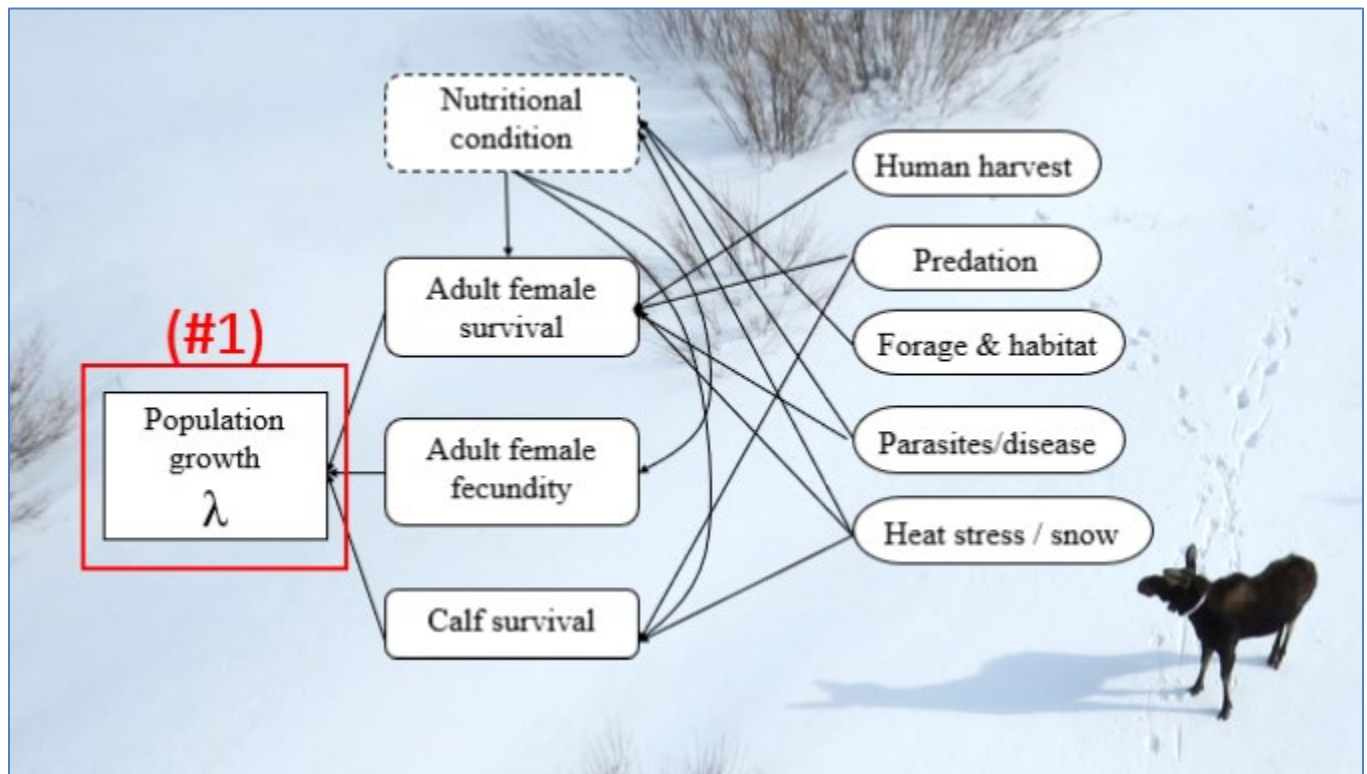
  - Forage nutrition – seasonal diet

- o Forage nutrition – digestible energy in moose diets
  - ▪ In summer, Cabinet-Salish and Rocky Mountain Front moose have more digestible energy in their foods than Big Hole moose. In the winter, Big Hole moose have much less digestible energy in their food than in summer, but more than the Rocky Mountain Front population.

Taxa	Common name(s)	Summer	Winter
Big Hole			
Salicaceae family	willow spp.	80.42	69.13
Pinaceae family	lodgepole pine, subalpine fir, Douglas fir, …	4.79	2.51
Rosaceae family	serviceberry, potentilla, …	3.61	
Betulaceae family	bog birch	2.57	1.17
Poaceae family	multiple rangeland grass species	1.49	12.47
Ribes spp.	currant	1.18	3.69
Cyperaceae family	sedges		3.15
Juncaceae family	rushes		2.6

- o Parasitism:
  - ▪ *Eleaphora schneideri*
    - • Worms in moose arteries
    - • Uncertain if parasitism kills moose but it is definitely a contributing factor. Difficult to study because moose must be dead to check for *Eleaphora*.
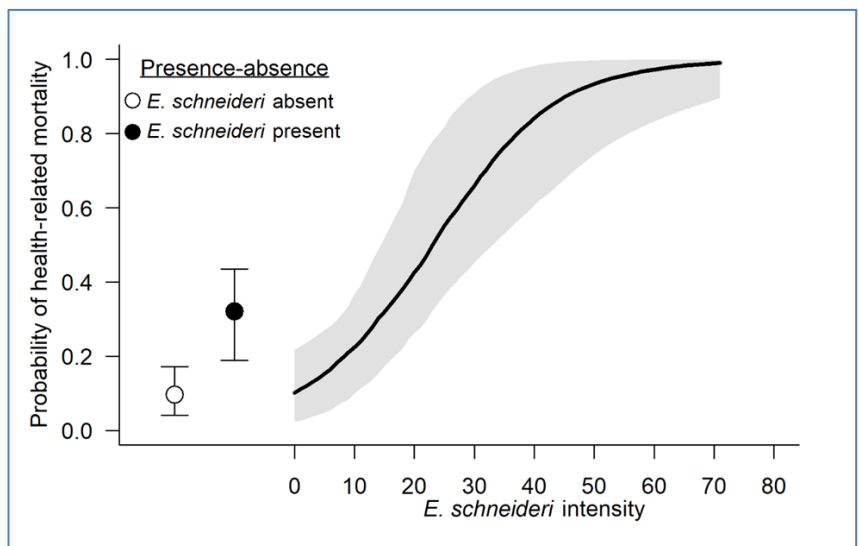

- - o Moose with *Eleaphora* infection are 4.3X more likely to have health-related mortality.
    - o For every 10 worms, ~2.4X likelihood of health-related mortality.
- o Predation – predator density
- o Vital rate estimates:
  - ▪ Adult survival: n=~612 moose-years
  - ▪ Pregnancy (n>619) via fecal progesterone

| Species	Cabinet-Salish	Big Hole Valley	Rocky Mtn. Front	Total
Focal predator species				
Black bear	10,780	1,755	1,876	14,411
Grizzly bear	668	44	3,602	4,314
Mountain lion	2,892	125	1,459	4,476
Wolf	3,463	731	1,180	5,374

- Parturition and litter size via spring flights
- Calf survival (n=3,715) via calf-at-heel for 1 year
- Adult fem survival monitoring is one reason why long-term research is needed. If you're trying
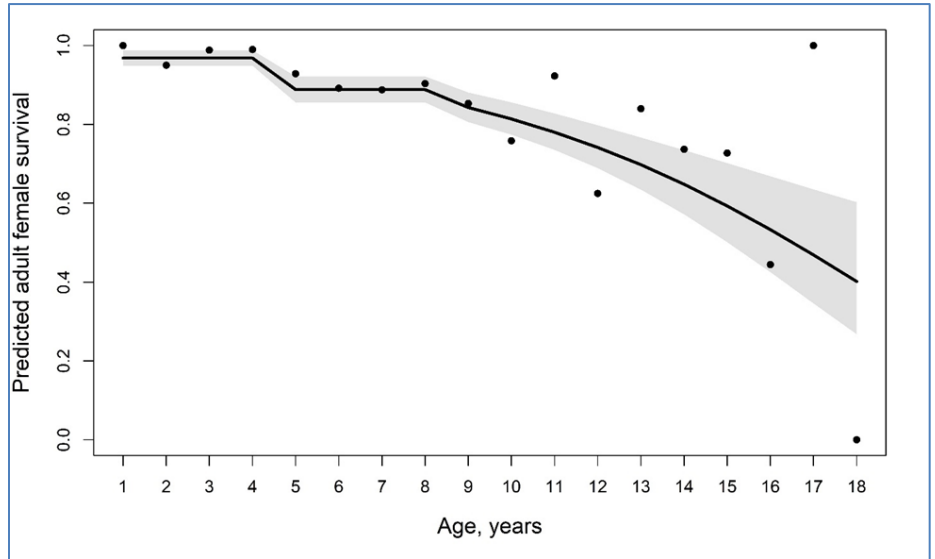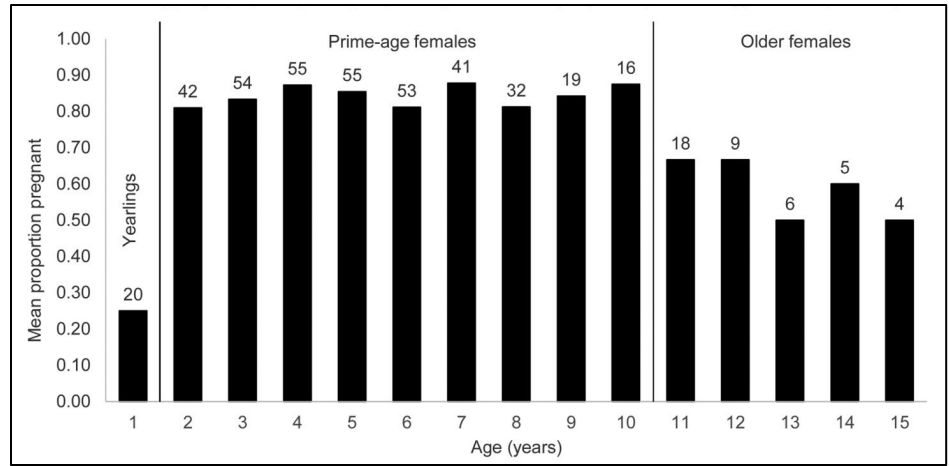

to understand mortality, you need to monitor them for quite a while, because they are long-lived species and to get adequate samples you need to keep on them for a long time.

- Adult survival
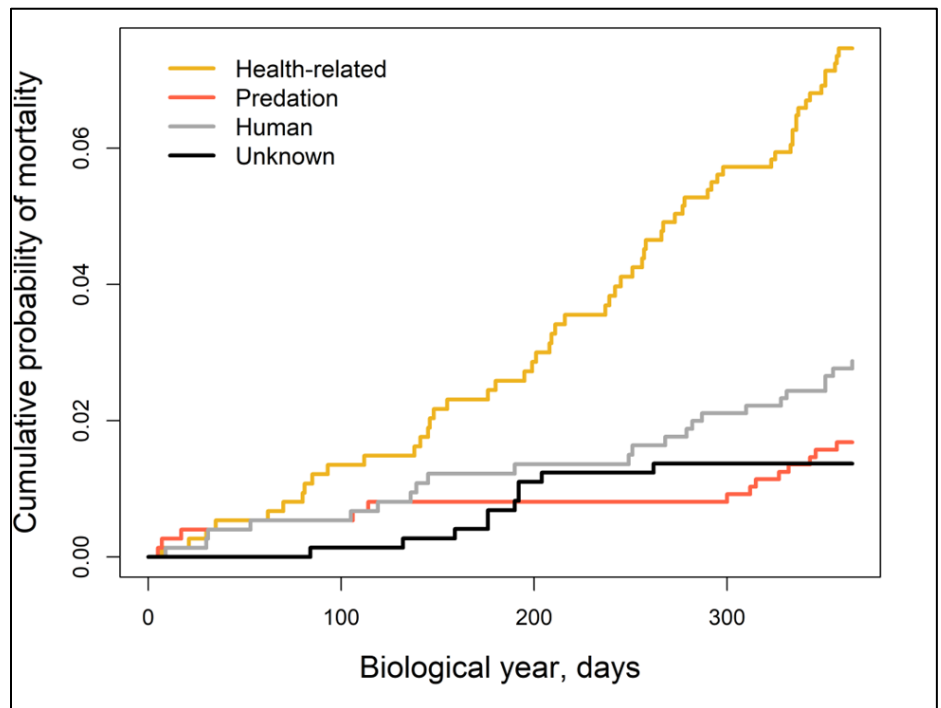
- Fecundity

- Calf mortality

Parameter	β_{std}	85% CI
Annual		
Maternal age ≥10	0.750	(0.529, 0.971)
Fetal-neonatal		
Predators: black bear + wolf	0.203	(0.040, 0.366)
Summer		
Maternal calves recruited$_{t-1}$	0.393	(0.230, 0.557)
Predators: black bear + grizzly bear + mountain lion + wolf	0.406	(0.183, 0.630)
Fall-winter		
Snow water equivalent	0.186	(0.029, 0.343)
Predators: black bear + mountain lion + wolf	-0.156	(-0.301, -0.011)

- Relative effects of factors on population growth
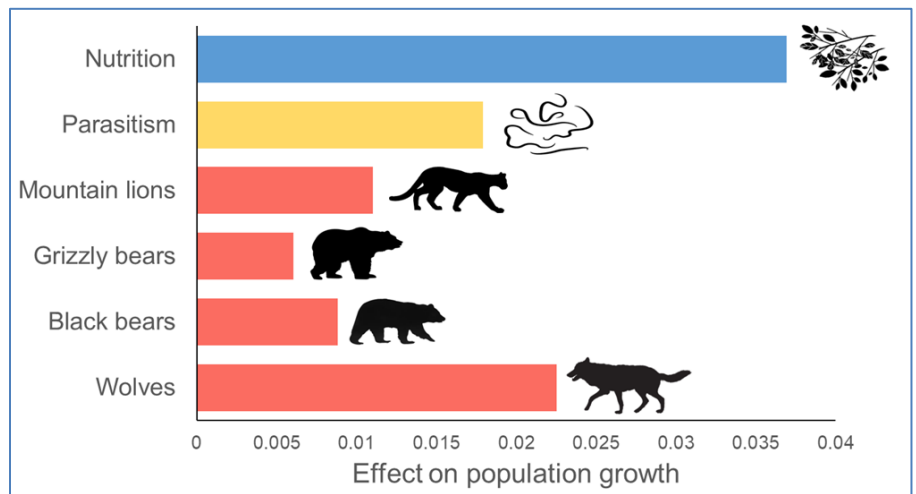   - Perturbation analysis
- Follow up monitoring in the Big Hole
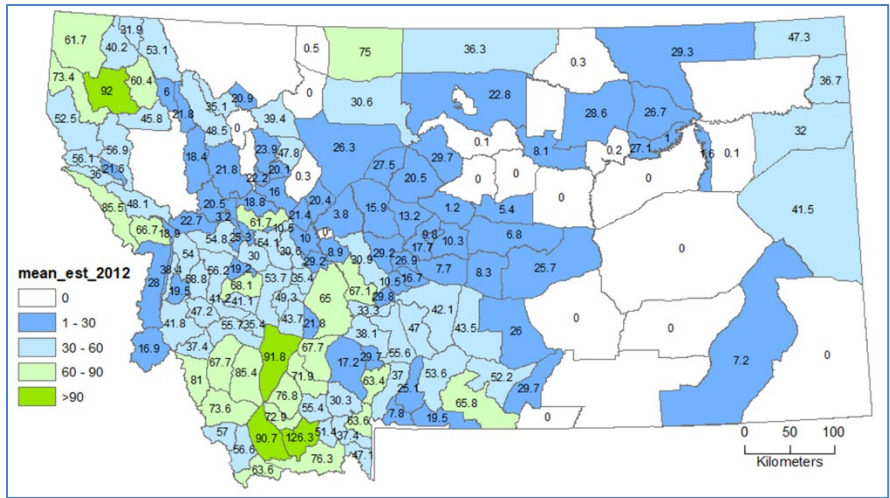   - Moose as secondary host
- Monitoring:
    - Moose POM (hunter sightings from phone surveys)
        - 5 years (2012-2016)
        - ~45,000 hunters/year
        - ~4,000 observations/year
        - ~$14,000 per year

- ▪ Moose PAM (Patch Abundance Models)
  - • Work in progress
  - • N-mixture models w/ counts
  - • Various ways to sum up counts while accounting for repeat sightings

  - • Next steps:
    - ○ Complete modeling
    - ○ Review of process and output by area bios and managers
  - • Other possibilities:
    - ○ Camera-based density estimation
- ○ Future work:
  - ▪ Monitoring:
    - • Complete PAM, sightings model
    - • Link PAM to vital rates w/IPM
    - • Genetics studies, *A. a. shirasi*
  - ▪ Population Dynamics:
    - • Monitoring full suite of vital rates
    - • Vital rate sensitivity analysis
    - • Carnivore occupancy analysis
    - • Blood test for *Elaeophora*
    - • Habitat selection studies w/GPS
  - ▪ Other directions?
    - • Forage nutrition studies
    - • *Elaeophora* studies
    - • Calf survival studies
    - • Alternate monitoring techniques
- ○ Take Home Points
  - ▪ Stable populations
    - • High adult survival
    - • Annual fluctuations are driven by survival of young
  - ▪ Declining populations
    - • When adult survival is low, populations decline
    - • Survival of young less important

Upcoming Meetings
- • BHWC does not meet in December
- • Wednesday, January 15, 2025: **BHWC Annual Business Meeting**

- o 11:00 AM at Fairmont Hot Springs Resort
  - o *For board and staff only*
- Wednesday, February 19, 2025: **BHWC Monthly Meeting: BHRF Water Quality and Invertebrate Monitoring**
  - o 6:00 PM at the Divide Grange Hall

Adjourn