IGBC Science Subcommittee

2023 IGBC WINTER MEETING



Photo: Jake Davis

Science Subcommittee members

- Hilary Cooley (USFWS)
- Cecily Costello (MTFWP-NCDE)
- Jennifer Fortin-Noreus (USFWS-BE)
- Scott Jackson (USFS)
- Wayne Kasworm (USFWS-SE/CYE)
- Katie Oelrich (IDFG-BE)
- Michael Proctor (Canada)
- Abby Sage (USFWS-NCE)
- Frank T. van Manen (USGS-GYE)

Science varies among ecosystems

- History
- Contextual differences
 - Habitat
 - Population status
 - Accessibility
 - Land use
 - Land management
 - Jurisdictions
 - Recreation
 - Others



Standardization of data

Occupied range (formalized in Costello et al. 2023)

A Summary of Grizzly Bear Distribution in Montana: Application of Consistent Methods in 2022

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Understanding and communicating knowledge about the distribution of grizzly bear populations in the lower-48 States, including Montana, is important for their conservation, management, and for public safety. Previously, our research teams working in grizzly bear ecosystems in the lower-48 States used varying methods to estimate distribution of grizzly bear populations. In the Greater Yellowstone Ecosystem (GYE) and Northern Continental Divide Ecosystem (NCDE), zonal analysis and ordinary kriging were applied to an array of grid cells with or without verified presence of grizzly bears, however the parameters of the methods varied between the two ecosystems. In the Cabinet-Yaak Ecosystem and the Selkirk Ecosystem (SE), population distribution was mapped as the Recovery Zone plus "bears outside of (10007) cross (Allen 2011) Additionally, the U.S. Fish and Wildlife Service developed a "may be present" to help agencies or prospective



Available from MT FWP website: Grizzly bear distribution report (mt.gov)

Photo: Steve Ard

2023 Status Update

THE BIG PICTURE

Photo: Jake Davis

The Big Picture

4 Recovery Zones with occupied range

Southern extent of occupied range in North America





Population – size and trend



C-YE: Population estimate (2022): 60–65 Rate of growth (1983–2022): 1.6% **NCDE**: Population estimate (2022): ~1,138 Rate of growth (2004–2014): 2.3%



SE: Population (BC + US) estimate (2022): 80–90 Rate of growth (1983–2022): 2.6%



Sources: Proctor et al. 2012; Gould et al. 2023; Costello et al. 2016, 2023; Kasworm et al. 2023a, 2023b

Habitat security – metrics

Ecosystem	Public lands in Recovery Zone	Protected lands in Recovery Zone ^a	Private land - % in easements or land trusts
GYE	98%	82%	35% in RZ 34% out RZ/in DMA
NCDE	93%	84%	45% in RZ 28% in Zone 1 11% in Zone 2
C-YE	98%	44%	
SE (US portion)	97%	3.5%	
BE	99.9%	98%	
NCE	90%	74%	13% in RZ

^a Includes designated and defacto wilderness + Inventoried Roadless Areas

Source: USFWS 2021

Conservation

easements



Occupied range – area and trend



Sources: Costello et 2023; Kasworm et al. 2023a, 2023b; Dellinger et al. 2023

Combined range

Total occupied range:

149,018 km² (57,536 mi²)

Total extent of occurrence ("maybe present" range):

230,586 km² (89,030 mi²)



Transboundary area

Occupied range contiguous with Canadian populations for 3 ecosystems



Sources: Proctor et al. 2012, 2015; USFWS 2023

Connectivity

Movement pathways for female grizzly bears

- Directed (left)
- Undirected (right)



Download maps: https://doi.org/10.5066/P91EWUO8

Source: Sells et al. 2023

Connectivity



Sources: Costello et al. 2022, 2023

Connectivity





Sources: Kasworm et al. 2023a, 2023b

Ongoing and recent science

Demographics: Selkirk BC and US population estimate; detecting birth events using activity data (NCDE, GYE, Gates of the Arctic Park and Preserve); density estimation using cameras in YNP (GYE, with MSU); unmarked spatial capture-recapture (GYE, with USGS-ESC)

Habitat: connectivity modeling; habitat modeling and connectivity areas (SE+CYE, with UI); effectiveness of BMAs in YNP (GYE, with MSU); effects of forest management and wildfire disturbance on habitat selection and movements (NCDE, UM); huckleberry mapping for SE+CYE

Bear ecology: dispersal (NCDE); drivers of birth timing (NCDE, GYE, Gates of the Arctic Park and Preserve); post-den movements to identify females with cubs (NCDE, GYE; with FWS Polar Bear Program)

Genetics: SE+CYE (with UI); grizzly bear genome project (with WSU)

Activity: activity rhythms (GYE + European populations, with Univ. Rome-La Sapienza); activity patterns (GYE, with Univ. Rome-La Sapienza); accelerometer data to predict bear behaviors (GYE + Alberta, with WSU, fRi)

Human-bear interactions and conflict: Proctor et al. 2023 (monograph); responses to residential human-bear conflicts (NCDE, southern BC); grizzly bear use of grain bins (NCDE); efficacy of guard dogs to reduce human-bear conflict (NCDE, with Utah State University); efficacy of scare devices to reduce human-bear conflict (NCDE); spatiotemporal patterns of livestock depredation (GYE, with UC-Berkeley)

Social science: comment analysis of 2018 DEIS and survey (NCE, with U-Mich); Montana human dimensions studies (with UM)

Recreation: responses to recreational activities in YNP (GYE, with MSU)

Climate change: YNP grizzly bear foods and demographics (GYE, with MSU)

Subcommittee Science priorities

- Integrated population models (GYE; NCDE, C-YE/SE BC; ongoing).
- 2. Mortality risk assessment outside Recovery Zones (all ecosystems; future research).
- **3.** Impacts of non-motorized recreation/trail use (all ecosystems; future research).
- 4. Prioritization of potential conservation areas/actions (areas in between; use Sells et al. 2023)
- 5. Natural recolonization of the Bitterroot Ecosystem (Sells et al. 2023 + ongoing work)

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