Climate change: Can Wyoming’s wildlife cope?

Embere Hall, PhD
Wyoming Cooperative Fish & Wildlife Research Unit
University of Wyoming
Climate and ecological systems

Shapes temperature, moisture, resource availability

Key factor in where we find animals on the landscape, how many are there, and how well they survive

John Henningsen
2016: **Warmest** year on record (since 1880)

15 of 16 warmest years occurred since 2000
Average January minimum temperature departure
(1951-2014)

Data Source: PRISM Group, Oregon State University. Girvetz et al. (2009)
Winners & losers

12 time NBA All-Star
5 time MVP
Olympic gold medalist
Winners & losers

S. Torbit
Vulnerability

**Sensitivity**: intrinsic sensitivity (e.g. physiological tolerances)

**Exposure**: degree of regional climatic change

**Adaptive capacity**: capacity to cope with change
900% in production in dry years

80% moderate or highly vulnerable
Vulnerability

**Sensitivity**: intrinsic sensitivity (e.g. physiological tolerances)

**Exposure**: degree of regional climatic change

**Adaptive capacity**: capacity of a species (or populations) to cope with change
Vulnerability

Sensitivity
(25° C)

Exposure
4 F in annual temp over past 50 years

Adaptive Capacity?
Vulnerability

Sensitivity

Exposure

Adaptive capacity
Observed global temperature

Adapted from IPCC. 2014. Synthesis report
Projected global temperature

Adapted from IPCC. 2014. Synthesis report

Mean over 2081–2100

Adapted from IPCC. 2014. Synthesis report
Emission scenarios

Adapted from IPCC. 2014. Synthesis report
Adapted from IPCC. 2014. Synthesis report.
There’s still time...

Adapted from IPCC. 2014. Synthesis report
Final thoughts

Climate change is happening in Wyoming

It affects nearly all wildlife species

New problem that requires new thinking: Adaptive management, collaboration, uncertainty

Way forward that moderates exposure and promotes resilience
Adapted from IPCC. 2014. Synthesis report

**Annual emissions (GtCO\(_2\)/yr)**

**Year**

**WGIII scenario categories:**
- >1000
- 720–1000
- 580–720
- 530–580
- 480–530
- 430–480

**RCP scenarios:**
- RCP8.5
- RCP6.0
- RCP4.5
- RCP2.6

Adapted from IPCC. 2014. Synthesis report
Minimum temperature departure from normal (2000-2011)

Annual temperature departure from normal (2000-2011)