

# Table S2. Climate Scenarios by 2050 for the White-tailed Ptarmigan Range in Northern Colorado

The summary table below describes changes in the future climate by 2050 (2040-2069) relative to the 1971-2000 period under three climate scenarios: **Very Hot and Dry** (IPSL-CM5A-MR.rcp85), **Hot** (CCSM4.rcp45), and **Hot and Very Wet** (MIROC5.rcp45)

Climate Metric	Time Period	Very Hot and Dry	Hot	Hot and Very Wet	Historical Value
Mean Temperature (°F)	Annual	8	4	6	30 °F
	Winter	6	3	4	14 °F
	Spring	6	3	8	28 °F
	Summer	8	4	3	49 °F
	Fall	8	5	5	31 °F
Precipitation (%)	Annual	-8	6	6	31 inches
	Winter	6	16	4	8 inches
	Spring	-16	11	12	10 inches
	Summer	-16	3	16	7 inches
	Fall	2	3	0	6 inches
Daytime Maximum Temperature (°F)	Annual	7	4	5	42 °F
	Winter	6	3	4	25 °F
	Spring	7	4	8	40 °F
	Summer	8	5	3	60 °F
	Fall	8	5	5	42 °F
Daytime Minimum Temperature (°F)	Annual	7	4	5	19 °F
	Winter	7	4	5	3 °F
	Spring	6	3	7	16 °F
	Summer	8	4	4	37 °F
	Fall	7	4	4	21 °F
Snow Water Equivalent (%)	January 1	-19	6	-19	5 inches
	April 1	-9	3	-2	12 inches
	May 1	-27	1	-29	15 inches
Soil Moisture (%)	Spring	0	-2	15	10 inches
	Summer	-25	-3	-16	16 inches
	Fall	-27	-14	-14	11 inches
Potential Evapotranspiration (%)	Summer	22	11	10	15 inches
	Fall	61	34	39	4 inches

Climate Metric	Very Hot and Dry	Hot	Hot and Very Wet	Historical Value
Coldest Winter Day (°F) (warmer relative to historical by °F)	-12 (7)	-16 (3)	-14 (5)	-19
Hottest Summer Day (°F) (warmer relative to historical by °F)	77 (8)	74 (5)	73 (4)	69
#Days with daytime low above 32°F (increases in #days)	143 (44)	123 (24)	135 (36)	99
First Fall Freeze (later relative to historical by #days)	Sep 21 (49)	Sep 16 (44)	Sep 10 (38)	Aug 3
Last Spring Freeze (earlier relative to historical by #days)	May 31 (19)	Jun 14 (5)	Jun 14 (5)	Jun 19
Growing Season Length (#days) (higher relative to historical by #days)	113 (68)	94 (49)	88 (43)	45
Growing Degree Days (°F; 32°F base)	3575	2864	3083	2127
Frequency of Severe Drought like 2002	Every other year	Every 2-3 years	Every 3 years	-
Duration of Severe Drought like 2002	1-5 years	1-4 years	1-2 years	1 year
"High" Fire Danger Days (higher relative to historical by #days)	115 (42)	83 (10)	81 (8)	73
"Very High" Fire Danger Days (higher relative to historical by #days)	70 (33)	45 (8)	43 (6)	37
"Extreme" Fire Danger Days (higher relative to historical by #days)	34 (23)	17 (6)	11 (0)	11

<b>Very Hot and Dry</b>	<ul style="list-style-type: none"> <li>• Very large increase in summer and fall temperatures (8°F) with substantial reduction in spring (-15%) and summer (-15%) precipitation</li> <li>• Hottest summer daytime high increases by 8°F; severe drought every other year with extreme drought conditions lasting up to 5 years</li> <li>• Large reduction in spring snowpack (May 1 SWE is 25% lower)</li> <li>• Growing season increases by more than 2 months; "High" fire danger days increase by ~40 days</li> <li>• Summer precipitation decreases significantly, but 20% more intense rainfall events when they occur</li> </ul>
<b>Hot</b>	<ul style="list-style-type: none"> <li>• Moderate increase in annual temperature (4°F) but no change in summer precipitation</li> <li>• Hottest summer daytime high increases by 4°F; severe drought every 2-3 years with extreme drought conditions lasting up to 4 years</li> <li>• No change to slight increase in spring snowpack b/c of increases in winter and spring precipitation</li> <li>• Growing season increases by ~50 days and "High" fire danger days increase by 10 days</li> <li>• 10% more intense rainfall events</li> </ul>
<b>Hot and Very Wet</b>	<ul style="list-style-type: none"> <li>• Least increase in summer daytime high temperature (3°F) but very warm springs (8°F), and large increase in summer precipitation (+15%)</li> <li>• 40% increase in spring precipitation and a high proportion of that falling as rain</li> <li>• Severe drought every 3 years with extreme drought conditions lasting up to 2 years</li> <li>• Growing season increases by ~40 days and "High" fire danger days increase by 1 week</li> <li>• 10% more intense rainfall events</li> </ul>

Values and projected changes described above are for the location at **39.7708°N; 105.9069°W** and a mean elevation of **11,521 ft**. Winter is Dec, Jan, Feb; Spring is Mar, Apr, May; Summer is Jun, Jul, Aug and Fall is Sep, Oct, Nov. Dataset: MACA metdata v2 (4-km downscaled climate projections), VIC (v4.1.2) forced by MACAv2-LIVNEH (6-km hydrology projections) and gridMET (4-km historical).