ONE-PAGE PLACE ASSESSMENT: CASTLE ROCK, COLORADO

LOCATED IN THE SOUTH PLATTE SUBWATERSHED WITHIN THE MISSOURI WATERSHED

CLIMATE ⚐1

AVERAGE HIGH & LOW TEMPERATURES[1] — 1893 – 2013

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
°F HIGH	45.1	46.0	52.4	59.8	69.1	79.3	85.1	83.3	76.7	65.7	53.9	44.9	63.4
°F LOW	13.3	15.1	21.7	29.6	38.5	46.8	52.5	50.6	42.2	31.3	21.5	13.0	31.3
°C HIGH	7.3	7.8	11.3	15.4	20.6	26.3	29.5	28.5	24.8	18.7	12.2	7.2	17.4
°C LOW	-10.4	-9.4	-5.7	-1.3	3.6	8.2	11.4	10.3	5.7	-0.4	-5.8	-10.6	-0.4

RECORD HIGH[1]: 100° F | 37.8° C | *June 27, 2012*

RECORD LOW[1]: -37° F | -38.3° C | *January 6, 1913*

SUN ⚐2

LATITUDE: 39.4°

ELEVATION: 6,229 FT / 1,899 m

	MAR 21	JUN 21	SEP 21	DEC 21
DEGREES N or S of DUE EAST THE SUN RISES[2]	0°	32°N	0°	30°S
DEGREES N or S of DUE WEST THE SUN SETS[2]	0°	32°N	0°	30°S
SOLAR-NOON ALTITUDE ANGLE (ABOVE HORIZON)[a,2,3]	51°	74°	51°	27°

SOLAR-NOON WINTER-SOLSTICE SHADOW RATIO[b]: 1 : 1.95 ...AND AZIMUTH[c]: 0°

9AM & 3PM WINTER-SOLSTICE SHADOW RATIO[b,2]: 1 : 3.87 ...AND AZIMUTH[c,2]: 42°

WIND ⚐3

MAX SPEED[6]: MPH | km/h

PREVAILING WIND DIRECTION (FROM WHERE)[4] & AVERAGE SPEED[5]

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
MPH													
km/h													

WATER ⚐4

AVERAGE RAINFALL (GAIN)[1] — 1893 – 2013

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
INCHES	0.48	0.61	1.34	1.93	2.29	2.00	2.56	2.21	1.12	1.14	0.74	0.72	17.14
mm	12.2	15.5	34.0	49.0	58.2	50.8	65.0	56.1	28.4	29.0	18.8	18.3	435.4

AVERAGE PAN EVAPORATION (POTENTIAL LOSS)[d,7]

INCHES													
mm													

WETTEST YEAR'S RAIN[1]: 30.39 INCHES | 771.9 mm | *1965*

DRIEST YEAR'S RAIN[1]: 11.40 INCHES | 289.6 mm | *1966*

LONGEST PERIOD WITH NO MEASURABLE PRECIPITATION[8]: 68 DAYS: *November 7, 1990 – January 15, 1991*

RAINFALL INCOME[e]: 537 GPCD / 2033 lpcd

AREA[f,9]: 33.79 SQ MILES / 87.5 km²

POPULATION[f,9]: 51,348 *2012 est.*

UTILITY-WATER USE[10]: GPCD / lpcd

HISTORICAL | DEPTH TO GROUNDWATER[g,11] | CURRENT

CURRENT GROUNDWATER EXTRACTION

NATURAL GROUNDWATER RECHARGE[h,i,12,13]

WATERGY ⚐5

of AVG [STATE] HOMES THAT COULD BE POWERED W/ ENERGY USED TO MOVE & TREAT [CITY'S] WATER[14]

TOTEM SPECIES ⚐6

PLANT: MAMMAL:

FISH: BIRD: REPTILE:

AMPHIBIAN: MEGAFAUNA:

FOR MORE INFORMATION & HOW TO APPLY IT

⚐**1.** For more CLIMATE information, see the introduction, chapters 1, 2, & 4, and appendix 5 of *Rainwater Harvesting for Drylands and Beyond (RWHDB), Volume 1, 2nd Edition*

⚐**2.** For more SUN information, see chapters 2 & 4 and appendices 5 & 7

⚐**3.** For more WIND information, see chapters 2 & 4 and appendices 5 & 9

⚐**4.** For more WATER information, see the introduction, chapters 1–4, and appendices 1–5

⚐**5.** For more WATERGY information, see chapters 2 & 4 and appendix 9

⚐**6.** For more TOTEM SPECIES information: the ethics, principles, and strategies throughout *RWHDB* help us shift from a negative to a positive impact on these species and their habitats and ecosystems, on which our quality of life also depends.

CASTLE ROCK PLACE-ASSESSMENT NOTES

a. Altitude angle (a.k.a., elevation angle) refers to the number of degrees the sun is located above the horizon at a given time and date.

b. The solar-noon winter-solstice shadow ratio is the object's height : length of object's shadow cast on December 21 at noon (the longest noontime shadow of the year). The ratio is 1 : x, where x = 1 ÷ tangent (90 - (latitude + 23.44)).

c. Azimuth is the angle formed between a reference direction (here, due south) to the point on the horizon directly below a given object. Solar noon is the time on any day when the sun's azimuth is 0°. The 9 am & 3 pm winter-solstice azimuth indicates the sun's deviation, in degrees, east/west of due south at those times (–/+ 3 hours from solar noon) on December 21.

d. An evaporation pan holds water whose depth is measured daily as water evaporates. These data allow us to determine evaporation rates at a given location. Compare average rainfall (water gain) to potential water loss via evaporation by looking up pan-evaporation rates for your area. If pan-evaporation rates exceed rainfall rates, you are in a dryland environment, where evaporation-reducing strategies such as mulch, windbreaks, shading, and covered water storage are very important.

e. Calculated in situ w/ average rainfall, area, & population

f. City proper

g.

h.

i.

CREDITS: Brad Lancaster, Resource concept **|** **Megan Hartman,** Resource creation, Research

CASTLE ROCK PLACE-ASSESSMENT REFERENCES

1. Castle Rock station (#051401), wrcc.dri.edu, accessed 8/14/2013

2. Rainwater Harvesting for Drylands & Beyond, Vol 1, or esrl.noaa.gov/gmd/grad/solcalc, accessed 8/14/2013

3. RWHDB Vol 1, or Mar 21 = 90–latitude, Jun 21 = 90–(latitude–23.44), Sep 21 = 90–latitude, Dec 21 = 90–(latitude+23.44)

4.

5.

6.

7.

8. Michelle Breckner, Service Climatologist, WRCC, via phone 8/14/2013

9. Census.gov, accessed 8/14/2013

10.

11.

12.

13.

14.

15.