ONE-PAGE PLACE ASSESSMENT: EAGLE MOUNTAIN, UTAH

LOCATED IN THE UTAH LAKE SUBWATERSHED WITHIN THE GREAT BASIN WATERSHED

CLIMATE ⚑1

AVERAGE HIGH & LOW TEMPERATURES[a,1] *1951 – 2014*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
°F HIGH	38.3	43.6	53.1	62.3	71.9	81.7	89.4	87.7	79.2	66.5	50.9	39.4	63.7
°F LOW	11.8	16.8	23.9	29.5	36.8	43.7	50.8	49.4	39.6	28.9	20.2	12.9	30.4
°C HIGH	3.5	6.4	11.7	16.8	22.2	27.6	31.9	30.9	26.2	19.2	10.5	4.1	17.6
°C LOW	-11.2	-8.4	-4.5	-1.4	2.7	6.5	10.4	9.7	4.2	-1.7	-6.6	-10.6	-0.9

RECORD HIGH[1]: 102° F | 38.9° C | *July 13, 2002* — RECORD LOW[1]: -36° F | -37.8° C | *February 6, 1989*

SUN ⚑2

LATITUDE: 40.3°

ELEVATION: 4,894 FT / 1,492 m

	MAR 21	JUN 21	SEP 21	DEC 21
DEGREES N or S of DUE EAST THE SUN RISES[2]	0°	32°N	0°	31°S
DEGREES N or S of DUE WEST THE SUN SETS[2]	0°	32°N	0°	31°S
SOLAR-NOON ALTITUDE ANGLE (ABOVE HORIZON)[b,2,3]	50°	73°	50°	26°

SOLAR-NOON WINTER-SOLSTICE SHADOW RATIO[c] 1 : 2.03 ...AND AZIMUTH[d] 0°

10AM & 2PM WINTER-SOLSTICE SHADOW RATIO[c,2] 1 : 2.68 ...AND AZIMUTH[d,2] 29°

WIND ⚑3

MAX SPEED[e] 94 MPH | 151 km/h

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

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
	SE	NW	NW	NW	S	S	S	S	S	SE	SE/NW	SE	S
MPH	4.9	5.5	7.3	6.6	6.4	6.5	5.6	6.1	5.5	5.9	5.8	4.7	5.9
km/h	8	9	12	11	10	10	9	10	9	9	9	8	9

WATER ⚑4

AVERAGE RAINFALL (GAIN)[a,1] *1951 – 2014*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
INCHES	1.07	0.98	1.08	1.02	1.16	0.73	0.91	0.94	0.92	1.08	0.89	0.98	11.76
mm	27.2	24.9	27.4	25.9	29.5	18.5	23.1	23.9	23.4	27.4	22.6	24.9	298.7

AVERAGE PAN EVAPORATION (POTENTIAL LOSS)[1,6] *1928 – 2003*

INCHES	0.00	0.00	2.77	5.19	7.11	8.80	9.61	8.58	6.10	3.81	1.42	0.00	53.39
mm	0.0	0.0	70.4	131.8	180.6	223.5	244.1	217.9	154.9	96.8	36.1	0.0	1,356.1

WETTEST YEAR'S RAIN[1]: 24.07 INCHES | 611 mm | *1983* — DRIEST YEAR'S RAIN[1]: 6.03 INCHES | 153 mm | *1976*

LONGEST PERIOD WITH NO MEASURABLE PRECIPITATION[7]: 64 DAYS: *September 12 – November 15, 1952*

RAINFALL INCOME[g]: 973 GPCD | 3,682 lpcd

AREA[h,8]: 44.46 SQ MILES | 115.1 km²

POPULATION[h,8]: 25,593 *2014 est.*

UTILITY-WATER USE[9]: 186 GPCD | 704 lpcd

HISTORICAL: 250 FT | 76.2 m | *1943* — DEPTH TO GROUNDWATER[i,10]: 239 FT | 72.9 m | *2014* CURRENT

CURRENT GROUNDWATER EXTRACTION < NATURAL GROUNDWATER RECHARGE[11]

WATERGY ⚑5

% of EAGLE MOUNTAIN'S MUNICIPAL kWh USED TO MOVE & TREAT WATER[j,12]: 93%

TOTEM SPECIES ⚑6

PLANT: Ute Ladies'-Tresses *(Spiranthes diluvialis)* MAMMAL: Mule Deer *(Odocoileus hemionus)*

FISH: June Sucker *(Chasmistes liorus)* BIRD: Yellow-Billed Cuckoo *(Coccyzus americanus)* 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.

EAGLE MOUNTAIN PLACE-ASSESSMENT NOTES

a. Despite what is listed on the climate-summary page for Fairfield (see ref. 1), its actual period of record is 1951–2014. Also, given the number of intermittent missing observations, we cannot say for sure that there is not a longer period with no measurable precipitation. However, we use this station's data, as it is by far the best compared with surrounding stations near Eagle Mountain.

b. The solar-noon altitude angle (a.k.a., solar-noon elevation angle) refers to the number of degrees the sun is located above the equator-facing horizon at solar noon on the given date. In the northern hemisphere, the equator-facing horizon is to the south. In the southern hemisphere, the equator-facing horizon is to the north.

c. 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)).

d. 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.

e. Tooele Station (T62), UT-ASOS Network. Period of record for December–June ≈ 1986–2002; July–November ≈ 1951–2002. Closest similar station with sufficient data. Eight-bin custom wind roses used; more bins available on website (see ref. 4).

f. 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. According to one definition, if pan-evaporation rates exceed rainfall rates, you are in a dryland environment. Another definition states that drylands are "land areas where the mean annual precipitation is less than two thirds of potential evapotranspiration (potential evaporation from soil plus transpiration by plants), excluding polar regions and some high mountain areas which meet this criterion but have completely different ecological characteristics" (Greenfacts.org). The higher the ratio of potential evaporation to rainfall, the more important evaporation-reducing strategies such as mulch, windbreaks, shading, & covered water storage become. Eagle Mountain's pan-evaporation:rainfall ratio is ~4.5:1.

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

h. City proper

i. USGS Well ID #402019112023201—located at latitude 40°20'15", longitude 112°02'33"—was chosen for its longest available period of record (71 years).

j. In the 12-month period from 11/2014 – 10/2015, Eagle Mountain City used 6,898,664.07 kWh for all municipal purposes (this does not include kVArh). Of this, 811,403.13 kWh (~12%) were used for wastewater operations (including sewer lift stations), and 5,587,135.88 kWh (~81%) were used for moving water (4 well pumps & a booster station), for a total of 6,398,539.01 kWh (~ 93% of all municipal kWh) used for pumping and treating water and wastewater (ref. 12).

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

EAGLE MOUNTAIN PLACE-ASSESSMENT REFERENCES

1. Fairfield station (#422696), wrcc.dri.edu, accessed 10/16/2015

2. Rainwater Harvesting for Drylands & Beyond, Vol 1, or esrl.noaa.gov/gmd/grad/solcalc, accessed 10/16/2015

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. Custom Wind Rose Plots, mesonet.agron.iastate.edu/sites/dyn_windrose.phtml?station=T62&network=UT_ASOS, accessed 10/18/2015

5. Almanac: Historical Information, Eagle Mountain, UT, www.myforecast.com/bin/climate.m?city=653021, accessed 10/18/2015

6. Monthly Average Pan Evaporation (Inches), Utah Lake – Lehi station, www.wrcc.dri.edu/htmlfiles/westevap.final.html#UTAH, accessed 10/18/2015

7. Michelle Breckner, Service Climatologist, WRCC, via email 10/20/2015

8. Census.gov, accessed 10/18/2015

9. Resolution: Water Conservation & Management Plan Update, dated 1/20/2015, www.emcity.org/Home/ShowDocument?id=1670, accessed 10/18/2015

10. Groundwater Levels for the Nation, nwis.waterdata.usgs.gov/usa/nwis/gwlevels/?site_no=402019112023201, accessed 10/19/2015

11. Christopher Pengra, Mayor, Eagle Mountain City, via email, 10/30/2015

12. Calculated w/ data provided by Paul Jerome, Eagle Mountain Assistant City Administrator & Finance Director, via email 11/2/2015