ONE-PAGE PLACE ASSESSMENT: LAS VEGAS, NEVADA
LOCATED IN THE LAS VEGAS WASH SUBWATERSHED WITHIN THE COLORADO RIVER WATERSHED

CLIMATE ⚑1

AVERAGE HIGH & LOW TEMPERATURES[1] *1937–2012*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
°F HIGH	57.2	62.5	69.5	78.2	88.4	98.6	104.5	102.3	94.8	81.3	66.5	57.2	80.1
°F LOW	34.6	39.0	44.5	51.9	61.2	70.1	76.8	75.1	66.8	54.6	42.1	34.9	54.3
°C HIGH	14.0	16.9	20.8	25.7	31.3	37.0	40.3	39.1	34.9	27.4	19.2	14.0	26.7
°C LOW	1.4	3.9	6.9	11.1	16.2	21.2	24.9	23.9	19.3	12.6	5.6	1.6	12.4

RECORD HIGH[1]	117° F	47.2° C	*July 24, 1942*	RECORD LOW[1]	8° F	-13.3° C	*January 13, 1963*

SUN ⚑2

	MAR 21	JUN 21	SEP 21	DEC 21
DEGREES N or S of DUE EAST THE SUN RISES[2]	0°	30°N	0°	29°S
DEGREES N or S of DUE WEST THE SUN SETS[2]	0°	30°N	0°	29°S
SOLAR-NOON ALTITUDE ANGLE (ABOVE HORIZON)[a,2,3]	54°	77°	54°	30°

LATITUDE 36.1°

ELEVATION 2,113 FT 644 m

SOLAR-NOON WINTER-SOLSTICE SHADOW RATIO[b]	1 : 1.70	...AND AZIMUTH[c]	0°
9AM & 3PM WINTER-SOLSTICE SHADOW RATIO[b,2]	1 : 3.29	...AND AZIMUTH[c,2]	43°

WIND ⚑3

MAX SPEED[5] 90 MPH 145 km/h

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

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
	W	W	W	SW	SW	S	S	S	S	W	W	W	
MPH	8.6	9.8	10.3	12.4	11.6	11.8	10.2	9.9	9.9	9.0	8.0	8.5	10.1
km/h	13.8	15.8	16.6	20.0	18.7	19.0	16.4	15.9	15.9	14.5	12.9	13.7	16.3

WATER ⚑4

AVERAGE RAINFALL (GAIN)[1] *1937–2012*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
INCHES	0.50	0.57	0.43	0.20	0.14	0.07	0.43	0.45	0.33	0.27	0.36	0.41	4.16
mm	12.7	14.5	10.9	5.1	3.6	1.8	10.9	11.4	8.4	6.9	9.1	10.4	105.7

AVERAGE PAN EVAPORATION (POTENTIAL LOSS)[d,6] *1931–2004*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
INCHES	3.71	4.68	7.56	10.67	13.79	16.57	16.45	14.41	11.51	8.11	4.87	3.69	116.02
mm	94.2	118.9	192.0	271.0	350.3	420.9	417.8	366.0	292.4	206.0	123.7	93.7	2,946.9

WETTEST YEAR'S RAIN[2]	10.68 INCHES	271.3 mm	*1941*	DRIEST YEAR'S RAIN[1]	0.56 INCHES	14.2 mm	*1953*

LONGEST PERIOD WITH NO MEASURABLE PRECIPITATION[7]
150 DAYS: *February 22 - July 21, 1959*

RAINFALL INCOME[e] 45 GPCD 171 lpcd

AREA[f,8] 135.82 SQ MILES 351.6 km²

POPULATION[f,8] 596,424 *2012 estimate*

UTILITY-WATER USE[9] 125 GPCD 473 lpcd

DEPTH TO GROUNDWATER[10] HISTORICAL 286 FT 87.1 m *1961* — 273 FT 83.3 m *2012* CURRENT

CURRENT GROUNDWATER EXTRACTION ? NATURAL GROUNDWATER RECHARGE[g,11]

WATERGY ⚑5
AVG NV HOMES THAT COULD BE POWERED W/ ENERGY TO MOVE & TREAT LV's WATER:[h,12] 84,989

TOTEM SPECIES ⚑6
PLANT: Las Vegas Buckwheat *(Eriogonum corymbosum var. nilesii)* MAMMAL: Allen's Big-Eared Bat *(Idionycteris phyllotis)*
FISH: Devil's Hole Pupfish *(Cyprinodon diabolis)* BIRD: Southwestern Willow Flycatcher *(Empidonax traillii extimus)* REPTILE: Desert Tortoise *(Gopherus agassizii)*
AMPHIBIAN: Northern Leopard Frog *(Lithobates pipiens)* MEGAFAUNA: Desert Bighorn Sheep *(Ovis canadensis nelsoni)*[13]

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.

LAS VEGAS 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) & 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 evaporation rates to be determined at a given location. Compare average rainfall (water gain) to potential evaporation (water loss) 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. Groundwater pumping can be reduced with the on-site harvest of free on-site waters as advocated in Brad's books. In addition, energy conservation and renewable on-site power production can reduce groundwater pumping associated with thermoelectric energy production. See appendix 9 of *RWHDB, Volume 1, 2nd ed.,* to compare costs of our water and energy options.

h. In 2011, Southern Nevada Water Authority produced 477,242 acre-feet of water with an energy intensity of 6.5 kWh per 1,000 gallons (ref. 12). To convert acre-feet to gallons, multiply 477,242 af by 325,851 gallons/af to get 155,509,780,000 gallons. Multiply this number by the stated energy intensity of 6.5 kWh/1,000 gallons to get 971,936,143 kWh used to produce SNWA's water in 2011. To determine how many average NV households could be powered with this energy, divide 971,936,143 kWh by 11,436 kWh/year (average usage of a NV household (953 kWh/month (ref. 13) x 12 months/year)) to get 84,989 households.

CREDITS: Brad Lancaster, Resource concept & oversight **| Jessica Penrod, Great Basin Permaculture,** Research **| Megan Hartman,** Research, resource creation

LAS VEGAS PLACE-ASSESSMENT REFERENCES

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