ONE-PAGE PLACE ASSESSMENT: LOS ANGELES, CALIFORNIA

LOCATED IN THE LOS ANGELES RIVER SUBWATERSHED WITHIN THE CALIFORNIA WATERSHED

CLIMATE ⚐1

AVERAGE HIGH & LOW TEMPERATURES[1] *1906–2013*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
°F HIGH	66.4	67.3	68.8	71.0	72.9	76.9	82.3	83.1	81.9	77.6	72.8	67.4	74.0
°F LOW	48.3	49.5	51.1	53.5	56.5	59.7	63.2	63.8	62.6	58.7	53.3	49.1	55.8
°C HIGH	19.1	19.6	20.4	21.7	22.7	24.9	27.9	28.4	27.7	25.3	22.7	19.7	23.3
°C LOW	9.1	9.7	10.6	11.9	13.6	15.4	17.3	17.7	17.0	14.8	11.8	9.5	13.2

RECORD HIGH[1]: 113° F | 45.0° C | *September 27, 2010*

RECORD LOW[1]: 25° F | -3.9° C | *February 19, 1911*

SUN ⚐2

LATITUDE: 34.1°

ELEVATION: 285 FT / 86.9 m

	MAR 21	JUN 21	SEP 21	DEC 21
DEGREES N or S of DUE EAST THE SUN RISES[3]	0°	29°N	0°	28°S
DEGREES N or S of DUE WEST THE SUN SETS[3]	0°	29°N	0°	28°S
SOLAR-NOON ALTITUDE ANGLE (ABOVE HORIZON)[a,3,4]	56°	79°	56°	33°

SOLAR-NOON WINTER-SOLSTICE SHADOW RATIO[b]: 1 : 1.57 ...AND AZIMUTH[c]: 0°

9AM & 3PM WINTER-SOLSTICE SHADOW RATIO[b,3]: 1 : 3.00 ...AND AZIMUTH[c,3]: 43°

WIND ⚐3

MAX SPEED[5]: 62 MPH | 100 km/h

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

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
	W	WSW	WSW	WSW	WSW	WSW	WSW	WSW	W	W	W	W	
MPH	9	9	10	10	10	10	9	9	9	9	9	6	9.1
km/h	14	14	16	16	16	16	14	14	14	14	14	10	14.6

WATER ⚐4

AVERAGE RAINFALL (GAIN)[1] *1906–2013*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
INCHES	3.20	3.38	2.40	1.01	0.25	0.06	0.01	0.05	0.27	0.48	1.25	2.41	14.77
mm	81.3	85.9	61.0	25.7	6.4	1.5	0.3	1.3	6.9	12.2	31.8	61.2	375.2

AVERAGE PAN EVAPORATION (POTENTIAL LOSS)[d,6] *1948–2005*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
INCHES	3.32	3.59	4.86	6.28	7.33	8.59	10.88	10.28	7.84	5.85	3.81	3.03	75.66
mm	84.3	91.2	123.4	159.5	186.2	218.2	276.4	261.1	199.1	148.6	96.8	77.0	1,921.8

WETTEST YEAR'S RAIN[1]: 34.04 INCHES | 864.6 mm | *1983*

DRIEST YEAR'S RAIN[7]: 3.60 INCHES | 91.4 mm | *2013*

LONGEST PERIOD WITH NO MEASURABLE PRECIPITATION[8]: 219 DAYS: *February 18 – September 25, 1997*

RAINFALL INCOME[e]: 85 GPCD / 323 lpcd

AREA[f,9]: 468.7 SQ MILES / 1213 km²

POPULATION[f,9]: 3,857,799 *2012 estimate*

UTILITY-WATER USE[10]: 123 GPCD / 466 lpcd

HISTORICAL: 149.1 FT | 45.5 m | *1936*

DEPTH TO GROUNDWATER[g,11]: 244.5 FT | 74.5 m | *2010* CURRENT

CURRENT GROUNDWATER EXTRACTION > NATURAL GROUNDWATER RECHARGE[h,i,12]

WATERGY ⚐5

AVG CA HOMES THAT COULD BE POWERED W/ kWh USED TO MOVE & TREAT LA'S WATER[j,13,14]: 154,434

TOTEM SPECIES ⚐6

CRUSTACEAN: Vernal Pool Fairy Shrimp *(Branchinecta lynchi)* MAMMAL: Pacific Pocket Mouse *(Perognathus longimembris pacificus)*

FISH: Santa Ana Sucker *(Catostomus santaanae)* PLANT: Marsh Sandwort (Arenaria paludicola) MEGAFAUNA: California Condor *(Gymnogyps californianus)*

AMPHIBIAN: California Red-legged Frog *(Rana draytonii)* BIRD: Western Snowy Plover *(Charadrius alexandrinus nivosus)* [15] REPTILE:

Available online at HarvestingRainwater.com/one-page-place-assessments

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.

LOS ANGELES 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. Well ID #2778, State #2S13W10A01, is located just southeast of downtown, near the Los Angeles River between East Olympic & East Washington Blvds. Historic and current depths measurements were both taken on June 22, of 1936 and 2010, respectively.

h. "Groundwater levels decreased over most of the Central Basin during water year 2011-12. Water levels decreased up to 21 feet and on average about 14.5 feet in the unconfined Montebello Forebay, and remained stable or decreased up to 5 feet across the unconfined Los Angeles Forebay and western Central Basin Pressure Area. Groundwater levels decreased up to 81 feet in the Long Beach Pressure Area. Groundwater levels increased up to 3 feet in the eastern Central Basin Pressure Area. Water levels did not change significantly over most of the West Coast Basin during water year 2011-12.... The average decrease over the Service area was 7.5 feet. This general decrease was due to the dry winter of 2011/2012, below normal replenishment water, and increased pumping which resulted in 73,200 AF of groundwater removed from storage" (ref. 11).

i. Groundwater pumping can be reduced with the on-site harvest of free on-site waters as advocated in this book. In addition, energy conservation and renewable on-site power production can reduce groundwater pumping associated with thermoelectric energy production. See appendix 9 to compare costs of our water and energy options.

j. The Los Angeles Department of Water & Power's average energy intensity in 2010 was 1,934 kWh/AF, x 562,480 AF delivered (ref. 12) = 1,087,836,320 kWh. Divide this by the state average of 7,044 kWh/household/year (587 kWh/household/month (ref. 13) x 12 months/year) gives us municipal water-related kWh usage equivalent to 154,434 households.

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

LOS ANGELES PLACE-ASSESSMENT REFERENCES

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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)

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