ONE-PAGE PLACE ASSESSMENT: DATELAND, ARIZONA

*LOCATED IN THE COPPER WASH SUBWATERSHED WITHIN THE LOWER COLORADO RIVER WATERSHED

CLIMATE ⚑1

AVERAGE HIGH & LOW TEMPERATURES[1] *1972 – 2010*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
°F HIGH	68.8	73.1	78.6	86.5	94.3	103.4	106.6	105.2	100.4	89.7	77.7	68.2	87.7
°F LOW	39.7	42.2	45.1	49.5	56.5	64.6	73.2	73.6	67.1	55.4	44.6	38.6	54.2
°C HIGH	20.4	22.8	25.9	30.3	34.6	39.7	41.4	40.7	38.0	32.1	25.4	20.1	30.9
°C LOW	4.3	5.7	7.3	9.7	13.6	18.1	22.9	23.1	19.5	13.0	7.0	3.7	12.3

RECORD HIGH[1]: 122° F | 50.0° C | *July 6, 1976* — RECORD LOW[1]: 17° F | -8.3° C | *December 23, 1990*

SUN ⚑2

LATITUDE: 33.1°

ELEVATION: 671 FT / 205 m

	MAR 21	JUN 21	SEP 21	DEC 21
DEGREES N or S of DUE EAST THE SUN RISES[2]	0°	29°N	0°	28°S
DEGREES N or S of DUE WEST THE SUN SETS[2]	0°	29°N	0°	28°S
SOLAR-NOON ALTITUDE ANGLE (ABOVE HORIZON)[a,2,3]	57°	80°	57°	33°

SOLAR-NOON WINTER-SOLSTICE SHADOW RATIO[b]: 1 : 1.51 ...AND AZIMUTH[c]: 0°

9AM & 3PM WINTER-SOLSTICE SHADOW RATIO[b,2]: 1 : 2.89 ...AND AZIMUTH[c,2]: 43°

WIND ⚑3

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

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

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
	NE	NNE	SW	SW	SSW	SW	SW	SSW	SW	SW/NE	NE	NE	SW
MPH	9.6	9.0	9.8	12.3	12.6	13.2	12.2	10.3	9.6	8.9	9.5	9.3	10.5
km/h	15	14	16	20	20	21	20	17	15	14	15	15	17

WATER ⚑4

AVERAGE RAINFALL (GAIN)[1] *1972 – 2010*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
INCHES	0.68	0.56	0.52	0.15	0.04	0.01	0.44	0.75	0.50	0.41	0.41	0.61	5.08
mm	17.3	14.2	13.2	3.8	1.0	0.3	11.2	19.1	12.7	10.4	10.4	15.5	129.0

AVERAGE POTENTIAL EVAPORATION (ETo, POTENTIAL LOSS)[e,6] *1990 – 1996*

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
INCHES	3.22	3.99	6.03	8.94	10.87	11.75	11.26	9.73	8.28	6.57	4.35	2.88	87.87
mm	81.8	101.3	153.2	227.1	276.1	298.5	286.0	247.1	210.3	166.9	110.5	73.2	2,231.9

WETTEST YEAR'S RAIN[1]: 10.87 INCHES | 276 mm | *1983* — DRIEST YEAR'S RAIN[1]: 1.42 INCHES | 36 mm | *1999*

LONGEST PERIOD WITH NO MEASURABLE PRECIPITATION[7]: 381 DAYS: *July 17, 1995 – July 31, 1996*

RAINFALL INCOME[f]: GPCD / lpcd

AREA[g,8]: SQ MILES / km²

POPULATION[g,8]

UTILITY-WATER USE[9]: GPCD / lpcd

HISTORICAL: 131.0 FT | 39.9 m | *1954* — DEPTH TO GROUNDWATER[h,10]: 134.2 FT | 40.9 m | *2001* — CURRENT

CURRENT GROUNDWATER EXTRACTION [>] NATURAL GROUNDWATER RECHARGE[i,11]

WATERGY ⚑5

% of [CITY'S] MUNICIPAL kWh USED TO MOVE & TREAT WATER[12]

TOTEM SPECIES ⚑6

PLANT: Acuña Cactus *(Echinomastus erectocentrus var. acunensis)* MEGAFAUNA:

FISH: Colorado Pikeminnow *(Ptychocheilus lucius)* AMPHIBIAN: REPTILE:

BIRD: Yuma Clapper Rail *(Rallus longirostris yumanensis)* MAMMAL: Sonoran Pronghorn *(Antilocapra americana sonoriensis)*

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.

DATELAND PLACE-ASSESSMENT NOTES

**Watershed and sun information is for Jalisco Jojoba Farm site; all other data is for Dateland unless otherwise specified*

a. 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.

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. Aqua Caliente–Oatman RAWS (OATMA3) station, located at latitude 33.05000, longitude -113.13860, at an elevation of 506.045 meters. Period of record: June 2012 – March 2017, 16-bin wind rose. This station is part of the Arizona DCP network.

e. Evapotranspiration (ET) is the loss of water from a vegetative surface through the combined processes of plant transpiration and soil evaporation. Both environmental and biological factors affect ET. Important environmental factors include solar radiation, temperature, atmospheric dryness (vapor pressure deficit), wind and soil moisture. Biological factors affecting ET include type of vegetation, foliage geometry and foliage density. Potential evapotranspiration is abbreviated as ETo. Arizona Meteorological Network ETo values are determined using a weather-based model known as the Penman Equation. Weather parameters utilized in the Penman calculation include solar radiation, temperature, humidity and wind speed. Compare average rainfall (water gain) to potential water loss via evaporation by looking up such rates for your area. One 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, and covered water storage become.

f. [Calculated in situ w/ average rainfall, area, & population when such information is noted herein]

g. [City proper]

h. USGS well ID #330422113164301 C-04-10 22ABB, located at latitude 33°04'22", longitude -113°16'43". Well was selected for proximity to Jalisco Jojoba Farm site (well is <2 miles almost due south of farm) and longest available period of record.

i.

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

DATELAND PLACE-ASSESSMENT REFERENCES

1. Dateland Whitewing Ranch station (#022434), wrcc.dri.edu, accessed 3/30/2017

2. Rainwater Harvesting for Drylands & Beyond, Vol 1, or esrl.noaa.gov/gmd/grad/solcalc, accessed 3/30/2017

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, Iowa Environmental Mesonet, mesonet.agron.iastate.edu/sites/locate.php, accessed 3/31/2017

5. Record wind speed for Dateland, www.myforecast.com/bin/climate.m?city=KNYL&zip_code=85333, accessed 3/31/2017

6. Monthly averages calculated from Arizona Meteorological Network reports for Dateland for April 1990 through December 1996, cals.arizona.edu/azmet/17.htm, accessed 3/31/2017

7. Nina Oakley, Regional Climatologist, Western Regional Climate Center, via email 3/30/2017

8. en.Wikipedia.org, accessed 3/30/2017

9.

10. Groundwater levels for the nation, nwis.waterdata.usgs.gov/nwis/gwlevels, accessed 3/31/2017

11. Per Jalisco Jojoba Farm records with an approximate period of record of 30 years

12.