

ONE-PAGE PLACE ASSESSMENT: FAYETTEVILLE, ARKANSAS

LOCATED IN THE BEAVER RESERVOIR SUBWATERSHED WITHIN THE ARKANSAS-WHITE-RED RIVER WATERSHED

CLIMATE		AVERAGE HIGH & LOW TEMPERATURES ¹											1899-1996
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
° F HIGH	46	51	59	69	76	84	89	89	81	70	59	48	68.5
° F LOW	26	30	38	47	56	65	69	68	59	47	38	29	47.8
° C HIGH	7.8	10.6	15.0	20.6	24.4	28.9	31.7	31.7	27.2	21.1	15.0	8.9	20.3
° C LOW	-3.3	-1.1	3.3	8.3	13.3	18.3	20.6	20.0	15.0	8.3	3.3	-1.7	8.8
RECORD HIGH ²	111° F		43.9° C		July 14, 1954			RECORD LOW ¹	-24° F		-31.1° C		February 1899

SUN		MAR 21 JUN 21 SEP 21 DEC 21					
LATITUDE	36.1°	DEGREES N or S of DUE EAST THE SUN RISES ³		0°	30° N	0°	29° S
ELEVATION	1,400 FT 427 m	DEGREES N or S of DUE WEST THE SUN SETS ³		0°	30° N	0°	29° S
		SOLAR-NOON ALTITUDE ANGLE (ABOVE HORIZON) ^{a,3,4}		54°	77°	54°	30°
		SOLAR-NOON WINTER-SOLSTICE SHADOW RATIO ^b		1 : 1.70	...AND AZIMUTH ^c		0°
		9AM & 3PM WINTER-SOLSTICE SHADOW RATIO ^{b,3}		1 : 3.28	...AND AZIMUTH ^{c,3}		43°

WIND		PREVAILING WIND DIRECTION (FROM WHERE) ⁵ & AVERAGE SPEED ⁵											MAX SPEED ⁶		
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	MPH	kph
	S	S	S	S	S	S	S	S	S	S	S	S			0
MPH	8	8	9	9	7	7	6	5	6	7	8	8	7.3		
kph	13	13	14	14	11	11	10	8	10	11	13	13	11.7		

WATER		AVERAGE RAINFALL (GAIN) ¹											1899-1996
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
INCHES	2.55	2.49	4.02	4.30	5.20	4.77	3.22	3.05	4.56	4.10	4.33	3.04	45.63
mm	64.8	63.2	102.1	109.2	132.1	121.2	81.8	77.5	115.8	104.1	110.0	77.2	1,159.0
		AVERAGE PAN EVAPORATION (POTENTIAL LOSS) ^{d,7}											1953-1979
INCHES				5.38	6.15	6.83	7.42	6.81	5.05	3.59	2.35		43.58
mm				136.7	156.2	173.5	188.5	173.0	128.3	91.2	59.7		1,106.9

WETTEST YEAR'S RAIN ²	75.0 INCHES	1,905 mm	1990	DRIEST YEAR'S RAIN ²	21.0 INCHES	533 mm	1963
LONGEST PERIOD WITH NO MEASURABLE PRECIPITATION ⁸	47 DAYS: December 2, 1955 - January 17, 1956				RAINFALL INCOME ^e	1,558	GPCD
						5,896	lpcd
AREA ^{f,9}	53.85	SQ MILES	POPULATION ^{f,9}	75,102	UTILITY-WATER USE ¹⁰	170	GPCD
	139	km ²		2011 est.		644	lpcd
HISTORICAL	0 FT	0.0 m	DEPTH TO GROUNDWATER ^{g,11}	0 FT	0.0 m	CURRENT	
CURRENT GROUNDWATER EXTRACTION			NATURAL GROUNDWATER RECHARGE ^{h,i,12,13}				

WATERGY	% MUNICIPAL ENERGY CONSUMPTION USED TO MOVE & TREAT WATER ¹⁴

TOTEM SPECIES	PLANT:	MAMMAL:
FISH:	Arkansas Darter ¹⁵	Ozark Big-Eared Bat ¹⁵
BIRD:	Piping Plover ¹⁵	Neosho Mucket ¹⁵
CRUSTACEAN:	Benton Cave Crayfish ¹⁵	MEGAFUNA: Florida Panther ¹⁵

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.

FAYETTEVILLE 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 $x = 1 \div \tan(90 - (\text{latitude} + 23.44))$.
- 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, research, content oversight | Megan Hartman, Research, Resource creation

FAYETTEVILLE PLACE-ASSESSMENT REFERENCES

1. Weather Channel, www.weather.com/weather/wxclimatology/monthly/USAR0189, accessed 2/25/2013. Period of record not specified, but likely begins earlier and ends later than the given years (provided as dates of certain temperature extremes).
2. National Weather Service Weather Forecast Office, www.srh.noaa.gov/tsa/?n=climo_fyv_pcp_13, accessed 2/25/2013. Period of record: 1950–2012.
3. Rainwater Harvesting for Drylands & Beyond, Vol 1, or esrl.noaa.gov/gmd/grad/solcalc, accessed 2/25/2013
4. RWHDB Vol 1, or Mar 21 = $90 - \text{latitude}$, Jun 21 = $90 - (\text{latitude} - 23.44)$, Sep 21 = $90 - \text{latitude}$, Dec 21 = $90 - (\text{latitude} + 23.44)$
5. WeatherSpark (beta), weatherspark.com/averages/30332/Fayetteville-Arkansas-United-States, accessed 2/25/2013. Note that reported prevailing-wind direction varies by source. Does this information match your actual observations?
- 6.
7. Note that this data is from Mountain Home, Arkansas, located about 100 miles ENE of Fayetteville at a significantly lower elevation of 817 feet. Therefore, these numbers are not necessarily representative of pan-evaporation rates in Fayetteville, but are provided nonetheless as more-localized data was unavailable. Data accessed online at NOAA's website, http://www.nws.noaa.gov/oh/hdsc/Technical_reports/TR34.pdf, 2/26/2013.
8. Period of record: July 1947 – February 2013. Uncertified data provided via phone by Nicole McGavock, Service Hydrologist, National Weather Service's Tulsa OK Office, 2/28/2013
9. Census.gov, accessed 2/25/2013
10. This all-inclusive figure (commercial, residential, industrial, agricultural) was provided via phone by Bill Hagenburger, Plant Engineer at Beaver Water District, 2/28/2013
- 11.
- 12.
- 13.
- 14.
15. U.S. Fish & Wildlife Service, Arkansas Ecological Services Field Office, www.fws.gov/arkansas-es/te_cty_list.html, 2/26/2013. Note about the *Benton Cave Crayfish*: Pollution of the groundwater in the caves was the main reason the animal was federally listed. Individuals are sometimes washed out of caves during floods, leading to mortality (Wikipedia).