

# The Largest Desert Fan Palm Oases

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The desert fan palm, *Washingtonia filifera* (Fig. 1), is restricted in its natural distribution to 116 seeps, springs, and streams in the Sonoran Desert of south-eastern California and northeastern Baja California, and two seep areas in south-western Arizona (Cornett 1985). Because of the limited range of *W. filifera* and its reliance on rare desert water resources, wild populations are vulnerable to both natural and man-caused alterations of the environment. Recently, in Riverside Co., CA, two of the largest palm oases were proposed as sites for commercial developments (Cornett 1982, 1984). These proposals have dramatized the need for more information concerning the relative significance of individual oases. In this paper the largest oases in which *W. filifera* occurs are listed and the relationship between their size and location is discussed.

Palm oasis size was determined by direct counts of mature desert fan palms in all but 4 of the 118 palm oases. (None of the uncounted groves were thought to contain more than 30 palms.) The counts were completed between 1983 and 1985. In addition, published reports of specific palm oases were reviewed with three references being of significance in the preparation of this report (Henderson 1948, 1951, 1955).

The naturally-occurring populations of mature desert fan palms total approximately 20,983 individuals. The largest

palm oases are listed in Table 1. The top nine account for 56% of the palms found in the wild yet represent only 7.6% of the palm oasis sites. Each of these palm oases occurs along the eastern base of the Peninsular Ranges in southern California and northern Baja California. The second most significant region of palm populations straddles the San Andreas Fault within the Coachella Valley of Riverside Co., CA. Half of the largest palm oases in the U.S. occur here, including Willis Palms and Thousand Palms. There are approximately 3,589 adult desert fan palms along the fault representing 17% of the known wild population.

The concentration of large palm oases at the base of the Peninsular Ranges surely results from the large and reliable water resources provided by storm runoff from the mountains. Several peaks in these ranges exceed 3,000 m in elevation and many of the canyons contain perennial streams. Summer surface flows of 260 acre feet per month have been recorded in Andreas Canyon (Riverside Co. Flood Control, 1981). None of the other palm oasis sites boast year-round surface flows.

Palm oases along the San Andreas Fault receive an abundant supply of underground water that comes to the surface along the fault. The origin of this water undoubtedly represents underground flows from the Transverse Ranges immediately to the north and west (P. Saint, pers. comm.). Subsurface flow to lower, south-



1. Palm Canyon, near Palm Springs, California. Copyright photograph by Stephen Willard.

erly elevations is prevented when this water reaches impermeable layers of sediment (fault gouge) at the fault. At this point the water is dammed underground and eventually rises to the surface (G. Meyer, pers. comm.). Although other Sonoran Desert localities have earth faults

and accompanying palm oases, none are of the magnitude of the San Andreas Fault.

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Table 1. Largest *W. filifera* oases.  $R^1$  refers to the overall ranking.  $R^2$  refers to the ranking within the U.S.<sup>a</sup>

# Mature <i>W. filifera</i>	Name and Location	Latitude (N)	Longitude (W)	$R^1$	$R^2$
2,511	Palm Canyon Riverside Co., Ca.	33°44'12"	116°32'16"	1	1
2,250*	Cañon Palomar Baja California Norte	31°55'30"	115°42'56"	2	—
1,715*	Cañon Santa Isabel Baja California Norte	31°54'05"	115°41'20"	3	—
1,076	Andreas Canyon Riverside Co., Ca.	33°45'41"	116°33'00"	4	2
1,000*	Cañon de Agua Caliente Baja California Norte	31°40'08"	115°38'30"	5	—
896	Cañon del Tajo Baja California Norte	32°15'41"	115°51'25"	6	—
791	Cañon de Guadalupe Baja California Norte	32°09'08"	115°45'09"	7	—
790	Borrego Palm Canyon San Diego Co., Ca.	33°16'49"	116°25'54"	8	3
688	Murray Canyon Riverside Co., Ca.	33°44'42"	116°33'06"	9	4
612	Willis Palms Riverside Co., Ca.	33°49'40"	116°19'49"	10	5
549	Thousand Palms Riverside Co., Ca.	33°50'15"	116°18'29"	11	6
457	Cañon de los Tanques Baja California Norte	32°22'31"	115°50'30"	12	—
438	Pushawalla Canyon Riverside Co., Ca.	33°49'16"	116°17'05"	13	7
421	Cat Canyon Riverside Co., Ca.	33°41'47"	116°26'20"	14	8
376	Macomber Palms Riverside Co., Ca.	33°47'59"	116°15'28"	15	9
362	Biskra Palms East Riverside Co., Ca.	33°47'29"	116°15'08"	16	10

<sup>a</sup> Palm counts from Henderson, see literature citations.

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