



Ecosystem Watershed Yield Analysis



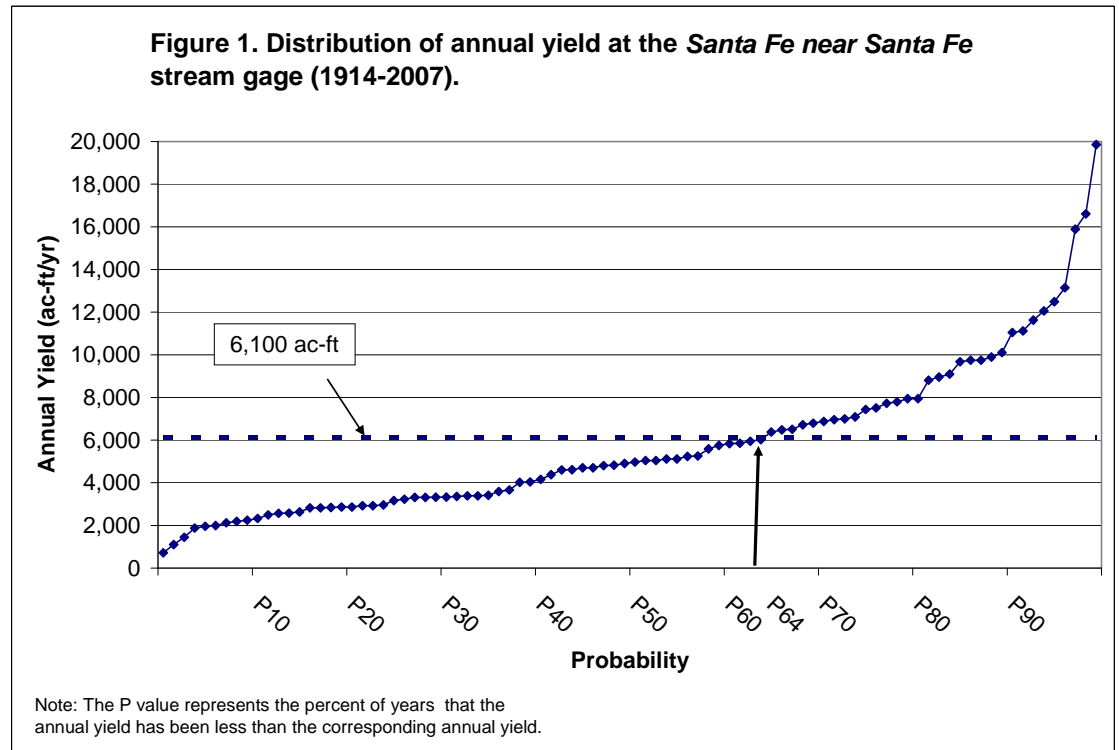
By Amy Lewis, Amy C. Lewis Consulting and
Claudia Borchert, City of Santa Fe

This is one of a series of scientifically-based studies designed to provide the technical background information for decision makers and the community in evaluating management options for the Santa Fe River. The series covers the following topics: stream flow, storm flow, reservoir storage, ecosystem watershed yield analysis, stream flow losses, stream-aquifer interaction, and fate of reservoir releases. For more information on the series, please contact Claudia Borchert at 505-955-4203 or ciborchert@santafenm.gov

Santa Fe River Studies: Ecosystem Watershed Yield Analysis

This report determines the frequency that the Santa Fe River yields 6,100 acre-feet per year) ac-ft/yr, which is needed for the City of Santa Fe to divert its complete right of 5,040 ac-ft, fulfill its Acequia Llano delivery requirement of 54.4 af/yr (CDM and Sangre de Cristo Staff, 2001), and dedicate 1,000 ac-ft for instream flows in the Santa Fe River. For this analysis, it is assumed that the deliveries to acequias except Acequia Llano are taken from the Santa Fe River downstream of the reservoirs. Table 1 and Figure 1 show the annual yield as measured at the *Santa Fe near Santa Fe* gage over the period of record from 1914 to 2007, sorted from driest to wettest to obtain the distribution of flows. This gage is located between Nichols and McClure reservoirs. The annual yield of the Santa Fe River has exceeded 6,100 ac-ft/yr in 36 percent of the years. Therefore, under historical climatic conditions the expected frequency that the Santa Fe River will yield at least 6,100 af/yr, or 1,000 ac-ft more than the City of Santa Fe's water right plus Acequia Llano's right, is about one in every three years.

The role of storage in boosting annual yield was not considered in this analyses, because parallel analyses (Lewis and Borchert, 2009) suggest that, on average, storage does little to



increase the yield from year to year. Storage does, however, allow the daily variability of flows to be regulated intra-year and to be redistributed and used in a manner that accommodates City customer and acequia demand.

References

- CDM and Sangre de Cristo Staff, 2001. Supply Analysis for the City of Santa Fe, January 2001.
- Lewis, Amy and Claudia Borchert. 2009. Santa Fe River Studies: Storage.
- USGS. 2008. <http://nwis.waterdata.usgs.gov/nm/nwis/dvstat/> accessed on March 3, 2008.

Table 1. Annual yield measured at the Santa Fe near Santa Fe gage USGS 08316000 (1914 to 2007) sorted from driest to wettest (USGS, 2008).

Year	Ac-ft/yr	Probability	Year	Ac-ft/yr	Probability
2002	715		1918	4,909	P50
1951	1,105		1939	4,974	
1956	1,444		1923	5,047	
1934	1,877		1944	5,047	
1925	1,964		1960	5,119	
1955	2,000		1962	5,119	
1981	2,123		1984	5,234	
1977	2,188		1940	5,256	
1954	2,245	P10	1975	5,588	
2003	2,325		1969	5,754	P60
1964	2,491		1966	5,834	
1917	2,570		1965	5,855	
1971	2,577		2007	5,949	
1974	2,635		1998	6,021	
1950	2,830		1935	6,382	
2006	2,830		1986	6,483	
1933	2,845		1936	6,505	
1959	2,859	P20	1932	6,722	
1972	2,866		1945	6,794	P70
1947	2,924		1980	6,873	
1976	2,931		1920	6,960	
1938	2,967		1949	6,996	
1996	3,162		1937	7,083	
1953	3,227		1924	7,436	
1922	3,314		1994	7,509	
2004	3,314		1997	7,725	
1989	3,321	P30	1931	7,797	
1967	3,336		1991	7,942	P80
1946	3,357		1995	7,942	
1970	3,386		1914	8,808	
2000	3,386		2005	8,953	
1952	3,415		1926	9,097	
1948	3,588		1992	9,675	
1990	3,668		1987	9,747	
1982	4,021		1993	9,747	
1961	4,043	P40	1979	9,891	
1943	4,159		1942	10,108	P90
1999	4,382		1983	11,046	
1978	4,599		1973	11,119	
1957	4,613		1958	11,624	
1988	4,700		1985	12,057	
2001	4,700		1915	12,490	
1968	4,808		1916	13,140	
1963	4,823		1941	15,884	