
AWRA 2011 ANNUAL WATER RESOURCES CONFERENCE
Albuquerque, New Mexico

November 7-10, 2011

Copyright © 2011 AWRA

SANTA FE PAIRED BASIN STUDY: QUANTIFYING WATER BUDGET COMPONENTS

Amy Lewis*, Darin Desilets

ABSTRACT: A paired basin study in the Upper Santa Fe River watershed (2500 to 3000 m amsl) following forest restoration measured water budget components in a treated and untreated basin. Precipitation, stream flow, soil moisture using cosmic ray probes, chloride concentrations in precipitation and stream flow, were measured to quantify the water budget components. The results show a high degree of confidence in the techniques applied. The total inflow from precipitation for water year 2010 minus the outflow of stream flow, evapotranspiration and soil moisture leaves a remainder of 3 to 5%. Volume-weighted chloride concentration in precipitation is 0.26 mg/L and 0.21 mg/L for water years 2009 and 2010. Volume-weighted chloride concentration in stream flow for water years 2009 and 2010 is 2.71 and 2.18 mg/L in the treated basin and 1.09 and 0.98 mg/L in the control basin. Evapotranspiration is estimated to be about 90% in the treated basin and 76 to 79% in the untreated basin for the first two years of the ongoing investigation based on the ratio of chloride in precipitation to the concentration in stream flow. The lower evapotranspiration rate in the untreated basin may be due to a greater area at a higher elevation with a north facing slope, rather than due to the treatments. The cosmic ray probes measured changes in soil moisture and snow pack throughout the year, but showed no change in moisture from the beginning to the end of the 2010 water year. Continued monitoring, as the vegetation reestablishes to the desired "restored" condition, will track the impacts on the water budget.

* Hydrologist, Amy C. Lewis, Consulting, 7 Seton Plaza, Santa Fe, NM 87508 USA, Phone: 505-982-0405, Email: amychilderslewis@earthlink.net