

Evaporation and Interception Water Loss from Juniper Communities
on the Edwards Aquifer Recharge Area

Quarterly Report

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The Texas Agricultural Experiment Station and the Texas Agricultural Extension Service, in cooperation with San Antonio Water Systems, Upper Guadalupe River Authority, San Antonio River Authority, and the Lower Colorado River Authority, are working on a project to determine the amount of rainfall intercepted by individual juniper trees on the Edwards Aquifer Recharge Area. The project is being conducted at ten locations in seven counties (Bexar, Blanco, Comal, Hays, Kendall, Kerr, Medina, and Uvalde) which stretch across the Edwards Aquifer recharge and Drainage area. County Extension Agents in all of these counties have been instrumental in locating and establishing these plots. Malfunction of some of the equipment immediately after we placed it in the field resulted in missed data for some storms. All questionable data resulting from this malfunction has been deleted from the database. Data for individual storms as well as year-to-date information may be viewed at <http://uvalde.tamu.edu/intercept> . The tables listed below summarize the rainfall and rainfall partitioning for each of the ten sites. The gallons listed in each table represent the amount of water which fell on the canopy outline of the tree. For more information contact either Dr. Owens (m-owens@tamu.edu) or Dr. Lyons (rk-lyons@tamu.edu) at (830) 278-9151 or by e-mail.

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Study sites

Bexar County East – Randy Page Ranch:
Established 11/22/00

The Page Ranch has received 7.49 inches of rain since the site establishment. Evaporation has accounted for 60.7% of the water budget, and 37.3% of the rainfall is available for potential recharge or plant growth. This site was funded by the San Antonio Water System.

Year to date	Rain (inches)	7.49
	Gallons	%
Rain	1291.04	
Throughfall	450.05	
Interception	840.99	
Stemflow	57.71	
Litter	26.83	2.0
Evaporation	783.28	60.7
Potential recharge	480.93	37.3

Gallons are on a per tree basis

Bexar County West – Gary Schott Ranch:
Established 9/15/00

Rainfall has totaled 21.99 inches since the inception of this site. Evaporation has accounted for 50.4% of the water budget, and 43.5% of the rainfall available for potential recharge. This site was funded by the San Antonio River Authority.

Year to date	Rain (inches)	21.99
	Gallons	%
Rain	2428.47	
Throughfall	1198.07	
Interception	1230.49	
Stemflow	7.09	
Litter	149.25	6.1
Evaporation	1223.39	50.4
Potential recharge	1055.91	43.5

Gallons are on a per tree basis

Blanco County – Johnson City area:
Established 11/16/00

The Johnson City area has received 10.47 inches of rainfall since November 16, 2000. Of this rainfall, 58.0% has evaporated and 40.3% is available for potential recharge. This site was funded by the Lower Colorado River Authority.

Since Establishment	Rain (inches)	10.47
	Gallons	%
Rain	759.25	
Throughfall	287.78	
Interception	472.16	
Stemflow	31.80	
Litter	13.96	1.7
Evaporation	440.36	58.0
Potential recharge	305.62	40.3

Gallons are on a per tree basis

Comal County – Pape Ranch: Established 12/15/00

Since December 15, 2000, 9.21 inches of rainfall have been recorded at this site. Evaporation has accounted for 45.1% of that rainfall, allowing 49.4% available for potential recharge. This site was funded by the Texas State Soil and Water Conservation Board.

Since Establishment	Rain (inches)	9.21
	Gallons	%
Rain	1662.46	
Throughfall	877.27	
Interception	785.19	
Stemflow	34.61	
Litter	89.98	5.4
Evaporation	750.58	45.1
Potential recharge	821.90	49.4

Gallons are on a per tree basis

Hays County – Freeman Ranch: Established 9/15/00

The Freeman Ranch has received 31.90 inches of rainfall since the establishment of the site. Evaporation has accounted for 51.7% of the water budget, with 42.3% of the rainfall available for potential recharge. This site was funded by the Texas State Soil and Water Conservation Board..

Year to date	Rain (inches)	31.90
	Gallons	%
Rain	5326.39	
Throughfall	2563.76	
Interception	2762.62	
Stemflow	11.28	
Litter	318.84	6.0
Evaporation	2751.35	51.7
Potential recharge	2256.20	42.3

Gallons are on a per tree basis

Kendall County – Seidensticker Ranch: Established 12/18/00

Since the inception of the Kendall county site, 8.33 inches of rainfall have been recorded. Evaporation accounted for 38.3% of the rainfall and potential recharge receiving 59.3%. This site was funded by the Texas State Soil and Water Conservation Board.

Year to date	Rain (inches)	8.33
	Gallons	%
Rain	2732.23	
Throughfall	1624.56	
Interception	1107.67	
Stemflow	60.25	
Litter	63.25	2.3
Evaporation	1047.42	38.3
Potential recharge	1621.56	59.3

Gallons are on a per tree basis

Kerr County – Kerr Wildlife Management Area: Established 10/3/00

The site at the Kerr Wildlife Management Area has recorded 13.69 inches of rainfall.

Evaporation has accounted for 64.5% of this rainfall, with potential recharge receiving 29.0%.

This site was funded by the Upper Guadalupe River Authority.

Year to date	Rain (inches)	13.69
	Gallons	%
Rain	1962.23	
Throughfall	657.33	
Interception	1304.90	
Stemflow	38.49	
Litter	126.23	6.4
Evaporation	1266.41	64.5
Potential recharge	569.59	29.0

Gallons are on a per tree basis

Medina County East – Peters Ranch: Established 11/2/00

Since this sites beginning, 12.74 inches of rainfall have been recorded. Of this rainfall, 60.7% has evaporated and 36.8% is available as potential recharge. This site was funded by the San Antonio Water System.

Year to date	Rain (inches)	12.74
	Gallons	%
Rain	847.11	
Throughfall	304.15	
Interception	542.95	
Stemflow	28.65	
Litter	20.75	2.5
Evaporation	514.30	60.7
Potential recharge	312.06	36.8

Gallons are on a per tree basis

Medina County West – Crosby Ranch: Established 12/19/00

Rainfall recorded at this site has totaled 6.57 inches. Evaporation has accounted for 44.1% of the rainfall and 43.4% is available for potential recharge. This site was funded by the Texas State Soil and Water Conservation Board.

Year to date	Rain (inches)	6.57
	Gallons	%
Rain	523.46	
Throughfall	277.26	
Interception	246.20	
Stemflow	15.43	
Litter	65.42	12.5
Evaporation	230.77	44.1
Potential recharge	227.27	43.4

Gallons are on a per tree basis

Uvalde County – Annandale Ranch:

Established 8/7/00

The Uvalde county site was the first site to be established. Since then, 17.45 inches of rainfall have been recorded. Evaporation has accounted for 34.9% of the rainfall and 62.9% available for potential recharge. This site was funded by the Texas State Soil and Water Conservation Board.

Year to date	Rain (inches)	17.45
	Gallons	%
Rain	1650.69	
Throughfall	1013.06	
Interception	637.63	
Stemflow	61.30	
Litter	36.60	2.2
Evaporation	576.33	34.9
Potential recharge	1037.76	62.9

Gallons are on a per tree basis

The following graph illustrates the percent of the total rainfall that is intercepted in relation to the size of the rainfall event. The smaller rainfall events intercept nearly all of the rainfall. When rainfall reaches about 0.35 inches, nearly 1/2 of the rainfall reaches the ground surface. In larger events (> 1 inch) the majority of the rainfall passes through the juniper canopy and is available for ground water recharge or runoff.

