

WATERSHED WEEK IN REVIEW



Two Minute Time Out

Texas Parks and
Wildlife
Department's
Postcard From Texas
series featured the
South Llano River
at the State Park a
few years ago.

Thought we all
might need a little
time out.

[Play Video](#)



Who is Don Richards Moss?

A Hint : Seven Hundred Springs



But you will not find his name in Frederica Wyatt's great Seven Hundred Springs : Source of the South Llano has rich history article. For the name is not associated with ownership or a gunfight, but rather with early settlement. Very early settlement.

Don Richards Moss lives in Seven Hundred Springs.

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Don Richards Moss

Donrichardsia macroneuron, also known as Don Richards Spring Moss, is found only in Seven Hundred Springs and nowhere else in the world. The moss (part of the bryophyte group) grows in the shaded and thermally constant rivulets in the limestone rocks between the outfall of the springs and the South Llano, a strip about 30 feet wide.

First discovered in 1932, concerns about the extinction of the plant arose in 1954 after a small dam was constructed on the South Llano. *Field visits in 1978* by Robert Wyatt (University of Georgia) and Ann Stoneburner (Duke University) found the plant in abundance, but only at that site. Systematic exploration at ten other nearby spring systems found no additional plants. It is the only Texas listing on the Red List of the 92 rarest bryophytes in the world.

James Donald Richards (1920-1980), by the way, was an amateur bryologist and benefactor of moss flora projects



Leaf of *Donrichardsia macroneuron*
From *Rare Plants of Texas: A Field Guide*

How Many Caves?

County	Caves	Sinks/Cavities	Shelters	Springs	Undefined	Total
Edwards	167	11	9	101	1	289
Kimble	87	19	2	85	1	194
Llano	42	2	14	25	0	83
Mason	37	5	0	17	1	60
Sutton	58	24	0	3	4	89

Texas Speleological Survey documents the number of karst features in each county; exact locations are not revealed. Note: The majority of Edwards and Sutton county features are outside the Llano watershed.



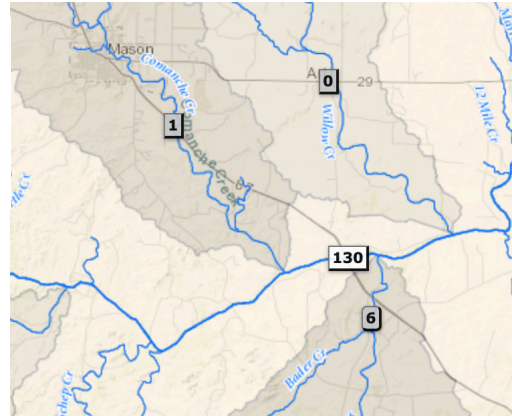
USGS v LCRA Gages

Warning : *The following content is intended for data nerds.* We have received questions over the years about why the USGS gages and the LCRA gages read differently at times.

Daily discharge, cubic feet per second -- statistics for Jun 5
based on 47 water years of record [more](#)

Min (2018)	Most Recent Instantaneous Value Jun 5	25th percen- tile	Median	75th percen- tile	Mean	Max (1987)
28.7	84.4	92	154	350	356	3880

This is certainly a valid question as the June 5, 2020 reading for the Llano River near Mason is estimated to be 130 cfs for LCRA and 84.4 cfs for USGS.



For starters, they are actually the same gage.

Second, a gage measures the height of the water rather than the flow. If you look at the USGS and LCRA websites more closely, the gage-height for both flow estimates is 0.73 feet as of this moment. So why is one 130 and the other 84?

Flow estimates are derived from what is called a rating curve. The curve is developed from actual stream flow measurements. For simplicity, say one month the field technician measures the streamflow to be 100 cfs and notes the stream gage (that big vertical ruler you often see by a gage) to be 1.0 feet. The next time, they measure 200 cfs and note the stream gage to be at 2.0 feet. Now you have a very crude rating curve that would let you estimate the flows between 1 and 2 feet. At 1.5 feet, you would estimate the flow to be 150 cfs. Obviously, a rating curve with only two points wouldn't be very accurate; the more measurements, the more accurate the rating curve.

130.0	0.980
131.6	0.990
133.2	1.000
134.8	1.010
136.4	1.020
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Here is a copy of part of the rating curve for Llano River at Llano, a site where over 1,100 measurements have been recorded since 1939. Using the rating, USGS can estimate the flow is 130.0 cfs when the gage reads 0.98, 133.2 cfs at 1.0 ft, and so on. Adjustments (shifts) are occasionally made if there are changes to the channel, vegetation growth, floods etc...

USGS tries to place gages at locations where this seldom occurs.

continued next page...

So why are the organizations using different rating curves? We are not sure, but each organization likely has a valid reason. Which was is correct? Only one way to tell...A Field Visit.

Warning: *The following content is intended for real Data Nerds.* These gages are serviced by LCRA or USGS personnel on a regular basis. The results of their measurement are available on the USGS website. (The Alliance website has a Quick Link to the gages in the Llano on the homepage). At the top of the gage you select, there is a pull-down menu for available data. Select Field measurements.

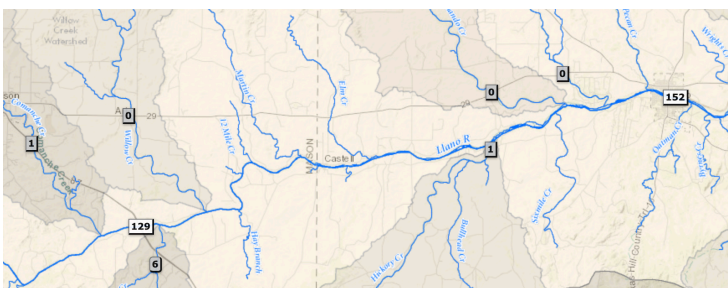
USGS 08150700 Llano Rv nr Mason, TX

Available data for this site												
Surface-water: Field measurements												
Meas. Number	Date	Time	Time Datum	Measurement Used?	Who	Measuring Agency	Stream flow (ft ³ /s)	Gage Height (ft)	GH Change (ft)	Meas. Duration (hr)	Meas. Rated	Control
473	2020-03-20	10:43:40	CDT	Yes	MBH/DGG	USGS	2050	4.95	0.02	0.25	Good	DebrisLight
472	2020-03-05	09:55	CST	Yes	LCRA	LCRA	267	1.40	0.02	0.70	Good	Clear
471	2020-03-05	09:01:30	CST	Yes	LCRA	LCRA	256	1.36	0.02	0.75	Good	Clear
470	2019-12-03	10:53:30	CST	Yes	LCRA	LCRA	109	0.55	0.00	0.72	Good	DebrisLight

The first thing of note is that the gage hasn't been serviced since March as field work has been limited recently. We are told that LCRA is scheduled to visit next week.

Second, in the comment section there are mentions of "Debris". Other comments, going back to 2009, mention "Vegetation". Vegetation growth downstream of a gage can impede and slightly back up the flow, creating an inaccurate gage-height reading. This obviously is more likely to occur during the warm summer months. A difference of just 1-inch in gage height can result in a difference of 20 cfs.

USGS lists all current (no pun intended) stream-flow data as "Provisional" until it is published in their final data reports. Thus, there is always uncertainty in the data on-line. It is likely that the flow that is reported now will be adjusted following next week's field measurement.



Uncertainty aside, there is another way to estimate which reading is more accurate. In this case, it appears to be LCRA's. Both the USGS and LCRA estimates for Llano at Llano are about 150 cfs. Looking more closely at LCRA Hydromet data, only Beaver Creek

downstream is providing significant inflow to the Llano. Thus a flow at Mason of 130 cfs is likely closer to the actual reading.