

Table 1.--Rio Grande seepage investigation from Radium Springs, New Mexico, to El Paso, Texas, February 13-14, 2007

EXPLANATION

REACH--The seepage investigation was conducted along a 62.4-mile reach from the Rio Grande below Leasburg Dam near Radium Springs, New Mexico, to the Rio Grande at El Paso, Texas (08364000). River miles are referenced upstream from the Rio Grande at El Paso, Texas, which is designated as river mile 1,249.9 (Hendricks, 1964).

WEATHER—Isolated rain showers occurred during the seepage investigation. The mean daily temperature at Leasburg, New Mexico was 8 degrees Celsius on February 13 and 14, 2007, with a low of 2 degrees Celsius on February 14 and a high of 14 degrees Celsius on February 14.

STREAMFLOW--The seepage investigation was conducted during the non-irrigation season at low flow. Discharge measurements indicate a net seepage loss of 36.4 cubic feet per second, with side-channel inflows of 46.5 cubic feet per second. Indicated gains (+) and losses (-) throughout the reach are shown below. Tributary flow recorded as inflow is considered a contribution and not a gain; no outflow (diversions) occurred within the study reach during the investigation. Channel gain or loss includes seepage to or from the streambed, evaporation from the water surface, and transpiration by vegetation along the channel banks. Evaporation from the water surface and transpiration by vegetation in February is considered negligible.

WATER QUALITY--Surface-water-quality samples were collected during the seepage investigation at five sites for chemical analyses to determine dissolved solids (salinity), and concentrations of major ions and selected nutrients. Results of the chemical analyses and field determinations are listed in table 2.

REMARKS-- The seepage investigation is rated good through most of the study reach based upon steady streamflow with minor diurnal fluctuation from site 1 through site 31. The end reach is rated poor from site 31 through site 34 (1.0 river miles) based upon unsteady streamflow conditions at site 34. Gage-height record at site 34 "Rio Grande at El Paso, Texas" indicated a stage change of +0.04 feet (+0.011 meter) during the discharge measurement with isolated rain showers.

Discharge measurements were conducted at 22 mainstream sites and 12 inflow sites with specific conductance and water temperature measured at each site. Individual discharge measurements were rated good (within 5 percent) throughout most of the stream reach. Individual discharge measurements were rated fair (within 8 percent) at sites 8, 10, 21, 24, 31, and rated poor (over 8 percent) at site 33 due to poor channel conditions. Accuracy of discharge measurements needs to be considered when evaluating indicated gains and losses. The seepage investigation was coordinated with the New Mexico Environment Department in conjunction with the Lower Rio Grande Water Quality Monitoring Program.

°C, degrees Celsius; $\mu\text{S}/\text{cm}$, microsiemens per centimeter at 25 degrees Celsius; ft^3/s , cubic feet per second; --, no data or not applicable. Locations are in New Mexico unless otherwise indicated. Horizontal coordinates in latitude and longitude are referenced to the North American Datum of 1927 (NAD27).

Table 1.--Rio Grande seepage investigation from Radium Springs, New Mexico, to El Paso, Texas, February 13-14, 2007--Continued

Site number	River mile	Stream	Location	Time	Water temperature (°C)	Specific conductance (µS/cm)	Discharge, in ft ³ /s		Gain or loss
							Main stream	Inflow	
<u>February 13, 2007</u>									
1	1,312.3	Rio Grande	Below Leasburg Dam, Radium Springs Lat 32°28'41", long 106°55'10"	0834	8.0	1,590	28.7	--	--
2	1,310.2	Rio Grande	Near Leasburg Lat 32°27'21", long 106°54'08"	1010	8.5	1,590	31.0	--	+2.3
3	1,307.6	Selden Drain	Near Leasburg Lat 32°25'38", long 106°52'50"	1106	--	--	--	0	--
4	1,306.3	Rio Grande	Near Hill Lat 32°25'05", long 106°52'01"	1205	10.0	1,670	31.8	--	+0.8
5	1,302.7	Rio Grande	At Shalem Bridge near Doña Ana Lat 32°22'34", long 106°51'16"	1340	11.5	1,630	33.4	--	+1.6
6	1,301.2	Wasteway No. 5	Near Doña Ana Lat 32°22'14", long 106°50'14"	1435	--	--	--	0	--
7	1,298.8	Rio Grande	Near Picacho Lat 32°20'18", long 106°50'09"	0907	5.0	1,630	18.2	--	-15.2
8	1,295.6	Rio Grande	Below Picacho Bridge near Las Cruces Lat 32°17'45", long 106°49'25"	1115	5.0	1,600	20.9	--	+2.7
9	1,295.4	Wastewater Inflow	City of Las Cruces Lat 32°17'35", long 106°49'26"	1415	19.0	1,300	--	¹ 12.9	--
10	1,293.1	Rio Grande	At NM-359 Bridge near Mesilla Lat 32°15'49", long 106°49'29"	1247	9.0	1,490	33.5	--	-0.3
11	1,291.8	Picacho Drain	Above Mesilla Dam Lat 32°14'34", long 106°48'56"	1645	6.0	1,660	--	² 0.069	--
12	1,291.7	Rio Grande	Below Picacho Drain Lat 32°14'30", long 106°48'49"	1535	8.0	1,480	30.3	--	-3.3
13	1,289.5	Rio Grande	Below Mesilla Dam Lat 32°13'17", long 106°47'15"	0905	6.5	1,500	18.3	--	-12.0

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Site num- ber	River mile	Stream	Location	Time	Water temper- ature (°C)	Specific conduct- ance (µS/cm)	Discharge, in ft ³ /s		Gain or loss
							Main stream	Inflow	
14	1,287.3	Rio Grande	At NM-28 Bridge near San Pablo Lat 32°12'24", long 106°45'32"	1020	8.0	1,490	18.1	--	-0.2
15	1,283.6	Santo Tomas River Drain	Near San Miguel Lat 32°10'16", long 106°43'11"	1112	--	--	--	0	--
16	1,282.7	Rio Grande	At NM-228 Bridge near San Miguel Lat 32°09'43", long 106°42'58"	1225	9.0	1,460	15.0	--	-3.1
17	1,277.8	Rio Grande	At NM-227 Bridge near Vado Lat 32°06'48", long 106°40'05"	1455	11.5	1,420	13.9	--	-1.1
<u>February 14, 2007</u>									
17	1,277.8	Rio Grande	At NM-227 Bridge near Vado Lat 32°06'48", long 106°40'05"	0840	5.0	1,400	13.4	--	--
18	1,276.6	Del Rio Drain	Near Vado Lat 32°06'09", long 106°39'27"	0840	7.0	1,400	--	4.86	--
18A	1,275.7	Wastewater Inflow	Doña Ana County South Central Plant Lat 32°05'25", long 106°39'34"	1400	15.5	1,310	--	³ 0.39	--
19	1,273.8	Rio Grande	At NM-226 Bridge near Berino Lat 32°03'56", long 106°39'45"	1005	8.5	1,420	16.3	--	-2.4
20	1,271.6	La Mesa Drain	Near Chamberino Lat 32°02'15", long 106°39'23"	1115	--	2,100	--	² 0.001	--
21	1,271.5	Rio Grande	Below La Mesa Drain near Chamberino Lat 32°02'12", long 106°39'18"	1145	10.6	1,470	17.1	--	+0.8
22	1,268.5	Rio Grande	At NM-225 Bridge near Anthony Lat 31°59'58", long 106°38'07"	1625	9.0	1,440	18.8	--	+1.7
23	1,268.5	Pipe Inflow	At NM-225 Bridge near Anthony Lat 31°59'58", long 106°38'07"	1720	10.0	1,970	--	² 0.010	--
24	1,265.4	East Drain	Near Vinton, Tex. Lat 31°58'09", long 106°36'17"	0915	7.5	2,520	--	3.31	--

Table 1.--Rio Grande seepage investigation from Radium Springs, New Mexico, to El Paso, Texas, February 13-14, 2007- -Concluded

Site number	River mile	Stream	Location	Time	Water temperature (°C)	Specific conductance (µS/cm)	Discharge, in ft ³ /s		Gain or loss
							Main stream	Inflow	
25	1,264.7	Rio Grande	At Vinton Bridge near Vinton, Tex. Lat 31°57'33", long 106°36'16"	1055	7.0	1,550	24.7	--	+2.6
26	1,261.6	Rio Grande	At TX-259 Bridge, Cañutillo, Tex. Lat 31°54'54", long 106°36'18"	1230	7.0	1,450	21.4	--	-3.3
27	1,259.3	Rio Grande	At Borderland Bridge near Borderland, Tex. Lat 31°53'09", long 106°35'55"	1415	9.5	1,430	19.3	--	-2.1
28	1,256.2	Rio Grande	At TX-260 Bridge near Santa Teresa Lat 31°50'46", long 106°36'18"	1025	9.0	1,460	15.6	--	-3.7
29	1,252.8	Rio Grande	Near Sunland Park Lat 31°48'24", long 106°34'57"	1225	10.5	1,440	12.0	--	-3.6
30	1,251.0	Wastewater Inflow	Sunland Plant, City of Sunland Park Lat 31°47'55", long 106°33'25"	1513	19.0	2,570	--	¹ 3.01	--
31	1,250.9	Rio Grande	At Sunland Park Bridge, Sunland Park Lat 31°47'56", long 106°33'16"	1345	11.0	1,600	14.5	--	-0.5
32	1,250.3	Montoya Drain	Near Sunland Park Lat 31°48'10", long 106°32'47"	1455	13.0	3,610	--	20.8	--
32A	1,250.2	El Paso Electric Discharge Inlet	Near Sunland Park Lat 31°48'12", long 106°32'44"	1425	12.5	5,770	--	¹ 0.604	--
33	1,250.1	Keystone Reservoir Inlet	Near El Paso, Tex. Lat 31°48'18", long 106°32'39"	1630	14.0	730	--	0.56	--
33A	1,250.0	Side-channel Inlet	Above Courchesne Bridge Near El Paso, Tex. Lat 31°48'13", long 106°32'28"	1450	--	5,050	--	² 0.013	--
34	1,249.9	Rio Grande	At Courchesne Bridge, El Paso, Tex. Lat 31°48'09", long 106°32'26"	1350	12.0	3,020	38.4	--	+1.9

¹ Reported instantaneous discharge

² Parshall Flume

³ Reported mean daily discharge

