

BSDMS Summary Report

14 Rio Grande River at U.S.285 near Monte Vista, CO

Site Location:

Site ID: 14

Site Name: Rio Grande River at U.S.285 near Monte Vista, CO

County: Rio Grande

Nearest City: Monte Vista

State: CO

Latitude: 373634

Longitude: 1060848

USGS Station ID:

Route Number: 285

Route Class: US

Service Level: Mainline

Route Direction: NA

Highway Mile Point:

Stream Name: Rio Grande River

River Mile:

Contact:
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Water Resources Investigations
Report 86-4030
Pilot Study for Collection of
Bridge-Scour Data
by Robert D. Jarret and Jeanne M.
Boyle

Site Description:

The study site is located at the U.S. Highway 285 bridge crossing the Rio Grande River, 2 mi north of Monte Vista, Colo. The drainage basin (1,590 sq mi) includes rolling, irrigated farmland and mountainous areas. Natural streamflow is affected by reservoirs, diversions, ground-water withdrawals and return flows. The majority of the flow is along the left side of the channel. There is a gravel channel bed at this site. During low flows, there is a gravel bar along the right bank that extends upstream and downstream from the bridge. Also, there is a gravel bar along the left side of the single pier at the site, and it extends downstream from the bridge.

The bridge, built in 1972, is 176 ft long, and one concrete pier is located at the center of the channel. The pier is 3.25 ft wide at the bottom tapering to 2 ft wide at the top. It is 90 ft long at the bottom tapering to 86.76 ft at the top. The pier is 13 ft high from the bottom up to the beam capping the pier. The pier is perpendicular to the bridge and is generally aligned with the channel. (A sediment sample taken from pier-scour hole is identified with a "P".)

A streamflow-gaging station operated by the State of Colorado is located on the left bank downstream from the bridge. The range of discharge during data collection was from 108 to 2,200 cubic feet per second. The maximum reported at-pier approach velocity was 5.4 feet per second. The maximum peak flow for 1984 (May 27) was 3,830 cubic feet per second.

The data reported herein were collected as part of a study of general

BSDMS Summary Report

14 Rio Grande River at U.S.285 near Monte Vista, CO

scour at bridge crossings and local scour at bridge piers at sites in Colorado in 1984 (Jarret and Boyle, 1986). The purpose of the study was to develop and test guidelines for collecting streambed-scour data at bridges during high flows. Equipment and procedures commonly used in the the U.S. Geological Survey streamflow-gaging program were employed. A secondary purpose was to evaluate local-sour-prediction equations. The four data-collection sites were selected because record or near-record snow packs were present in the basin headwaters, and the bridges at the sites did not appear to contract the main-channel flow. Estimates of local scour at piers based on the stream cross-section data collected at the upstream and downstream side of the bridge are reported here. Approach depths at piers were computed as the total depth minus the estimated scour-hole depth. At-pier approach velocity and flow skew angle are reported if available.

Elevation Reference

Datum: Gage

MSL (ft): 7654.16

Description of Reference Elevation:

Stream Data

Drainage Area (sq mi):	1590	Floodplain Width:	Unknown
Slope in Vicinity(ft/ft):	0.00075	Natural Levees:	Unknown
Flow Impact:	Unknown	Apparent Incision:	Unknown
Channel Evolution	Unknown	Channel Boundary:	Alluvial
Armoring:	Unknown	Banks Tree Cover:	Medium
Debris Frequency:	Unknown	Sinuosity:	Unknown
Debris Effect:	Unknown	Braiding:	Locally
Stream Size:	Medium	Anabranching:	Locally
Flow Habit:	Perennial	Bars:	Unknown
Bed Material:	Gravel	Stream Width Variability:	Unknown
Valley Setting:	Low		

Roughness Data

Manning's n Values

Left Overbank	Channel	Right Overbank
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BSDMS Summary Report

14 Rio Grande River at U.S.285 near Monte Vista, CO

High:

Typical

Low:

Bed Material

Measurement Number	Yr	Mo	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape	Cohesion
1	1984	6	1	BM-54	29.9	25	4.3	0.67	2.65		Non-Cohesive
2	1984	9	25	HAND	30.9	20	8.05	0.43	2.65		Non-Cohesive
3	1984	9	25	HAND (P)	80.8	69	29.8	8.81	2.65		Non-Cohesive

Bed Material Comments

Measurement No: 1

Measurement No: 2

Measurement No: 3

Bridge Data

Structure No: N-12-AX

Length(ft): 176

Width(ft): 88

Number of Spans: 2

BSDMS Summary Report

14 Rio Grande River at U.S.285 near Monte Vista, CO

Vertical Configuration: Sloping

Low Chord Elev (ft): 7666

Upper Chord Elev (ft): 7667

Overtopping Elev (ft): 7670.8

Skew (degrees): 0

Guide Banks: Unknown

Waterway Classification: Main

Year Built: 1971

Avg Daily Traffic:

Plans on File: Yes

Parallel Bridges No

Upstream/Downstream: N/A

Continuous Abutment: No

Distance Between Centerlines:

Distance Between Pier Faces:

Bridge Description:

The concrete bridge, built in 1972, is 176 ft long and 88.5 ft wide. One concrete pier is located at the center of the channel. The pier is perpendicular to the bridge and is generally aligned with the channel.

Abutment Data

Left Station: 0

Right Station: 172

Left Skew (deg): 0

Right Skew (deg) 0

Left Abutment Length (ft): 88.5

Right Abutment Length (ft) 88.5

Left Abutment to Channel Bank (ft): 0

Right Abutment to Channel Bank (ft): 0

Left Abutment Protection:

BSDMS Summary Report

14 Rio Grande River at U.S.285 near Monte Vista, CO

Right Abutment Protection

Contracted Opening Type: III
 Embankment Skew (deg): 0
 Embankment Slope (ft/ft):
 Abutment Slope (ft/ft) 2
 Wingwalls: Yes
 Wingwall Angle (deg): 0

Pier Data

Pier ID	Bridge Station(ft)	Alignment	Highway Station	PierType	# Of Piles	Pile Spacing(ft)
1	85.8	0	10028	Single	0	

Pier ID	Pier Width(ft)	Pier Shape	Shape Factor	Length(ft)	Protection	Foundation
1	3.25	Sharp		90	Unknown	Piles

Pier ID	Top Elevation(ft)	Bottom Elevation(ft)	Foot or Pile Cap Width(ft)	Cap Shape	Pile Tip Elevation(ft)
1				Unknown	7611

Pier Description

Pier ID 1

The concrete pier is 3.25 ft wide at the bottom tapering to 2 ft wide at the top. It is 90 ft long at the bottom tapering to 86.76 ft at the top. The pier is 13 ft high from the bottom up to the beam capping the pier. The foundataion is 35-ft-long pipe piles and "H" piles.

Pier Scour Data

Pier ID	Date	Time	USOrDS
1	5/22/84	12:00	Upstream
1	5/22/84	14:00	Downstream
1	9/25/84	8:00	Upstream

Pier ID	Scour Depth	Accuracy (ft)	Side Slope (ft/ft)	TopWidth (ft)	Apprch Vel (ft/s)	Apprch Depth(ft)	Effective Pier Width	Skew to Flow(deg)

BSDMS Summary Report

14 Rio Grande River at U.S.285 near Monte Vista, CO

Stage and Discharge Data

Peak Discharge					Flow (cfs)	Qacc	Peak Stage					Stage (ft)	Water Temp (C)	Return Period(yr)
year	mo	dy	hr	mi			year	mo	dy	hr	mi			
1984	5	22	12:00	0	2200	10	1984	5	22	12:00	0	5.72		
1984	6	1	8:00	0	1650	10	1984	6	1	8:00	0	5.14		
1984	9	25	8:00	0	108	1	1984	9	25	8:00	0	2.77		

Hydrograph

Hydrograph Number	Year	Month	Day	Hr	Min	Sec	Stage(ft)	Discharge (cfs)
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Supporting Files
