

RECLAMATION

Managing Water in the West

TR-2012-08

Travel to Price-Stubb Diversion Dam on the Colorado River near Palisade, Colorado

Date of Travel: May 01, 2012



**U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center
Hydraulic Investigations and Laboratory Services Group
Denver, Colorado**

BUREAU OF RECLAMATION
Technical Service Center
Denver, Colorado

TRAVEL REPORT

Codes: 86-68140 and 86-68460 Date: June 11, 2012

To: Manager, Water Conveyance Group
Manager, Hydraulic Investigations and Laboratory Services Group

From: Ken Sayer, 86-68140
Water Conveyance Group

Brent Mefford, 86-68460
Hydraulic Investigations and Laboratory Services Group

Subject: Travel to Price-Stubb Diversion Dam on the Colorado River near Palisade,
Colorado

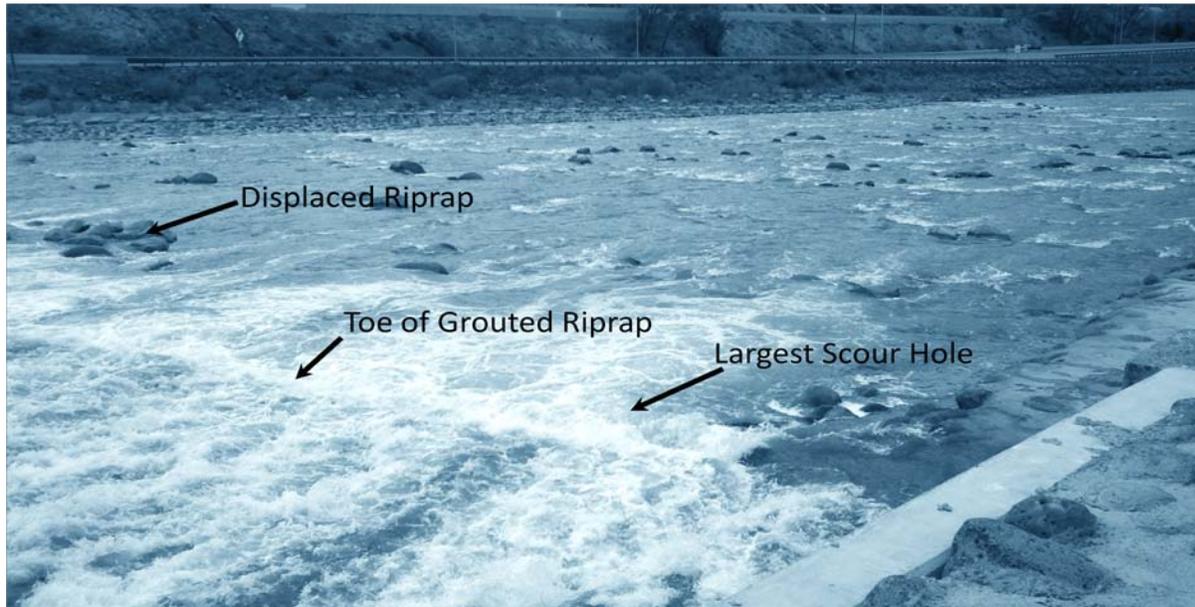
1. Travel period: 01 May 2012.
2. Places or offices visited: Price-Stubb Diversion Dam, Palisade, Colorado.
3. Purpose of trip: Look at scouring of riprap that has occurred on the rock ramp downstream of the dam and discuss corrective actions.
4. Synopsis of trip: The morning of May 1, 2012, we drove from the Technical Service Center to Price-Stubb Diversion Dam site and met Mark Wernke and Kevin Moran of the Bureau of Reclamation's Western Colorado Area Office at about 11 a.m. MDT. We then toured the site.

Price-Stubb fish passage facility near Palisade, Colorado, on the Colorado River was completed in 2008. The facility includes a rock riprap ramp at 2.5 percent slope running downstream from Price-Stubb diversion dam. The upper 45 feet of riprap on the ramp adjacent to the dam is grouted. UngROUTED oversize riprap was placed as transition zone between the grouted riprap and smaller ramp riprap. The downstream toe of the ramp is founded in bedrock and is also grouted.

Since completion, the facility has passed several high flows. Sustained high flows of about 20,000 ft³/s, peaking at 30,000 ft³/s in the spring of 2011, resulted in some scouring/displacement of ungrouted oversize riprap.

On the day of visit, the flow on the ramp was reported to be about 1,000 ft³/s. The ramp was constructed using locally quarried riprap that is typically rounded volcanic river rock of generally good quality although some material was observed to contain considerable gas pockets. We observed several areas on the ramp where significant loss of riprap appears to have occurred immediately downstream of the grouted riprap (see photograph). The largest scour hole

measuring about 10 feet deep appears to be close to the right (looking downstream) dam abutment. Scour holes appeared to decrease in depth and frequency from right to left side of dam, likely due to the left-hand bend in the river upstream. A number of 3- to 4-ft boulders were visible above water that probably were displaced from the scour holes. Very few larger boulders were visible downstream of the scour holes.



View looking downstream from dam crest.

The fish passage runs from the dam downstream on river left and is a grouted riprap trapezoidal channel with rows of concrete cylinder “baffles.” The passage is as long as the ramp and appears to be in excellent condition. Some ramp boulders have moved to the area of the fish entrance/water exit of the passage and are creating flow conditions that may inhibit fish from finding and entering the fish passage.

We discussed possible repairs and departed the site at about 2 p.m. MDT.

5. Conclusions: Some movement of ramp riprap by high flows is expected; however, the apparent scouring of large riprap along the toe of the grouted riprap below the dam crest was not expected. The lack of oversize boulders on the ramp downstream of the scour holes may indicate the oversized riprap was not as large as specified, particularly on the right side of ramp. The scour holes are not endangering the dam in any way. However, they should be repaired to keep the ramp stable. Partial cofferdaming of the dam crest will likely be required for repairs. We discussed using large sand-filled bags placed on the dam crest upstream of the major work areas to control river flow. Anticipated low flows in the river this year make this an opportune time for repairs.

We discussed two repair options. An extensive repair with additional grouting would require removing the ungrouted oversize riprap, cleaning it, replacing and replenishing it, and extending the grout 50 to 100 ft downstream. This would be expensive, could result in the formation of

Travelers: Mefford, Sayer

undesirable thin surface grout layers, and could result in increased scour potential downstream of the toe of the new grouted material. We believe the preferred repair method is to rework the areas of oversize material to some depth between the scour holes and replace as needed with large (5- to 6-foot) angular boulders in the scour holes and in the removal areas, raising the ramp surface back to roughly the surface of the existing grouted material. Pit-run rock material (~3-inch to 12-inch angular material if available) and the existing smaller 18- to 36-inch riprap material should be used to choke the voids between the large riprap and achieve good contact with surrounding material. We also suggest stockpiling some additional large riprap near the site for future use should the material be required.

Ramp boulders interfering with flow exiting the fish passage should be moved away.

6. Action correspondence initiated or required: None.

cc: WCG-MWernke, WCG-KMoran, WCG-BUilenberg, 86-68140 (Sayer),
86-68460 (Mefford)

SIGNATURES AND SURNAMES FOR:

Travel to: Palisade, Colorado

Date or Dates of Travel: 01 May 2012

Names and Codes of Travelers: Brent Mefford, 86-68460, Ken Sayer, 86-68140

Travelers

K.A. Sayer
Signature

5/10/2012
Date

Brent Mefford
Signature

5/18/2012
Date

Noted and Dated by:

R. Eichelberg
Signature

Manager, 86-68460
Title

5/29/12
Date

W.C. De
Signature

Acting Manager 86-68140
Title

6/4/12
Date