

Greybull Valley Rehabilitation / Upper Sunshine Diversion, Level II

Client/ Mr. Chris Abernathy
Reference: Wyoming Water Development Commission
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In May 2007, Anderson Consulting Engineers, Inc. (ACE) entered a contract with the Wyoming Water Development Commission (WWDC) to provide professional services to the Greybull Valley Irrigation District (GVID) in support of the Greybull Valley Rehabilitation / Upper Sunshine Diversion, Level II Study Irrigation District in the vicinity of Meeteetse, Wyoming.

The GVID boundary includes approximately 80,000 acres in Park and Big Horn Counties. Of this total, approximately 65,000 acres are irrigated. Water shortages and droughts promulgated the GVID to seek storage opportunities in the basin. In 1938, the Upper Sunshine Reservoir was completed. This off-channel reservoir is supplied via the Upper Sunshine Supply Canal which conveys available flows of the Greybull River. The canal is reported to have capacity of approximately 1,000 cubic feet per second. Later, in 1972, the Lower Sunshine Reservoir was completed. It is filled from the Greybull River via Upper Sunshine Reservoir outflows and from the Wood River. The combined storage capacity of the two reservoirs is approximately 112,000 acre-feet

When river discharge exceeds approximately 2,000 cubic feet per second, an in-channel berm effectively confines the flow and promotes transport of gravel and cobble material. Mobilization of the coarse bed material within the river results in transport of this material to the supply canal and subsequent deposition of these same materials within the canal. Consequently, during spring runoff when excess flows are available for storage, the GVID must continually excavate the upper portions of the canal or capacity is rapidly lost.

The GVID Several issues face the GVID with respect to the Diversion and its potential rehabilitation or replacement. These include:

- The structure is nearly 70 years old. Deterioration of the structure may limit its longevity.
- Cobbles and gravels mobilized by the Greybull River are diverted into the Canal and deposited in its upper reaches. Consequently, the GVID must continually dredge the canal during these events resulting in higher operations and maintenance costs.
- The GVID is wary of potential permitting issues and constraints imposed by the US Army Corps of Engineers through section 404 of the Clean Water Act.
- Currently, there is no means of measuring flows in either the canal or in the river.

Specific tasks included in this effort are listed below.

- Conduct a geomorphic evaluation of the Greybull River within the limits of the study reach in order to develop design criteria which will create geomorphically stable conditions within the river and, subsequently, result in less deposition of river bedload within the canal;
- Develop and evaluate diversion facility alternatives including rehabilitation of the existing structure, replacement of the existing structure at its present location, and replacement of the structure at a new location upstream;
- Evaluate alternatives to measure flows within the Greybull River and within the canal;
- Evaluate feasibility of automating the proposed diversion facility enabling greater management efficiencies;
- Identify permits and easements required to complete the proposed project; and
- Complete conceptual designs and cost estimates at a detail adequate to compare the various alternatives.

