Water Supply Reserve Account – Grant and Loan Program
Water Activity Summary Sheet

Applicant: North Fork Water Conservancy District and the Fire Mountain Canal and Reservoir Co.

Water Activity Name: Sedimentation Management Study for Paonia Reservoir

Water Activity Purpose: Technical Assistance (Feasibility Study)

County: Gunnison

Drainage Basin: North Fork Gunnison

Water Source: North Fork Gunnison

Amount Requested: $79,000 (Basin Account); $230,000 (Statewide Account)

Matching Funds: NFWCD, $5,000 and Fire Mtn. Canal Co., $5,000

Water Activity Summary:

Paonia Reservoir was commissioned in 1962, with an original capacity of 21,000 acre-feet. The reservoir has lost approximately 24% of its total capacity as of the last sediment survey in 2002, and storage losses to sediment continue at an annual rate of about 124 acre-feet. At the historic rate of sedimentation, the storage volume will be completely displaced by sediment within the next 125 years. Nearly all of the dead and inactive pools (storage reserved by the U.S. Federal Government) have presently been depleted due to sedimentation losses and active storage is currently being encroached on.

A large sedimentation delta has been forming and moving toward the dam since the reservoir was placed in operation and has migrated downstream over 80 percent of the length of the reservoir to within 3,000 feet of the dam. This delta is expected to reach the dam within the next decade or two. Once that happens the scope of negative impacts is expected to increase. The accumulation of sediment around the outlet's intake structure is expected to adversely affect the reservoir outlet in ways that may harmfully impact the ability to control the reservoir in a manner consistent with historic operation, in accordance with downstream demands for storage releases and in a way which avoids detrimental downstream environmental impacts.

The result is that storage water which has historically been used for agriculture and other purposes is being lost and conditions are developing which may jeopardize the ability to judiciously operate the reservoir. In addition to irrigation water, the Paonia Reservoir provides flatwater recreation, fishing, improved late season flows to the North Fork of the Gunnison River, flood control for downstream towns and developments such as the towns of Paonia and Hotchkiss, water for downstream calls (specifically calls placed by Redlands Water and Power Company), water to supplement normal late summer low stream flows and existing as well as potential future augmentation water. All these uses will be curtailed if no solution to the sediment problem is found. Additionally, use of the water to fill present augmentation needs is limited based on the uncertainty of future availability of committed pool volumes. There are no other currently available irrigation options for the farms and ranches in this area that presently rely on water stored in Paonia Reservoir and, without some action, there will be a devastating impact on existing agricultural water users. Unless the storage volume in the reservoir can be maintained or restored, the only alternatives will be to abandon the existing storage rights or to build additional storage projects in the same drainage basin at a much higher cost.

Therefore, there is a compelling need to evaluate a range of sedimentation mitigation options and identify the best and most cost effective method(s) for insuring reservoir sustainability and a continued full supply of water from the Paonia Reservoir project.

The North Fork Water Conservancy District has been moving forward with relatively limited incremental tasks including preliminary studies of dredging feasibility, evaluation of historic sediment accumulation data and preliminary analysis of sedimentation mitigation options. However, with the potential availability of additional funding, there is a desire to take a much more substantial step toward identifying possible solutions so as to enable implementation of mitigation measures as early as possible.

The objective of this study is to investigate sediment management options for Paonia Reservoir with the intent of identifying means to accomplish one or all of the following goals:

1. Remove a portion of the historically accumulated sediment.

2. Reduce the rate of future sediment accumulation.

3. Identify operational and management practices which will extend the life of the reservoir, preferably indefinitely.

The study will assess the technical feasibility of alternative sediment management techniques and identify the most economical and practical technique(s) for long-term sediment management. The intent is to establish a solid technical and regulatory basis on which to make decisions regarding future goals such as construction of sedimentation control features, removal of existing sediment, improvements in the drainage basin, operation and maintenance protocols and future sedimentation monitoring.

Addressing Paonia Reservoir sedimentation is included specifically as an item in the Gunnison Basin Round Table (GBRT) needs assessment memorandum. The need for reservoir rehabilitation and maintenance is recognized as a water management objective in the Statewide Water Supply Initiative (SWSI). Sediment mitigation is considered a rehabilitative effort. Specific SWSI objectives are addressed by this project as follows:

1. Long term sustainability of the existing Paonia Reservoir storage volume is the ultimate intent of the project. The proposed project is a major step toward implementing capital and operational measures which will partially or fully mitigate the sedimentation problem.

2. The project is intended to develop measures which will offset, abate or eliminate the inevitable loss of irrigation water storage volume if no action is taken.

3. Optimization of existing and future water supplies includes sustaining existing storage capacity that will otherwise be lost or that must be replaced with less effective facilities at much greater cost and with greater environmental impacts.

4. By assuring the long term sustainability of Paonia Reservoir and the stable stream flow that results from summer releases, recreational opportunities in the area are protected. The ultimate outcome of the no-action alternative will be a reservoir basin fully filled with sediment, land of

questionable usefulness and complete loss of current recreational opportunities associated with the reservoir and its storage releases.

5. Environmental enhancements will result from this project in relation to the potential destructive consequences that will otherwise occur as a result of continued, unrestrained sedimentation. Continued sedimentation will result in a completely sediment filled reservoir basin and may involve replacement of the storage capacity at one or more other sites with the attendant environmental repercussions. Additionally, if no action is taken, the sedimentation delta will eventually surround the intake structure, and the ability to control the rate for release of sediment from the reservoir will be decreased. Sediment releases may occur episodically, in slugs and with unavoidable negative environmental impacts.

6. Instituting a sustainability plan for Paonia Reservoir will avoid the costs, disruption and environmental impacts of developing one or more alternative storage sites. Also, reduction of sediment loads against the dam will avoid costly dam modifications which may be necessary to buttress the embankment against potential failure

7. If the sedimentation continues at current rates, the impact on the dam's outlet works may start to restrict the range of allowable operational flexibility due to downstream environmental and other considerations. Therefore, one of the benefits of developing a plan to control sedimentation impacts will be to maintain current operational versatility.

Discussion:
The Applicant was exceptionally thorough in describing how they meet the WSRA Threshold Criteria and the Statewide Evaluation Criteria (please refer to the application to review their response in entirety). In summary, the Applicant stresses the importance of Paonia Reservoir to the basin, in particular to the agricultural community. There are approximately 15,000 acres and 500 water users relying on water stored in Paonia Reservoir. It is estimated that, if lost to sedimentation, the cost to replace each acre-foot would be between $3,000 and $10,000—a cost that many in the North Fork Gunnison basin would find difficult to pay.

Most important, it is critical that the State invest in maintaining its existing infrastructure to the best of its ability. Every year, sediment continues to fill the reservoir which will eventually interfere with the outlet works and reduces capacity. Several SWSI water management objectives can be addressed by the project:

- Sustainably meet agricultural demands
- Optimizing existing and future water supplies
- Promoting cost-effectiveness

This project could be seen a "smart" project in that it ensures the utility of an existing facility and invests in the most cost-effective and least environmentally damaging water supply option. The improvement/rehabilitation of existing infrastructure avoids unnecessary new storage and/or diversion structures which could contribute to environmental damage as well as high costs. This study is an important first step the actual removal of sediment from Paonia Reservoir.

While it is understood that operation and maintenance was assumed by the North Fork Water Conservancy District in 1962 and that by contract, the NFWCD transferred the physical operation and maintenance of the project to the Fire Mountain Canal and Reservoir Company, it would have been ideal if the Bureau were to contribute towards the funding of this study (e.g. Water 2025 Challenge Grant program).

Issues/Additional Needs:

- Please describe the deliverables that will be submitted to the CWCB;
- Please provide more detail in the budget, especially in regards to Phase II of the project and relate each item in the budget to each task and/or subtask in the scope of work; and
- The Applicant has utilized an older version of the WSRA application. For future reference, please utilize the most current version (May 2007).

Staff Recommendation:

The proposed project meets the Threshold Criteria and the majority of the Evaluation Criteria for the Statewide Account. Staff recommends funding of up to $79,000 from the Basin Account and $230,000 from the Statewide Account to assist with the costs associated with the Paonia Reservoir Sedimentation Study. It should be noted that past costs can not be reimbursed.