Bad River Watershed Project - Watershed Management Model Works in South Dakota

The Bad River watershed, 3,172 square miles that drain into the Missouri River at Ft. Pierre, South Dakota, consists primarily of highly erodible shallow and dense clays. The river does not support its assigned beneficial uses primarily because its sediment load is 3.25 million tons per year, which also severely impacts the Lake Sharpe impoundment of the Missouri River. The sport fishery in this reach of the Missouri River contributes about $2.5 million annually to Pierre's economy, but only when it is not impaired by turbidity from the Bad River. When the Bad River is flowing, the value essentially goes to zero.

Unchecked sediments pose many risks

The Bad River's sediment load settles in the Missouri River near Pierre and Ft. Pierre and has significantly filled the channel. The result is increased flooding in the municipalities and surrounding area, and a consequent reduction in the water that the U.S. Army Corps of Engineers will release from the Oahe Reservoir during extremely cold periods. The loss of power generation during these times has an average annual value of $12.5 million. Beyond economic value, however, is a greater concern; namely, that the loss of power generation during critical winter conditions may result in regional multistate brown- or black-out conditions with consequent loss of life. If the sediment continues to accumulate, the Corps of Engineers predicts flow restrictions and subsequent power generation curtailments even under open channel flows.

Although these impacts of sediment delivery are sizable and well known, numerous obstacles must be overcome before anyone can undertake a project large enough to make a significant reduction in the volume of sediment delivery.

Steering committee takes first steps

The Bad River watershed steering committee -- composed of local residents and governmental officials -- selected a watershed management approach. Thus, the steering committee, who will guide program development and conduct a monitoring and assessment program, began documenting the magnitude and location of sediment contributions in the watershed as a first step toward solving the problem. People generally believed that the sediment came mostly from South Dakota badlands in the upper basin and tablelands that had been converted from grasses to wheat production.

The steering committee's assessment program suggested, however, that the lower third of the watershed produces two-thirds of the sediment -- primarily from gully erosion on grazing lands and streambank scour.

The next step toward a solution was to begin a demonstration project in the 250-square- mile Plum Creek subwatershed to illustrate the feasibility of pollution controls. The practices must be carefully chosen not to jeopardize the economic stability of ranches and farms in the project area.

BAD RIVER WATERSHED

In the Bad River watershed, the project recommended an array of practices: planned grazing systems, proper grazing use, erosion control structures, riparian revegetation, range seedings, water spreader systems, and alternative stock watering facilities.

The breadth of these practices demonstrated to farmers and ranchers that the program was truly voluntary and would enhance the economic stability of their operations. Simultaneously, it convinced management agencies that the project could achieve substantial landowner participation.

Above all, this portion of the workplan showed that the steering committee had explored innovative best management practices and knew for certain that the recommended practices would help the watershed community control the volume of sediment in the Bad River drainage.

The principal partners in the Bad River contributed financially and offered technical expertise. Among them:

- Stanley County Conservation District (Primary Sponsor)
- South Dakota Department of Environment and Natural Resources
- South Dakota Game, Fish and Parks
- USDA Farm Services Agency
- USDA Natural Resources Conservation Service
- South Dakota Department of Agriculture
- South Dakota Cooperative Extension Service
- U.S. Geological Survey
- U.S. Fish & Wildlife Service
- North Central Resource Conservation and Development
- Pheasants Forever
- South Dakota Wheat Commission

Results of the demonstration project exceeded expectations and achieved a significant reduction in erosion and sediment delivered to the Bad River. In 1990, Plum Creek delivered 82.7 tons of sediment per acre/foot of runoff. The average annual sediment delivery during 1993 through 1995 was 10.2 tons of sediment per acre/foot of runoff. These data were collected by the U.S. Geological Survey in cooperation with Stanley County Conservation District and published in the annual USGS Water Resources Data for South Dakota, 1990 through 1995. Years 1991 and beyond were unusually high precipitation years. Nevertheless, a significant reduction of sediment delivery was apparent.

Increased vegetation in the formerly eroded streambanks and riparian areas helped control water yield. Improved land resource management by project cooperators further reduced total runoff.

Landowner participation in the Plum Creek watershed was approximately 90 percent, with approximately 95 percent of the land under some type of intense management. The watershed residents have supported expansion of the project to the rest of the basin and demands for technical and financial assistance are about four times expected levels.