Jackson Hole Rodeo Grounds Snow Storage Site:
Filtration System Reduces Urban Storm Water Runoff

Flat Creek is in the Upper Snake River watershed. Upstream of the town of Jackson, within the National Elk Refuge, the creek is a Class 1 trout stream. Historically, Flat Creek has provided diverse recreational opportunities and aesthetic value to the residents and visitors of Jackson as it meanders through the community. For many years, however, it has become increasingly apparent that once the creek enters the town, fish habitat quality is significantly diminished.

In response to these concerns, the Wyoming Department of Environmental Quality and Jorgensen Engineering completed a water quality assessment of Flat Creek in 1982. The study revealed a number of factors affecting water quality, including increased impervious surface area, increased traffic volume, and land uses resulting in concentrations of heavy metals, oils, and suspended solids. The study also found that urban storm water was adversely affecting Flat Creek.

In 1994 the Teton County Conservation District (TCCD), in cooperation with the Town of Jackson, conducted a thorough investigation of nonpoint source pollutants affecting Flat Creek. This comprehensive program, which included establishing permanent monitoring stations in key areas, identified the snow storage area at the rodeo grounds as a significant source of nonpoint source pollutants.

The TCDD, Town of Jackson, and Nelson Engineering prepared a grant proposal for installation of a commercially available storm water filtration system and submitted the proposal to the Wyoming Nonpoint Source Task Force. The project was approved for funding in the amount of $32,735 in the fall of 1997.

In the course of determining the necessary sizing of the filtration unit, snowmelt runoff samples were collected and analyzed. This analysis revealed that the sediment load in the runoff would exceed the capacity of existing commercial units and require excessive maintenance. Given these findings, the Town Engineer and Nelson Engineering designed a surrogate filtration system. The new design lowered the project cost to $14,824, resulting in a savings of 50 percent over the cost of the commercial unit. Because of the experimental nature of the new design, an amendment to the grant proposal was sought and approved. The project was completed in the fall of 1998 and evaluated for effectiveness in the spring of 1999.

Project details

The Jackson Hole Rodeo Grounds cover 6.2 acres, with a 1-percent southwesterly slope. Snow removed from the streets of Jackson is stored on the western half of the lot. To improve drainage to the southwest corner of the site, where the filtration system is installed, the snow storage area was graded. In the immediate area surrounding the filtration system, a shallow detention basin was cut to provide a settling area for particulates prior to entering the filtration system.

The primary filter installed by the Town of Jackson is composed of 2-inch-diameter washed rock and a nonwoven geotextile fabric. Particles from runoff, 0.0059 inch or greater, are trapped and held in the top surface of the fabric in the gravels.

JACKSON HOLE

The filtered runoff is collected in a 6-foot-diameter perforated manhole and then conveyed to a catch basin sediment trap that provides additional sediment removal and storage in a sump-type facility. Runoff then passes to the storm water collection system. The perforated manhole has 4 feet of effective depth with 1.5-inch perforations on 8-inch centers; the immediate filtering surface is 484 square feet (22 feet by 22 feet).

A winning combination

During the winter of 1998–1999, roughly 120,000 cubic yards of snow from the streets of Jackson was stockpiled at the rodeo grounds. The results of storm water runoff sampling collected during the spring runoff period were inconclusive, so Nelson Engineering was contracted to evaluate the system's effectiveness. The investigation found that the three-phase rodeo ground filtration system was effective in removing gross pollutants 0.0059 inch and larger. There was no evidence of sediment in the bypass, so the geotextile fabric was not replaced for the 2000 runoff season.

The design combination of sediment basin, geofabric, washed rock filtration, and sump for bypass flows was successful in removing particulates and can be used in areas of limited space. This application can be used with favorable results in urban areas where sediments are a storm water concern. The only modification to the system being considered is the use of filter fabric with a smaller sieve size.

Primary Sources of Pollution:
- urban storm runoff
- runoff from snow storage area

Primary NPS Pollutants:
- heavy metals
- oils
- suspended solids

Project Activities:
- installation of storm water filtration system

Results:
- successful removal of storm water particulates

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