Water Resources Forecasting in the North Platte Basin

Water needs have increased dramatically in many areas of the west. The North Platte and Platte River basins are no exception. Over the years water has become extremely valuable in the North Platte River basin. Downstream uses on the North Platte and Platte Rivers in Nebraska necessitate the need for both flood and water supply forecasts. In times of drought the water in the North Platte River is not enough to meet the needs of the users. As such, they are dependent on water that is stored in reservoirs such as Lake McConaughy in the Nebraska panhandle, near Ogallala..

Figure 1. Lake McConaughy; nr Ogallala, NE.

Both flood forecasting and water management forecasts depend on the cooperation of many Federal, State and local agencies. Lake McConaughy itself is maintained and operated by the Central Nebraska Public Power. Data from the reservoir is used for downstream water management activities, including waterfowl (Sandhill Crane) habitat enhancement, power generation, flood control, irrigation as well as flood forecasting.

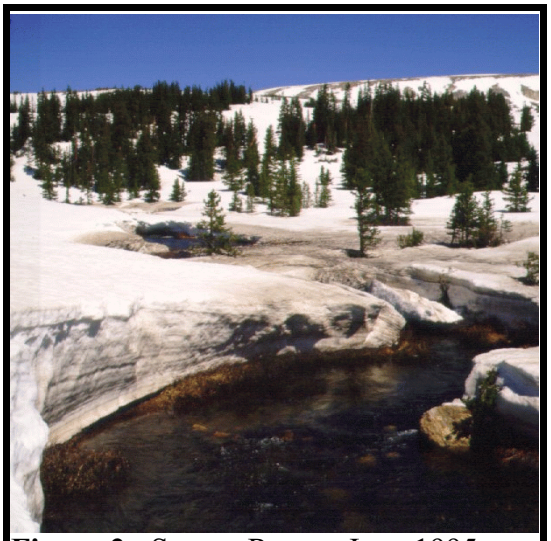

Figure 2. Snowy Range: June 1995

In the headwaters of the North Platte, inter-agency coordination includes the Natural Resource Conservation Service (NRCS) for snowpack measurements. Much of the snow accumulation area lies in the state of Colorado, with the remaining portion in southern Wyoming. The Park Range and the Rawahs in Colorado have numerous SNOTEL sites, in addition to several snow course sites. The snow course (manual) sites are often read by U.S. Forest Service crews that go out once a month and take the manual snow course readings. These in turn are relayed to the state NRCS offices and finally to the Missouri Basin River Forecast Center in Kansas City. SNOTEL (automated) readings are monitored on a daily basis, with the readings transmitted from NRCS downlink sites in either Ogden, UT. or Boise, ID. Altogether the North Platte River basin has approximately 25 - 30 snow monitoring sites. This includes both snow course and SNOTEL snow water equivalent observations.

In addition, the U.S. Geological Survey (U.S.G.S.) in Colorado, Wyoming and Nebraska serve as partners in collecting of streamflow/stage measurements. While the National Weather Service uses the data for streamflow/flood forecasting, state engineers use the data for monitoring irrigation diversions and water rights administration. Many of the U.S.G.S. stations now have Data Collection Platforms (DCPs) to monitor the streams via satellite. While the U.S.G.S. has installed some of the DCPs, the Bureau of Reclamation (BuRec) has installed many of them in order to forecast inflows into their reservoirs. State agencies also install and maintain stream gages to monitor streamflow in Colorado, Nebraska and Wyoming.

Figure 3. Laramie River @ Woods Landing; WY

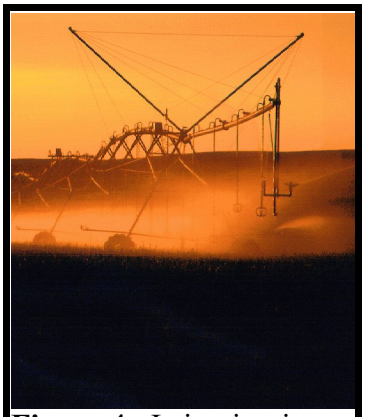

Figure 4. Irrigation in Eastern Wyoming.

The Bureau of Reclamation is primarily interested in meeting irrigation requirements of farmers in the North Platte River basin, although there is some flood control storage in Glendo Reservoir in southeast Wyoming. In order to meet irrigation requirements, the BuRec uses coop data from the NWS, as well as snow course/SNOTEL data from the NRCS and stream gaging data from both their own gages and those of the U.S.G.S.The BuRec also tries to manage their reservoirs to provide water for irrigation during low runoff years, and produce some flood control benefits during high runoff or flood periods. If the North Platte River has excessive runoff and water begins to get stored in the flood control pool at Glendo, then the Corps of Engineers also ends up involved in the process by managing reservoir releases from Glendo to minimize flood damages in downstream communities, such as Scottsbluff and North Platte, NE.

The River Forecast Center in Kansas City also ends up as a link in this whole process by collecting the various agencies' hydrological/meteorological data and then preparing both water supply forecasts for water management activities, as well as flood forecasts when they are needed. Providing hydrologic forecasts for the North Platte River requires working with numerous state and Federal agencies, as well as utility companies. However, with water being "liquid gold" in the west now, the economy of the North Platte River basin depends on both forecasts for water management activities, as well as accurate flood forecasts. Throughout the entire process, inter-agency coordination and cooperation makes it all happen.

Figure 5. Scottsbluff, NE.