THE 1994-1995 SNOW ACCUMULATION AND RUNOFF EVENT IN NORTHERN COLORADO, SOUTHEASTERN WYOMING AND THE NEBRASKA PANHANDLE

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ABSTRACT

After a number of years of below normal snowpack in northern Colorado and southern Wyoming the weather took a dramatic change. Beginning in mid-April of 1995 the snow become coming down in a big way. Outside of the mountains, the valleys and plains received abundant rainfall to the point of causing flooding along the Laramie and North Platte Rivers in eastern Wyoming and the Nebraska Panhandle. In the upper part of the basin, at Saratoga, WY the North Platte River ran bankfull for several weeks resulting in some sandbagging to protect homes. Through the use the flood control pool at Glendo Reservoir and controlled releases flooding was held to a minimum.

INTRODUCTION

The North Platte River always seems to live on the edge when it comes to getting enough snow to support all the demands that are placed on the river. With this in mind several large reservoirs were built over the last 100 years to provide enough storage for irrigation and power generation, in particular. From the late 1980's snowfall in northern Colorado and southern Wyoming had been generally below normal. As a result the 2 largest reservoirs, Seminoe and Pathfinder were approaching record low levels. It looked like the 1994-1995 water year would be another in a trend of below normal snow accumulation years.

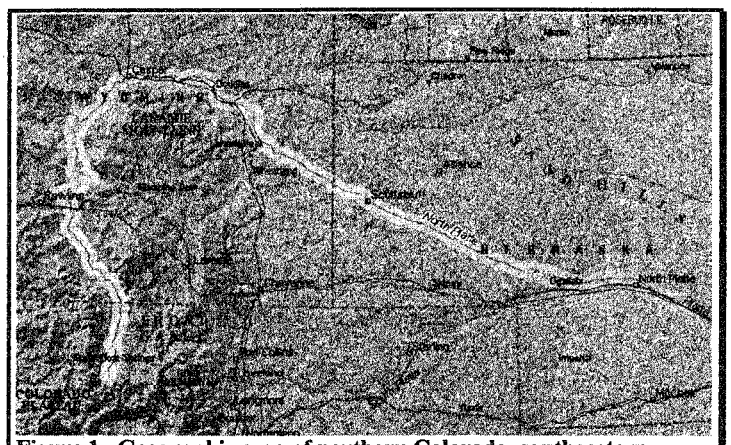

Figure 1. Geographic area of northern Colorado, southeastern Wyoming and the Nebraska highlighting the North Platte River.

However, by mid-April the snow began in earnest, in the Park Range, the Sierra Madres and in particular the Snowy Range of Wyoming and the Rawahs of northern Colorado. For about 6 weeks, it was a period of heavy snow in the mountains and rain in

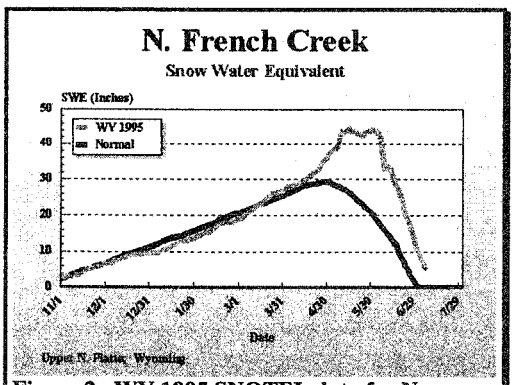

Figure 2. WY 1995 SNOTEL data for N. French Creek (Snowy Range; WY)

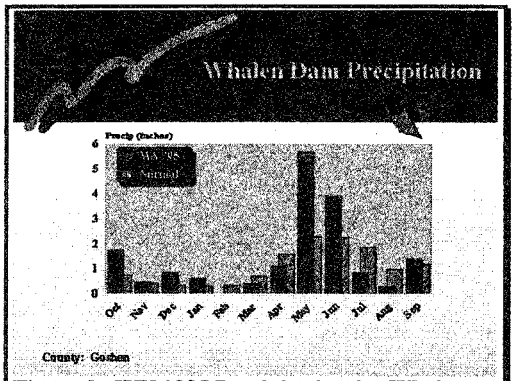

Figure 3. WY 1995 Precipitation for Whalen Dam; WY

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the valleys as well as on the high plains. Overnight forecasts for below normal runoff turned into forecasts for above normal runoff and in some cases flooding. This was particularly true for the Laramie River where heavy rainfall in early June caused Grayrocks Reservoir to have to spill resulting in flooding along the Laramie River. Glendo and Guernsey Reservoirs were forced to cut back on releases in order to prevent additional flooding downstream. Meanwhile, in the headwaters of the North Platte the runoff hadn't even peaked in early June. It was until late June that runoff finally peaked with the North Platte running bankfull at Saratoga, WY and forcing some sand-bagging to protect property along the river.

Figure 4. Laramie River nr Ft Laramie, WY.

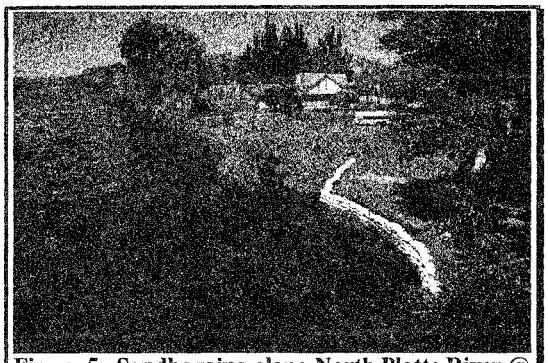

Figure 5. Sandbagging along North Platte River @ Saratoga, WY.

This whole process of heavy spring snows and rain delayed the snowmelt runoff and resulting in quite a juggling act by the Corps of Engineers, Bureau of Reclamation as well as Dakota Utilities in managing the runoff on the Lower North Platte without causing undue flooding problems. Releases had been started from Glendo and Guernsey Reservoirs to accommodate some of the expected runoff. Unfortunately, heavy rains above Grayrocks on the Laramie River forced releases from Grayrocks Reservoir which had no place to store the flood producing inflows. In a matter of hours releases had to be cut back at Glendo and Guernsey to maintain bankfull conditions with minimal impacts on the North Platte through the Nebraska panhandle. Releases from Grayrocks pushed the Lower Laramie River over flood stage, but only to the point of putting about 6 inches of water over S.R. 160 in eastern Wyoming near Ft Laramie.

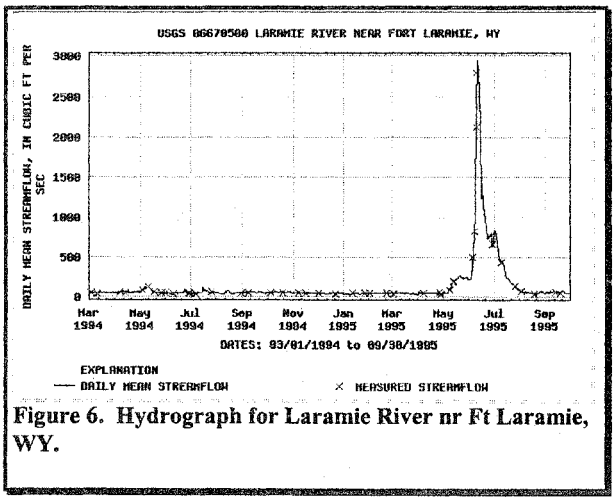

Figure 6. Hydrograph for Laramie River nr Ft Laramie, WY.

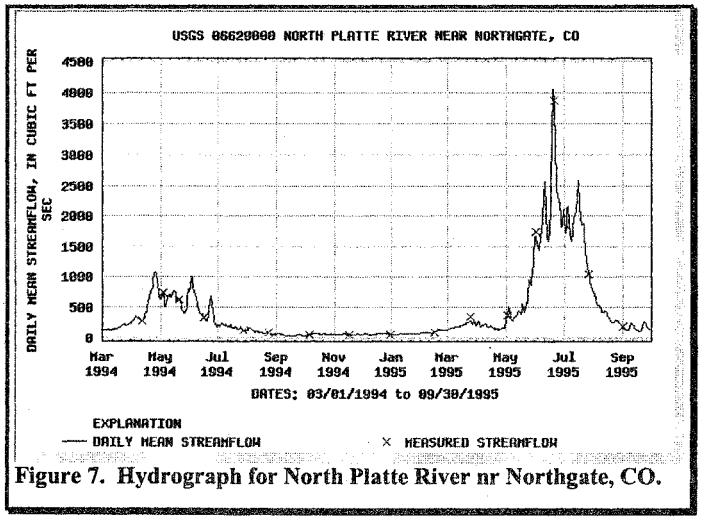

Figure 7. Hydrograph for North Platte River nr Northgate, CO.

The hydrographs for the North Platte @ Northgate, CO as well as the Laramie River nr Ft Laramie are shown in the attached figures. The "almost" flash flood event above Grayrocks Reservoir is quite evident in the hydrograph (Figure 6) for the Laramie River nr Ft Laramie, WY.

While the Lower North Platte experienced most of its "problems" in early June, it wasn't until later in the month that the headwaters actually crested. Because of the additional spring snows and cooler temperatures, the

actual peak runoff was almost a month later than that experienced in 1994 (Figure 7) and approximately 2 weeks later than the crest on the Lower North Platte in eastern Wyoming.

CONCLUSION

It was interesting, in retrospect, to do a post-analysis of the entire 1995 snowmelt/runoff event. While the Bureau of Reclamation/Corps of Engineers/Dakota Utilities were involved in juggling reservoir releases in early June on the lower North Platte, the main runoff scenario on the Upper North Platte was only setting up. By late June, the North Platte was peaking in the Saratoga area causing some concern over potential flooding. The runoff event in the Upper North Platte enabled the Bureau of Reclamation to virtually refill both Seminoe and Pathfinder Reservoirs for the 1st time in many years. In the Lower North Platte the flood pool at Glendo was utilized to help minimize flood impacts on the North Platte in eastern Wyoming and the Nebraska Panhandle.

The hydrology of the North Platte River basin is, in all honesty, quite exciting. With numerous scenarios that can occur from year to year, it was basically a fun basin to forecast for. In addition, it was quite interesting working with all the different Federal, State and local officials who had an interest in river and flood forecasts for the North Platte River.

REFERENCES

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