A Review of

"A Drought Relief Study in the South Platte River Valley Emphasizing Conjunctive Use"
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Introduction

The Drought Relief Study was conducted in response to the serious 1977 drought, which was the single driest year of record for many river basins in Colorado until the 2002 year. The BOR funded the study in the fall of 1977 in anticipation of the drought extending for several years as had been the pattern of earlier droughts such as the drought of the 1950's.

The objectives of the study were:

1. Identify developable sites for supplemental ground water withdrawals to provide short-term relief at times when insufficient surface water is available for diversion by ditches and canals.
2. Identify depletions resulting from the supplemental ground water pumping program in various reaches of the South Platte River from Chatfield dam to the State Line and prevent any injury to senior water rights.
3. Determine a method of allocating operating costs to the various beneficiaries based upon the results of the study.

Procedure of the Study

The study had to be conducted in a matter of months so three consulting engineering firms were employed and supervised by the State Engineers Office (SEO) to conduct the field work for three reaches of the South Platte River.

1. Chatfield dam to Kersey gage – Hydro-Triad, Ltd. – District 1
2. Kersey gage to Balzac gage – Toups Corporation – District 2
3. Balzac gage to the State Line – URS Company – District 64

URS also provided 1977 aerial photo base maps of the entire study area so that the consulting firms could map ditch systems, wells under these systems, and acres irrigated under the systems.

The consultants were also to evaluate the ditch systems for the ability to use ground water as an alternative supply in a drought situation.

The consultants were also to identify the ditches and canals that would be the most seriously affected by continuing drought conditions and to suggest alternatives within the study area to optimize the use of surface and ground water considering the constraints of time, economics, and impacts on senior water rights.

Constraints to Developing a Supplemental Well Pumping Plan

The study identified two legal constraints that had to be addressed in the pumping plan and they were:

1. Injury to senior surface water rights could not be allowed by the supplemental well pumping program, but it may be possible to offset the impact of the plan by providing ground water in lieu of surface water to the impacted water rights.

2. The existing wells in the valley had to comply the 1974 Amended Rules and Regulations of the State Engineer.

The majority of wells were operating under temporary plans for augmentation approved annually by the State Engineer. The plans were approved in 1977 based on the minimum requirement of providing five percent of the estimated pumping volume as the amount of replacement water necessary for operation of the plans. If late summer rains had not occurred in 1977, the plans would not have been sufficient.

The report recognized that if the drought continued in 1978 that more replacement water would be needed to protect senior water rights. It also pointed out that many canal systems had irrigation wells and would be reluctant to demand strict well administration since it would also impact their ability to pump their supplemental wells. The report did state that some canals had limited or no access to supplemental wells under their systems and would be impacted by drought and junior well pumping. The study would focus on a plan to provide augmentation water to these water rights which was legally viable and which would permit continued pumping of the numerous junior wells in the South Platte for supplemental irrigation water.

The study also identified time as a constraint to the implementation of the plan and that it had to be fully operational by June 15. This would require numerous meetings between various water users to reach agreements necessary to implement the plan. The study recognized that in the past mutual agreements between water users have been difficult to attain and it is in this area that the major difficulty with a supplemental wells pumping program may be encountered, especially due to the short time for implementation. As it turned out, 1978 was not a drought year and the plan was not implemented.

Economics was also identified as a constraint to the success of the program due to the costs of constructing and operating new wells along affect canals. It was recognized that grants or loans to ground water user entities may have to be provided to implement the pumping program.

Description of the South Platte River System

The study briefly described the work of the consultants to map the system on 133 mylar base maps. The field work found 4250 irrigation wells under the canals in the study area that could be used to provide supplemental ground water if the drought continued and surface water was available in limited quantities. It also identified canals with limited or no supplemental wells and insufficient water rights to provide water due to drought or the impact of well depletions.

These ditches without sufficient water rights or existing supplemental wells were listed in the report by District and for District 64 included the Liddle, South Reservation, Peterson, Harmony No. 1, Powell-Blair and Sterling No. 1 canals.
For District 1, it included the Tetsel, North Sterling, Weldon Valley, and Riverside canals.

For District 2, it included the Evans No. 2, the Fulton, and the Burlington/Brighton Lateral.

Present Water Management Practices within the Study Area

The report then described the irrigation practices and the changes from initial development of irrigation in the 1860's to 1978. Direct flow irrigation was followed by reservoir development in the early 1900's with two systems identified as having no senior direct flow water rights or limited alluvium for the construction of wells which are the Riverside Irrigation District and the North Sterling Irrigation District.

Irrigation wells were then constructed primarily after 1950 when turbine well technology and electricity became economically available.

The formation of two well owner organizations was discussed which were established for the purpose of allowing wells to comply with the 1974 amended rules, i.e. GASP and Central Colorado Water Conservancy District. In 1977, GASP had 2,648 wells with a projected pumping of 370,000 a-f and Central had 845 wells with a projected pumping of 104,000 a-f. This totaled 3493 wells and 472,000 a-f of pumping.

GASP's plan to remove the call from certain key senior water rights was described and in particular how this removal of a call provided water to upstream canals that had traditionally had to pass water downstream to these calling rights. Well fields had been constructed along the South Reservation Canal and Sterling No. 1 and the benefits of the use of these wells as alternate point of diversion was discussed. This method of removing the call is often referred to as "call management". Later wells were constructed along the upper reach of the Peterson Canal by GASP to provide water to the canal to offset well depletions and remove its senior call.

The lease of recharge credits by GASP was also mentioned and the value and low cost pointed out ($2/a-f). The use of additional recharge projects was encouraged and this has come to fruition with hundreds of recharge facilities constructed up to 2006.

Recommended Plan to Facilitate Supplemental Well Pumping for Drought Relief

The report then set forth the concept of the plan which was identifying those surface water rights which would most seriously be affected by drought and well depletions and developing a method to alleviate the detrimental effect of well depletions and drought for each affected canal.

For each of the canals listed above for District 64, a plan was developed that relied on well fields along the canals to operate as alternate points of diversion (APD's) to senior surface water rights. The report in particular described how the APD's would operate without injury to downstream water rights based on the legal treatment of APD's in 1978. The APD was also premised upon the fact that any downstream senior water right was satisfied and not calling due to the supplemental well fields along the canal. However, this legal treatment changed in the 1980's and the delayed depletions of APD pumping now have to be considered and if other rights are injured, then the APD pumping must replace this post-pumping depletion. This is especially a problem if there are downstream reservoir rights diverting in the non-irrigation season that could be impacted by post-pumping depletions. Existing decreed APD's were not subject to this change in legal theory.

For District 1, the plan recognized that little could be done for the Riverside and North Sterling systems since wells along the upper parts of the canals could not operate as APD's without injuring downstream senior water rights due to the junior priority of the water rights associated with these systems. There was no other recourse for these water rights other than maximizing diversions of available surface water. This is a major problem for a conjunctive use program for the South Platte basin and while it may have worked for a limited duration drought, it may not be feasible for a long term conjunctive use program unless this shortage to these systems is addressed in some way. The Weldon Valley canal would divert Jackson Lake water in an exchange with the Fort Morgan canal water users who would pump ground water rather than use their Jackson Lake shares. This would require a large degree of cooperation that may not have been possible in 1978 or more so in 2007.

For District 1, the canals facing shortages are more impacted by drought and not well depletions since there are not many wells upstream of these canals. Evans No. 2 would divert water by exchange with the more senior Western canal and the Western Canal users would pump ground water. The Evans No. 2 water users would pay the Western canal users to pump. The Fulton Canal would operate an intra-ditch exchange among share holders with wells and those without wells. Those without wells would take surface water and pay those with wells to pump. The additional depletions resulting from this plan would have to be replaced or it could not be approved. There was no solution

identified for the Burlington canal – Brighton lateral during drought due to its location and lack of senior surface water rights for about 16,000 acres.

Conclusions and Comments about the Viability of Such a Plan in 2007

The study was conducted at a time where the political, economic and regulatory climate was considerably different than it is now in 2007.

The technical and legal requirements for approving a plan for augmentation or a temporary plan for augmentation in 1978 were much less stringent and allowed the State Engineer to approve plans on an annual basis.

The competition for water was significantly less and water was economically available to lease from cities and other water users to provide replacement water for annually approved temporary plans for augmentation.

The use of wells as alternate point of diversions to senior surface water rights was allowed without the current requirement that post-pumping depletions be replaced if it causes injury to other water rights or impacted compliance with South Platte River Compact.

The cooperation among water users was better in 1978, i.e. the Gentlemen's agreement, than it is now and the report assumed considerable cooperation among water users in order for the proposed plan to succeed and such cooperation may not have been achieved even in 1978.

It may be possible to develop a conjunctive management plan for the South Platte River basin in the future if the South Platte River DSS is completed as soon as possible. This powerful set of tools can be used to evaluate various management options that could lead to a true conjunctive use management plan that reasonably protects senior water rights and maximizes the use of the water resources of the South Platte River basin.

Completion of the South Platte DSS is at least two years away so it is not available to address the immediate needs of the South Platte River Task Force but could assist in a long term solution to maximizing the use of the water resources of the South Platte River basin.