

The Water Report™

Water Rights, Water Quality & Water Solutions in the West

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SOUTH PLATTE WELL CRISIS, 2002-2010

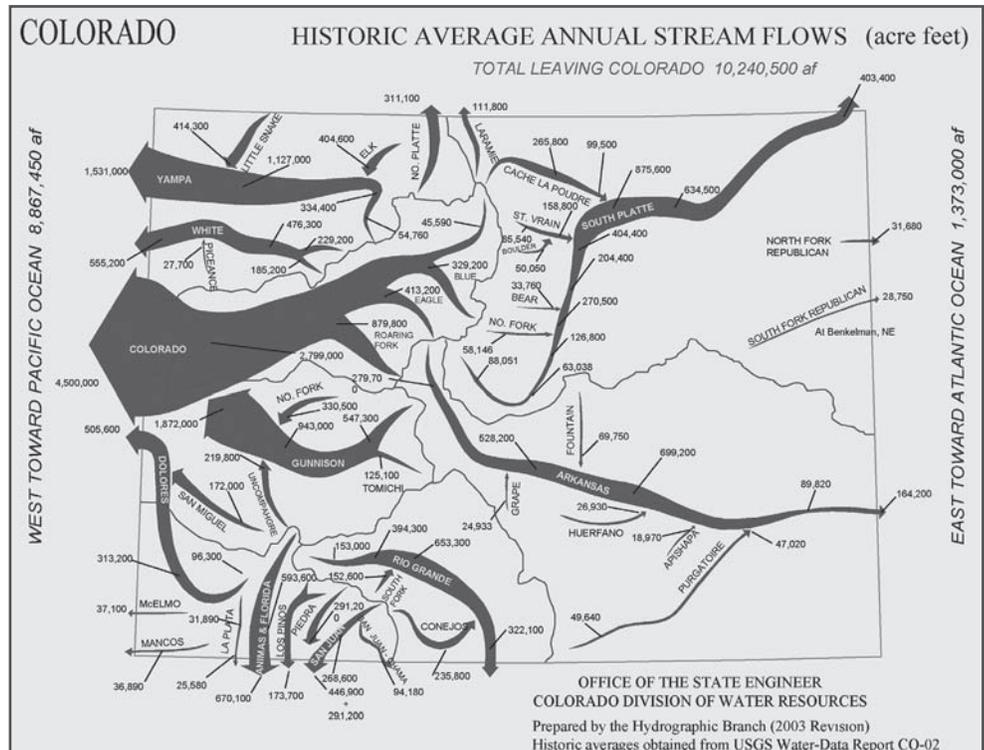
EVOLVING ALLUVIAL GROUNDWATER REGULATION

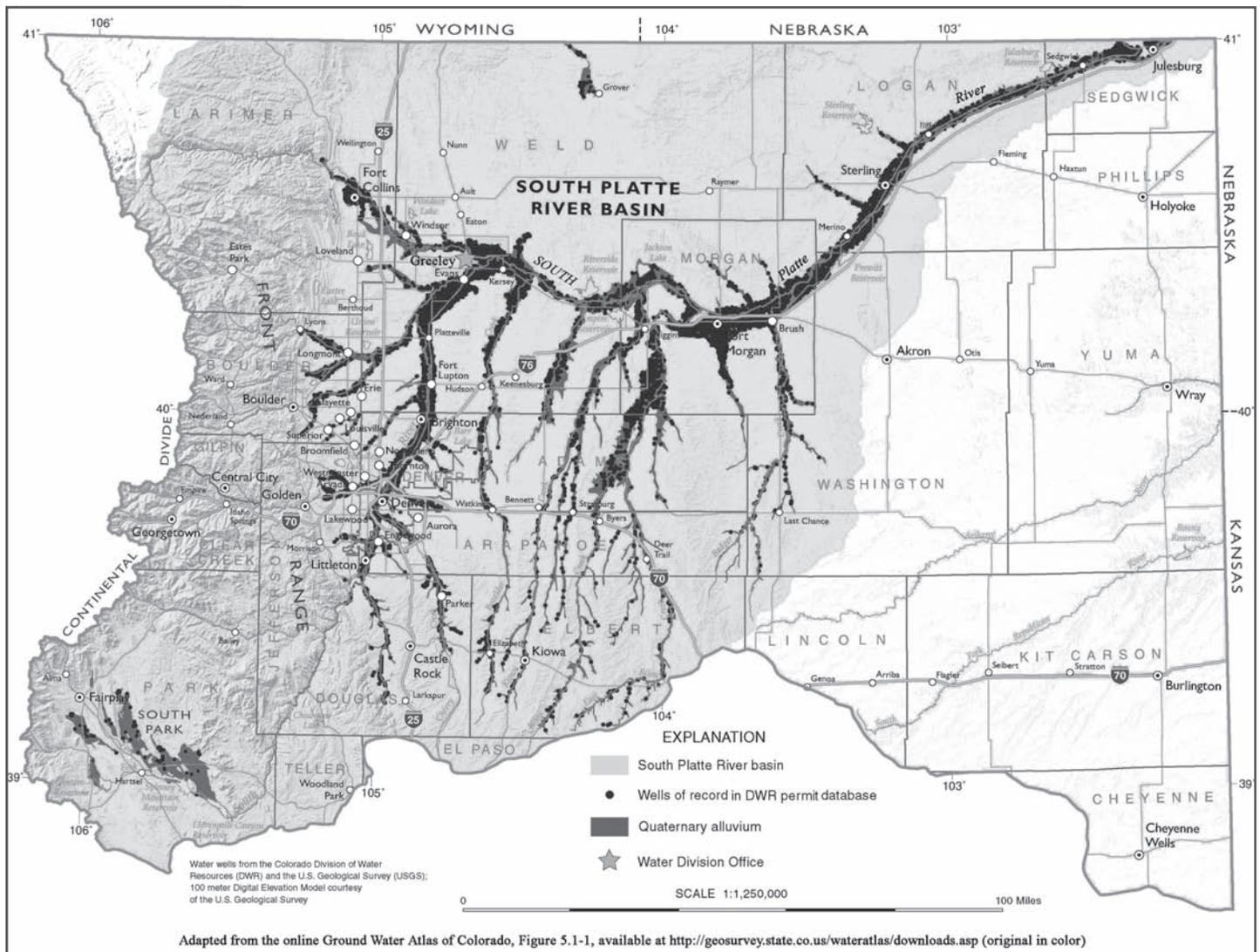
by P. Andrew Jones, Lawrence, Jones, Custer & Grasmick LLP (Windsor, CO)

INTRODUCTION

Like many western states, Colorado has struggled to regulate alluvial groundwater usage. Colorado's General Assembly made a decision to incorporate alluvial groundwater usage into the prior appropriation system governing the State's surface water in 1969. However, that decision was only the beginning. The purpose of this article is to describe the State's experience in implementing the General Assembly's mandate in the South Platte River Basin — Colorado's most populous and developed watershed.

Colorado's population distribution does not match its water supply. Eighty percent of the State's population resides to the east of the Rocky Mountains along Colorado's "Front Range," while eighty percent of the State's water resources are located to the west of the continental divide on the "West Slope." The Front Range relies upon two relatively small river systems — the South Platte and the Arkansas — to supply its needs, supplemented by approximately 550,000 acre-feet (AF) of annual trans-mountain infusions from the West Slope. Even with this infusion, the South Platte and Arkansas river flows pale in comparison to their West Slope counterparts. The Colorado Division of Water Resources reports that average flows leaving the State in the South Platte River are 403,400 AF, including transmountain diversions of approximately 400,000 AF. By comparison, average flows leaving the State in the Colorado River are 4,500,000 AF.





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THE SOUTH PLATTE RIVER

Arising in the mountains west of Denver, the South Platte River serves the most populous areas of the state, located roughly from Denver then north along the Front Range to the border with Wyoming. It drains 18,900 square miles of area. According to the 2000 census, approximately 3 million people — or 70% of the State’s population — live in this basin. The basin boasts 1,000,000 acres of the State’s most productive irrigated agricultural land, and 1.1 million AF of water storage capacity in 22 large reservoirs. Fertile alluvial soils in the basin produce irrigated corn, alfalfa, sugar beets, pinto beans, and market vegetables. The prevalence of feed and proximity to large markets encourages the development of large feedlot and dairy operations.

The South Platte River is “over-appropriated” and thus governed by senior surface “calls.” [Editor’s Note: “Over-appropriated” means the amounts granted to existing water rights exceed the actual water supply; a “call” by a senior water user is a request to authorities to regulate the river by shutting off junior water rights owners so that the senior user receives the full amount of their water rights.] Though there are times of “free river” (water flow in surplus of the amount subject to water rights) in the spring runoff months and following large storm events, for most of the irrigation season the river serves only water rights with priority dates pre-dating 1900. In the winter months the river is dedicated to filling reservoirs with priority dates pre-dating 1915. Water rights junior to these dates take water on an as-available basis during times of high flow and/or low demand.

**South Platte
Groundwater**

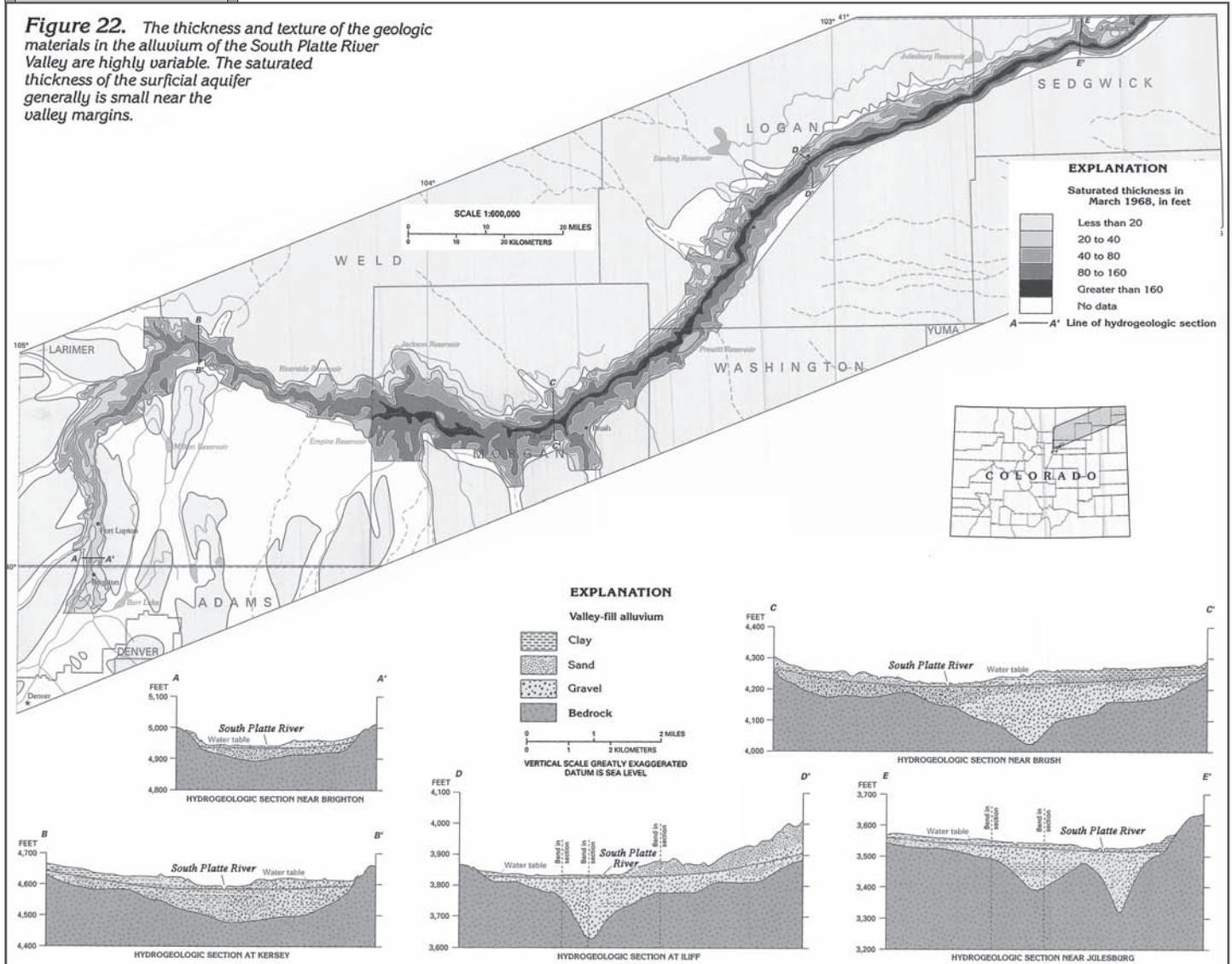
**Hydraulic
Connection**

ALLUVIAL WELL DEVELOPMENT IN THE SOUTH PLATTE RIVER BASIN

Given the high demand for water and the low volume of surface flow, it is not surprising that South Platte water users began to look to the alluvial aquifer for supplemental supply as soon as technology became available. They were not disappointed. The South Platte Alluvial aquifer holds approximately 8,000,000 AF of water in storage. The ancient South Platte River and its tributaries, swollen with snowmelt at the end of the last ice age, left robust alluvial deposits ranging in width from two to six miles wide and up to 200 feet deep on the main river channel. Alluvial wells installed in the main channel are good producers, providing as much as 5000 gallons per minute. These wells are hydraulically connected to the South Platte River and influence its flows.

From the 1930s through the 1950s, agricultural producers were not aware of, or concerned with, the potential affects of well pumping on surface flows. Wells produced crop-saving supplemental water at a reasonable cost. By 2002, there were approximately 8,200 high capacity wells installed in the South Platte alluvium — pumping approximately 500,000 AF of water annually.

Figure 22. The thickness and texture of the geologic materials in the alluvium of the South Platte River Valley are highly variable. The saturated thickness of the surficial aquifer generally is small near the valley margins.



INITIAL ATTEMPTS AT REGULATION

South Platte
Groundwater

Despite its leadership role in the development of the prior appropriation system, Colorado was slow to enact legislation governing groundwater withdrawals. See Vranesh, George, *Colorado Water Law*, Volume 1, p. 341. Other western States addressed the issue in some form early in their development (Territory of Dakota, 1866; Kansas 1891, 1910; Idaho, 1899; Utah, 1903; Nevada and California, 1913; Arizona, 1919). The Colorado General Assembly took no meaningful action until 1957. *Id.*

Groundwater
Distinctions

Statutory schemes enacted by other States frequently recognized a distinction between groundwater flowing in “subterranean streams flowing through known and definite channels” and “percolating waters the course and boundaries of which are incapable of determination.” See *Id.* at 242 (citing 1913 Cal. Stat; 1915 Nev. Stat. 210). “Subterranean streams” were made the subject of the prior appropriation system, whereas “percolating waters” were distributed pursuant to a riparian conception of “reasonable use” — independent of the prior appropriation system. *Id.* Over time, these States showed a trend towards increasing the amount of groundwater subject to the prior appropriation system, and decreasing the amount of groundwater labeled as “percolating waters.” *Id.* Nevertheless, this distinction has been retained by a number of States, most notably California, which continues to recognize a difference between “underground streamflow,” governed by the State’s prior appropriation system, and “percolating groundwater,” governed by an assortment of court-developed doctrines designed to divide available groundwater between overlying landowners. See William Blomquist, et al, *Common Waters, Diverging Streams: Linking Institutions to Water, Water Management in Arizona, California, and Colorado, Resources for the Future*, 2004, pp. 60-62.

Alluvial
Aquifer

In the absence of guidance from the General Assembly, Colorado courts struggled to address the distinction between “underground streams” and the common law conception of “percolating ground water.” Early cases recognized that groundwater flowing in the alluvial aquifer of a stream were subject to the State’s system of prior appropriation and could not be diverted to the detriment of senior appropriators. See *McClellan v. Hurdle*, 33 P. 280 (Colo. 1893); *Medano Ditch Co. v. Adams*, 68 P. 431 (Colo. 1902), *Buckers Irrigation Milling and Improvement Company*, 53 P.334 (Colo. 1898), and *Comstock v. Ramsay*, 133 P. 1107 (Colo. 1913) In each of these cases, appellants argued that the groundwater to be diverted was “percolating groundwater,” subject to reasonable use by overlying landowners. See e.g., *Comstock v. Ramsay*, 133 P. at 1108. Though this doctrine was clearly disfavored by Colorado courts, the cases were decided upon their own facts, leaving the potential for future argument on the issue. *Id.* Finally, in *Nevius v. Smith*, 279 P. 44 (Colo. 1929) the Colorado Supreme Court rejected the “percolating waters” argument as “unsound in Colorado” — establishing the assumption that all groundwater is tributary to the State’s natural streams, in the absence of proof to the contrary. The *Nevius v. Smith* doctrine was recited and applied in *Safranek v. Town of Limon*, 228 P.2d 975 (Colo. 1951). *Safranek* is now the leading case cited for the proposition that all Colorado groundwater is presumed tributary to a natural stream.

Tributary to
Stream

During this period of the State’s history, it was not clear whether and to what extent alluvial wells were “water rights” to be administered under the State’s system of prior appropriation. Though the pre-1957 courts recognized the assumption that all groundwater was tributary to a natural stream, the State Engineer had no express authority to act to curtail the use of wells for the benefit of surface rights. Wells were not adjudicated, so most of them had no decree or priority date. In short, as of 1953, Colorado was in a “chaotic situation.” Vranesh, § 3.5 p. 243.

Overpumping

Meanwhile, the rapid development of wells led to overpumping in areas of limited natural water recharge in the South Platte River basin. Groundwater “mining” conditions developed as well users raced to consume this common resource. [Editor’s Note: “Mining” refers to a situation where the amount of water pumped from an aquifer exceeds water replenishment to the aquifer.] It became apparent that without regulation, these areas would be mined to exhaustion. Despite the dire conditions, well owners in these areas resisted well regulation, and the General Assembly was reticent to impose it. Vranesh, § 3.5, p. 244-45.

Early
Legislation

In 1953, the General Assembly enacted legislation that required well drillers to be licensed and forbade the wasting of water from wells. The legislation also subjected wells to the jurisdiction of the Colorado Water Conservation Board, though in reality the Board had no authority to curtail production from the wells. See § 148-18-1 et. seq., C.R.S. The 1953 Act was a beginning, but it quickly became clear that more regulation was needed.

The General Assembly made an attempt to address the mining conditions occurring in South Platte tributaries in 1957. See § 147-19-1 et. seq., C.R.S. At the time the bill was passed, there were no restrictions on the issuance of new well permits and no means to control withdrawals — even in locales where water mining conditions had become critical. The bill was intended to address these concerns and to provide a management scheme that could prolong the life of overburdened aquifers.

**South Platte
Groundwater**

**Critical
Districts**

**“Opt-Out”
Provision**

**State Engineer
Authority**

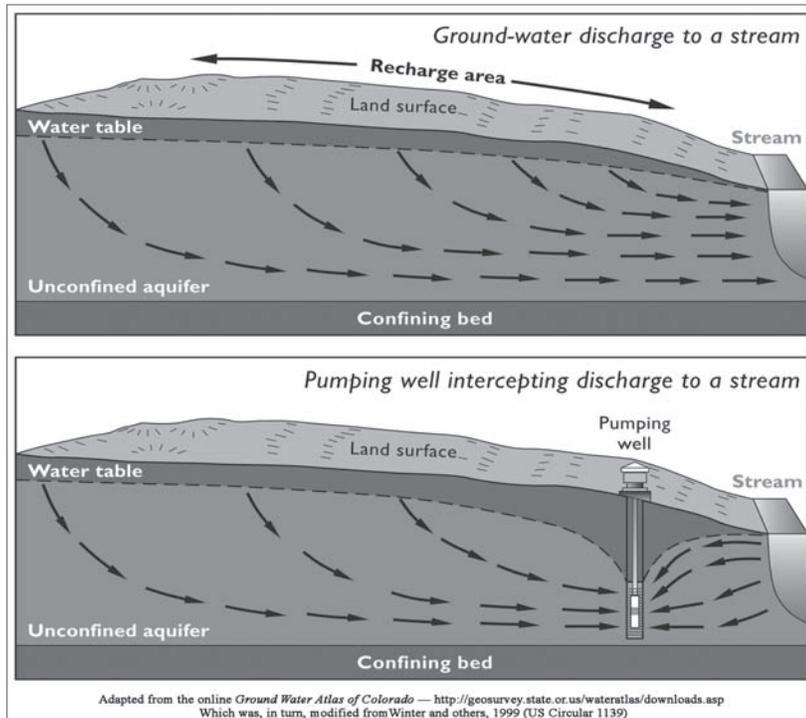
**Well Policy
Decision**

The bill sought to achieve these ends by two principal means. First, well permits were required for the construction of new wells. Second, the Colorado Ground Water Commission was created and authorized to establish “Tentatively Critical Ground Water Districts,” which are defined as “any areas where, from the information gathered, the withdrawal of ground water appears to have approached, reached or exceeded the normal annual rate of replenishment.” §147-18-3(7), C.R.S. The statute further provided that “[t]he Commission shall immediately close all areas designated as Tentatively Critical Districts to further development of ground water resources.” §147-18-3(9), C.R.S. The Act provided no authority to the State Engineer to prevent groundwater development in areas outside the Critical Districts.

In addition, the Act provided that the landowners in a Critical District could “de-designate” their basin and “opt-out” of the controls imposed by the Act. §147-18-3(11), C.R.S. This scenario played out in the Kiowa-Bijou Basin, one of the principal areas of concern intended to be addressed by the Act, when the newly created Advisory Board requested de-designation. This “opt-out” provision made the Act largely ineffectual. Vranesh, §3.5, p. 247.

In 1965, the General Assembly made its first large scale attempt at regulating alluvial well withdrawals. House Bill 1066 authorized the State Engineer to administer surface waters and “underground waters tributary thereto in accordance with the right of priority of appropriation.” *A Survey of Colorado Water Law*, Denver Law Journal, 1970, Volume 47, Number 2, p. 324. House Bill 1066 did not set out specific guidelines for the State Engineer to follow with regard to administering surface water and tributary groundwater but required that he adopt rules and regulations as necessary to accomplish the administrative goals set by the legislature. *Id.*

In 1966, the State Engineer attempted to exercise his House Bill 1066 authority by curtailing 39 wells in the Arkansas River basin. The resulting Colorado Supreme Court decision, *Fellhauer v. People*, 447 P.2d 986 (Colo. 1968), would shape the state’s alluvial well policy. After determining that the State Engineer’s actions amounted to arbitrary and capricious conduct on due process grounds, the *Fellhauer* court seized the occasion to offer an extended discussion of alluvial well policy. The court rejected the argument that both tributary groundwater and surface water should be administered in identical fashion, and envisioned a future where the courts were concerned with twin goals of protecting vested rights and “maximum utilization of the water of [the] state.” *Id.* at 994. Sending a clear signal to the General Assembly, the Court discussed “the new drama of maximum utilization” and its principal dilemma — “how constitutionally that doctrine can be integrated in to the law of vested rights.” *Id.* Though dicta, the Court’s statements would shape the General Assembly’s renewed efforts to regulate alluvial well usage by encouraging lawmakers to recognize the unique hydrologic character and economic importance of alluvial wells. [Editor’s Note: “Dicta” refers to a court’s discussion of issues that are not *required* to be decided by the court in order to support its decision. Thus, dicta does not provide a precedent that lower courts must follow. Nonetheless, it obviously provides guidance as to how the higher court would rule should the issue come before it.]



THE 1969 WATER RIGHTS DETERMINATION AND ADMINISTRATION ACT

Even before the decision in *Fellhauer*, the Legislature recognized HB 1066 was not going to be sufficient to adequately administer surface water and tributary groundwater together. In 1967, the Legislature passed Senate Bill 407, appropriating \$50,000 for a two-year investigation and study of the relationships between surface and groundwater to evaluate the need for additional legislation to effectuate integrated administration of surface and groundwater. Vranesh at 260.

Senate Bill 407 resulted in a study by Morton W. Bittinger & Associates and Wright Water Engineers on the interaction between surface water and groundwater in the South Platte Basin (Bittinger Study).

BITTINGER STUDY FINDINGS, CONCLUSIONS, & RECOMMENDATIONS INCLUDED:
Findings

- The average annual water supply within the South Platte River basin is adequate to meet present requirements. However, because of the wide fluctuations in runoff, the distribution of water availability is far from satisfactory.
- The groundwater reservoir along the mainstem of the South Platte River between Denver and the State line contains approximately ten million AF of water. Only a small percentage of this capacity is utilized and this only in a haphazard and unplanned way.
- Groundwater pumping and transmountain importations have been the major factors in stabilizing water supplies in the South Platte Basin. However, the pumping of groundwater has caused infringement upon prior surface water rights. Studies indicate that this infringement is not as severe as many have felt it to be.
- The water supplies of the South Platte Basin are not being utilized or administered as efficiently and effectively as they could be.
- Deficiencies exist in the completeness and accuracy of water use records.

Conclusions

- Planned utilization of 10 percent to 15 percent of the available groundwater storage capacity in the alluvium is reasonably attainable. Use of the groundwater storage capacity can provide more efficient utilization of the total resources of the Basin, reduce shortages, and minimize conflicts between water users. This planned utilization in conjunction with surface water supplies would basically involve a heavier draft upon the groundwater supplies during low runoff years with provision for replenishment of those supplies during years of surplus runoff.
- To achieve more optimum distribution of water supplies and accomplish desired goals, certain surface water rights should be served from groundwater sources during low runoff periods. Such operations would allow more surface water to be diverted in the upper regions, making greater re-use of return flows possible.
- Since the groundwater in storage adjacent to the mainstem of the South Platte is currently being used to support the flowing stream, and many users are dependent upon and have rights in the return flow which joins the River via the groundwater system, provisions must be made to protect these rights and to supply them with alternate sources of water to insure the continued utilization of the groundwater supply. The cost of providing such facilities should be borne by those who benefit.
- Optimum use of water resources within the South Platte Basin cannot be achieved without control of non-beneficial uses or waste of water.
- Integrated management of groundwater and surface water can be best achieved on an overall South Platte River Basin basis.

Recommendations

- It is recommended that legislation should be passed which will allow and encourage the integrated management and administration of groundwater and surface water in the South Platte Basin.

Adapted from Vranesh at 260-261 quoting Morton W. Bittinger & Associates & Wright Water Engineers, *Report on Engineering Water Code Studies for the South Platte River* 3, 4 (August 1968).

**South Platte
Groundwater**
**Interaction
Study**
**Surface Water
Infringement**
**Planned
Utilization**
Return Flow
**Integrated
Management**

South Platte Groundwater 1969 Act
Depletive Effect
Augmentation Plans
Temporary Augmentation
Well Owner Organizations
Engineer's Authority
Organization's Approaches

Following the Bittering Study and the *Fellhauer* decision, the Legislature repealed House Bill 1066 and enacted comprehensive legislation entitled the Water Right Determination and Administration Act of 1969 (the “1969 Act”). See § 37-92-101 et. seq., C.R.S. The 1969 Act was the Legislature’s attempt to integrate surface and groundwater use and promote the constitutionally mandated protection of vested rights and maximum utilization articulated by the Colorado Supreme Court in *Fellhauer*. Vranesh at 265. The 1969 Act intentionally brought all alluvial groundwater within the ambit of the State’s Prior Appropriation Doctrine. In order to provide priority dates for the wells, the General Assembly allowed well owners a grace period to adjudicate priorities for the wells in the state’s water courts. It further required the State Engineer to administer the wells in priority in relation to surface rights in the same stream system.

The priority dates for the wells are very junior in relation to the surface water rights in the South Platte and Arkansas basins, where senior surface rights date to the 1850s. As a result, in the absence of intervention, application of the priority system would have resulted in widespread curtailment of the wells during the irrigation season, when the surface flows of these rivers are reserved for senior priorities. Calls by senior users for regulation vary widely based on river conditions and demand. In addition, the depletive effect of the wells on surface water flows is not instantaneous, which complicates priority administration. Although a well might be in priority on a given day, that day’s allowed well pumping will not impact the river until some future time. It is impossible to predict whether the delayed depletions will be in priority on any given day in the future.

In the 1969 Act, the General Assembly’s answer to these issues was a statutory creature called an “augmentation plan.” See § 37-92-103(9), C.R.S.; § 37-92-302, C.R.S.; § 37-92-305, C.R.S. An augmentation plan is a water court approved plan whereby the well owner provides a water supply to offset out-of-priority depletions caused by the well. The well owner must secure a water source of sufficient reliability to convince the court (and other water users scrutinizing the plan) that he or she will be able to replace any “out of priority” depletions that affect the river. The fundamental analysis performed by the court is a comparison of augmentation supplies and anticipated well depletions. The General Assembly saw the augmentation plan as a means to allow the continued use of the junior alluvial wells, while integrating them into the surface water priority system. In practice, augmentation plans require well users to acquire or develop additional water supplies to offset anticipated well depletions.

THE “SUBSTITUTE SUPPLY PLAN” ERA: 1969-2001

Though the 1969 Act called for adjudication of all augmentation plans by the water court, in order to ease the transition, the 1969 Act further provided the ability for the State Engineer to approve temporary augmentation plans pending court adjudication of the final plans. See *Empire Lodge Homeowners Ass’n v. Moyer*, 39 P.3d 1139, 1150-1152 (Colo. 2001). The statute granting this authority was repealed in 1977. *Id.* The State Engineer’s approval of temporary plans would prove to be an issue precipitating a major crisis in 2002.

In the wake of the 1969 Act, most South Platte Well Users adjudicated their wells and received priority dates. Some sought court approval of augmentation plans, but the vast majority of South Platte wells sought shelter in State Engineer approved “substitute supply plans” — annual administrative approvals that allowed ongoing pumping. Because of the high cost of obtaining the “replacement water” necessary for the adjudication of a permanent plan, the well owners sought strength in numbers. Two major well augmentation groups formed on the South Platte — one under the auspices of the Ground Water Management Subdistrict of the Central Colorado Water Conservancy District (GMS), and the other a private entity bearing the name “Ground Water Appropriators of the South Platte (GASP).

Neither GMS nor GASP sought a court approved augmentation plan in the 1970s, 80s or 90s. Though the statute giving the State Engineer express authority to approve temporary plans was revoked in 1977, the State Engineer nevertheless continued to review and approve annual “Substitute Supply Plans” for these entities. At the time, the State Engineer believed that he had the authority to approve the plans indefinitely. Some South Platte water users questioned his conclusion in this regard, and became increasingly dissatisfied with the approval process, accusing GMS, GASP, and the State Engineer of providing inadequate replacement of depletions. However, from 1980 to 2000 the South Platte enjoyed 20 of the wettest years of record, blunting criticism and masking supply shortages.

GMS and GASP took different approaches. While both continued to enjoy temporary administrative approvals, GMS set its sights on obtaining augmentation plans approved by water court, and worked towards assembling permanent supplies. GASP opted for a less costly route, arranging temporary leases and shorter term supplies that supported the annual approvals, but were less useful in a permanent augmentation plan.

2002 WATER CRISIS

A PERFECT STORM

South Platte Groundwater

Empire Lodge Decision

Rules Rejected

Water Court Process

Wintertime "Calls"

Temporary Plans Reinstated

South Platte well users sailed into the perfect storm in 2002. First, Colorado's Supreme Court decided that the State Engineer had no authority to approve temporary substitute supply plans. *Empire Lodge Homeowners Ass'n v. Moyer*, 39 P.3d 1139, 1150-1152 (Colo. 2001). The court determined that the General Assembly had intended that every South Platte well user obtain a water court decreed plan of augmentation, and that he had no authority to approve "Substitute Supply Plans" relied upon by GMS and GASP.

The State Engineer reacted to the *Empire Lodge* decision by promulgating rules that allowed him to continue to approve temporary "replacement plans" — the equivalent of substitute supply plans. The Supreme Court rejected these rules in *Simpson v. Bijou Irrigation Company*, 69 P.3d 50 (Colo. 2003), finding that the State Engineer had exceeded his rulemaking authority. Consequently, all wells in the South Platte River Basin must be enrolled in a water court decree augmentation plan to legally operate.

Neither GMS nor GASP was ready to go to water court and seek approval of a permanent plan. Furthermore, even if one could be obtained, Colorado's water court process is such that it would be two to three years at a minimum before a decree could be achieved. As a result, GMS and GASP well users were faced with the prospect of curtailment for two to three years while the groups sought water court approval. Even if a plan could be achieved, GMS did not have enough permanent water supplies assembled to achieve full pumping under a water court approved augmentation plan. It was also uncertain whether GASP had enough long-term supplies to achieve approval of a water court decree.

In the midst of the legal maelstrom, the South Platte River basin was hit by severe drought, unmasking supply deficiencies inherent in the GMS and GASP plans and propelling surface water users into an all out attack on groundwater usage. Severe call scenarios dominated the river. In previous years, river calls had been limited to the irrigation season by a "gentlemen's agreement" among surface water users. As a result, GMS and GASP had not been required to replace well depletions in the winter months. In 2002, as supplies dwindled, storage right users — with rights in South Platte Reservoirs that fill during the winter — placed calls to fill the reservoirs, thereby requiring the augmentation plans to double their supplies or face curtailment.

The General Assembly responded to the legal crisis, passing a bill that reinstated the State Engineer's authority to approve temporary plans pending water court approval, so long as the wells users had filed an application in water court. See §37-92-308, C.R.S. GMS filed a water court application and continued to operate under the temporary plan. GASP struggled through one year under the new regime, then voted to

dissolve rather than seek a water court approved augmentation plan.

In the wake of dissolution, owners of wells formerly covered by GASP scattered. In locations downstream of Fort Morgan, where call scenarios are less severe and supplies more plentiful, users formed their own well user groups and applied to water court for approval of augmentation plans. GASP members further upstream in the most stressed river segment approached the Central Colorado Water Conservancy District (CCWCD), the major augmentation entity in the region and parent of GMS. At former GASP users' urging, CCWCD created the new "Well Augmentation Subdistrict" (WAS) to seek a court approved augmentation plan for them. WAS issued \$20,000,000 in bonds to purchase permanent water supplies to support the new plan and filed an application in water court.

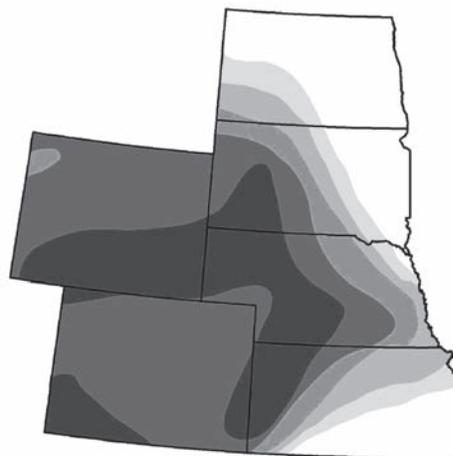
U.S. Drought Monitor High Plains

August 20, 2002
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	20.2	79.8	74.0	66.8	59.4	23.4
Last Week (08/13/2002 map)	20.0	80.0	74.1	68.8	61.2	23.4
3 Months Ago (05/28/2002 map)	16.6	83.4	54.3	45.3	31.0	1.9
Start of Calendar Year (01/01/2002 map)	36.4	63.6	28.5	10.7	5.5	0.0
Start of Water Year (10/02/2001 map)	62.2	37.8	14.7	10.9	8.2	0.0
One Year Ago (08/21/2001 map)	72.3	27.7	16.0	9.0	6.9	0.0

Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://drought.unl.edu/dm>



Released Thursday, August 22, 2002
Author: Scott Stephens/Richard Heim, NOAA/NCDC

Water Court Decreed Augmentation Plans

After lengthy multi-party negotiations, GMS — the largest and oldest of the remaining augmentation groups — settled out of court with water users opposing its plan, and presented a stipulated augmentation plan to the judge. The principal breakthrough facilitating settlement and resulting in a 2005 decree was a concept referred to as a “Projection Tool.” See Findings of Fact, Conclusions of Law and Decree of the Water Court, Case No. 02CW335, Division One Water Court, June 3, 2005.

The GMS plan did not have enough water supplies to cover depletions from pumping its member wells at 100% capacity. As a result, there was a need to limit pumping such that depletions would never exceed replacement supply. The Projection Tool (Tool) is a mechanism described by the decree that facilitates a comparison of anticipated depletions from well pumping with anticipated future supplies. In practice, it is an Excel spreadsheet prepared by GMS’ engineering consultants.

On the depletion side, the Tool forecasts the amount and timing of depletions that are expected to affect the river from metered well pumping that has already occurred. It also has the capability to project anticipated depletions from varying amounts of anticipated pumping. By adjusting the amount of proposed pumping, future depletions can be manipulated. Anticipated pumping is expressed in terms of a percentage of full demand. This “Quota” is the amount that members are allowed to pump. For the purposes of the Tool, it is assumed that there will be a call senior to the wells for every future day for the entire length of the projection. In reality, there may not be a call for every day — there will almost certainly be times when the wells are in priority and do not have to replace their depletions. However, the “year round call” assumption is considered a prudent, conservative estimate designed to accommodate a worst case scenario.

Depletions are calculated for each well, taking into account consumptive use and return flows, to establish the impact on surface flows. The net depletion for all wells is determined by adding up all the net depletions calculated for each individual well. No consideration is given to regional aquifer conditions resulting from the operation of wells generally, such as the lowering of groundwater tables and resulting elimination of phreatophytes (water loving plants), for example. The decree does not mandate any measurements or monitoring of the alluvial aquifer. Instead, it requires a mathematical calculation of depletions based on analytical equations described by Glover (Glover, Robert E., 1977, *Transient Ground Water Hydraulics*, Water Resources Publications). The wells are required to replace the calculated depletions in the time and amount that the “Glover” analysis dictates, at a location set forth in the decree.

For supply, GMS is allowed to project deliveries of senior rights it owns based on a dry year yield. It may project deliveries from surface storage to the extent that there is water in storage at the time of the projection. Similarly, it may predict groundwater accretions to the extent that water has already been delivered to recharge sites for aquifer percolation. It may not assume any future deliveries of junior rights.

The length of the GMS projection is seven years. This time period is intended to match the approximate time it takes for the bulk of delayed depletions from pumping the member wells to affect the river. The projection is updated annually by April 15.

This “Projection Tool” methodology was also applied successfully to GASP orphan groups located downstream of Fort Morgan. Since its inception, it has been refined in a series of South Platte decrees and has become the de facto standard for South Platte Augmentation plans. Since the entry of its decree, GMS has been able to declare quotas ranging from 15% to 40% of calculated demand.

WAS was not able to settle out of court with senior surface rights owners opposing the application, principally because these opposers believed that WAS did not have enough augmentation supplies to justify the entry of a decree, and the opposers made multiple motions for dismissal of the application. WAS wells did not receive temporary approval to operate in 2006, and were curtailed. This curtailment was an extreme hardship on well owners, and drew attention from national media.

Whereas GMS had been assembling permanent supplies for 30 years, WAS had only four years and limited means. Faced with relatively small amounts of permanent supply, and the reality that available funding was insufficient to allow the large scale purchase of senior water rights, WAS developed an aggressive program of groundwater recharge designed to capture “free” river water during times of surplus and re-time it to replace well depletions. WAS’ recharge program consists of a series of shallow infiltration basins, generally located on existing ditch systems. When water is available, it is delivered via agreement with the ditch company to the recharge sites, where it is allowed to infiltrate into the alluvial aquifer. The same analytical equations that are used to calculate depletions are then used to calculate “accretions” and predict when these accretions will supplement river flows. In addition, many of the projects involve the use of alluvial wells to take water from the aquifer and deliver it to the river to supplement river flows (“augmentation wells”) or take water from the river and deliver it to recharge sites (“headgate wells”). Operated together, these facilities give WAS the ability to take water when it is available and retime it to match the pattern of groundwater depletions caused by the member wells used for irrigation.

South Platte Groundwater

Projection Tool

Depletion Forecasts

Pumping “Quota”

Depletion Calculations

Supply Projections

De Facto Standard

2006 Curtailment

Groundwater Recharge

South Platte Groundwater

Hydrologic “Debt”

Adversarial Process

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WAS survived the opposers' efforts to secure dismissal of its application and presented its plan to the Court in early 2007. After a six-week trial, the water court awarded WAS an augmentation plan decree, approving a projection tool similar to the GMS decree. See Findings of Fact, Conclusions of Law and Decree of the Water Court, Case No. 03CW99, Division One Water Court, May 14, 2008. To date, WAS has not been able to issue a quota to members because all of its water supplies are dedicated to replacing depletions caused by pumping that occurred prior to the crisis. WAS appealed the propriety of requiring current WAS augmentation plan members to replace the depletions caused by well pumping that occurred under GASP prior to WAS' formation, but a majority of Colorado's Supreme Court upheld the trial court's determination that WAS must pay the hydrologic "debt" generated by its predecessor. *Well Augmentation Subdistrict of Central Colorado Water Conservancy Dist. v. City of Aurora*, 221 P.3d 399 (Colo. 2009). WAS continues to purchase senior water rights, develop new storage facilities, and build out its integrated network of recharge basins. In the interim, WAS leases municipal effluent and other fully consumable supplies to supplement the permanent supplies and ensure that all depletions required to be replaced by the water court decree are replaced.

LESSONS

At the outset of the South Platte well crisis in 2002, there were 8,200 wells permitted to withdraw water from the South Platte alluvium. Today, 3,700 of these wells are not enrolled in any court approved augmentation plan and have been completely curtailed. 4,500 wells are enrolled in augmentation plans and continue to pump, though most of these are partially curtailed. The direct and indirect economic costs have been conservatively estimated at \$28 million through 2007, not counting the millions spent on legal and expert witness fees by agricultural water users on both sides ill-situated to bear the burden. See Thorvaldson, Jennifer and Pritchett, James, *Some Economic Effects of Changing Augmentation Rules in Colorado's Lower South Platte River Basin: Producer Survey and Regional Economic Impact Analysis*, Colorado Water Resources Research Institute, July 2007. The social cost of failed family agribusinesses and farm communities' long dependent on groundwater cannot be quantified in dollars, but is nonetheless very real to those individuals caught in the crossfire of failed water policy.

The South Platte well crisis illustrates the strengths and weaknesses of Colorado's water court process. Colorado water courts are very good at assessing individual cases. The adversarial process allows scrutiny at a level not available in a purely administrative context. In major water matters, water users fund detailed analyses and employ cadres of experts and skilled attorneys to make their point. This "no stone left unturned" approach generally produces good results. In the South Platte Well context, it allowed all water users involved their "day in court." Regardless of whether one agrees with the outcome, it is difficult to argue that either side did not have the opportunity to present all relevant evidence. Colorado values this approach and is willing to invest large amounts of judicial time and resources to its preservation.

There are negatives to this approach, however. The intense, case driven scrutiny that is a strength can also be a weakness because it fails to allow room for regional planning and management. Rather than approaching the alluvial well problem on a basin-wide basis, it fragmented it into a series of private lawsuits, relegating decision making to piecemeal determinations based upon whatever evidence or engineering approach the litigants emphasized. Decisions regarding appropriate engineering or data assumptions in one case give way to a new and better (or just different) approaches in the next. Each case is re-engineered, in isolation, ignoring broader systemic issues, and at great transaction cost to the applicants and other water users. Cases, once decided, are fixed — even when future scientific developments reveal that the decrees were fundamentally flawed.

The South Platte well crisis suggests that Colorado has not yet achieved a workable balance between systemic planning and management, on the one hand, and its strong commitment to the adversarial model on the other. Though the dispute was resolved, the resolution came at a high cost. Had there been a means to assess the basin as a whole — including its alluvial aquifer — and determine sustainable yield, the State might have been able to find a way to protect senior water users, allow an appropriate amount of ongoing well usage by all well users, and avoid large scale curtailment.

As populations burgeon and supplies dwindle, water professionals in Colorado and similarly situated states must find a way to integrate systemic, data driven planning and administration with important ideals of due process, adversarial decision-making, and protection of property rights. This 21st century mandate is of critical importance in basins like the South Platte, where users rely upon both surface flows and withdrawals from a large alluvial groundwater system.

FOR ADDITIONAL INFORMATION:

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Mr. Jones' firm represents the Central Colorado Water Conservancy District. Mr. Jones was lead counsel on the WAS case and secondary counsel on the GMS case. In addition, the firm represented numerous other smaller well augmentation groups on the South Platte during the well crisis.