



policy STUDY

September 2010

Platte
INSTITUTE
for economic research

NEBRASKA'S EVOLVING WATER LAW: OVERVIEW OF CHALLENGES & OPPORTUNITIES

Authored by Mary Kelly



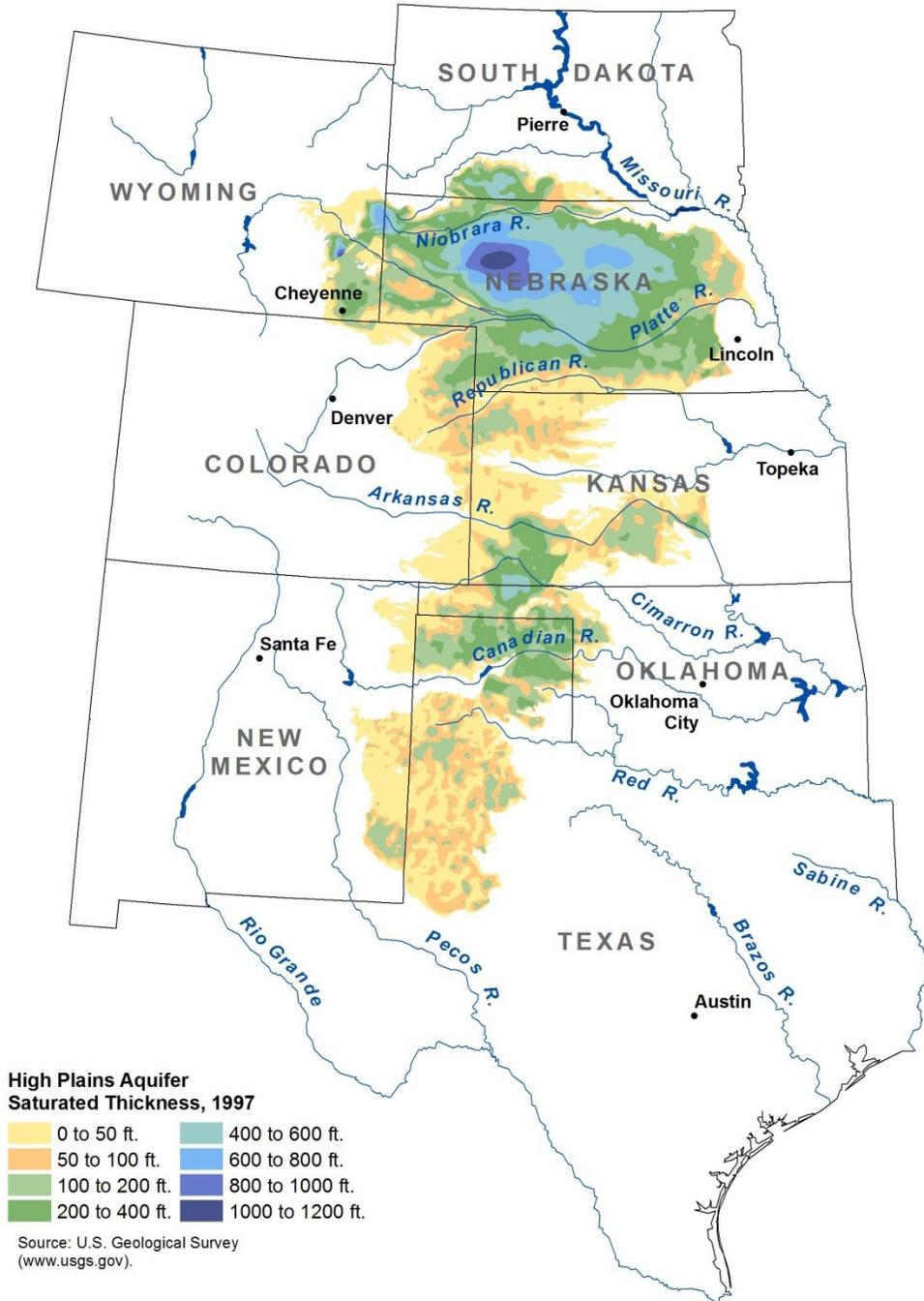
Background

Nebraska's Water Resources

Nebraska is endowed with abundant, accessible water resources. From the vast reserves of the High Plains Aquifer to the healthy flows of the Republican, Platte, Niobrara, and several other rivers, Nebraska's water resources are extensive, especially in the context of the state's modest and relatively stable population.

The High Plains Aquifer

As the United States' largest underground reserve of water, the High Plains Aquifer (also referred to as the "Ogallala Aquifer") covers 174,000 square miles over portions of eight states (Figure 1). In total, the aquifer is currently estimated to store about 3 billion acre-feet of water,¹ though not all of this water is technically or economically recoverable. Nebraska contains 37% of the aquifer's land area and an estimated 65% of the total aquifer volume. The saturated thickness of the aquifer in many areas of Nebraska ranges from 200 to 1200 feet.



This map was produced by the University of Nebraska-Lincoln. For additional information and an interactive version of this map visit <http://water.unl.edu>

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The information presented on this map is the best available as of July 2008. To order a copy of this map go to nebraskamaps.unl.edu. Any questions or comments

Figure 1. Map of the High Plains Aquifer, including saturated thickness, from UNL.

The aquifer underlies most of Nebraska, including the Republican, Platte, and Niobrara river basins. In most areas, the water table of the High Plains Aquifer is relatively near the surface, ranging from zero to 300 feet. The relatively shallow depth of the aquifer enhances its connectivity to surface water courses. For example, the U.S. Geological Survey reports that in 1975 the High Plains Aquifer contributed in the range of 3 million acre-feet/year to the Platte River.² Another source estimates that ground water contributes 50 to 90% of surface flows in the Platte and Niobrara Rivers and 10 to 20% in the Republican River.³ Throughout the state, spring flows and aquifer seeps contribute to the headwaters of smaller streams and creeks.

Evaporation rates parallel or exceed rainfall in many areas overlying the High Plains Aquifer, particularly in western Nebraska, leading to generally low recharge rates.

The Republican River

The Republican River is formed from the North Fork of the Republican (originating in Colorado) and the Arikaree River (originating in Kansas). (Figure 2). After being joined by the South Fork of the Republican (also originating in Colorado), it flows through southwestern Nebraska before crossing into Kansas. There are two major reservoirs on the river, Harlan County Lake and Swanson Lake, primarily supplying water for irrigation. About 40% of the river’s drainage basin lies in Nebraska (fed by a series of major tributary rivers flowing into the Republican from the north), with the rest split between Kansas and Colorado.

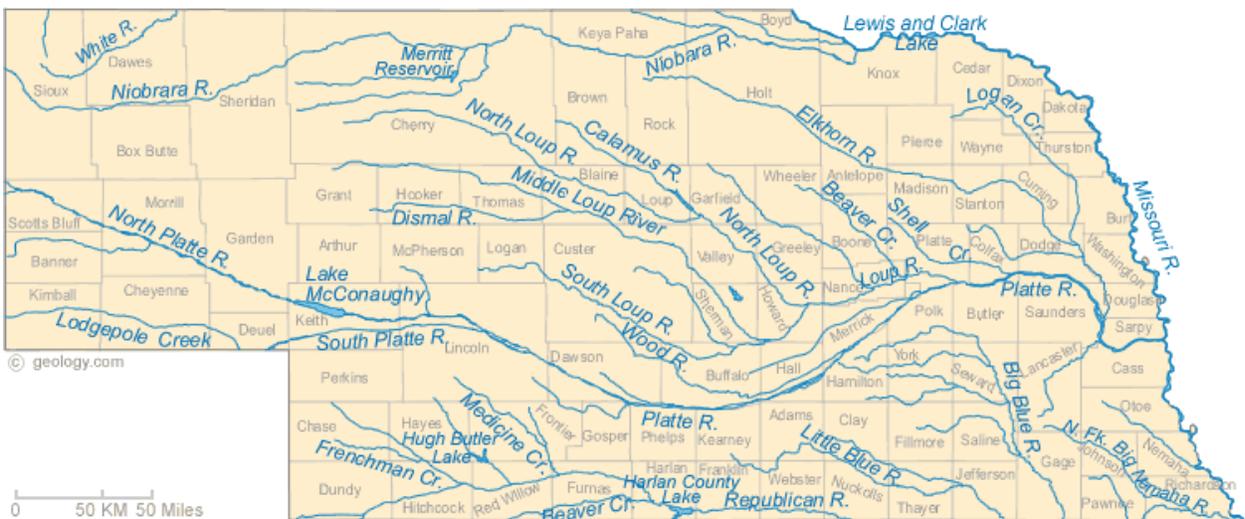


Figure 2. Map of Nebraska Rivers

The Republican River basin in Nebraska is a complex system, with highly variable inflows and substantial ground water/surface water interaction along the main stem. Many of the major tributaries to the Republican have their own similar complexities. Stream flows are generally declining, however, as measured at a variety of gauges throughout the basin over the last half-century. The declines are not fully accounted for by precipitation variability or surface water

use. As discussed below, these changes, and their implications for ground water and surface water management, as well as compliance with the Colorado/Kansas/Nebraska compact governing interstate allocation of the Republican, have led to substantial water law and policy innovation seeking to move this basin towards sustainability.

The Platte River

The Platte River is formed in western Nebraska by the joining of the waters of the South and North Platte Rivers. The South Platte headwaters lie in the Front Range of the Rocky Mountains in Colorado, linking its higher flows to snowmelt runoff from April to June. About 15% of the 24,300 square mile South Platte Basin lies within Nebraska (with almost 80% in Colorado). The North Platte also originates in the Rockies, but it makes its way through Colorado to Wyoming, where a series of federal reservoirs for irrigation have been developed, before reaching Nebraska. In Nebraska, it flows into the 35,700-acre Lake McConaughy, one of Nebraska's largest reservoirs. The reservoir, owned by Central Nebraska Power and Irrigation District, provides both hydropower and irrigation water.

As it flows through Nebraska, the Platte is a broad, braided river, with a well-deserved international reputation as excellent habitat for fish, birds, and wildlife. However, stream flow reductions and other pressures have resulted in adverse effects on the once-abundant pallid sturgeon and three endangered bird species (the whooping crane, the least tern, and the piping plover). As discussed in more detail below, a species recovery program under the federal Endangered Species Act is being implemented in the Platte Basin.

Flows in the North Platte, in particular, are heavily dependent on ground water input, posing similar challenges as found in the Republican River Basin with respect to conjunctive surface and ground water management.

The two forks of the Platte also depend on inflows from other states. The South Platte River Compact between Colorado and Nebraska was signed in 1923, making it one of the earliest interstate compacts to be approved by Congress.⁴ The compact requires Colorado to limit diversions of any post-1897 rights between April and October in order to maintain a daily mean river flow of at least 120 cubic feet per second or greater at a gauge at Julesburg, as long as such flows are necessary for beneficial use in Nebraska.⁵ The limits apply to diverters essentially between Fort Morgan and the Colorado/Nebraska state line.

Allocations and interstate management of the North Platte are governed by a U.S. Supreme Court decree, the result of litigation filed by Nebraska against Wyoming in 1934 after compact negotiations failed. The Supreme Court issued its decree, to which Colorado is also a party, in 1945. The original decree essentially allocated 75% of the natural flows originating in the Wyoming portion of the basin to Nebraska. The decree was revised in the mid-1990s, after litigation was re-initiated by Nebraska, and a broad settlement of issues and decree revisions were approved by the Supreme Court in 2001.⁶

The Niobrara River

The Niobrara begins in Wyoming and crosses into Nebraska on the state's western boundary. The river flows east across the northern portion of the state until it enters the Upper Missouri. A 76-mile stretch of the Niobrara, between Valentine and Mariaville, was designated a National Scenic River in 1991 and is frequently used for canoeing and other water-based recreational activities. Like the Republican and the Platte, there is substantial ground water/surface water interaction along the course of the Niobrara.⁷

Water Resources Development and Implications

Nebraska's water resource management challenges are currently derived from three major, and often intersecting, drivers:

- The operation of a vast network of center pivot agricultural irrigation systems, with pumping volumes significant enough to potentially affect aquifer sustainability and river flows;
- The obligation to meet various water delivery requirements under the Republican River compact and related settlement; and
- An increasing need to ensure instream flows for protection of fish and wildlife, as well as habitat and river recreation.

Agricultural irrigation water use

The center pivot irrigation system began to take hold in Nebraska in the mid-1960s. Figure 3 shows the expansion of center pivot irrigation. There are now well over 50,000 center pivot systems in operation. Ground water, primarily from the High Plains aquifer, is used to supply these systems. Ground water use for irrigation now accounts for over 80% of total state water withdrawals, (excluding withdrawals for hydropower and thermal power plant cooling).⁸ In large part due to the use of center pivots, Nebraska now has most land of any state in country under irrigation⁹ and is the third largest user of ground water among the states (following California and Texas).

Cumulative Total of Irrigation Wells Registered in Nebraska 1910 - 2009

Registered with the Nebraska Department of Natural Resources



Published by the Nebraska Department of Natural Resources February 11, 2010

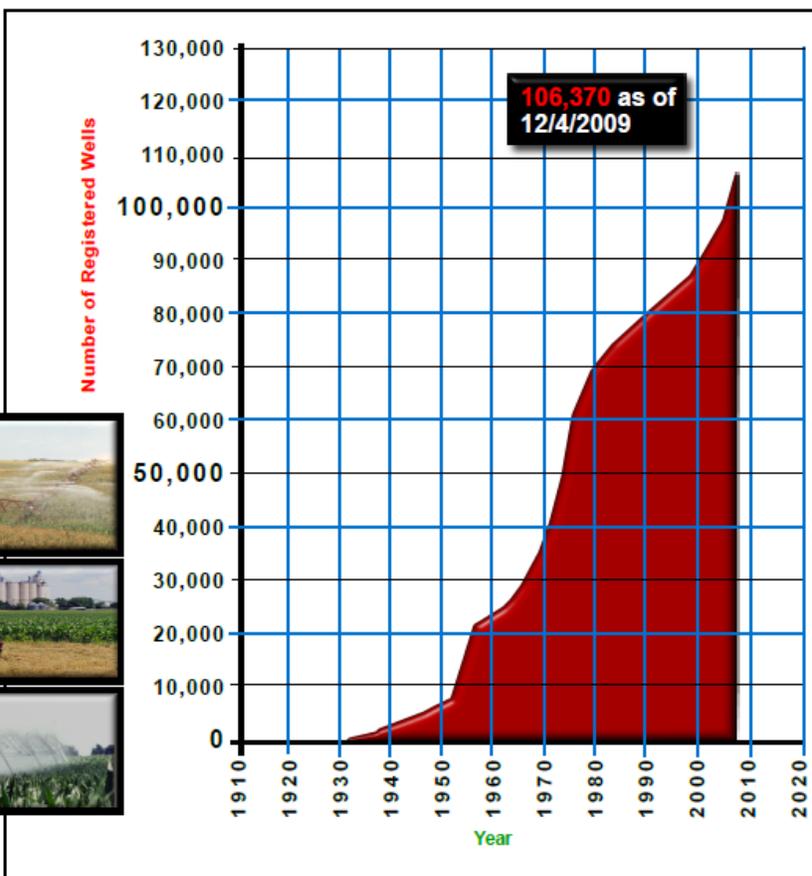


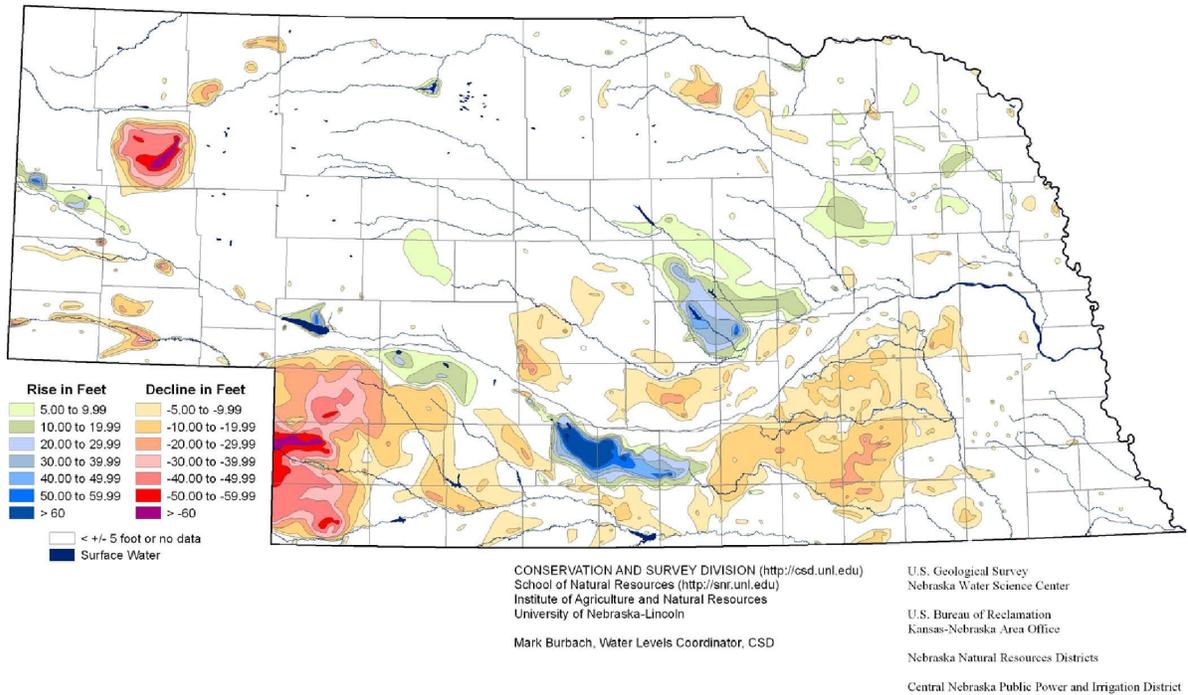
Figure 3. Irrigation Well Expansion, Nebraska Department of Natural Resources.

Ground water irrigation has increased rapidly in just the last few decades. According to the Nebraska Department of Natural Resources, total irrigation wells registered increased from 80,000 in 1990 to over 106,000 in 2009.

Irrigation, of course, generally results in increased crop yields in comparison to dryland farming. About 60% of the corn grown in Nebraska is irrigated, with reported yields in the range of 180 bushels/acre, versus 130 bushels/acre for dryland.¹⁰ The inflation-adjusted value of land with access to irrigation has nearly doubled since 1970.¹¹ Irrigated agriculture is also a mainstay of Nebraska’s economy, estimated to contribute \$3.6 to \$4.5 billion in net economic impact.¹²

In some areas of the state, the intensive use of ground water for irrigation has led to local aquifer declines. Throughout the southern portion of the state, ground water level declines of from 5 to 30 or 40 feet are common.¹³ In other areas of the state, ground water levels have not declined substantially and have, in fact, increased (Figure 4). Note that similar, or even more stark, declines are common throughout the entire range of the High Plains aquifer. Figure 5 shows regional declines in the various states that overlie the aquifer.

Groundwater-level Changes in Nebraska - Predevelopment to Spring 2008



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September 2008

Figure 4. Groundwater level declines, from UNL, School of Natural Resources.

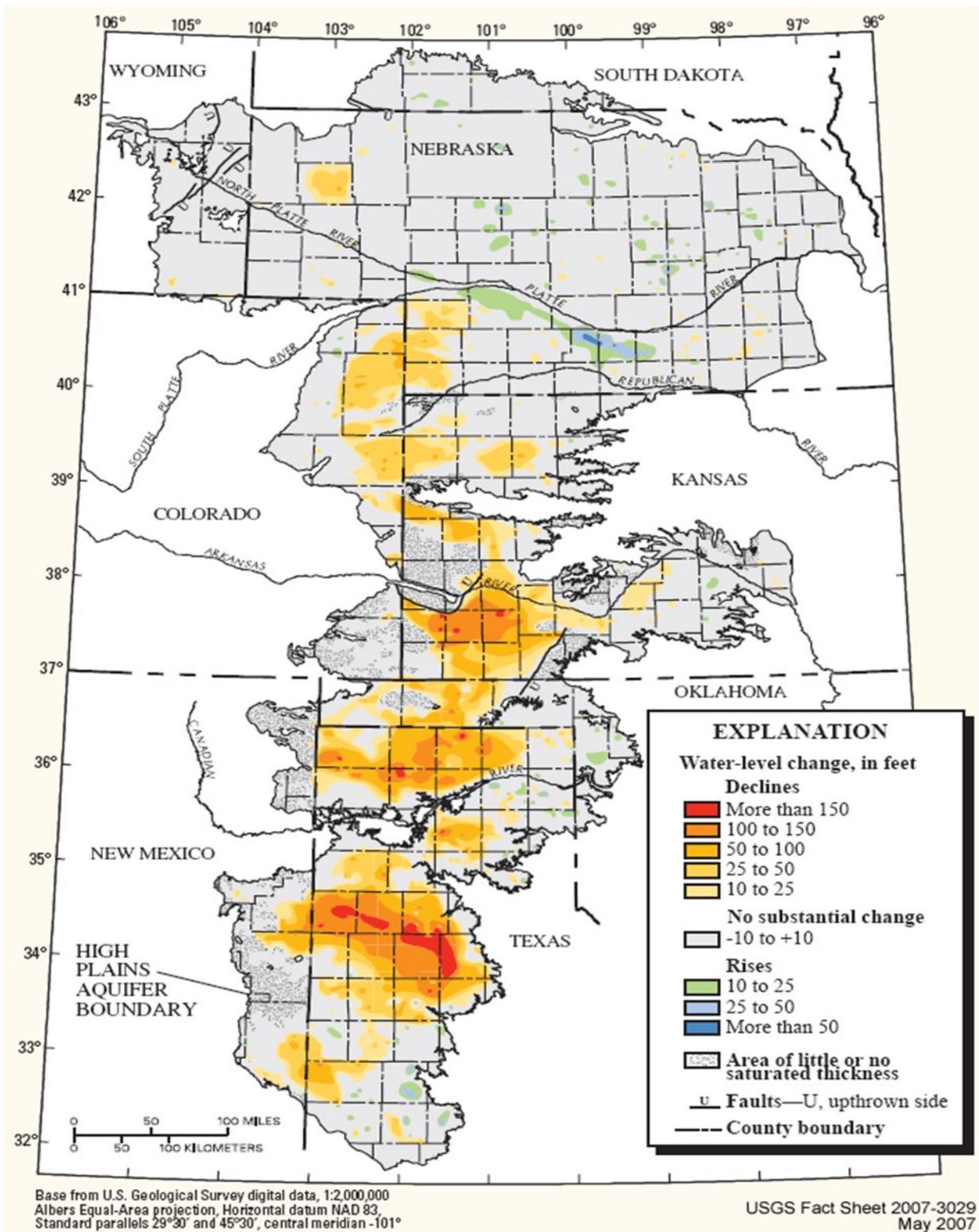


Figure 5. Regional Water Level Changes, High Plains Aquifer, USGS.

As many Nebraska water experts have observed, the increasing use of ground water, especially in areas where the ground water has historically provided substantial input to stream flow, is one of the most prominent challenges facing state decision-makers.¹⁴ The issue has arisen in the context of Nebraska's ability to meet certain compact delivery requirements on the Republican River (see further discussion below). In the North Platte, some surface water right holders have been unable to exercise their full water rights, many that have been in place well before the ground water pumping, and they have begun to use various avenues to resolve this issue, from administrative proceedings to litigation to seeking new legislation. These actions are reshaping Nebraska's water law on many fronts and creating uncertainty about the respective rights of surface water permit holders and ground water users (current and future potential use, especially by overlying landowners).

Conflicts between ground water pumping and surface water flows are only likely to increase. As Professor David Aiken explains in his comprehensive 2006 article for the Nebraska Law Review,¹⁵ the effect of pumping on stream flow may not show up immediately. In fact, in instances other than those where the ground water being pumped is from the shallow alluvial aquifer via wells adjacent or nearly adjacent to the river, changes in stream base flow due to pumping otherwise hydrologically connected ground water may not show up for years (depending on how far the pumping is from the river and how fast the water moves through the aquifer). As Aiken further notes, this fact has two broad implications:

1. Ground water level declines are not necessarily the appropriate trigger for deciding when to regulate pumping to protect stream flow and
2. Reductions in ground water pumping will not necessarily result in immediate improvements in stream flow.

Regional water level changes are not a reliable guide as to when ground water pumping may reduce streamflows or even when ground water supply problems are developing. Ground water level declines will become apparent only when the aquifer discharge to the stream has stopped, and when the transition from a gaining perennial stream to a losing ephemeral stream will be difficult to reverse....Not until 2004 did the impact of pumping [hydrologically connected] ground water become an official factor in triggering ground water regulations....The fundamental policy issue is that much of the ground water pumping in Nebraska (and in the West) involves the pumping of tributary ground water without regard to its future impact on streamflow. The long-run impact of this will be to turn gaining streams into losing streams. (Aiken, 2006, supra n. 3, at 973-974).

In the Republican River basin, where about 1 million acre-feet/year of ground water is pumped for irrigation, it has been estimated that about 14 to 18% of the pumping is associated with stream flow depletion, reducing flows in the Republican by 25% in the lower portion of the river to 44% in the upper Republican.¹⁶

Agricultural irrigation also places more direct pressure on surface water resources, now accounting for about 12% of total state water withdrawals (excluding hydropower and water for thermal power plant cooling). Surface water irrigation derives primarily from in-state and out-of-state federal Bureau of Reclamation reservoir projects (Figure 6) and Lake McConaughy.

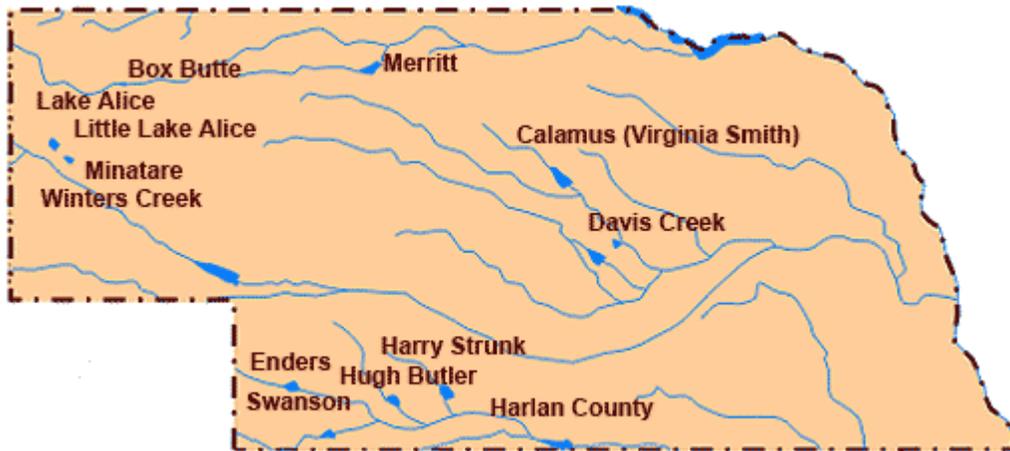


Figure 6. Major federal reservoirs in Nebraska, U. S. Bureau of Reclamation.

In addition to water lost through reservoir evaporation, the operation of water storage reservoirs can substantially alter stream flow patterns.¹⁷ In a river such as the Platte, with extensive surface water development throughout the basin, this has meant very significant alteration of in-river and riparian habitat, with consequent effects on various species of fish and wildlife. As summarized by the U.S. Geological Survey:¹⁸

The channel of the Platte River in Wyoming, Colorado and Nebraska has been narrowed to as little as 15 percent of its former width as a result of in-channel sediment accumulation in some stretches, caused by the placement of dams upstream. The numerous dams and reservoirs that provide flow regulation for irrigation have also depleted much of the Platte River's volume and significantly reduced the magnitude of spring floods. The riparian habitat, depended on by various species of cranes and other waterfowl, has also been severely restricted. Balancing the need for irrigation water for farmers upstream and for restoring wildfowl habitat downstream is one of the management challenges now faced. Adaptive management techniques have been suggested that would allow for moderate releases that could submerge sandbars that would otherwise host germination of unwanted vegetation. Under such a management strategy, planned releases could also open and maintain a channel adequate for use by waterfowl.

Compact delivery requirements

Nebraska, Colorado, and Kansas formally ratified the Republican River Compact in 1943. The compact allocated specific amounts of the "virgin water supply" to each of the three states: 49% to Nebraska (234,500 acre-feet); 40% to Kansas (190,300 acre-feet); and 11% to Colorado (54,100 acre-feet).¹⁹ The compact does not specifically mention or allocate ground water.

As pressure on the state's water resources has increased—primarily from the increase in agricultural irrigation—the terms and obligations of the Republican River Compact are driving many water management decisions, just as compact and decree provisions have resulted in various water policy and management changes in the Platte's upstream states of Colorado and Wyoming. As discussed in more detail in Section II (C), below, the effect of stream flow depletions caused ground water pumping and subsequent Supreme Court litigation by the state of Kansas to secure delivery of its compact allocations. This action and its settlement ultimately led to enactment by the state legislature of one of the broadest conjunctive surface water/ground water management laws in the country: LB 962.²⁰

The key provisions of LB 962 are discussed in more detail below. Essentially, however, it established a process for the state, through the Department of Natural Resources (DNR), to declare a river basin fully- or over-appropriated and to work with the local Natural Resource Districts (NRDs) in the affected basin to prepare integrated ground water/surface water management plans. Significantly, the legislature did not limit the provisions of LB 962 to the Republican basin. These new additions to the state's legal framework, while not universally hailed, have put Nebraska in the forefront of western states in terms of recognizing and beginning to address the undeniable and important connections between ground water and surface water and in attempting to bring its water allocation system into more sustainable balance.

Instream flow needs

Throughout the United States, growing water use over the last few decades has led to concerns about maintaining sufficient instream flows for fish, wildlife, riparian habitat, and recreation. Two areas in Nebraska highlight these concerns.

Degradation of riverine and riparian habitat in the Platte River has led to the development and implementation of a three-state, multi-species recovery program for three endangered birds and one endangered fish. While water use is not the only factor in the decline of these species in the Platte, the changing flow patterns have had a significant effect. The multi-agency cooperative agreement (CA) approved in 2006 includes water management goals for restoring both base flows to benefit native fish and wildlife and pulse flows to benefit instream and riparian habitat. Targets for Nebraska include restoring 130,000 to 150,000 acre-feet/year within 13 years (out of an estimated 417,000 acre-foot annual shortfall) and addressing reductions in surface and ground water to target flows caused by depletions begun or expanded after July 1997.²¹ These targets are over and above the current instream flow rights held by the Nebraska Game and Fish Department and the Central Platte NRD water bank. The plan is also dependent on significant adaptive management work, as well as the combined "integrated management plans" of the NRDs located in the Platte Basin.

Another river receiving increasing attention from a flows standpoint is the Niobrara. As described by the Niobrara Council, the river is somewhat unique in Nebraska, offering "an outstanding example of a largely free-flowing Great Plains river. The valley contains a large con-

centration of scenic cliffs and waterfalls, rare in the Great Plains. The high bluffs along the river provide scenic vistas of the valley, with distant views of the Sand Hill prairie to the south.”²² With 76 miles designated as a federal Scenic River in 1991, the Niobrara is attracting increasing numbers of recreational users, bird watchers, and other tourists, bringing vitally important revenue to several aspects of the local rural economy.

While the level of surface water development and ground water irrigation the Niobrara has not been as extensive as in the Platte or Republican, there are developing conflicts between irrigators and the need to legally protect adequate instream flows for fish, wildlife, riverine habitat, and recreation. Parts of the basin have been declared “fully appropriated” and the Nebraska Department of Game and Fish has begun a suite of studies to better define instream flow needs for the Niobrara.²³ As discussed below, however, Nebraska has both important statutory and case law limits on new appropriations for instream flow purposes.

Nebraska's Current Water Management Framework

Nebraska has already developed a fairly comprehensive water management framework. From the regional to the state level, Nebraska decision-makers have put in place a system of inter-linked statutes and regulations, providing a variety of tools to develop, conserve, manage, and protect both surface water and ground water. This statutory and regulatory framework is paired with a series of important state court decisions, as well as federal court decisions related to interpretation of the Republican River.

This section briefly reviews the most salient aspects of Nebraska's water management framework, with a particular focus on those areas of law or policy that are still evolving or that may need to evolve further to meet the types of challenges discussed in Section I.

Ground Water

Ground water in Nebraska has been subject to a combination of common law and detailed statutory provisions. On the common law front, the state courts adopted the "rule of reasonable use," overlaid with a correlative rights doctrine for allocation among ground water users in times of shortage. This doctrine, unique among U.S. states, was articulated in the case of *Olson v. City of Wahoo*²⁴ in 1933:

[T]he owner of land is entitled to appropriate subterranean waters found under his land, but he cannot extract and appropriate them in excess of a reasonable and beneficial use upon the land which he owns, especially if such use is injurious to others who have substantial rights to the waters, and if the natural underground supply is insufficient for all owners, each is entitled to a reasonable proportion of the whole...

This basic doctrine has been adopted into statute by the legislature, with certain very important modifications. State law provides that "every landowner shall be entitled to reasonable and beneficial use of the ground water underlying his or her land" *subject to the provisions of the Nebraska Ground Water Management and Protection Act*, and the "correlative rights of other landowners when the ground water supply is insufficient for all users."²⁵ In enacting this basic doctrine, the legislature made broad findings about the need to manage and regulate ground water use for the long-term benefit of the public and the state's economy:

The Legislature finds that ownership of water is held by the state for the benefit of its citizens, that ground water is one of the most valuable natural resources in the state, and that an adequate supply of ground water is essential to the general welfare of the citizens of this state and to the present and future development of agriculture in the state. The Legislature recognizes its duty to define broad policy goals concerning the utilization and management of ground water and to ensure local implementation of those goals. The Legislature also finds that natural resources districts have the legal authority to regulate certain activities and, except as otherwise

specifically provided by statute, as local entities are the preferred regulators of activities which may contribute to ground water depletion.

The Legislature further recognizes and declares that the management, protection, and conservation of ground water and the reasonable and beneficial use thereof are essential to the economic prosperity and future well-being of the state and that the public interest demands procedures for the implementation of management practices to conserve and protect ground water supplies and to prevent the contamination or inefficient or improper use thereof. The Legislature recognizes the need to provide for orderly management systems in areas where management of ground water is necessary to achieve locally and regionally determined ground water management objectives and where available data, evidence, or other information indicates that present or potential ground water conditions, including subirrigation conditions, require the designation of areas with special regulation of development and use.²⁶

The legislature has also modified the aspect of traditional rule of reasonable use that limits ground water use to the overlying land, allowing it to be transferred to other parcels or other uses.²⁷

The Ground Water Management and Protection Act (GWMPA)²⁸ was adopted in 1975. The state is divided into 23 Natural Resource Districts (NRDs), generally based on river basin boundaries. These NRDs, which are governed by locally elected boards, have been granted broad powers by the legislature, from ground water management and regulation to flood control, water supply, erosion control, drainage and even forest management. The NRDs develop ground water management plans, which are subject to review and approval by DNR. The statute specifies the elements that must be contained in these plans, including a proposed “ground water reservoir life goal” for the district.²⁹

With respect to regulating ground water pumping, the NRD can declare a “ground water management area,”³⁰ within which it can impose pumping restrictions, temporary new well moratoria, measurement of ground water use and, in certain cases, a reduction in irrigated acreage.³¹ Allocations of ground water within a management area must generally be made in a way that allocates an equal amount of water per acre throughout the area, though there is the possibility of variations in allocations for “varying climatic, hydrologic, geologic, or soil conditions,” “different hydrologic relationships between ground water and surface water,” or other conditions.³²

These broad and flexible powers give Nebraska NRDs distinct advantages over similar districts in other states that rely on local control. Texas, for example, also relies on local districts as the “preferred” approach to ground water management,³³ but Groundwater Control Districts (GCDs) are only established upon local or legislative initiative. With the exception of the vast Edwards Aquifer Authority, most districts have been created on county jurisdictional lines, not on aquifer or river basin boundaries. This means that several different districts may cover just small parts of the same aquifer, each with its own different approach to manage-

ment.³⁴ While Texas GCDs can generally develop management plans and goals and regulate well spacing and pumping, their powers are narrowly drawn and often ambiguous, especially in comparison to those provided to Nebraska NRDs.³⁵

Texas GCDs have faced constant administrative and litigation challenges, especially if they attempt any sort of conservation-minded management. They receive little financial or technical assistance from the state. Moreover, the ability of many Texas GCDs to raise a reasonable budget to carry out aquifer modeling and/or monitoring has been limited by restrictions in their authorizing legislation. For example, some districts are prohibited from imposing *ad valorem* property taxes and must depend on pumping fees, which certainly acts as a disincentive to conserving the water resource through pumping limitations.³⁶

However, before 2004 most Nebraska NRDs had not fully exercised their charge under the GWMPA. Professor Aiken notes:

...NRDs were not actively regulating ground water development (well drilling) or use (pumping restrictions) until recently. For many years, only one NRD [the Upper Republican NRD] restricted well drilling and ground water withdrawals, although two NRDs began regulating ground water withdrawals in the 2005 irrigation season [Middle and Lower Republican NRDs].³⁷ (citations omitted).

The Upper Republican NRD, which has experienced extensive center pivot irrigation development and some of the largest ground water level declines in the state, has been regulating ground water withdrawals for about 30 years.³⁸ Recently, the URNRD made full use of its authority and mandate to protect ground water resources by imposing strict consequences on irrigators that bypassed required water metering devices.³⁹

As discussed below, the linkages between ground water pumping and Republican River compact delivery requirements, and the subsequent enactment of LB 962, is now driving much of the regulatory action in all three of the Republic River NRDs as well as in other NRDs throughout the state. As more NRDs become active in declaring and adopting regulations for ground water management areas, they may face more administrative and legal challenges.

A recent Nebraska Supreme Court opinion, however, appears to limit the range of actors that can challenge NRD decisions, perhaps substantially. In *Central Nebraska Public Power and Irrigation District v. North Platte Natural Resource District*,⁴⁰ the court found that Central did not have standing under the Administrative Procedures Act to appeal a 2008 decision of the NPNRD that lowered ground water allocation from 14 to 12 inches per acre.⁴¹ The court held that even though Central is the permitted holder (i.e. owner of) the surface water rights it claimed would be impaired by the allowed level of ground water pumping, it holds those rights for the benefit of others (irrigators and the general public). Therefore, the court concluded, Central's interests were essentially "derivative" of other interests, depriving it of standing under Nebraska precedent.⁴²

The court went on to find that Central's pleadings also essentially failed to show a "fairly traced" link between the ground water pumping allowed under the regulations at issue and the reduction of inflows to Lake McConaughy.⁴³

While it is obviously too early to characterize the full effect of this ruling, it would seem that standing to challenge NRD regulations, at least from a surface water perspective, will be narrowed substantially.

Surface Water

The Nebraska constitution provides that "[t]he use of the water of every natural stream within the State of Nebraska is hereby dedicated to the people of the state for beneficial purposes..." and that "[t]he right to divert unappropriated waters of every natural stream for beneficial use shall never be denied except when such denial is demanded by the public interest."⁴⁴ Since 1895, surface water in Nebraska has been allocated according to the prior appropriation (first in time, first in right) doctrine used throughout most of the western United States.

The state Department of Natural Resources is empowered to issue surface water rights permits for beneficial use, including the place and purpose of use, authorized diversion rates, and other conditions.⁴⁵ Permits can contain conditions necessary to protect the public interest. However, except for permits for induced ground water recharge and inter-basin transfers, DNR is not expressly required to include conditions that protect instream flows for fish and wildlife or consider whether the permit applicant has engaged in water conservation or other measures and can demonstrate a need for the requested water.⁴⁶ This leaves the DNR with broad discretion in permit application decisions, and leaves those concerned about a particular proposed use with little or no guidance as to how DNR will balance various factors that might bear on the "public interest."⁴⁷

Nebraska has completed adjudication of surface water rights on all its rivers, a process initiated in the early 20th century. This is a distinct advantage over some western states that are still struggling with complex, expensive and time-consuming stream adjudication processes.⁴⁸

Surface water rights are potentially subject to cancellation, under various procedures and conditions specified in the statute, after five consecutive years of non-use.⁴⁹ Like most western states, however, Nebraska has been reluctant to cancel unused rights. But the issues surrounding non-use have been raised in litigation in the Niobrara River basin, where in 2007 the Nebraska Public Power District sought to exercise senior priority surface water rights that have not been used for several years.⁵⁰ Despite having concluded in previous years that the Niobrara was not fully appropriated, once NPPD made the call for its 1942 rights, DNR declared the upper part of the Niobrara fully appropriated and ordered many junior surface water users and ground water pumpers to cut back. This decision was challenged in state court by four NRDs, and a Nebraska Supreme Court decision is expected soon (the case was argued in the first week of September 2010). Two irrigators lodged an administrative challenge to the clos-

ing order issued by DNR in response to the NPPD call, and that issue is still pending before DNR.⁵¹ Some irrigators also challenged the DNR cut-back order in federal court as a taking, but they have so far not been successful.⁵²

Ranchers in the Upper Niobrara have also brought a mandamus action seeking to compel DNR to execute various monitoring and data analysis activities under the 1962 Nebraska/Wyoming Compact on the Niobrara.⁵³ The plaintiffs in this case, which is still pending in state district court, assert that ground water development in Wyoming is reducing stream flows into Nebraska and undermining their ability to exercise senior water rights.

As shown in Figure 7, significant stretches of Nebraska's rivers are now held to be fully- or over-appropriated from a surface water standpoint. Drought, increased pumping of hydrologically connected ground water, and the use of surface water rights that have not been heretofore fully exercised all have the potential to cause controversy and legal conflict in the future.

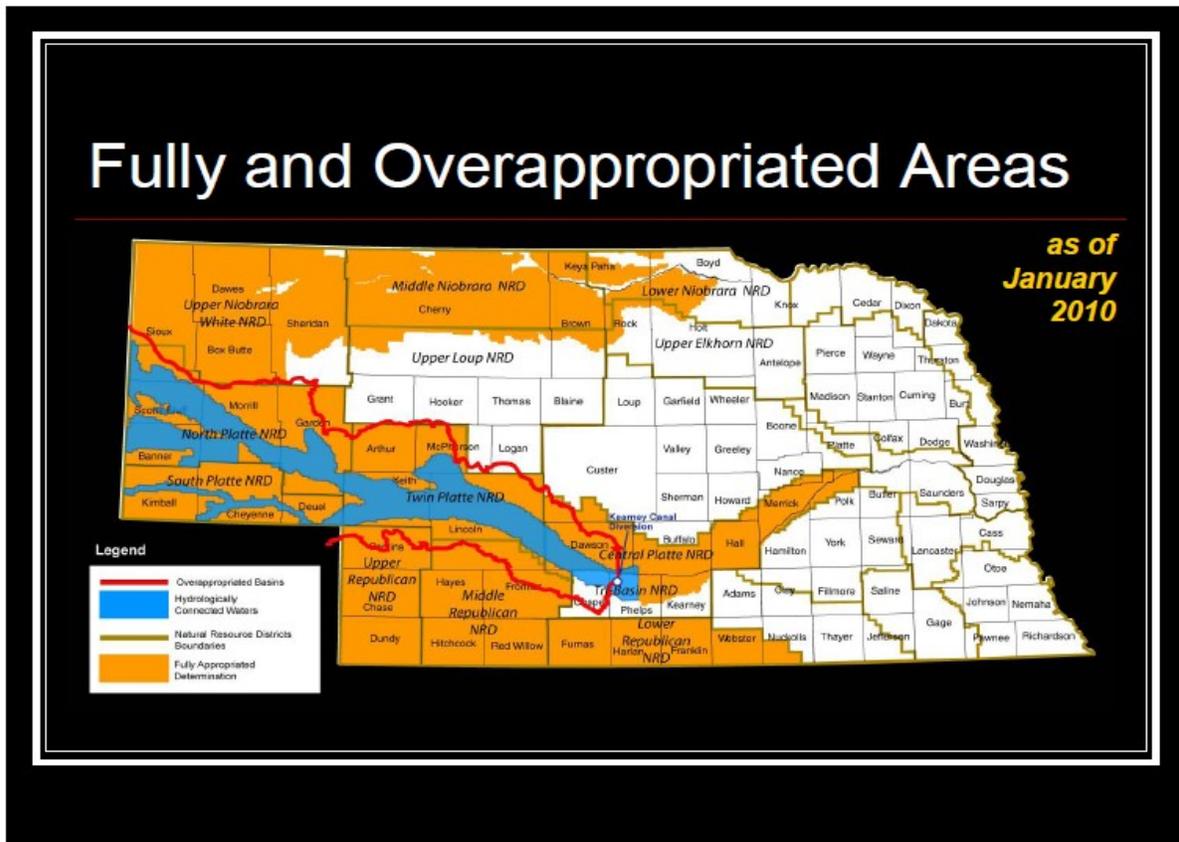


Figure 7. Fully and over-appropriated basins as of January 2010, Nebraska Department of Natural Resources.

The enactment of LB 962 (the provisions of which are discussed in more detail below) has substantially affected the relationship between surface water permittees and ground water users. The “appropriation” classification of a river is largely based on the situation of junior water right holders (if these juniors are not adversely affected under the current status, then senior right holders would be fully protected as well). The rules of DNR for making appropriation determinations provide, in part:

*001.01A Except as provided in 001.01C below, for purposes of Section 46-713(3)(a), the surface water supply for a river basin, subbasin, or reach shall be deemed insufficient, if **after considering the impact of the lag effect from existing groundwater pumping in the hydrologically connected area that will deplete the water supply within the next 25 years**, it is projected that during the period of May 1 through September 30, inclusive, the most junior irrigation right will be unable to divert sufficient surface water to meet on average eighty-five percent of the annual crop irrigation requirement, or, during the period of July 1 through August 31, inclusive, will be unable to divert sufficient surface water to meet at least sixty-five percent of the annual crop irrigation requirement. 457 Neb. Admin. Code, Chapter 24, Sec. 001.01A.*

Thus, DNR first evaluates the effect of pumping of hydrologically-connected groundwater on projected surface flows, and then looks at whether junior water rights can be satisfied at the stated threshold. Known as the 65/85 rule, this trigger drives the appropriation classification. Under LB 962, a fully- appropriated designation kicks in various provisions capping water use at current levels under LB 962 and requires development of integrated ground water/surface water management plans, as discussed below.

Ground Water/Surface Water Interconnectivity

The extensive interconnectivity of ground water and surface water in Nebraska, combined with Republic River compact delivery requirements and flow issues on the Platte River, brings the challenges associated with conjunctive management of surface and ground water to center stage in Nebraska. Court rulings, administrative and legislative actions, literature, and opinions on the various aspects of ground water/surface water connectivity in the state are extensive and varied. It is beyond the scope of this short paper to delve into all of them in detail. Instead, this subsection focuses on: (1) the broad implications of and issues raised by the *Spear T Ranch v. Knaub*⁵⁴ case and (2) the provisions and implementation of LB 962.⁵⁵

The 2005 Nebraska Supreme Court ruling in *Spear T Ranch v. Knaub* set a new course for the state’s water law. By giving judicial recognition to the reality of ground water/surface water interconnectivity, the court erased the legal fiction of separation that still plagues many western states.⁵⁶ That in itself constitutes an important, albeit controversial, step to long-term sustainable water management, even if it is only a first step.

But the court’s creation of a judicial balancing test, based on section 858 of the *Restatement of Torts (Second)*, raises a whole host of new questions. In brief, the court held that section 858

should be used to adjudicate disputes between surface water right holders and ground water pumpers. This case-by-case “balancing of the equities” leaves many issues for further development and, likely, litigation. With some clear empathy for the surface water right holders who initiated the case seeking redress for the sharp declines in the flow of Pumpkin Creek,⁵⁷ the court held:

Initially, we reject a rule that would bar a surface water appropriator from recovering in all situations. Such a rule would ignore the hydrological fact that a ground water user’s actions may have significant, negative consequences for surface water appropriators.

Instead, the common law should acknowledge and attempt to balance the competing equities of ground water users and surface water appropriators; the Restatement approach best accomplishes this. The Restatement recognizes that ground water and surface water are interconnected and that in determining the rights and liabilities of competing users, the fact finder needs broad discretion. Thus, when applying the Restatement, the fact finder has flexibility to consider many factors such as those listed in [section] 805A [of the Restatement], along with other factors that could affect a determination of reasonable use.⁵⁸

The Restatement balancing factors themselves do indeed offer almost unlimited discretion to the fact-finder. The factors to be balanced include, but are not limited to:⁵⁹

- Purpose of use
- Suitability of the use to the watercourse or lake
- Economic value of the use
- Social value of the use
- Extent and amount of harm it causes
- Practicality of avoiding the harm by adjusting the use or method of use of one proprietor or the other
- Practicality of adjusting the quality of water used by each proprietor
- Protecting of existing values of water uses, land, investments, and enterprises
- Justice of requiring the user causing the harm to bear the loss

Nebraska legal commentators have noted the uncertainty and potential for further litigation over these factors in specific cases. Professor Aiken has raised the issue of whether the Restatement rule would apply only to interconnection between surface flow and pumping of the immediately connected sub-flow ground water, or whether it can be extended to pumping of hydrologically connected but more distant “tributary” ground water.⁶⁰ Another commentator, Donald Blankenau, has raised two additional issues: (1) how the *Spear T Ranch* decision will interact with the ground water/surface water models and integrated management plans being developed under LB 962, and (2) the prospect of substantial monetary damage awards to surface water right holders encouraging litigation and the effect of such litigation on LB 962 implementation.⁶¹

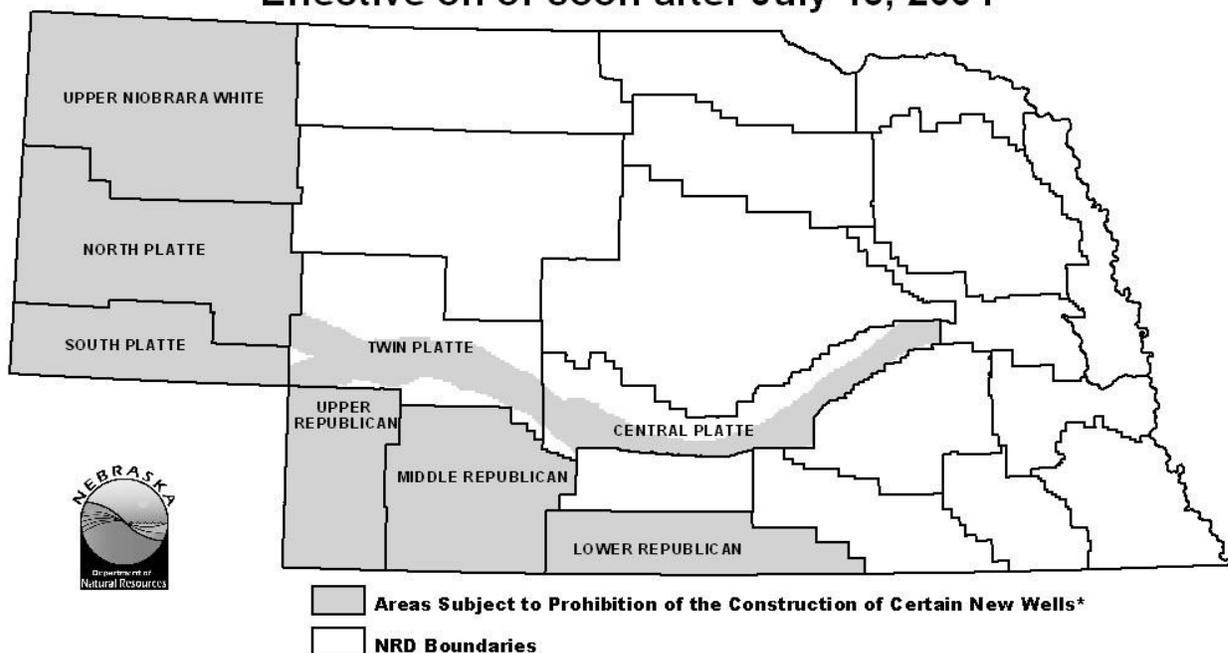
In some ways, successful implementation of LB 962 is critical to avoiding further litigation under the new common law established by the *Spear T Ranch* decision. This ground-breaking legislation, if fully implemented, could set Nebraska on a clear path to sustainable, conjunctive management of surface water and ground water, something that has so far eluded virtually every state in the western U.S.

The basic conjunctive management provisions of LB 962, which grew out of a multi-stakeholder task force, can be summarized as follows:⁶²

River basins and the associated NRDs are evaluated by the state, via DNR, to their appropriation classification. DNR considers both surface flows and the 25-year “lag effect” of use of ground water that is hydrologically connected to stream flow.⁶³ All or a portion of nine NRDs, generally located in the drier western and southwestern parts of the state were designated as fully appropriated upon adoption of the bill. A “fully appropriated” designation automatically triggers moratoria on new surface water permitting and on new ground water well drilling in areas of hydrologically-connected surface water and ground water until development of an approved “integrated management plan.”⁶⁴

The IMPs are developed by the NRDs, with assistance from DNR, and are subject to review and approval by DNR. There are now nine approved IMPs, with five more to be completed.⁶⁵ Undesignated basins are reviewed annually by DNR. Figure 8 shows the current status of basins and related NRDs.

NRD Areas where the Construction of Certain New Wells is Prohibited* Effective on or soon after July 16, 2004



Each area subject to the prohibition on certain new well construction exists because (1) the NRD has adopted a well moratorium in the management area and/or (2) a stay on new well construction has been imposed pursuant to Sections 53 to 60 of LB 962 (2004 Nebraska Legislature). For more detailed information, contact your local NRD or visit the DNR website at <http://www.dnr.state.ne.us>

* Issuances of certain appropriations and other activities are also prohibited. See LB 962 (Sections 53, 54 and 60), available through the DNR website, or your local NRD rules for details.

Figure 8. NRDs with Ground Water Pumping Restrictions, Nebraska Department of Natural Resources

An over-appropriated basin is theoretically one where the extent of development is not sustainable over the long-term. However, Sec. 46-713(4)(a), by linking “over-appropriated” status to a river with an “interstate cooperative agreement” and certain moratoria measures in place on July 16, 2004, is written so as to essentially limit the “over-appropriated” designation to the Platte River.⁶⁶

The overall goal of an IMP is to obtain a balance between water use and supply in order to sustain the economic viability, environmental and social health, and public safety and welfare in the basin over both the near term and long term.⁶⁷

Both voluntary and regulatory measures to meet IMP goals are contemplated. For surface water, these measures include:

The surface water controls that may be included in an integrated management plan and may be adopted by the Department of Natural Resources are: (a) Increased monitoring and enforcement of surface water diversion rates and amounts diverted annually; (b) the prohibition or limitation of additional surface water appropriations; (c) requirements for surface water appropriators to apply or utilize reasonable conservation measures consistent with good husbandry and other requirements of section [46-231](#) and consistent with reasonable reliance by other surface water or ground water users on return flows or on seepage to the aquifer; and (d) other reasonable restrictions on surface water use which are consistent with the intent of section [46-715](#) and the requirements of section [46-231](#).⁶⁸

For ground water, the measures are generally those authorized for the NRDs ground water management plan, including, but not limited to: allocation of groundwater to various users, rotational irrigation requirements, well-spacing rules, measurement and monitoring requirements, reduction of irrigated acres,⁶⁹ limitations on or prevention of the expansion of irrigated acres or increases in the consumptive use of ground water withdrawals from water wells used for irrigation or other beneficial purposes.⁷⁰

Broad public and stakeholder participation is required in the development of and decision on the IMPs. Uses existing prior to the preliminary appropriation determination are generally protected from mandatory cutbacks, though they might be included in relation to voluntary or incentive-based programs.⁷¹

The DNR provides a wide range of technical support in development of the IMPs, including ground water and surface water hydrological modeling, evaluation of instream flow needs, water demand projections, effect of land use changes on stream flow and recharge rates, options for reservoir or other infrastructure reoperation, and economic analysis of alternatives.⁷²

Significantly, LB 962 also established the Water Resources Trust Fund, to be used for implementation. The funds can be used by both the state and NRDs. In addition, NRDs were provided with authority to adopt an additional \$0.01/\$100 taxable valuation to generate funds for LB 962 work.

While the LB 962 process is still relatively new and quite ambitious, it most likely provides the best hope of both protecting the water resources of the state and preserving economically valuable water use. It is a solid and reasonable alternative to disruptive and expensive private litigation between surface water and ground water users or a legislative rewrite of Nebraska water law to harmonize ground water and surface rights under the prior appropriation doctrine.

A central set of challenges for Nebraska water policy decision makers will be to ensure transparency, the use of good science and on-going monitoring of IMP implementation to build water user and public confidence in the LB 962 process. In some areas, voluntary market transactions (leases, purchases, dry year options, etc) will likely be necessary to reduce existing consumptive use. All of this will require substantial and sustained funding, but the alternatives would clearly be more expensive.

Republican River Compact Compliance

The Republican River Compact operated without much controversy for several years.⁷³ Over the last few decades, however, Nebraska has frequently not met its delivery obligations to Kansas, primarily because of the combined effects of greatly expanded ground water use for irrigation (due in large part to center pivot technology) and periodic droughts.⁷⁴ In 1998, Kansas brought a case in the U.S. Supreme Court seeking a ruling that stream flow derived from ground water inputs was covered by the compact terms and seeking hefty monetary damages for Nebraska's failure to meet delivery requirements. After lengthy proceedings before a Special Master, the Court approved a "Final Settlement Stipulation" agreed to by all three Republican River states in 2003.⁷⁵ The Special Master's Report and the associated settlement made it clear that Nebraska could not escape its downstream compact obligations even if the stream flows were reduced due to ground water pumping. Over the state's protestations, the term "virgin water flows" was found to include *all* the natural stream flow, even that contributed by ground water inputs to the river.

Although the 2003 settlement included a fairly broad (though not absolute) moratorium on new ground water wells upstream of Guide Rock, Nebraska, many new wells were drilled between the date the litigation was filed and the date of settlement.⁷⁶ Seeking to help the state meet the terms of the Compact and the Settlement, the Nebraska legislature enacted the groundbreaking LB 962 in 2004, the provisions of which are described above. After intensive cooperative work between DNR and the NRDs, as well as several opportunities for public hearing and comment, the Upper, Middle, and Lower Republican NRDs now have approved integrated management plans.⁷⁷ The plans have specific goals with respect to allowable depletions of stream flow via ground water pumping and reductions in pumping required to achieve those goals. For example, the plan for the Upper Republican provides that:

*The NRD and the NDNR agree that the IMP for the District shall keep the District's depletions including credits for streamflow augmentation to an amount within 44% of the State's allowable ground water depletions. Based upon its calculations, the NDNR believes that a 20% reduction in pumping from the 98-02 baseline would be sufficient without additional streamflow augmentation to keep the District's net depletions within the URNRD's 44% share of the State's allowable ground water depletions during periods of average precipitation throughout the basin, through the year 2020.*⁷⁸

It remains to be seen whether the measures proposed in the new IMPs on the Republican River will be sufficient for Nebraska to consistently meet its delivery obligations to Kansas under the compact particularly if there is a recurring or persistent drought.

In May 2010, Kansas again sought to have the Supreme Court hear the dispute, alleging that both Nebraska and Colorado have failed to meet their obligations under the compact and the 2003 settlement.⁷⁹ Kansas claims Nebraska under-delivered by about 79,000 acre-feet during 2005-2006. Nebraska and Colorado filed replies in July 2010. Nebraska's brief recounts the

state's efforts to improve compliance (via LB 962, the new IMPs, and other measures)⁸⁰ and asserts that Kansas has not suffered material damage due to the under-delivery (noting that Kansas was awarded only \$10,000 via the required pre-court arbitration process in 2008).⁸¹ Nebraska states that is currently in compliance and that total ground water pumping for irrigation in the three Republican River NRDs has declined from a high of about 1.5 million acre-feet in 2002 to about 725,000 acre-feet in 2009.⁸²

One of the most critical challenges in implementing the IMPs and meeting compact delivery requirements in the Republican Basin is how to finance conservation measures, temporary water right buyouts, and/or permanent reductions in consumptive use. These measures will be particularly important in drought years, when irrigators feel pressure to pump ground water to make up for low precipitation. Unfortunately, these are precisely the years in which compact compliance can be difficult.

In this area too, Nebraska has been willing to explore various mechanisms at its disposal to beef up funding for management plan implementation, conservation, and reductions in consumptive use. The state has been at the forefront in accessing and providing the required state funding match for water conservation and related programs available under the federal farm bill.⁸³ About 40,000 acres had been enrolled in the Conservation Reserve Enhancement Program (CREP) for the Republican River, leading to a consumptive use savings of about 35,000 acre-feet in 2008, over 30,000 of which are from reduced ground water use.⁸⁴ The water use reduction goal for the combined Platte-Republican Conservation area (Figure 9) is 125,000 acre-feet/year.⁸⁵ The program also seeks to increase surface and ground water retention by a combined 85,000 acre-feet.⁸⁶

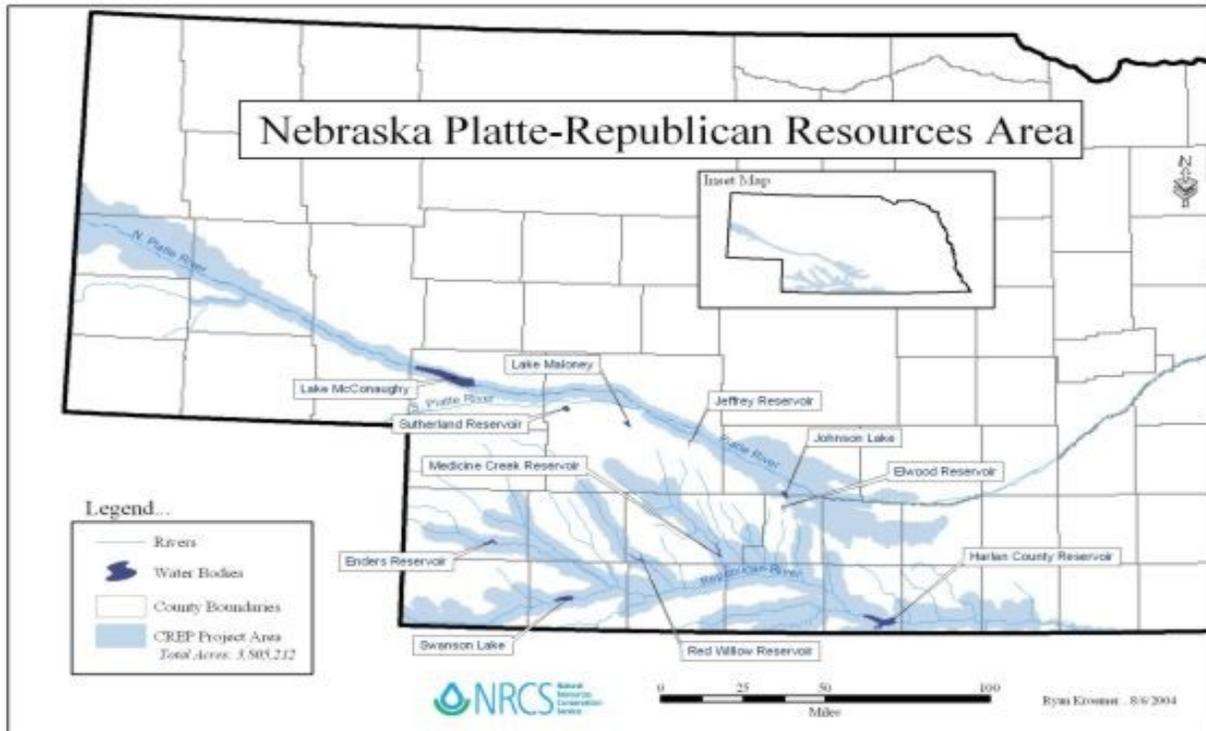


Figure 9. Conservation Reserve Enhancement Program (CREP) areas in Nebraska, Natural Resources Conservation Service, U.S. Department of Agriculture.

In 2007, the state legislature passed LB 701 which, among other things, established two funding mechanisms for the Republican Basin consumptive use reduction programs. The law created bonding authority for NRDs to purchase surface or ground water rights, reduce vegetation impairing stream flow, and take other actions to help ensure compact compliance. The bonds could be paid back with either state funds or by local funds derived from two new sources created by the law: a property tax levy (not to exceed ten cents per \$100 taxable valuation) by the NRDs and an “occupation tax” that could be levied annually on irrigated acreage (with a limit of \$10/acre).

The property tax authority was challenged in state court by several landowners in the affected NRDs. The plaintiffs claimed that the tax amounted to a property tax for state purposes and was unconstitutional under Article VIII, Section 1A of the Nebraska Constitution. Ultimately, the Supreme Court of Nebraska agreed, holding in *Garey et al. v. Nebraska Department of Natural Resources*⁸⁷ that the tax was enacted by the state and primarily to be used for state purposes (i.e. compact compliance). The court found that:

The language of § 11(1)(d) of L.B. 701 grants property taxing authority only to those districts with a jurisdiction which includes “a river subject to an interstate compact among three or more states and that also includes one or more irrigation districts within the compact river basin.”. . . On its face . . . [this] narrows the applicability of

the taxing authority and, according to the record, includes only those districts which are appellants in this case. Further . . . the tax levy at issue in the instant case . . . is, on the face of the statute, excluded from being used for the operation of the district. The failure to include [the challenged] property taxes raised . . . from being used for the operation of the district suggests that such revenue will be channeled elsewhere, arguably to meet the expenses associated with the State's obligation to comply with the Compact. Based on the legislative history and the plain language of the statute, we conclude that the controlling and predominant purpose behind the property tax provision in § 11(1)(d) of L.B. 701 is for the purpose of maintaining compliance with the Compact, which we conclude is a state purpose.

The *Garey* decision also threw into doubt the validity of the "occupation tax." The Legislature responded this year by enacting LB 862, which extends the occupation tax authority to all NRDs preparing integrated management plans.

A recent analysis by University of Nebraska Professor Ray Supalla contains several findings that have implications for the state's design of programs aimed to compensate irrigators for consumptive use reductions:

We found that if Nebraska implements a long-term program and wants to fully compensate irrigators using the least cost approach, they should: (1) use land retirement instead of allocation; (2) use a land purchase instead of a land leasing approach; and (3) use a regulatory with compensation policy for retiring land, instead of a voluntary willing buyer and willing seller approach. Land retirement is cheaper than allocation because it allows for more reduction in on-farm capital costs. Purchasing instead of leasing land is cheaper because with a lease you essentially "purchase" the land multiple times over the 50-year period that was analyzed. Regulated reduction in acres, with compensation equal to the estimated change in farm income, is cheaper than a voluntary willing buyer and willing seller approach because it eliminates the need to pay a premium price to induce the voluntary sale or lease.⁸⁸

These options and related questions regarding who should be compensated, when, and by whom (local or state taxpayers) are going to be critical components of implementing the integrated management plans in the Republican and other basins.

Financing and other issues may be addressed through the newly created basin-wide Republican River Task Force, which holds its second meeting September 21, 2010. The Task Force was created by LB 1057, which provides that:

- (1) *The Republican River Basin Water Sustainability Task Force is created. The task force shall consist of twenty-two voting members, and except for the state agency representatives, the members shall be residents representing a cross-section of the Republican River basin . . . [specific positions to be appointed by the Governor].*

- (2) . . . The purposes of the task force are to define water sustainability for the Republican River basin, develop and recommend a plan to help reach water sustainability in the basin, and develop and recommend a plan to help avoid a water-short year in the basin. . .
- (3) The task force shall present a preliminary report to the Governor and the Legislature on or before May 15, 2011, and a final report before May 15, 2012 . . .⁸⁹

Instream Flows

Nebraska's statutory instream flow provisions, many of which have been in place since 1984,⁹⁰ focus on new appropriations for instream flow. Instream flow for "recreation and fish and wildlife" is defined as a beneficial use.⁹¹ Only the Game and Fish Commission and Natural Resource Districts can obtain instream flow appropriations.⁹² Game and Fish and the NRDs are to define the segments with a "critical need for instream flows" and quantify those needs.⁹³ These provisions do not appear to have been fully implemented, as UNL Professor Sandra Zellmer notes:

[o]nly 247 miles (2%) of Nebraska's 12,371 miles of streams and rivers have received some protection through instream flow appropriations (8 miles on Long Pine Creek and 239 miles on the Platte River)⁹⁴. . . Current miles of select high priority streams and rivers that have not been protected with instream flows include but are not limited to the White River (70), lower Snake (14), Holt Creek (19), Niobrara River (487), North Platte River (164), Nine mile Creek (13), Elkhorn River (382), Cedar River (88), Big Nemaha (140), Missouri River (313) and Brazile Creek (42).⁹⁵

The statute contains other restrictions on new instream flow appropriations: (1) unappropriated water must be available 20% of the time;⁹⁶ (2) the flows must be the *minimum* necessary to protect *existing* recreation and fish and wildlife resources;⁹⁷ and (3) the permits are subject to review every 15 years and can be cancelled or modified.⁹⁸ Professor Zellmer notes that:

A comparison of Nebraska law to the water law of other western states demonstrates that Nebraska's existing instream flow legislation is quite narrow. Nebraska statutes impose a variety of restrictions on instream flow appropriations, many of which are unique and even unprecedented.⁹⁹

However, interpretation of the statutory language by the Nebraska Supreme Court indicates room for flexibility:

The Nebraska Supreme Court has ruled that this language does not require instream appropriations quantities be limited to provide merely survival habitat and no more, but rather a flow rate that would maintain the existing habitat quality, even if that existing habitat quality were "optimum to outstanding" (In re: Application A-16642, 463 NW2d 591, 609-12 (Neb. 1990)). Thus, there is considerable room for interpretation and discretion regarding the quantity of an instream appropriation in Nebraska.¹⁰⁰

In 2004, via LB 962, the legislature provided that the “consumptive use” portion of existing surface water rights could be leased for instream flow purposes for up to 30 years, though this does not appear to have been widely exercised yet.¹⁰¹

The flow protection activities that have occurred in Nebraska seem to be driven by factors other than a comprehensive statewide program to protect instream flows. That is, activities to date have been driven largely by the cooperative agreement in the Platte, compact delivery requirements on the Republican River, and recreation interests in the Niobrara. Unlike many western states, Nebraska does not have a state-run or non-profit water trust dedicated to leasing water rights for instream flow purposes, either statewide or on particular rivers.

Summary

Nebraska water management is entering a new era. After many decades of extensive and lightly regulated irrigation development—heavily dependent on the vast and accessible reserves of the High Plains Aquifer—the state now faces several challenging issues, including: conflicts between surface water and ground water users; compliance with Republican River Compact delivery requirements; and debates over how best to ensure instream flows for fish, wildlife, and recreation.

In the last few years, Nebraska policymakers, state and local agencies, water users, and academic and non-governmental leaders have responded to these challenges with impressive dedication, new ideas, and financial resources. The results include the ambitious innovations of LB 962; cooperative efforts to recover species and habitat quality in the Platte River; financing for reducing consumptive water use in various basins and NRDs; and increasing recognition of the economic value of recreation and ecotourism on rivers like the Niobrara. Other developments, like the holdings in the *Spear T Ranch* and *Central Nebraska Public Power District* cases discussed above, raise new issues that may spur further litigation and/or legislative action. And almost all of the issues at the top of the Nebraska water policy agenda have an associated financing challenge: how to secure and make the most economically efficient use of funds to solve water management problems.

In meeting these challenges, it may be useful to draw on water management approaches tried and lessons learned in other states, particularly those with similar challenges.

Approaches from Other States

Ground Water Management¹⁰²

Ensuring that ground water use is sustainable is one of the major challenges facing much of country as well as other parts of the world. Sustainability has multiple dimensions, including the effect of ground water pumping on springs and river flows and balancing pumping with recharge so as not to “mine” the aquifer. Of course, there are no easy answers and there are many different approaches, each of which has certain advantages and disadvantages. If one were starting with a “clean slate,” a combined, consistent legal framework of public ownership and state-permitted use for both surface water and ground water could potentially be the best approach to sustainable management. Some states, including the neighboring jurisdictions of Colorado and Kansas, have incorporated this basic concept into their water management framework, but most did that in the early to mid-1900s, when the number of ground water users and pumping levels were a fraction of what they are today. Imposing this type of framework at this date in Nebraska is not likely practical or even desirable, given the certainty of political controversy, administrative complexity, and litigation that would accompany such a change.

Even with distinct surface water and ground water regimes, some states centralize management in a state resource agency, as opposed to locally-based regulation. In theory, there are potential benefits to this approach assuming state decision-makers are more insulated from local political pressures, but it is certainly no guarantee of sustainable management. And, in some cases, local interests may be more aggressive than state policy makers in protecting their resources.¹⁰³

Again, imposing this type of framework in place of the long-standing NRD structure in Nebraska is not likely practical or desirable.

The question for Nebraska is more likely how to make the current ground water management framework a more effective system for achieving sustainability.¹⁰⁴

One approach may be to explore the development of specific “caps” on total ground water pumping, within an NRD and among NRDs where pumping affects stream flow in a particular river basin. The cap could fluctuate with climate conditions: i.e. a lower cap in dry years when ground water inputs to stream flow are critical. While reductions in consumptive use, conditions on new wells, and related measures are already incorporated into Nebraska law, the use of defined annual caps appears to be infrequent.

The “cap” approach has been used in Texas to limit pumping from the large Edwards Aquifer. The aquifer is a major source of both agricultural irrigation water and municipal water for the City of San Antonio and other municipalities.¹⁰⁵ This prolific aquifer also supplies several major natural springs, some of which are home to endangered species, and these springs in turn supply much of the natural flow of the Guadalupe River. In response to litigation under the federal Endangered Species Act in the early 1990s, the Texas legislature created the Edwards Aquifer Authority and imposed a “pumping cap” on use of the aquifer.¹⁰⁶ The cap, which was modified by the legislature in 2007, has been set at 572,000 acre-feet/yr, with a critical period (drought) cap of 340,000 acre-feet/yr.

While implementation of the Edwards Aquifer Act has not been without controversy and legal challenges (derived in large part from Texas' history of reliance on the "rule of capture" and uncertainty about legal ownership of ground water),¹⁰⁷ the cap has had real benefits. First, it has largely achieved its purpose of maintaining spring flows, even during some fairly serious drought years. Second, the cap has created a vibrant market in ground water pumping rights, allowing farmers to lease or sell their rights to other irrigators or the City of San Antonio. This approach saves the state of Texas from having to allocate funds to buy out or fallow irrigation to meet spring protection and river flow objectives. Essentially, with the cap in place, the market (which is overseen by the Edwards Aquifer Authority) lets voluntary transactions work to find the most economically efficient reductions and trades.

One analysis of the "cap and trade" approach for managing ground water in the Republican River basin concluded that it could be more economically efficient than other approaches.¹⁰⁸

The "cap" approach has now been incorporated into legislation applicable to ground water management districts across Texas. HB 1763, enacted in 2005, requires ground water districts overlying a common aquifer (ground water management area, or GMA) to agree on "desired future conditions" (DFC) of the aquifer. Several GMAs have included spring flow/stream flow protection as part of their DFC. The state provides technical assistance and modeling to translate these DFCs into an amount of "managed available ground water."¹⁰⁹ Essentially, this process is designed to result in caps on how much water can be extracted from the aquifer over the applicable planning period of 50 years. The DFC process is just now concluding its first round, and it remains to be seen if the idea of the ground water districts (vs the state) setting the caps will work. The process, like any major shift in water management framework, has been rocky at times. Nevertheless, like Nebraska's Integrated Management Plan approach, it has both increased attention to ground water sustainability issues and resulted in the development of substantially more hydrological and use information than has previously been available.

Surface Water Management

Having adjudicated surface water rights throughout the state, Nebraska has overcome one of the hurdles that still bedevil other western prior appropriation states. Two areas where Nebraska law might be improved are: (1) better regulatory definition of "public interest" factors to be considered in reviewing requests for new surface water appropriations and (2) instream flow protection.

Professor Zellmer has suggested that the state look to the "public interest" criteria applicable to inter-basin transfers in Nebraska and to Oregon and Alaska statutes that define public interest criteria for surface water right application reviews.¹¹⁰ Advantages of better definition of the public interest criteria include increased fairness, certainty, and acceptance of the decision-making process. In addition, if surface water transfers become more common in Nebraska, having a body of regulation and decisions applying more specific public interest criteria might help with review of and decision on transfer applications.

Given the increasing importance of protecting instream flows in Nebraska, it might be time for the state to consider enacting a more comprehensive program. At a minimum, surface water laws could be amended to require explicit consideration and protection of instream flow values, including fish and wildlife habitat, recreation, and related values, in evaluating surface water appropriation, with a prohibition on issuing appropriations that would adversely affect those values. For example, since 1985 in Texas all new appropriations and most amendments to existing permits have been subject to review for their effect on instream flows, fish and wildlife habitat, and recreation. In 2007, Texas expanded on this permit-by-permit approach to enact an ambitious and comprehensive program to develop environmental flow regime standards for all the river basins and bays in Texas.¹¹¹ In addition to a desire to offer more certainty to water users and better environmental flow protection, this new process is aimed at getting ahead of situations like those in the Platte, the Klamath, and other places where water management is being driven by various endangered species requirements. It is not focused merely on minimum flows, but rather a complete regime of low flow, base flow, pulse and, in some cases, overbank flows necessary to sustain a “sound ecological environment” in the rivers and bays. It also is structured to involve a variety of stakeholders and scientists familiar with the particular basins and bays.

In Nebraska, it might be desirable to develop flow targets or standards (beyond just minimum flows) as part of the integrated management plans for various basins.

Several other states have also undertaken programs to protect instream flows for fish and wildlife and other purposes.¹¹² A number of states are relying on “Water Trusts” (generally not-for-profit organizations that receive funding from a variety of sources) to help achieve instream flow goals in fully- or over-appropriated rivers by leasing or purchasing existing water rights and converting them to instream flows.¹¹³ In most states, the water rights are actually officially held by the state, but the Trusts are charged with implementing the lease/purchase programs. The advantage of these Trusts is that they are able to *focus* on the instream flow protection objectives. Of course, to be successful they must develop relationships with water right holders (the best have a board that represents a variety of stakeholders), become efficient at the permit amendment process, be adept at accessing various sources of funding (including grants, federal funds and even revenue from lease-backs in some cases) and, of course, have tools in state law that are workable. Important examples of successful Trusts include the Freshwater Trust (<http://www.thefreshwatertrust.org>) (formerly the Oregon Water Trust); the Washington Water Trust (<http://washingtonwatertrust.org/>); the Deschutes River Conservancy (<http://www.deschutesriver.org>), working to protect the Deschutes basin in Oregon; and the Montana Water Trust (<http://www.montanawatertrust.org>), now run by the Clark Fork Coalition.

Given the already extensive institutional structure, stakeholder involvement, and complexity of issues in the Platte and Republican, a new Water Trust may not be particularly helpful in those basins, but it could be useful in helping to ensure instream flow protection in Nebraska’s many other river basins.

Managing Public Expenditures in Securing Consumptive Use Reductions

The last few years have shown that, at least from a political feasibility standpoint, Nebraska is going to have to be able to provide some level of compensation to existing permitted water users where consumptive use reductions are urgently needed. This includes, at a minimum, the Republican and Platte Basins. The challenges center on how to ensure that the federal, state, or local funds generated for these purposes are used most efficiently, providing the taxpayers with real value and ensuring transparency of transactions for decision-makers and the public.

One option that might offer greater economic efficiency and transparency than one-on-one negotiations with water right holders is the use of “reverse auctions.”¹¹⁴ The literature on reverse auctions generally is extensive, but the application of this technique to conservation issues, including water right transactions, is relatively new.¹¹⁵ Essentially, in a reverse auction the “buyer” (be it DNR or an NRD) would announce that it was seeking bids for the “best price” for leases or even permanent acquisitions. The buyer could announce total funding available, a total goal in terms of acre-feet, both, or neither. Then, willing “sellers” would submit a bid, offering to lease or sell a certain amount of water for a particular price per acre-foot. The buyer would evaluate these bids, and pick a combination of those that offered the most suitable water for the best price. Properly structured, reverse auctions can make the best use of limited funding because sellers are competing against each other to offer the successful bid.

Apart from economic efficiency aspects involved in the design of water rights leasing or well retirement programs, there is also a need for transparency in these transactions. At some point, programs will lose support if decision-makers and the public at large cannot see how funds are being spent and what results are being achieved. Accessible annual reports on transactions, including prices paid for water and stream flow gains and/or pumping reductions achieved will likely become increasingly important as the Integrated Management Plans relying on these techniques are implemented.

Finally, and this is certainly not unique to Nebraska, better use needs to be made both of available gauging/measurement techniques and modeling and other techniques to show how storage reservoirs can be operated to meet multiple needs.

Funding constraints have affected stream gauging programs throughout the west, but this is a basic, relatively lower cost investment that is absolutely critical in managing river systems, especially those in fully- or over-appropriated situations.

More sophisticated modeling techniques are beginning to be employed to re-model operations of existing reservoirs to better accomplish their primary purposes (water storage, flood control) while protecting or enhancing environmental flows.¹¹⁶ For example, the U.S. Army Corps of Engineers has undertaken cooperative efforts with the Nature Conservancy in several locations, particularly the southeastern U.S., to investigate potential environmental and other benefits of reservoir reoperation. Some of this type of experimentation has taken place on the Platte via the Cooperative Agreement program, but there appears to be much more potential for this type of analysis in various river basins in Nebraska.

Emerging Issues

There are at least two issues on the horizon that could have significant implications for water resources management in Nebraska: climate change and the next Congressional review of the federal farm bill. While these issues do not supplant the issues discussed above that require more immediate attention, they are worth considering, especially with respect to future water planning.

Climate Change

Predicting the precise effects of climate change on the Great Plains region in general, and water resources in particular, is difficult. The U.S. National Assessment of the Potential Consequences of Climate Variability and Change summarizes potential effects for the Great Plains region, including Nebraska, as follows:

The two climate models used as the primary source of results for the National Assessment suggest a continuation of the trends seen in the Great Plains historical climate: higher temperatures, and for some areas, greater precipitation. One of the models projects higher temperatures than the other. In both models, the annual average temperature rises more than 5 degrees F by the 2090s. Increases in temperature are greatest along the eastern edge of the Rocky Mountains. More warming is expected in the winter than in the summer. The models also suggest a greater number of heat events -- three days in a row above 90 degrees F. For Colorado and Oklahoma, this represents more than a doubling of the number of times such heat stress would occur. Substantial increases in the July heat index (a combination of heat and humidity), with the largest increases in the southern areas, are also projected for this region.

Annual precipitation over the Great Plains is projected to increase by at least 13% in both models by the 2090s -- but not everywhere in the region. A pattern of decreasing precipitation appears in the lee of the Rocky Mountains and is much greater in one of the models. The annual increases in precipitation are greatest in the eastern and northern parts of the Great Plains. Precipitation is likely to occur in more intense rainfall events, especially in the Southern Great Plains. Although precipitation increases are projected for parts of the Great Plains, increased evaporation from rising air temperatures is very likely to overwhelm the extra moisture from precipitation, causing soil moisture to likely decline for large parts of the region. Both climate models also suggest that, just as a normal aspect of ongoing variability, there will be years when drought conditions are likely to prevail.

In addition to in-state effects on water needs, ground water recharge, and reservoir evaporation, the fact that the Platte and Republican have their headwaters in the Rocky Mountains (which are predicted to have significantly changed snow accumulation and melt patterns) further complicates the picture for Nebraska.

Changes in Federal Farm Policy

The federal farm bill will be up for renewal in 2012, in an unknown legislative and political environment. The ballooning federal budget deficit could put pressure on allocation of resources for traditional crop payments, which would have potentially very significant effects on Nebraska corn production, including irrigated production. Additionally, there will likely be battles over funding for various farm bill conservation programs, including those Nebraska has been able to use to help farmers reduce consumptive use of surface water and ground water. It would be foolhardy to attempt to predict the outcome of the next farm bill debate, but, whatever the outcome, it will have at least some implications for Nebraska water management.

Conclusion

While Nebraska is endowed with abundant water resources, it faces some difficult management challenges over the next several years. Interaction between ground water and surface water and the conflicts that can generate between respective users of these two supply sources are at the top of the policy agenda, along with Republican River Compact delivery issues and challenges in protecting instream flows for fish, wildlife and recreational tourism.

Fortunately for Nebraska, the legislature and policymakers at the state and regional levels have undertaken some quite innovative efforts to deal with at least the first two of these issues: ground water/surface water interaction and compact delivery issues. Many of the measures reviewed in this paper are relatively new and their full implementation will no doubt present new and difficult questions (including those related to financing reductions in consumptive water use), some of which will likely end up in the courts. Nevertheless, these measures represent a genuine effort by Nebraska to build a more sustainable water management framework. In this respect, there are many features of Nebraska law and policy that could be of interest to other western states facing similar challenges.

There are some features of water law and policy in other states that may help inform the further development of Nebraska's water management framework, including a more substantial move to "capping" aquifer withdrawals while allowing trading of rights and more comprehensive approaches to setting instream flow targets. In addition, with financing for consumptive use reductions being a prominent issue requiring significant resources, it will be particularly important to ensure efficiency and transparency in the expenditure of funds for this purpose.

Finally, both potential effects of climate change and upcoming revisions to the federal farm bill subsidy and conservation programs could have important implications for Nebraska water policy and should be incorporated where possible into the state's water planning framework.

End Notes

¹V.L. McGuire, "Changes in Water Levels and Storage in the High Plains Aquifer: Pre-development to 2007," U.S. Geological Survey, Fact Sheet 2009-3005, February 2009.

²U.S. Geological Survey, Groundwater Atlas of the United States, HA-730D, Kansas, Missouri and Nebraska. Available at http://pubs.usgs.gov/ha/ha730/ch_d/D-text2.html.

³James Goeke, "Surface Water and Ground Water Relationships in Nebraska," University of Nebraska-Lincoln, available at http://water.unl.edu/c/document_library/get_file?folderId=173022&name=DLFE-2927.pdf. See also Aiken, David J., *Hydrologically-Connected Ground Water, Section 858, and the Spear T Ranch Decision*, Nebraska Law Review 84: 962 (2006). Aiken includes a table for various groundwater contributions to total flows for several river drainages. (Hereinafter cited as Aiken, 2006).

⁴See Neb. Rev. Stat. Sec. 1-105 for the text of the South Platte Compact.

⁵South Platte River Compact, Art. IV.

⁶Detailed information on the North Platte Decree and subsequent litigation and settlement can be found at <http://www.dnr.state.ne.us/legal/nebraska.html>.

⁷The U.S. Bureau of Reclamation recently approved \$350,000 in grant funding for a "Basin Study" for the Niobrara. This study could provide an excellent opportunity to gain a better understanding of the basin hydrology, existing and future water demands and management alternatives. "Grant Funds Niobrara Study", *Omaha World Herald*, August 17, 2010.

⁸Nebraska Department of Natural Resources, state water use data at <http://www.dnr.state.ne.us/SurfaceWater/TotalWithdrawals2005.pdf>.

⁹Based on the 2007 Census of Agriculture by the U.S. Department of Agriculture. Nebraska is now estimated to have 8.56 million acres of irrigated farmland, up from about 7.62 million in 2002.

¹⁰2007 USDA Census of Agriculture.

¹¹Supalla, Raymond, "Will Agricultural Research Make Future Irrigation Reductions Easier?," in *Cornhusker Economics*, September 2008.

¹²Charles Lamphear, *Economic Importance of Irrigated Agriculture 2003*, Nebraska Policy Institute, available at http://www.nebraskapolicy.org/Irrigation_study_Summary.pdf.

¹³Goeke, n. 3, supra.

¹⁴See Aiken 2006, supra n. 3 and references cited in the bibliography accompanying this paper.

¹⁵Aiken 2006, supra n. 3.

¹⁶Integrated Management Plan for the Upper Republican (2008), available at www.urnd.org/IMP2008.pdf.

¹⁷See generally N.L. Poff, et al, *Ecological responses to altered flow regimes: a literature review to inform the science and management of environmental flows*. *Freshwater Biology*. 2009. P 1-12. Brian Richter, et al., *Ecologically sustainable water management: Managing river flows for ecological integrity*. *Ecological Applications*. 13(1): 206-224. (2003).

¹⁸U.S. Geological Survey, "Dams and Rivers: Scientists Take a New Look Downstream" (1996), news release summarizing findings of comprehensive 1996 report on the effect of dams on river habitat, available at <http://www.usgs.gov/newsroom/article.asp?ID=811>. See also U.S. Geological Survey, *Platte River Ecosystem Resources and Management, with an Emphasis on the Big Bend Reach in Nebraska*, August 2006, available at <http://www.npwrc.usgs.gov/resource/habitat/plrivmgt/factors.htm> and John Echeverria, *No Success Like Failure: The Platte River Collaborative Watershed Planning Process*, William and Mary Environmental Law and Policy Review, 25:559 (2001) (written prior to the 2006 Cooperative Agreement).

¹⁹Republican River Compact, Neb. Rev. Stat. Sec. 1-106, Art. IV. The compact provides that: *Should the future computed virgin water supply of any source vary more than ten (10) per cent from the virgin water supply as hereinabove set forth, the allocations hereinafter made from such source shall be increased or decreased in the relative proportions that the future computed virgin water supply of such source bears to the computed virgin water supply used herein.* Id. Art. III. Virgin water supply is defined in the compact as: *"the water supply within the Basin undepleted by the activities of man."* Id. Art. II. Under the Republican River Compact 2003 settlement, allocations are based on five-year rolling averages, not annual amounts.

²⁰Now codified in various sections of the Nebraska Water Code, ch. 46 Nebraska Revised Statutes (Neb. Rev. Stat.).

- ²¹Nebraska Department of Game and Fish, *Instream Flow Implementation in Nebraska* (2009), available at http://www.dnr.state.ne.us/CREP/CREP_Report_2009.pdf, p 8. Relicensing of the hydropower facilities associated with Lake McConaughy resulted in the creation of a 100,000 acre-foot “environmental account,” which can be used to release water flows for the benefit of downstream endangered species. This is about 10% of the authorized storage in Lake McConaughy. *Id.*, pp 11-12.
- ²²Niobrara Council, <http://www.niobraraCouncil.org/>.
- ²³Nebraska DFG, *supra*, n. 21 at pp. 23-25.
- ²⁴*Olson v. City of Wahoo*, 124 Neb. 802, 248 N.W. 304 (1933).
- ²⁵Neb. Rev. Stat. Sec. 46-702 (2004).
- ²⁶*Id.*
- ²⁷See, for example, Neb. Rev. Stat. Sec. 46-691 (transfers off overlying land for agricultural irrigation or ground water remediation uses, setting conditions and allowing for affected persons to protest transfers at the local Natural Resource District).
- ²⁸Neb. Rev. Stat. Secs. 46-701 to 46-753 (2004).
- ²⁹Neb. Rev. Stat. Sec. 709.
- ³⁰Neb. Rev. Stat. Sec. 712.
- ³¹Neb. Rev. Stat. Sec. 739.
- ³²Neb. Rev. Stat. Secs. 740 and 739 (4), (6)(a).
- ³³Tex. Water Code Sec. 36.0015
- ³⁴Texas now has over 90 GCDs. This problem has been recognized by the Texas legislature and there is now a process underway by which ground water districts covering the same aquifer have been grouped into “ground water management areas” and tasked with arriving at common “desired future conditions” for the aquifer. See Robert Mace, et al, *A Streetcar Named Desired Future Conditions: the New Groundwater Availability for Texas*, Texas Water Development Board (2008), available at http://www.twdb.state.tx.us/gwrd/pdffdocs/03-1_mace.pdf.
- ³⁵Compare Tex. Water Code, Ch. 36 with Neb. Rev. Stat. Secs. 701-753.
- ³⁶For more resources on Texas GCDs, see <http://www.texaswatermatters.org/groundwater.htm>. http://www.edf.org/documents/9326_2009_TX_Groundwater_Report.pdf and Laura Marbury and Mary E. Kelly,
- ³⁷Aiken 2006, *supra* n. 3 at 978.
- ³⁸For a history of the URNRD actions, see Stephenson, Kirk, *Groundwater Management in Nebraska: Governing the Commons through Local Resource Districts*, *Natural Resources Journal*, 36:761 (1996).
- ³⁹“Harshesht possible penalties handed down for URNRD meter violations,” *Imperial Republican*, July 6, 2010 (describing URNRD’s revocation of irrigation rights of owners who were found to have bypassed meters). Some of the well owners have appealed these penalties. “Bond, Kramer seek hearings on meter violations, penalties,” *Imperial Republican*, August 16, 2010.
- ⁴⁰Opinion issued August 27, 2010, Case No. S-09-727. Opinion available at <http://court.nol.org/opinions/2010/august/aug27/s09-727.pdf>.
- ⁴¹Central and Spear T Ranch challenged the proposed regulation at the administrative level and then appealed pursuant to the state APA. The GWMPA provides that “Any person aggrieved by any order of the district...may appeal the order” under the APA. Neb. Rev. Stat. Sec. 750.
- ⁴²Opinion at 543.
- ⁴³*Id.* at 545. The court seemed particularly discomfited by the pleadings allegation that Lake McConaughy would be “ruined” or was being “destroyed” by the NRD actions, calling it “apocalyptic rhetoric.”
- ⁴⁴Nebraska Constitution, Articles XV-5 and XV-6.
- ⁴⁵Neb. Rev. Stat. Sec. 46-231, 233.
- ⁴⁶Sandra B. Zellmer, *The Public Interest Test for Water Appropriations* (2006), available at <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1003&context=watercenterpubs>.
- ⁴⁷*Id.*
- ⁴⁸See <http://www.judges.org/dividingthewaters/adjudications.html> for a summary of adjudication proceedings in various states. This source notes that “other adjudications could occur if Iowa, Omaha, Sac & Fox, Santee, or Winnebago Tribes seek to quantify their water rights.”
- ⁴⁹Neb. Rev. Stat. Sec. 46-229.
- ⁵⁰For a more complete explanation of the priority date, type of use preference and other issues in this conflict, see J.

David Aiken, "Priority, Preferences and Irrigator-Power Disputes on the Niobrara" in *Cornhusker Economics*, October 10, 2007. Also available at http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1336&context=agecon_cornhusker.

⁵¹Personal communication, Don Blankenau, September 14, 2010.

⁵²*Keating et al v. Nebraska Public Power District et al*, Memorandum of Opinion, May 12, 2010, Case No. 7:07CV5011 (available at <http://www.omaha.com/assets/pdf/OW5023513.PDF#read-the-judge-s-ruling>).

⁵³Stephen C. Smith, "Enforcement of the Nebraska/Wyoming Compact for the Niobrara River Basin," *The Nebraska Lawyer*, July/August 2010.

⁵⁴*Spear T Ranch, Inc. v. Knaub*, 269 Neb. 177, 691 N.W. 2d 116 (2005). The facts and rulings in *Spear T Ranch* have been extensively analyzed by various commentators and that analysis is not repeated here. See, for example, Aiken 2006, supra n. 3; Donald Blankenau, et al, *Spear T Ranch v. Knaub: The Reincarnation of Riparianism in Nebraska Law*, *Creighton Law Review*, 38: 1203 (2005) (hereinafter Blankenau 2005); and LeRoy W. Sievers, *Nebraska Water Law Facing Dramatic Changes in Our State: The Spear T Ranch Case*, *Nebraska Lawyer*, 14 (June 2005).

⁵⁵In 2009, the Nebraska legislature passed LB 483, which sets out a number of requirements for DNR with respect to basins that were either changed from fully appropriated to not fully appropriated or have only a preliminary determination of being fully appropriated. Implementation of this legislation is in the early stages and it is not discussed here.

⁵⁶See, e.g., Robert Glennon, *Ground Water Pumping the Fate of America's Fresh Waters*, Island Press (2002).

⁵⁷In a broad critique of the *Spear T Ranch* holding, Blankenthau 2005, supra n. 52 at 1208, states that none of the Plaintiffs' appeal briefs mentioned the Restatement; it was only raised in a brief from Defendants. The court explored, but rejected, application of the doctrine of prior appropriation to ground water. Aiken 2006, n. 3, supra. at 982-83.

⁵⁸*Spear T Ranch*, 269 Neb. at 193, 691 N.W.2d at 131-32.

⁵⁹The court noted that the "test is flexible and that a trial court should consider any factors it deems relevant." The *Spear T Ranch* plaintiffs did not pursue the case on remand and, to date, no court has applied the rule set out in the Supreme Court's opinion.

⁶⁰Aiken 2006, supra n. 3, at 989-90, arguing for the broader interpretation.

⁶¹Blankenau, supra n. 54, at 1219-20, noting, however, that the court's holding that the effect of ground water pumping on surface water flows must meet a "direct and substantial" threshold test to be successful.

⁶²LB 962 also addressed transfers of surface water and ground water rights and cancellation of surface water rights. The 2006 Nebraska legislature passed LB 1226 to refine and augment various aspects of LB 962, including a grant program to assist NRDs in implementation of integrated management plans.

⁶³DNR regulations provide that: "[t]he geographic area within which the Department preliminarily considers surface water and ground water to be hydrologically connected for the purpose prescribed in Section 46-713(3) is the area within which pumping of a well for 50 years will deplete the river or a base flow tributary thereof by at least 10 percent of the amount pumped in that time." 457 Neb. Admin Code, Ch 24, Sec. 001.02.

⁶⁴Neb. Rev. Stat. Sec. 46-714. This section further provides that, in reaches preliminarily determined to be fully appropriated, stays shall also be imposed on wells permitted but not constructed before the preliminary determination and on the expansion beyond "historic use" from existing wells and surface water permits. 46-714(a)(2).

⁶⁵See http://www.dnr.state.ne.us/IWM/docs/IWM_ApprovedPlans.html.

⁶⁶Neb. Rev. Stat. Sec. 46-713(4)(a) provides: "A river basin, subbasin, or reach shall be deemed overappropriated if, on July 16, 2004, the river basin, subbasin, or reach is subject to an interstate cooperative agreement among three or more states and if, prior to such date, the department has declared a moratorium on the issuance of new surface water appropriations in such river basin, subbasin, or reach and has requested each natural resources district with jurisdiction in the affected area in such river basin, subbasin, or reach either (i) to close or to continue in effect a previously adopted closure of all or part of such river basin, subbasin, or reach to the issuance of additional water well permits in accordance with subdivision (1)(k) of section 46-656.25 as such section existed prior to July 16, 2004, or (ii) to temporarily suspend or to continue in effect a temporary suspension, previously adopted pursuant to section 46-656.28 as such section existed prior to July 16, 2004, on the drilling of new water wells in all or part of such river basin, subbasin, or reach." See also, Katherine Vogel, "Declaring a River Basin Over-Appropriated: The Need for Reevaluation of the Republican River Basin," *The Nebraska Lawyer*, July/Aug 2010 (arguing that the Republican River should be subject to evaluation of whether or not it is over-appropriated).

⁶⁷Neb. Rev. Stat. Sec. 46-715(2)(a) provides that the IMP must have “[c]lear goals and objectives with a purpose of sustaining a balance between water uses and water supplies so that the economic viability, social and environmental health, safety, and welfare of the river basin, subbasin, or reach can be achieved and maintained for both the near term and the long term.”

⁶⁸Neb. Rev. Stat. Sec. 46-716 (1).

⁶⁹These measures would be governed by Neb. Rev. Stat. 46-740.

⁷⁰Neb. Rev. Stat. Sec. 46-739.

⁷¹For example, the Central Platte NRD has established a Water Bank to perpetually lease existing ground water irrigation rights and retire them in order to reduce stream flow depletions in the Platte River. The Bank has so far obtained almost 2,456 acre-feet of such credits out of an IMP target of 2,503. See http://www.cpnrd.org/Final_Fall_2010_CPNRD_Fact_Sheet.pdf.

⁷²James Schneider, “Nebraska’s Integrated Management Planning Process,” April 23, 2010, presented to the Nebraska Water Resources Advisory Board and available at http://www.dnr.state.ne.us/IWM/Presentations/NE_IWM_PlanningProcess_0410.pdf.

⁷³For a brief and interesting history of the Republican River Compact and Compact-related litigation, see Don Blankenau, “Republican River Litigation: Clearing the Waters,” *The Nebraska Lawyer*, July/August 2010.

⁷⁴For a more comprehensive discussion of events over the life of the compact, see Popelka, Aaron, *The Republican River Dispute: An Analysis of the Parties’ Compact Interpretations and Final Settlement Stipulations*, *Creighton Law Review*, 38:1203 (2004).

⁷⁵*Kansas v. Nebraska*, 538 U.S. 720, 123 S.Ct. 1898 (2003).

⁷⁶Popelka, supra n 18 at 626. Moratoria on new wells were adopted in the Upper Republican NRD in 1997, but the Lower and Middle did not halt new wells until 2002.

⁷⁷Approved IMPs are available at http://www.dnr.state.ne.us/IWM/docs/IWM_ApprovedPlans.html.

⁷⁸*Integrated Management Plan for the Upper Republican River*, jointly developed by the Nebraska Department of Natural Resources and the Upper Republican Natural Resources District (2008). Available at http://www.dnr.state.ne.us/IWM/NRD/UpperRep/URNRD_IMP_2008.pdf. The earlier management plans for these districts required only about a 5% reduction over baseline.

⁷⁹For a summary of Kansas’ position see: http://www.ksda.gov/includes/document_center/interstate_water_issues/RRC_Docs/RRCompactFS050410.pdf.

⁸⁰One of the other measures was the lease of surface water rights from 2006 to 2008, requiring about \$18 million to lease 98,000 acre-feet (resulting in a consumptive use reduction of about 51,000 acre-feet, or \$183/af leased).

⁸¹Brief of the State of Nebraska in response to Kansas’ Motion for Leave to File Petition, July 2, 2010, available at http://www.ksda.gov/includes/document_center/interstate_water_issues/RRC_Docs/RRCompactFS050410.pdf.

⁸²Depending on where these reductions are occurring, they could have immediate, near-term or longer-term effects on restoration of stream flow. Pumping reductions closest to the river will likely have the most immediate effect.

⁸³The state has also received federal farm bill water conservation funding for areas in the Platte River. Colorado has also structured and received funding for a CREP in the Republican basin to help meet its downstream delivery obligations. http://www.fsa.usda.gov/Internet/FSA_File/crepcorr06.pdf.

⁸⁴State of Nebraska, *Nebraska Platte-Republican Resources Area CREP Annual Performance Report*, December 2009, p. 10. Available at http://www.dnr.state.ne.us/CREP/CREP_Report_2009.pdf.

⁸⁵For the water use retirement contract entered into between DNR and the water rights holder, see http://www.dnr.state.ne.us/CREP/CREPWaterUseContract_05-07.pdf.

⁸⁶See http://www.fsa.usda.gov/Internet/FSA_File/nebcrep05.pdf and http://www.dnr.state.ne.us/CREP/CREP_Report_2009.pdf for more detail on the CREP programs.

⁸⁷*Garey et al v. Nebraska Department of Natural Resource*, 277 Neb. 149 (2009).

⁸⁸Raymond J. Supalla, et al, *The Cost of Reducing Irrigation*. (2006). Available at <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1039&context=ageconworkpap>.

⁸⁹Neb. Rev. Stat. 46-2,140 (added in 2010 by LB 1057).

⁹⁰For a discussion of the motivations for enacting the original instream flow provisions, see Gene Zuerlein, “Remember our Rivers!: An Overview of Instream Flows in Nebraska,” in *Prairie Fire: the Progressive Voice of the Great Plains*, August 2007 (online at <http://www.prairiefirenewspaper.com/2007/08/remember-our-rivers>).

⁹¹Neb. Rev. Stat. 46-2,108(2).

⁹²*Id.*

⁹³Neb. Rev. Stat. 46-2,109

⁹⁴See discussion supra re: Platte River Environmental Account and relationship to the Platte River Recovery Program.

⁹⁵Sandra Zellmer, "Instream Flow Legislation" NU Water-Related Research in Brief: Information for Nebraska's Water Resources Decision-Makers (November 2006), available at <http://watercenter.unl.edu/WRRRI/WRRRIWaterResearchPapers.asp>. See also Nebraska Department of Game and Fish, Instream Flow Implementation in Nebraska (2009), available at http://www.dnr.state.ne.us/CREP/CREP_Report_2009.pdf.

⁹⁶Neb. Rev. Stat. 46-2,115(1). However, the statute does also give the Director of DNR discretion to investigate the use of "stored water" for instream flows if insufficient unappropriated natural instream flow is unavailable: "If the director determines that there is insufficient unappropriated natural flow available for an application for an instream appropriation and if the applicant consents, the department may conduct a study to determine whether the instream flow needs can be met through the use of stored water in new storage facilities. The study shall address the availability of storage sites, the estimated cost of providing any required storage, and such other findings and conclusions as the department deems appropriate."

⁹⁷Neb. Rev. Stat. 46-2,116.01.

⁹⁸Neb. Rev. Stat. 46-2,115(2), (4).

⁹⁹Neb. Rev. Stat. 46-2,112.

¹⁰⁰Zellmer, supra n. 93.

Leo Eisel and J. David Aiken, Platte River Basin Study, Report to the Western Water Policy Review Advisory Committee, p 23 (1997), available at <http://digitalcommons.unl.edu/ageconfacpub/25>. This report also contains a discussion of various instream flow applications in the Platte and the subsequent 1997 amendments to the instream flow laws. Id. Pp. 24-27.

¹⁰¹Neb. Rev. Stat. Secs. 46-291 to 294 set out detailed provisions for transfers and leasing.

¹⁰²For a discussion of how several western states deal with ground water, see Gary Bryner and Elizabeth Purcell, Groundwater Law Sourcebook of the Western United States, Natural Resources Law Center, University of Colorado School of Law (September 2003).

¹⁰³See, e.g., Kurt Stephenson, "Groundwater Management in Nebraska: Governing the Commons through Local Resource Districts" *Natural Resources Journal* 36:761 (1996).

¹⁰⁴The powers accorded Nebraska NRDs are generally as comprehensive as those in other states that rely on local districts to manage ground water. As noted above, the issue is more about ensuring those powers are effectively used by the NRDs, even before serious problems of ground water level declines or stream flow depletions occur. See Aiken 2006, supra n. 3 and J. David Aiken, "NRD Plans for Not Quite Fully-Appropriated Basins," in *Cornhusker Economics*, April 22, 2009. (Discussing how NRDs might implement LB 483 with respect to control ground water development in basins that are not yet fully appropriated).

¹⁰⁵See, generally, <http://www.edwardsaquifer.net>.

¹⁰⁶For a history of the litigation that led to the Edwards Aquifer Act, see <http://www.edwardsaquifer.net/rules.html>.

¹⁰⁷The *Edwards Aquifer Authority v. Day* case pending in the Texas Supreme Court could have huge ramifications for Texas ground water law. See, e.g. Morgan Smith, *Lawsuit could determine future of Texas ground water*, *Texas Tribune*, April 22, 2010, online at <http://www.texastribune.org/texas-environmental-news/water-supply/lawsuit-could-determine-future-of-groundwater/>.

¹⁰⁸Chris Thompson, et al., *Evidence Supporting Cap and Trade as a Groundwater Policy*, October 2008, available at <http://www.agecon.unl.edu/wateroptimizer/links/EvidenceSupportingCapandTradeasaGroundwaterPolicy10-30-08.pdf>.

¹⁰⁹Mace, et al, supra.

¹¹⁰Zellmer, supra n. 46.

¹¹¹For details on the new environmental flows process in Texas, see <http://www.texaswatermatters.org/flows.htm>.

¹¹²For a survey of instream flow programs in the western U.S., see, e.g. Jesse A. Boyd, *Hip Deep: A Survey of State Instream Flow from the Rocky Mountains to the Pacific Ocean*, *Natural Resources Journal*, 43:1151 (2003).

¹¹³Mary Ann King, *Getting our Feet Wet: An Introduction to Water Trusts*, *Harvard Law Review*, 28:495 (2004).

¹¹⁴In 2009, the Nebraska legislature passed LB 168, authorizing the use of reverse auctions for various state procurement functions.

¹¹⁵For an analysis of water rights auction techniques in Oregon, see Ray Hartwell and Bruce Aylward, Auctions and the Reallocation of Water Rights in Central Oregon, prepared for the Deschutes Resources Conservancy, April 2007. Available at http://www.earthmind.net/teebforbusiness/docs/Auctions_and_the_Reallocation_of_Water_Rights_in_Central_Oregon.pdf.

For a discussion of the use of reverse auctions for other conservation matters, see Suzie Greenhalgh, et al., *Paying for Environmental Performance: Using Reverse Auctions to Allocate Funding for Conservation*, World Resources Institute, January 2007.

¹¹⁶See, e.g. Brian Richter and Gregory Thomas, *Restoring Environmental Flows by Modifying Dam Operations*, in *Ecology and Society*, 12: 12 (2007), available online at <http://www.ecologyandsociety.org/vol12/iss1/art12>.

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10050 Regency Circle, Suite 120
Omaha, NE 68114
402.452.3737
www.platteinstitute.org

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