

**NOTES ON MANAGEMENT OF INTERRELATED SURFACE WATER AND
GROUNDWATER IN WESTERN STATES OTHER THAN NEBRASKA**

These notes provide limited information on groundwater regulation and management of interrelated groundwater and surface water in other western states for use in comparison to Nebraska. Information on comparative water use is also provided to help provide the setting in which these other management systems operate.

Irrigation Water Use in Nebraska Versus Other Western States

Nebraska, like the three High Plains Aquifer states to the south (and in contrast to all states to the west) makes a solid majority of its irrigation water withdrawals from groundwater (76.6% in 1995). Although Nebraska ranks only 12th among states in surface water withdrawals and 3rd in groundwater withdrawals, it is 2nd in the nation in irrigated acreage. This seems likely to be a result of water application efficiencies, crops and evapotranspiration in Nebraska's climatic regime.

In 1995 Nebraska accounted for almost 13% of the nation's irrigated acreage. This compares to 1st place California (16.4%) and 3rd place Texas (10.9%), both states with far larger total areas. In some sense those states are the big three of irrigated acreage, since 4th place Arkansas has less than half of Nebraska's irrigated area.

In 1995 Nebraska ranked 6th nationally in total irrigation water withdrawals and 7th in water withdrawals of all types. Irrigation accounted for over 93% of groundwater withdrawals in Nebraska. Tables I and II depict water use in Nebraska versus other states.

Table 1 - Top Dozen States in Irrigated Acreage – 1995

<u>State</u>	<u>Irrigated Acreage Rank</u>	<u>Irrigation Withdrawal Rank</u>	<u>% of Total U.S. Irrigated Acreage</u>	<u>% of Total Withdrawals That Were From Groundwater</u>
California	1	1	16.4%	37.3%
Nebraska	2	6	12.9%	76.6%
Texas	3	4	10.9%	69.1%
Arkansas	4	10	6.1%	83.0%
Colorado	5	3	5.7%	15.8%
Kansas	6	14	5.4%	93.4%
Idaho	7	2	5.2%	19.3%
Florida	8	13	3.7%	48.3%
Washington	9	8	3.7%	12.7%
Wyoming	10	7	3.4%	2.7%
Oregon	11	9	3.2%	14.3%
Montana	12	5	3.1%	1.0%
			79.7%	

Source: Estimated Use of Water in the United States in 1995 – U.S. Geological Survey Circular 1200

Table 2 - Top Dozen States in Irrigation Withdrawals - 1995

<u>Rank for Irrigation Withdrawals</u>	<u>% of Total U.S. Irrigation Withdrawals</u>	<u>% of Total Withdrawals That Were From Groundwater</u>
1. California	21.6%	37.3%
2. Idaho	9.7%	19.3%
3. Colorado	9.5%	15.8%
4. Texas	7.1%	69.1%
5. Montana	6.4%	1.0%
6. Nebraska	5.6%	76.6%
7. Wyoming	4.9%	2.7%
8. Washington	4.8%	12.7%
9. Oregon	4.6%	14.3%
10. Arkansas	4.4%	83.0%
11. Arizona	4.2%	37.6%
12. Utah	2.6%	11.1%
	85.4%	

Source: Estimated Use of Water in the United States in 1995 - U.S. Geological Survey Circular 1200

Table 3 - State Water Withdrawal Rankings - 1995

<u>Surface Water Withdrawals for Irrigation - 1995</u>		<u>Groundwater Withdrawals for Irrigation - 1995</u>		<u>Total Fresh Water Withdrawals (All Types - Not Just Irrigation) - 1995</u>
California	20,300	California	12,100	1. California
Colorado	12,000	Texas	7,320	2. Texas
Idaho	11,800	Nebraska	6,480	3. Illinois
Montana	9,490	Arkansas	5,520	4. Idaho
Wyoming	7,190	Kansas	3,540	5. Colorado
Washington	6,330	Idaho	2,820	6. Michigan
Oregon	5,930	Arizona	2,390	7. Nebraska
Arizona	3,970	Florida	1,880	8. Ohio
Utah	3,520	Mississippi	1,840	9. New York
Texas	3,280	New Mexico	1,430	10. Tennessee
Florida	2,010	Oregon	985	11. Louisiana
Nebraska	1,990	Washington	918	12. Pennsylvania
New Mexico	1,920	Oklahoma	859	13. Montana
Arkansas	1,130	Nevada	719	14. Washington
Nevada	1,120	Georgia	537	15. Arkansas

Note: Amounts are in thousand acre feet per year

Source: Estimated Use of Water in the United States in 1995 - U.S. Geological Survey Circular 1200

General Comparison of Nebraska's Management of Interrelated Surface Water and Groundwater Versus Management in Other Western States

Broad generalizations about management of interrelated groundwater and surface water in other states are difficult to support because the legal basis for management in each state is different and specific application of the available laws is often based upon local hydrologic and water use factors. Varying authorities are also often delegated to special purpose local districts for groundwater management and those authorities may either enable or require actions from those units of government.

If an extremely broad generalization were to be made it would be that: 1) many western states have some type of permitting or prior appropriation for groundwater, and 2) once groundwater use begins to significantly affect surface water rights that fact becomes relevant to whether new groundwater permits are granted, denied, or only granted with conditions. In those states where groundwater is part of the prior appropriation system a senior surface water user can also make a call on junior groundwater appropriators. However, what that means in practice is difficult to determine and would require contact with each individual state.

It appears that a number of states or districts close off permits for new wells in areas where pumping exceeds recharge. In some instances even existing wells are or may be regulated to attain some version of safe yield or managed depletion. However, this writer was unable to find in print an instance other than Colorado where a previously existing but junior groundwater well causing long term depletions was cut off or significantly regulated specifically to provide water to a senior surface water user making a call. In Colorado, groundwater use that results in more than 1/10 of 1% depletion to surface water rights within 100 years is subject to a requirement for replacement water.

Despite being unable to find in print other instances where existing groundwater wells are being regulated to support calls from senior surface water rights, it does appear that some states have laws that can at least allow that to happen. It may be that those states or districts are enforcing that type of measure, but I haven't dug deep enough to find out about it. Discussion with water administration officials in each of those states would be needed to better characterize what is happening. It is certainly an issue that is of concern in western states and is sometimes in the process of being addressed. Idaho is currently working on implementing extensive conjunctive use laws.

The three states where aquifer and water use conditions most nearly parallel those of Nebraska are Texas, Kansas and Oklahoma. Like Nebraska, those states are underlain by the High Plains Aquifer system and make 2/3 or more of their irrigation withdrawals from groundwater. Significantly, two of those states appear to have little or no regulation of groundwater for the benefit of surface water users, and the third has a relatively small percentage of surface water irrigated acreage to protect. The "rule of capture" means that Texas landowners are entitled to pump and use the water under their land as long as they don't waste it. Oklahoma statutes allow the regulation of groundwater, but it is to provide a minimum 20 year aquifer life. Kansas does have a prior appropriation system for both surface water and groundwater as well as a safe yield concept effectively in place for new appropriations in the state. It also has either a

safe yield or a specified allowable depletion policy for existing appropriations in groundwater management districts. However, surface water accounted for only about 3% of the state's irrigated acreage in 1995, so opportunities for conflict are at least somewhat limited.

States to the west of Nebraska tend to have relatively greater availability of surface water than groundwater along with more variable precipitation distribution and greater relief. This may have arguably resulted in more policy attention for water storage and transfer options in those states versus the plains states as well as greater influence for surface water interests. There may also be relatively more opportunities for storage of surface water in groundwater basins and thus intentional conjunctive use projects in some areas of the mountain and west-coast states. Population growth in water short areas and associated high value municipal water needs in those states has also likely encouraged water transfer mechanisms and banking. Irrigation does not account for the same proportion of total water use in all western states.

While it is difficult to classify western state policy on interrelated groundwater and surface water, there has been at least one effort to do so in table form. The draft Table 4 on the following page was compiled by John Chaffin at the U.S. Department of the Interior, Office of the Solicitor in Billings, Montana. It is based upon calls on groundwater management and interrelated water management made to various Reclamation states. (Note: Only the table on the following page is from Chaffin, not the remaining material).

Table 4 Draft Reclamation States Groundwater Survey

STATE	1	1A	2	2A	3	4	4A	5	6
CA	E/CORR	ST/CO	1980	N	B	Y	N	YE	N
OR	Y	WRD	1955	YE	Y	Y	N	YE	N
WA	Y	ECY	1945/1971	E	Y	Y	E	E	Y
ID	Y	DWR	1963	YE	Y	Y	Y	YE	Y
UT	Y	DNR	1903/1935	NE	YE	Y	YE	YE	Y
NV	Y	DCNR	1918/1939	N	YE	Y	NE	NE	Y
AZ	YE	DWR	1980	YE	N	Y	N	NE	Y
NM	YE	SE		YE	YE	Y	Y	YE	N
CO	Y	SE		Y	Y	Y	N	YE	N
WY	Y	SE		Y	N	Y	N	YE	N
MT	Y	DNRC	1962/1973	Y	YE	Y	YE	YE	N
ND	Y	SWC		YE	N	N	N	YE	N
SD	Y	DWNR	1955	N	N	Y	YE	YE	N
NE	Y	NRD E		YE	NE	Y	YE	NE	Y
KS	Y	DWR	1945	YE	Y	Y	Y	YE	Y
OK	N			N	N	N	N	NE	N
TX	N			N	NA	Y	N	NE	N

Y = YES N = NO E = EXPLANATION NA = NOT APPLICABLE

1. Does the state permit or regulate the use of groundwater?
 - 1a. What is the name of the permitting organization?
2. When did the state begin to regulate groundwater?
 - 2a. Can the state regulate pre-statute groundwater?
3. Do GW applications require an investigation into impacts to surface use?
4. Does the state have special groundwater areas?
 - 4a. If so, does the special area provide new rights for surface users?
5. Can a surface user place a call on groundwater users?
6. Is there a potential for new or expanded integrated water management?

Source : Draft table supplied by John Chaffin, U.S. Department of the Interior, Office of the Solicitor.

**Management of Groundwater and Interrelated Surface Water and Groundwater in
Western States Other Than Nebraska**
(States Listed in Order of Total Irrigated Acreage)

CALIFORNIA

- 127.2% of the irrigated acreage of Nebraska in 1995
- 37.3% of 1995 withdrawals were from groundwater
- Irrigation accounts for 74.5% of groundwater withdrawals and 83% of fresh surface water withdrawals
- Surface water is subject to appropriation under the California water code. Rights to use groundwater have evolved through a long series of court decisions. Diversions of percolating groundwater are not subject to state regulation.
- A California Department of Water Resources Water Facts report notes: *“The State of California is not authorized by the California State Water Code to manage groundwater. California landowners have a correlative right to extract as much groundwater as they can put to beneficial use. In some basins that correlative right has been defined by a court. In other basins, the correlative right has not yet been defined. Groundwater management programs have usually been developed on an ad hoc basis in response to local initiative through local agencies, adjudication, and districts formed by special legislation.”*
- In 1999 the California Division of Planning and Land Assistance website noted: *“California does not have a statewide program for management of groundwater. Groundwater management in California is a local responsibility accomplished under the California Water Code and a number of court decisions. There are six possible methods for groundwater management under present law. Groundwater management is achieved by one or more of these methods.*

Overlying Rights

Local Agencies

Adjudicated Basins

Groundwater Management Agencies

AB 3030

City and County Ordinances”

- The California Division of Planning and Land Assistance has a conjunctive water management program that provides technical expertise and financial assistance to local agency partners for practically and economically managing their groundwater and surface water resources.
- Overall powers to manage groundwater and interrelated groundwater and surface water in California are highly disparate, with very large numbers of local agencies of varying types and powers. In general state law on groundwater/management is enabling to local governments and does not provide requirements. Meanwhile, surface water irrigation is highly developed and heavily dependent upon a variety of federal, state and local surface water projects. Storage of surface water underground and conjunctive management of

surface water and groundwater are also significant facets of state policy. Water transfer mechanisms also appear relatively well developed in California.

TEXAS

- 84.7% of the irrigated acreage of Nebraska in 1995
- 69.1% of 1995 irrigation withdrawals were from groundwater
- Groundwater is subject to the “rule of capture” by the overlying landowner – also called “the law of the biggest pump”. However, waste is prohibited.
- Texas Natural Resource Conservation Commission, when considering a surface water permit, must assess its effects on groundwater and may deny or place restrictions on the permit on the basis of specified effects on groundwater.
- Local elections to designate groundwater districts (as of 1999 there were 45 districts). Controls have included well spacing and limits on the amount/diversion of withdrawal *based on irrigated acreage*.
- Edwards Aquifer area has major regulation partially due to groundwater affecting endangered species needs. Houston area limits pumping partially due to land subsidence issues.
- District management plans have minimum content requirement and must be submitted to the Texas Water Development Board.
- Texas also has 16 regionally developed water plans which were compiled into a Texas State Water Plan in 2002.

COLORADO

- 44.5% of the irrigated acreage of Nebraska in 1995
- 15.8% of 1995 irrigation withdrawals were from groundwater
- Prior appropriation of surface water and groundwater
- Groundwater classified as tributary, non-tributary, not non-tributary or designated
- Replacement water required for new depletions in tributary areas
- Existing tributary wells at time of 1969 Act required to provide replacement water to senior rights. Nontributary groundwater is that located outside a designated groundwater basin where the withdrawal of the groundwater by a well will not within 100 years deplete the flow of a natural stream at an annual rate greater than 1/10 of 1% of the annual rate of withdrawal
- Water administered via seven division offices and with water court system.
- Eight “designated groundwater basins” together with thirteen “groundwater management districts” within most of those basins occupy much of eastern and northeastern Colorado. “Designated ground water is ground water, which, in its natural course, is not available to or required for the fulfillment of decreed surface rights, or ground water in areas not adjacent to a continuously flowing natural stream; wherein ground water withdrawals have constituted the principal water usage for at least 15 years preceding the date of the first hearing on the proposed designation of the basin, and which is within the geographic boundaries of a designated ground water basin.” New appropriations in designated basins may not be given favorable consideration unless the water is available for appropriation, the withdrawal will not cause unreasonable impairment to other vested water rights and the withdrawal is not unreasonably wasteful.

KANSAS

- 41% of irrigated acreage of Nebraska in 1995
- 93% of 1995 withdrawals for irrigation were from groundwater
- 97% of irrigated acreage is irrigated from wells
- 56.5% of public water supply withdrawals are from surface water
- Prior appropriation of surface water and groundwater
- When issuing appropriations for groundwater Chief Engineer is to consider “public interest”, which includes safe yield of the area and the impact additional appropriations will have on prior appropriations. Safe yield generally required for new appropriations.
- Existing appropriations in groundwater management districts are managed under either a safe yield or an allowable depletion concept depending upon the groundwater management district involved. The allowable depletion concept used in three districts limits total appropriation to a level that will deplete the aquifer by a specified amount in a specified timeframe within a specified radius of a well.
- 1972 groundwater management district legislation authorized development of local plans for regulation and management. In practice Chief Engineer of DWR has generally followed district guidelines when issuing permits.
- In control areas of intensive groundwater use the Chief Engineer may close the area to further appropriations, restrict withdrawals of junior or of any appropriators, and require rotation of pumping.
- Average annual rates of decline of Ogallala in Kansas – 1970’s – 1.4 ft./year, 1980’s - .82 ft./year, 1990’s - .55 ft./year.

IDAHO

- 40.4% of irrigated acreage of Nebraska in 1995
- 19.3% of 1995 irrigation withdrawals were from groundwater
- Prior appropriation for both surface water and groundwater
- Director of Idaho DWR has the authority to: 1) restrict pumping when a junior water right holder is interfering with the rights of a senior appropriator when withdrawals are in excess of natural recharge, and 2) establish reasonable pumping limits to protect prior appropriators.
- Director of Idaho DWR may designate “critical groundwater areas” where no new well permits are issued unless the director finds there is water available. Critical areas are those found to not have “sufficient water to provide a reasonably safe supply”.
- Director may also require “groundwater management areas” in those areas thought to be approaching the critical stage. In a groundwater management area the Director can require monitoring and reporting of withdrawals to insure that additional permits that might interfere with existing uses are not issued.
- Idaho statutes have established a water bank for sale and lease of water.
- The Snake River Basin is in the process of a massive water rights adjudication process – up to 185,000 rights.

- A lawsuit is currently ongoing in the eastern Snake Basin over surface water – groundwater conflicts. IDWR is working as a mediator. They are working with water right holders to develop a mitigation plan. IDWR is also working to develop solutions in other areas of the state.

WASHINGTON

- 28.5% of irrigated acreage of Nebraska in 1995
- 12.7% of withdrawals were from groundwater
- Prior appropriation of surface water and groundwater
- Surface water is essentially almost fully appropriated. In 1990 roughly 2/3 of applications for water permits were for groundwater withdrawals
- Despite a rise in applications for groundwater use, as of the early to mid 1990s many were being denied because of the impact that groundwater withdrawals would have on prior surface and groundwater appropriators and instream flows for salmon runs
- Overdrafting is a problem in some counties. Many aquifers in eastern Washington recharge at a very slow rate or are for practical purposes non-recharging.
- Washington Department of Ecology has the authority to designate groundwater management areas or subareas for regulation.
- “The State Court of Appeals ruled in *Hubbard v. Department of Ecology (1994)* that the connection between groundwater and surface water (referred to as hydraulic continuity) may exist even when the point of withdrawal of the groundwater is several miles removed from the affected stream. It upheld Ecology’s conditioning of a ground water right with instream flows in the Okanogan River, based on continuity between the aquifer and river, even if the effect of pumping on the flow of the river would be small and delayed. The decision also affirmed that where surface and ground water is connected, minimum flows established by rule are treated as appropriations and should be protected from impairment by any subsequent ground water appropriation.”

WYOMING

- 26.7% of the 1995 Irrigated Acreage of Nebraska
- 2.7% of 1995 Irrigation Withdrawals were from Groundwater
- 57% of fresh groundwater in 1995 used for irrigation, 23% industrial and mining, 12% public supply, 7% rural domestic and livestock
- Prior appropriation for both surface water and groundwater
- Control Areas may be designated by Wyoming Board of Control in areas where use of underground water is approaching a use equal to the current recharge rate, where conflicts between users are occurring, or foreseeable, or where groundwater levels are declining or have declined excessively.
- In control areas the State Engineer has the authority to refuse to grant permits for drilling wells within the control area and may also impose specified types of use limitations. These may include: closing the critical area to further appropriation, determining the total withdrawals for every day, month or year, or ordering junior rights holders to reduce their withdrawals. If he finds that cessation or reduction of withdrawals by junior appropriators

will not result in proportionate benefits to senior appropriators, he may require and specify a system of rotation of use of underground water in the controlled area.

- Where underground waters in different aquifers are so interconnected as to constitute in fact one source of supply, or where underground waters and the waters of surface streams are so interconnected as to constitute in fact one source of supply, priorities of rights to the use of all such interconnected waters shall be correlated and such single schedule of priorities shall relate to the whole common water supply. The state engineer may by order adopt any of the corrective controls specified.
- Groundwater in specified areas is subject to the terms of the North Platte Decree/Settlement. Most other basins subject to interstate compacts.
- The Wyoming Water Development Commission uses groundwater withdrawn under instream-flow permits to increase streamflows for mandated flow requirements.

OREGON

- 24.7% of the irrigated acreage of Nebraska in 1995
- 14.2% of total irrigation withdrawals were from groundwater
- Prior appropriation for both surface water and groundwater
- In order to assure sustained supplies and protect important resources some basins are closed to new appropriation or restricted. Except in severe situations such as critical groundwater areas the restrictions do not affect existing water uses, but only the ability to authorize new uses in the basin.
- Water Rights in Oregon by the Oregon DWR states: *"The law requires that when pumping of ground water exceeds the long-term natural replenishment of the underground water reservoir, the Water Resources Commission must act to declare the source a critical ground water area and restrict water use. Critical ground water areas can also be declared if there is interference between wells and senior surface water user or deterioration of water quality."* Oregon has declared six critical groundwater areas to date.
- Once a Critical Groundwater Area is designated the Water Resource Commission may establish requirement necessary to reduce the impacts of groundwater withdrawals. These can include requiring a user to abandon a well, closing the area to further appropriations, and establishing a cap on withdrawals.
- The Oregon DWR has also established 11 "ground water limited areas" where additional pumping is restricted to a few designated uses.
- Permanent and temporary water rights transfers allowed. However to approve a transfer application the DWR must determine that the proposed change will not injure other water rights.

MONTANA

- 24.2% of the irrigated acreage of Nebraska in 1995
- 1.0% of total irrigation withdrawals were from groundwater
- Prior appropriation of surface water and groundwater
- The Department of Natural Resources and Conservation may declare a controlled groundwater area on its own or if it receives a petition and verifies facts indicating any of the following: 1) groundwater withdrawals are in excess of recharge, 2) excessive groundwater

withdrawals are likely to occur in the near future because withdrawals have consistently increased in the area, 3) there are significant disputes within the area concerning priority of rights, amounts of water being used, or priority of type of use, 4) groundwater levels or pressures are declining or have declined excessively, 5) excessive groundwater withdrawals would cause a variety of water quality impacts. Among the standards used in declaring an area after receipt of a petition is a finding that "any proposed use or well will impair or substantially interfere with existing rights to appropriate surface water or ground water by others".

- Potential actions once declared include: closing the area to further appropriations, limiting the total withdrawal rate in accordance with the relative priority of rights, rotation, reducing permissible withdrawals, and other requirements.
- Some basins have been legislatively closed to further withdrawals

UTAH

- 15.3% of the irrigated acreage of Nebraska in 1995
- 11.1% of 1995 irrigation withdrawals were from groundwater
- Irrigation accounted for about 51% of total groundwater withdrawals in 1995
- 59% of 1995 public water supply water supply withdrawals were from groundwater
- Prior appropriation of both surface water and groundwater
- State agencies authorized to distribute existing supply according to priority of rights and to determine whether there is adequate water to support each claim. State engineer also has the ability to issue fixed time permits.
- Water rights transfer applications generally approved if existing appropriators not affected and guidelines for original applications met.

ARIZONA

- 14.6% of the irrigated acreage of Nebraska in 1995
- 37.6% of 1995 irrigation withdrawals were from groundwater
- Surface water administered by prior appropriation
- Arizona Groundwater Management Act (1980) allows stringent water conservation and after January 1, 2006 purchase and retirement of groundwater rights in order to meet safe yield. Also, no new irrigation is allowed in Active Management Areas.
- Arizona has five Active Management Areas in areas containing 70% of the state's groundwater overdraft
- The goal in four of those Active Management Areas is to achieve "safe yield" by 2025. Safe yield is defined as long term balance between annual withdrawals and natural and artificial recharge.
- In 1955 agriculture accounted for 95% of Arizona's water use. In the mid 1990s agriculture used about 80% of water. By 2040 agricultural use is expected to drop to about 66% of water use.
- Central Arizona Project Water, and transfer of salable water rights from irrigation to municipal uses are major factors in the push towards safe yield.

- The Arizona Water Bank Authority stores unused Colorado River Water to assure municipal and industrial supply, meet management plan objectives of the Arizona Groundwater Code, assist in settling Indian Water Rights claims and exchange water to assist Colorado River communities.
- From Arizona Department of Water Resources Website:

“WATER RIGHTS ADJUDICATIONS

Few of the surface water rights established before or after the enactment of the Public Water Code have ever been examined for validity or currency. Also, the water reserved for Indian reservations and federal government purposes has not been quantified. The general adjudication of water rights in the Gila River and Little Colorado River watersheds will help the court determine the status of all rights to use surface water in these watersheds

SURFACE WATER AND GROUNDWATER

The separate administration of surface water and groundwater is one of the greatest legal factors affecting water management in Arizona. The legal separation of these two types of waters requires a water manager to determine what type of water is at issue before it can be determined what law is applicable. Determining when hydrologically connected waters separate into surface water and “percolating groundwater” is currently the subject of litigation as an issue in the water rights adjudications.”

- In 2001 a Governor’s Water Management Commission Report reevaluated the Groundwater Management Act.

NEW MEXICO

- 12.9% of the irrigated acreage of Nebraska in 1995
- 43.3% of 1995 irrigation withdrawals were from groundwater
- Only a small percentage of rights adjudicated
- Prior appropriation of surface water and groundwater
- Declared Groundwater Basins cover over half of the state
- If wells existed prior to Declared Area then surface water right holders only recourse for pumping effects is to go to court or wait for well owner to try to change right.
- After Declared Area initiated new applicants must run hydro-model. If there is a depletion effect, it must be offset by purchasing valid existing rights.

OKLAHOMA

- 7.5% of irrigated acreage of Nebraska in 1995
- 88.6% of 1995 irrigation withdrawals were from groundwater
- Surface Water allocated by prior appropriation. Groundwater privately owned by the overlying surface owner, but subject to reasonable use regulation.
- Regular groundwater permits are approved for a proportionate amount of water determined by the maximum annual yield of the basin and the % of land overlying the basin that is owned or leased by the applicant.

- Maximum annual yield is the amount that can be safely withdrawn from an aquifer to ensure a minimum basin life of 20 years.
- Maximum annual yield is being determined in separate studies of Oklahoma's 38 major and 33 minor basins
- Each applicant is allotted two acre-feet/year per acre of land in basins where maximum annual yield studies have not yet been completed. In some areas new permits are receiving a smaller allotment than existing permits.
- If a surface water application is for transportation of water outside the area of origin, the use must not interfere with existing or proposed beneficial uses or the needs of area water users.

NEVADA

- 7.5% of the irrigated acreage of Nebraska in 1995
- 39.1% of 1995 irrigation withdrawals were from groundwater
- Both surface water and groundwater allocated via prior appropriation
- Groundwater basins are managed on a perennial yield basis – only allowing appropriation, pumping and usage to the extent they don't exceed the amount that is replenished by recharge.
- 230 groundwater basins have been identified and less than a dozen are in overdraft, some of those resulting from the exception for single family domestic wells.
- Nevada has a historical precedent of surface water transfers due to mining. However the State Engineer now looks at future in-basin uses and the hydrologic/environmental health of the basin of origin when considering transfers.
- Water rights applications may be rejected by the State Engineer if: 1) they are not in the public interest, 2) there is no appropriated water in the proposed source of supply, 3) they may impair the water rights held by other persons or conflict with existing rights, or 4) water is not available from the proposed source of supply without exceeding the perennial yield or safe yield of that source.

SOUTH DAKOTA

- 4.0% of the irrigated acreage of Nebraska in 1995
- 31.6% of 1995 irrigation withdrawals were from groundwater
- Irrigation accounted for 45.5% of 1995 groundwater withdrawals
- Groundwater supplied 60% of 1995 public water supply withdrawals and 100% of self-supplied domestic withdrawals
- Prior Appropriation for both surface water and groundwater
- A permit to appropriate water may be issued only if: 1) there is a reasonable probability that unappropriated water is available, 2) the proposed diversion can be developed without unlawful impairment of existing rights, 3) the proposed use is a beneficial use, and 4) the use is in the public interest. Public interest is not defined by law.
- Generally, except for public supplies in some geologic formations, annual groundwater withdrawals are not to exceed recharge.

NORTH DAKOTA

- 2.6% of the irrigated acreage of Nebraska in 1995
- 50.4% of 1995 irrigation withdrawals were from groundwater
- Both surface water and groundwater allocated via prior appropriation
- Very limited conjunctive use in state. Most aquifers are small scale glacially related aquifers not hydraulically connected to surface water
- State Engineer has the authority to restrict groundwater pumping to protect the rights of senior surface water appropriators, but has never had to do so.
- In areas where aquifers are hydraulically connected to rivers, the State Engineer may deny or condition a groundwater permit and has conditioned groundwater permits to protect senior surface water rights.