The Water Report™
Water Rights, Water Quality & Water Solutions in the West

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WATER MARKETING IN TEXAS

SELLING OR LEASING OF GROUNDWATER AND SURFACE WATER RIGHTS

by Edmond R. McCarthy, Jr., Jackson, Sjoberg, McCarthy & Wilson, L.L.P. (Austin, TX)

INTRODUCTION

According to the 2007 Texas Water Plan, the population of Texas will more than double by the year 2060. In the absence of planning and implementing a water plan to develop additional water resources, more than eighty-five percent (85%) of Texans will lack sufficient water resources during drought conditions in the year 2060. (Water For Texas 2007 (Texas Water Development Board, January 2007)).

These facts are good indicators of the need for developing water markets and large-scale water projects. Many factors and limitations existing under current law and politics, however, hamper the development of these markets as well as inhibit implementation of such projects.

The focus of this paper is to provide an overview of some of the regulatory and political considerations affecting the development of such projects, as well as discuss how to structure transactions involving sale and/or lease of groundwater rights and surface water rights.

CLASSIFICATIONS OF WATER IN TEXAS

Buying and selling groundwater rights and/or surface water rights, and for that matter "leasing" those rights, are real estate transactions. Accordingly, the fundamental principles of real property law generally apply to such transactions. There are certain nuances and peculiarities that distinguish transactions involving water rights from other real property transactions. Moreover, there are distinctions between transactions involving groundwater and surface water rights that must be considered.

Water in Texas is classified into one of two classifications: surface water and groundwater. In Texas, both the ownership of, and regulatory scheme governing the various types of water is dependent upon its classification. While groundwater is privately owned and subject to the "Rule of Capture," surface water is owned by the State and held in trust for the benefit of all of the people of the State. A basic understanding of the laws related to these two water sources is essential to engaging in water related transactions.

SURFACE WATER OVERVIEW: LAWFUL USES AND EXEMPTIONS

"State Water" is defined very broadly by the Texas Water Code § 11.021 as follows:

> Water of the ordinary flow, under flow and tides of every flowing river, natural stream, and lake, and of every bay or arm of the Gulf of Mexico, and the storm water, flood water, and rain water of every river, natural stream, canyon, ravine, depression and water shed in the state is "State Water."

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Water Rights

"Exemptions"

Riparian Rights

Valid Right

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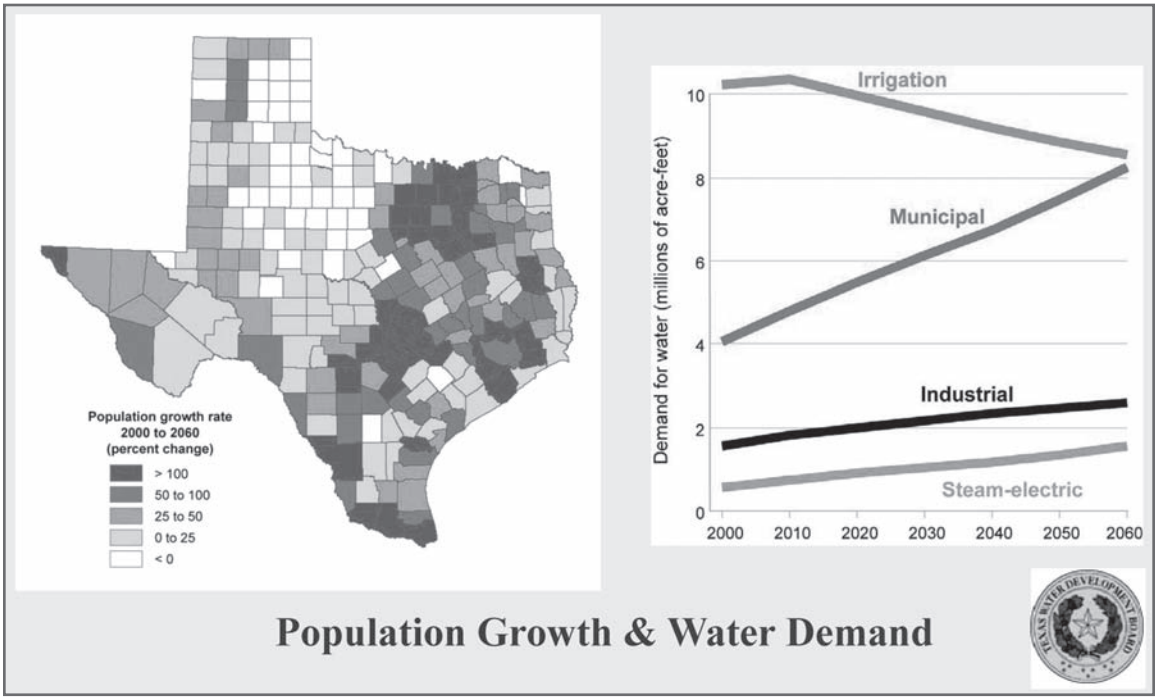
As evidenced by the breadth of the statutory language, there is very little water flowing across the surface of the State in a "water course" that is not presumptively owned by the State. The Texas Commission on Environmental Quality (TCEQ or "Commission") has been designated as the State's "agent" for water rights matters, in accordance with Texas Water Code §§ 5.012-5.013.

To lawfully divert, store or use the waters of the State for any purpose, an individual or entity must first obtain a water right from the State,[1] unless authorized as an "exempt use" under Texas law (see below).[2] It is illegal to "take, divert, or appropriate" State Water for any purpose without authorization.[3] Unlawful use is subject to the imposition of civil penalties of up to $5,000/day for each day the unlawful use continues.[4] It is also unlawful to sell a "water right" unless the right has been perfected, or the Commission, by permit, has authorized the sale.[5]

The "exemptions," or exceptions to the permit requirement, include the right for a person to construct a dam or reservoir on his property that will impound less than 200 acre-feet (AF) of water to be used for domestic and livestock (including wildlife) purposes.[6] Additionally, water may be diverted from the Gulf of Mexico at a rate not to exceed one AF of water during a 24-hour period for drilling and producing oil and gas, or conducting operations associated with oil and gas development and production. Additionally, reservoirs may be constructed without a permit if their sole purpose is sediment control as part of a surface coal mining operation under the Texas Surface Coaling Reclamation Act.[7] Brackish or marine water may also be used without a permit for purposes of conducting mariculture activities.[8] Finally, a tax-exempt, non-profit corporation that owns a cemetery that borders the river and is more than 100 years old may divert up to 200 AF of water per year from a river to irrigate the grounds of a cemetery.[9]

Historically, another means to use surface water without a permit is the exercise of a "riparian right," which allows the owner of real property adjacent to a water course to divert a reasonable amount of water for domestic and livestock purposes. That right, however, is considered a "correlative right" — meaning that it is subject to the requirement that the riparian landowner allow sufficient water to flow past his property to satisfy the rights of other riparian landowners downstream both as to the quantity and quality of the water.[10] These riparian rights are still recognized today, but are commonly known as "domestic and livestock" or "D&L" uses.

As a general rule, the "seller" of a surface water right must hold a valid water right from the State to be able to sell the right, or to sell the right to use the water for a specific period of time.[11] The right to use or appropriate State Water can be evidenced by one of the following forms: permits; certificates of adjudication; or certified filings. Certificates of Adjudication[12] and, in particular, "certified filings"[13] are historic evidences of the right to appropriate State Water. The most common form of authorization to appropriate State Water today is a water right permit.



Population Growth & Water Demand

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Property Right

In Texas, the right to divert and use water for beneficial purposes is considered a usufructury right ("right of use"), and it is treated as a "property right."[14] The holder of a water right does not hold title to the corpus of the water (i.e., the water itself). The water itself is the property of the State,[15] however, as against all other persons, the permit holder possesses a superior property right. That property right can be bought and sold like real estate.

An individual who wishes to obtain a water right may do so in one of two ways. You can file an application for a new permit with the Commission or, because an existing water right is a property right, you can purchase or lease a water right from the owner of a permit, certificate of adjudication or certified filing.[16] As many watersheds in the state are already considered "fully appropriated,"[17] however, acquiring an existing water right may be the most practical means of securing a water right.

"Term Permit"

Water rights may be obtained for varying periods of time, e.g., in perpetuity, for a term (a set number of years), or as a "temporary permit."[18] A water right obtained in perpetuity becomes a permanent property. A "term permit" is generally issued in watersheds that are considered to be fully appropriated. Terms are imposed to allow subsequent evaluation by the Commission of whether water has become available that would allow conversion of the term water right to a perpetual water right. Term permits also provide the Commission with an "opportunity" to terminate a water right due to a lack of water availability, or demonstrated beneficial use.[19]

Temporary permits are usually issued for a quantity not to exceed 10 AF to be used over a period of time not to exceed three years. These types of permits are frequently used for construction, particularly road construction projects.

Lease

Existing permits can be amended in order to implement a "lease" or similar contractual agreement. These amendments usually contain a provision providing for the automatic termination of the amendment upon expiration of the lease or contractual relationship.

Beneficial Uses

Water rights permits, and amendments thereto, may only be issued after a determination by the Commission that the purpose for which the water will be used is a "beneficial purpose."[20] By statute, multiple categories of use have been articulated by the Legislature as beneficial uses.[21] These include: domestic and municipal use; agricultural (including stock raising and wildlife) and industrial uses; mining; hydroelectric power generation; navigation; recreation; public parks; and game preserves.[22]

Limitations

Limitations may be imposed on a new water right that affect its value.

Limitations affecting the value of a new water right depend upon:[23]

- the type of water right or amendment sought, e.g., whether for municipal, industrial, agriculture, or other use
- the quantity and/or diversion rate
- the location of the proposed diversion point and/or place of use and whether the water has or proposes to have "storage" (on-channel or off-channel) associated with it
- the surrounding and downstream environment
- the number of existing downstream water rights

SUMMARY OF MAJOR WATER RIGHTS ISSUES

The limited scope of this article precludes a full discussion of the water rights permit and amendment application process and related water rights issues. In order to appreciate the complexity of a water rights transaction, however, a number of the major issues are summarized here.

Application

Application requirements: In general, to obtain a water right, or an amendment to an existing right, an individual must file an application with TCEQ. The Application must be on a form developed by the Commission, and must comply with the Commission's rules and regulations.[24]

Conservation Plans

Water conservation & drought contingency plans: In 1997, the Texas Legislature increased the level of scrutiny of water conservation and drought management efforts of surface water rights holders as part of the Senate Bill 1 process.[25] Specifically, the Legislature prescribed that all applications for new and/or amended water rights include a water conservation plan.[26] Additionally, existing water rights holders authorized to appropriate: (i) 1,000 AF or more per annum for municipal, industrial or other uses; or (ii) 10,000 AF or more per annum for irrigation use were required to submit water conservation plans.[27] Wholesale and retail water suppliers, as well as irrigation districts, also were required to develop conservation and drought contingency plans, and to coordinate the same with the regional water planning groups.[28]

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"Reuse"

DELIVERING WATER DOWN BANKS AND BEDS[29]: Section 11.042 of the Texas Water Code — entitled "Delivering Water Down Banks and Beds" — contains the statutory authority for TCEQ to issue what are commonly known as "bed-n-banks permits,"[30] and to regulate the use of State water courses to move water downstream. In particular, Section 11.042, allows the Commission to regulate persons wishing to "reuse" water that originated as privately owned groundwater after discharging the same into a State water course for conveyance downstream for diversion and reuse.[31]

"Carriage Losses" & Return Flow

In addition to accounting for the traditionally recognized "carriage losses" associated with bed-n-banks permits, the amended Section 11.042 authorizes the Commission to subject the "reuse" bed-n-banks project to "special conditions."[32] "Carriage Losses" include reductions in the volume of stream flow resulting from evaporation and bank seepage. A person wishing to use a State owned water course to convey a volume of water down stream must account for, and not divert the amounts designated as "carriage losses." "Special conditions" imposed by the Commission reduce the volume of return flows available for reuse if the Commission determines the same are necessary to protect existing water rights granted on the basis of the availability of the historic return flows of the privately owned groundwater which had not previously been part of a "reuse project."[33] The Commission can also impose "special conditions" to maintain instream uses, including aquatic and riparian habitats, recreational uses, and freshwater inflows to bays and estuaries.[34] In the event the amount of the discharge of groundwater-based effluent increases in the future, authorization must be obtained to reuse the "increases" before the increase occurs in order to avoid the imposition of a "special condition."[35]

Interbasin Transfers

INTERBASIN TRANSFERS: In the case of a permit application which includes an "interbasin transfer" — i.e., a proposal which would take water out of one river basin and move it into another river basin — the application must include the following information:

(a) The contract price of the water to be transferred;

(b) A statement of the general category of the proposed use of the water to be transferred, and a detailed description of the proposed uses and users under each category;

(c) The cost of diverting, conveying, distributing, and supplying the water to, and treating the water for, the proposed users; and

(d) The projected effect on user rates and fees for each class of ratepayers.[36]

Factors Considered

In addition to the other considerations outlined in the statute,[37] the Commission must conduct at least two public hearings, notice of the hearing must be published, and the Commission must consider the effects of the following factors:

(a) The need for the water in the basin of origin and in the proposed receiving basin over the next 50 years;

(b) Any factors identified in an approved regional water plan regarding the following:

- The availability of a feasible or practicable alternative supply in the receiving basin;
- The amount and purposes of use in the receiving basin for which water is needed;
- The proposed methods and efforts by a receiving basin to avoid waste and implement water conservation and drought contingency measures;
- Proposed methods and efforts by the receiving basin to put water to a beneficial use;
- The projected economic impact that is reasonably expected to occur within each basin as a result of the transfer; and
- Impacts of the proposed transfer reasonably expected to occur on existing water rights, instream uses, water quality, aquatic and riparian habitat, and bays and estuaries in each basin.

(c) Proposed mitigation or compensation, if any, to the basin of origin by the applicant;

(d) The continued need to use the water for the purposes authorized under an existing permit, certified filing, or certificate of adjudication if an amendment to an existing water right is sought; and

(d) Any other information required to be submitted by an applicant.[38]

Benefits Analysis

After consideration of these factors, the Commission may only grant an application for an interbasin transfer, either in whole or in part, to the extent that it determines the following:

- The detriment of the transfer to the basin of origin is less than the benefits to the receiving basin;
- The applicant for the interbasin transfer has prepared a drought contingency plan and developed and implemented a water conservation plan that will result in the highest practicable levels of water conservation and efficiency achievable within the jurisdiction of the applicant.[39]

Subordination

An application for an "interbasin transfer" may only be granted if it includes "specific conditions" under which the transfer of water may occur. In the case of a transfer based on a contractual sale of water, the permit must contain a specific term or time period in the permit consistent with the contract term.[40] Finally, an interbasin transfer permit, by statute, is "junior" in priority to water rights in the originating basin.[41]

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Interbasin Exemptions

The requirements for interbasin transfers do not apply to all "transfers."[42] As one author described it, "Mercifully, exemptions from the special new requirements were made to certain transfers… ."[43]

"Exempt" transfers include:

(a) A transfer of less than 3,000 AF per year from a single permit;

(b) A request for an emergency transfer of water;

(c) A transfer to an adjoining coastal basin, or a transfer from a basin to a county; or

(d) Municipality (retail service area) that is partially within the basin.[44]

Cancellation

Cancellation of water rights and water "banking" — "Use it" or "Lose it": Although a perpetual permit is a property right,[45] that right is subject to cancellation, in whole or in part, for nonuse.[46] Specifically, if all or part of a water right has not been put to "beneficial use" at any time during the ten-year period immediately preceding the cancellation proceeding, the water right is subject to cancellation in whole or in part to the extent of the ten years of nonuse.[47] Under Texas law, "nonuse," in the absence of "conservation" and/or long-range water planning, is recognized as "waste."

Exceptions

Additionally, water is considered to have been put to beneficial use by the permitee — and not be subject to cancellation — to the extent that the permitee has placed the same in a Conservation Preserve Program authorized by the "Food Security Act," or participated in a similar governmental program.[48] A water right is also not subject to cancellation to the extent that a "significant" portion of the permitted water has been used in accordance with an "approved" regional water plan.[49] Additionally, water deposited in the Texas Water Bank is "exempted" from cancellation during the initial term of deposit for a period of up to ten years.[50]

Water Bank

The purpose for creation of the Water Bank was to facilitate water transactions to provide sources of adequate water supplies for use within the State. To this end, the Water Bank was intended to function as a "broker" of water rights, as well as a clearinghouse for holders of water rights (both surface and groundwater) to conduct "sale by owner" transactions. The Texas Water Development Board (TWDB) has adopted rules for the operation of the Water Bank, which are codified in Capter 359 of the Board's rules (31 Texas Administrative Code - "TAC").

Limited Term

The Water Bank legislation allows a water right holder to deposit the right into the Water Bank for an initial term not to exceed ten years. While on deposit during the initial term, the water right is exempt from cancellation. The "exemption" from cancellation by TCEQ, however, can only be used once.[51]

Water Trust

Two sessions after it created the Water Bank, the Texas Legislature established the "Texas Water Trust" to hold water rights dedicated to environmental needs, including instream flows, water quality, fish and wildlife habitats, and bay and estuary inflows.[52] The Texas Parks and Wildlife Department (TPWD) works closely with TWDB in connection with the Water Trust. TPWD, along with TCEQ, is supposed to be consulted by TWDB in the adoption of rules governing the process for holding and transferring water rights into the Trust.[53] Unlike a water right placed in the Water Bank, the Legislature did not place any limit on the duration for which water may be placed in the Texas Water Trust.[54]

Watermaster

Watermaster operations: Following the adjudication of water rights pursuant in Texas to the Water Rights Adjudication Act,[55] the Commission was authorized to divide the state into "water divisions"[56] and appoint a watermaster to administer the adjudicated rights within each division.[57] Only three watermaster operations exist within the state, however: the Rio Grande Watermaster and the South Texas Watermaster, which includes the Concho River Watermaster program.

The Rio Grande Watermaster operation covers the Rio Grande Basin. Rules governing the operation are contained in Chapter 303 of the Commission's rules.[58] The South Texas Watermaster operation includes the Nueces, San Antonio, Guadalupe River Basins, and portions of the Colorado River Basins. Texas' watermaster program was expanded in 2005 with the creation of the Concho River Watermaster.[59] Rules governing these operations are contained in Chapter 304 of the Commission's rules.[60]

Duties

Although the duties of the Rio Grande Watermaster vary somewhat from those of the South Texas (and Concho River) Watermaster, the watermaster operations have a common purpose, i.e. to protect senior water rights. In general, Watermaster duties include inventorying water rights, as well as identification of diversion works and reservoirs, and monitoring diversions by water rights holders to insure that the same observe their "priority dates" and do not exceed the quantities authorized by their respective water rights.

Water Allocation

Watermaster operations are intended to function to protect senior water rights during shortages. To this end, the Watermaster is authorized to allocate the available flows in the affected river basins.

In the allocation process, commission rules allow the watermaster to:

- limit and/or suspend diversion rights by junior water rights holders; and
- order that inflows into exempt and/or permitted reservoirs, be passed through to honor: (i) downstream senior water rights; (ii) domestic and livestock users (formerly known as riparian users); and (iii) minimum stream flow and release requirements.

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Rule of Capture

Sales Distinctions

Groundwater Districts

District Issues

"Enabling Legislation"

Evolving Rules

GROUNDWATER OVERVIEW

Since 1904, Texas has followed the "Rule of Capture." In *Houston and Texas Central Railroad Company v. East*, 81 S.W.279 (Tex. 1904) (*East* case), the Texas Supreme Court adopted the rule from the English case of *Acton v. Blundell*[61] and concluded that the owner of the surface of the land had the right to dig and to capture the water from beneath his property even if it affected his neighbor.[62] Accordingly, in Texas, groundwater in place, or *in situ*, beneath the surface of real property belongs to the owner of the surface of the property as a part of the "surface estate."[63]

The sale of groundwater rights involves the sale of the groundwater in place, i.e., the groundwater beneath the surface of the property. It is important to note that the sale of "groundwater rights" is to be distinguished from the sale of "groundwater" once it has been produced, i.e., pumped to the surface and captured at the wellhead. The sale of the right to own the water *in situ* is a sale of real property, and the sale of the groundwater "captured" at the wellhead is personal property.

In a conventional real estate transaction involving the sale of the surface acreage, the conveyance includes the *in situ* groundwater, together with all the oil, gas and other minerals. Water, whether you are dealing with surface water or groundwater, that has not been expressly severed from the surface estate by conveyance, or reservation, is part of the surface estate and included in the conveyance.[64] The groundwater right, like the surface water right, can be severed from the surface estate and sold separately (similar to the oil, gas and/or mineral estate).[65] The sale of water produced at the wellhead and reduced to possession, however, is the sale of personal property and is treated as a commodity sale. It does not convey any real property interest.

How and what can be bought, sold or leased — and what rights (or limitations thereon) are involved in a conveyance of groundwater rights — can be affected by a variety of issues. Most of the issues are similar to the type of title defects or physical contamination issues that are normally associated with a traditional real estate transaction. In fact, many of the issues can be covered by "title insurance."[66] In the last decade, a non-traditional impediment to conveyances of groundwater has arisen. Specifically, a proliferation of newly created groundwater districts across the State has impacted the alienability of groundwater rights. For example, the regulation of groundwater production by these groundwater districts can significantly impact the groundwater rights owner's enjoyment or use, and/or the value of the rights.[67]

In 1997 the Legislature amended Chapter 36, Texas Water Code, to add Section 36.0015, which provides, in part, that "Groundwater conservation districts created as provided by this chapter are the State's preferred method of groundwater management."[68] Two years later, writing for a split court in the Texas Supreme Court's reaffirmation of the *East* case and the "Rule of Capture" in *Sipriano v. Great Spring Waters of America*, Justice Enoch reiterated the Legislature's position regarding the State's "preferred" management strategy for groundwater.[69]

While the scope of this article precludes a full discussion of groundwater districts and their regulatory powers, including issues related to the rulemaking and permitting processes, a summary of the major issues to be considered follows.

MAJOR CONSIDERATIONS IN GROUNDWATER TRANSACTIONS INCLUDE:

FAMILIARIZE YOURSELF WITH THE DISTRICT, its Board Members and Staff: As a general statement, all Groundwater districts are subject to Chapter 36, Texas Water Code; however, many Groundwater districts were created by special legislative enactment, known as "enabling legislation." As a result, some Groundwater districts are governed by their enabling legislation, as the same may have been amended from time-to-time, in addition to Chapter 36. With certain limited exceptions, an individual Groundwater district's enabling legislation prevails over any conflicting provision of Chapter 36.[70] Because groundwater districts have prospered under the mantra of "local control," and many regulate rural and/or thinly populated areas where folks know each other on a first name basis, you do not want to appear before the Board as an outsider. Finally, as important as the development of personal relationships will be, knowing the educational and professional backgrounds, as well as politics and/or philosophy of those with whom you are dealing will be important.

PARTICIPATE IN THE DISTRICT: The majority of the State's groundwater districts have been actively involved in permitting and rulemaking for less than a decade. Accordingly, the district's rules and permitting processes are either still in the developmental stages, or are continuing to evolve. To keep abreast of district activities, you should consider the following actions:

- Learn when the Board regularly schedules meetings and watch for agenda notices to be posted/published, and attend meetings;[71]
- Provide district personnel with your name, mailing address, fax number and e-mail address and ask them to provide you with copies of agenda notices;

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- With respect to rulemaking hearings, each calendar year the Practitioner should file a written request with each district of interest to receive notice of all rulemaking proceedings;[72]
- With respect to permit proceedings, each calendar year the Practitioner should file a written request with each district of interest to receive notice of all permit proceedings;[73]
- Subscribe to the district's "web alerts," and newsletter, if any;
- Monitor the district's website for updates; and
- Stop by and have a "cup of coffee" periodically with Board members and district staff.

Records Request

OPEN MEETINGS & OPEN RECORDS: Groundwater districts are political subdivisions of the State subject to the Texas Open Meetings Act,[74] and the Texas Public Information Act (formerly known as the "Texas Open Records Act"or "TORA).[75] Both of these statutes provide vehicles to obtain information from the district. The district's public records officer is required to "prominently display a sign in the form prescribed by the attorney general that contains basic information about the rights of a requestor, the responsibilities of a governmental body, and the procedures for inspecting or obtaining a copy of public information" under the Public Information Act. The statute also requires that the sign be displayed "at one or more places" in the administrative offices of the district where it is "plainly visible."[76]

Unresolved Issues

Conveyances involving groundwater and/or the landowner's groundwater rights have given a new meaning to the classic warning "caveat emptor" (let the buyer beware). The private property rights associated with groundwater issues, including the Rule of Capture, and the prospect for "takings" of those rights by Groundwater districts resulting from groundwater regulation have not been fully resolved. One can anticipate efforts in the courthouses of Texas, and in future legislative sessions, to "refine" the regulatory authority of groundwater districts over a landowner's right to pump, sell or otherwise develop and enjoy the groundwater from beneath the property he owns or controls.[77]

KEY ISSUES IN WATER TRANSACTIONS

Surface Water Transactions

Common Issues

Whether buying or selling surface water rights, or simply leasing the right to use surface water, the following "key issues" are common to the transaction:

- Does the Seller have marketable title to the surface water, i.e., a valid water right issued by TCEQ, or one of its predecessor agencies?
- Has the permitee beneficially used the water during the last ten years, or is the water right subject to cancellation?
- Is the water right subject to the jurisdiction of a Watermaster Operation?

If the answer is "yes:"

(a) Have you read the TCEQ rules under which the Watermaster operates?
(b) Is the Permittee "current" on payment of Watermaster Fees?

Limitations of Right

- Will the terms of the water right restrict the production, or use, of surface water based upon any of the following:
  (a) Minimum stream flow restriction?
  (b) Seasonal use?
  (c) Diversion/ Production Rates?
  (d) What uses are authorized?
  (e) What location is authorized for the use?
  (f) Is production tied to any other special conditions?
  (g) Where is the location of the diversion point?
  (h) By any other means?

If the answer to any of these questions is "yes," how will the restrictions affect (i.e., limit or prohibit) the possible development and beneficial use of surface water?

Contractual Limits

- Is the water right issued in perpetuity or for a term of years?
- Is the water right issued on the basis of a contract with a third party who has leased, or subordinated, their superior rights in order for the water right to be issued or amended?

If the answer is "yes," is that contract still in effect and/or is it being conveyed/assigned along with the permit?

- Does the permitee have a current TCEQ approved water conservation plan and/or drought contingency plan (if required)?

The foregoing list of "issues" is not exhaustive. It is offered only as a "starting point" for due diligence. Like all real property transactions, "site-specific" facts unique to the transaction will require modification and/or expansion of the listed issues.

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Groundwater District Review

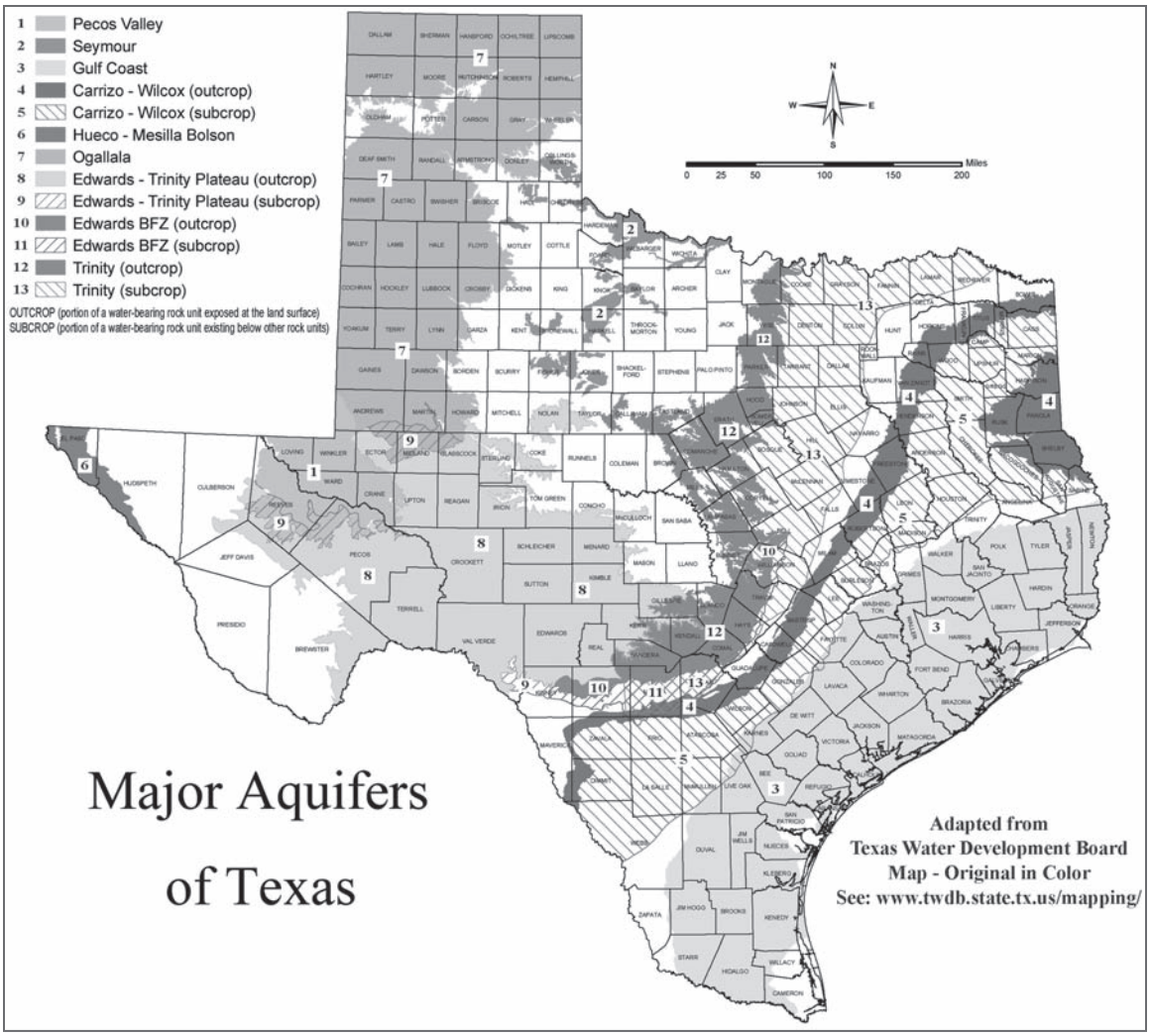
Groundwater Transactions

Whether buying, selling or leasing the groundwater in question (whether *in situ* or produced at the wellhead), the following "key issues" are common to the transaction:

- Does the Seller have marketable title to the groundwater?
- Is the groundwater subject to the jurisdiction of a Groundwater district?

If the answer is "yes:"

(a) Read the statutes(s) under which the district operates;
(b) Read the district's Management Plan;
(c) Read the district's Rules;
(d) Read the district's Fee Order/Resolution;
(e) If the district requires well registrations and permits:
(i) Does the Seller have any existing wells and, if so, are they registered and/or permitted?
(ii) For what purposes of "use" are the wells registered and/or permitted?
(iii) If the permitting is "in process" at the time of conveyance, has the Seller assigned all applications, etc. to the Buyer?
(iv) Has the Seller timely filed all required applications and/or paid any applicable district fees?
(v) Has the Seller located and transferred all records related to, or necessary to support, the application? This is particularly critical if the application is for "historic use" of the groundwater.



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Restrictions

- Do the district's Rules restrict the production of groundwater:
  - (a) By well spacing?
  - (b) By set back requirements?
  - (c) By acreage limits?
  - (d) By well bore or meter size?
  - (e) By other means?

  If the answer to any of these questions is "yes," how will the restrictions limit or prohibit the possible development of groundwater?
- Do the district's Rules restrict the use, transfer, or sale of the groundwater produced by any means (including production and/or transfer fees) that adversely impact an intended use?

Quality Question

- Has the quality of the groundwater been established?
- Has the well, and any appurtenant facilities (e.g., pumps, meter, storage tanks, pipeline, etc.) been tested and determined to be operational and/or fit for its intended use?

Similar to surface water transactions, the foregoing list of "issues" is not exhaustive and is offered only as a "starting point" for due diligence. "Site-specific" facts unique to the transaction will require modification and/or expansion of the listed issues, like all real property transactions.

Leasing of Rights

Leasing Transaction Issues (Surface Water & Groundwater)

The same basic principles applicable to the purchase of a surface water or groundwater right discussed above generally apply to the "lease" of a water right. Structuring a water right lease, however, involves additional considerations as discussed below.

Valuation

Valuation: Due to the lack of an established market for water rights (think MLS real estate multiple listing clearinghouse), the true value of the right is unknown. The price per acre-foot in the sale of the water right, however, will be higher than the per acre-foot annual lease price. Over the life of the lease, however, the total return or cost of the leased water right could be greater on a per acre-foot basis than the sale price. Additionally, at the end of the lease, the water right owner will still own the water right. The market value of the right will likely have appreciated during the term of the lease, provi ddoerner@technaprint.com ding another long-term benefit to the water right holder.

Payment Options

Other provisions affecting lease price: Additional "lease price" considerations that can affect the overall value of the lease transaction include the following:

(a) Guaranteed annual payment — leases may be structured and labeled in various ways such as "take-or-pay," "minimum take," or "guaranteed purchase." Each of these structures ensures that the lessor receives some "minimal payment" on an annual basis.

(b) Payment based on "beneficial use" compared to payment based on "actual use" may be structured — e.g., where the lessor wants to insure receipt of payment irrespective of whether water is "actually used" by the lessee. The issue is addressed if the transaction includes a "take-or-pay provision;" however, if the lease contemplates payment only if the lessee gets the benefit of the water, i.e., the ability to actually use it, then the lessor should be careful how the payment obligation is structured.

Nonuse

For example, a lessee might lease water for the purpose of "trading" its use, or nonuse, to improve the reliability of, or otherwise enhance, the water available from a separate water right or source under the control of the lessee. This issue is particularly important in surface water leases where the pressures from environmental interests and/or demands by downstream water right holders might cause a lessee developing a water project to negotiate a lease that would tie up a water right that would not actually be diverted. The nonuse of the leased water right in that instance could facilitate having higher flows in a stream segment or to bays and estuaries, but not trigger any obligation to pay for the leased water. Moreover, the lessee's nonuse of the water over an extended period of time could jeopardize the underlying water right by subjecting it to cancellation.

(c) Inclusion of a "Price Escalation Clause" should be considered in any lease involving a substantial amount of water, particularly where the lease term will likely be for twenty-plus years. The lessor will want to provide for periodic increases of the annual rent during the term to reflect the appreciation in the value of the water right over time. This can be addressed in a variety of ways. Rent increases can be scheduled at a set interval (i.e., annually or every five years), specified as a percentage increase, or be based on a market price indicator (e.g., track an index like the consumer price index; or be tied to an indicator such as inflation or a large water purveyor's rate or price).

Cancellation

Cancellation of water rights/groundwater permits: Water rights are subject to cancellation, in whole or in part, for non-beneficial use during a ten-year period.[78] While a take-or-pay clause should help to insure that the lessor will get paid, it may not insure that the water is beneficially used during the term of the

Texas Markets

Suggested Clauses

lease. To avoid the prospect of cancellation due to nonuse of a surface water right, clauses that may be included in a lease include the following:

- A clause mandating that the lessee protect the water right from cancellation and beneficially use the water right by actually diverting the leased water at least once every ten-year cycle
- A clause mandating that the lessee defend against any action brought by TCEQ to cancel the water right and to give immediate notice to the lessor of receipt of any notice of cancellation proceedings being initiated by the TCEQ
- A clause allowing the lessor to beneficially use, or cause to be beneficially used, the water right in order to prevent cancellation. This clause should also provide that in the event it is exercised: (a) the lessee is still required to pay the rent on one hundred percent of the water (including the quantity used by the lessor); and (b) the lessor has no obligation to either replace the water used or to rebate or refund any portion of the rent (even if the lessor does a spot sale to a third party).

Renewal Requirements

In the context of groundwater permits, the permits are usually issued for a term lasting from one to five years. The permits are renewable; however, timely renewal applications must be filed. Among the requirements for renewal include timely payment of all fees owed to the groundwater district, together with compliance with the district's rules and reporting requirements. The lease should address the Parties' respective obligations to insure the continued renewal of the permit during the lease term. This obligation will generally fall on the lessor in whose name the permit has been issued.

Assessments

Watermaster fees and other assessments: If the water right is located in a river basin subject to the jurisdiction of a watermaster, the lease should address payment of watermaster fees in addition to other assessments. Even if the water right is not located in a watermaster area, any long-term lease should address this issue because of the possibility of expanding watermaster operations throughout the State. Based upon the rationale that the lessee is benefiting from the use of the water, the lease should address which party is responsible for the payment of all assessments on the water right and the use of the water. This would include, specifically, any annual watermaster fees or water quality fees under the Clean Rivers Program.[79] It would also include any other type of assessment such as ad valorem taxes.

Annual Reports

Annual reports: Any requirement to file reports regarding the use of the water right, or use of water under the water right, should be expressly made the obligation of the lessee. For the lessor's protection, however, the lease should require that the lessee provide the lessor with a copy of all filed reports. The copies should be required to be delivered to the lessor by a date sufficiently before the filing deadline so that the lessor can accomplish the filing in the event the lessee defaults.

Sale During Lease

Third party offers and a right of first refusal: Much can happen during the life of a lease, particularly where the term is twenty-plus years. For example, the lessor could receive an offer to purchase the underlying water rights. The lease may be negotiated to allow such a sale and, if it does, should address the following related issues:

(a) Whether the sale of the underlying water right during the term of the lease triggers a right in the lessor to terminate the lease early, if necessary to close the sale. If so, the circumstances of such termination should be addressed, including what notice is provided to the lessee and whether the lessee is entitled to a replacement water source or some compensation because of the termination.

(b) Whether the lessee should be entitled to a right of first refusal to buy the water rights for the same deal offered to the lessor. If so, the terms of the right of first refusal and the lessee's closing obligations should be specified in the lease.

Termination

Early termination: The lessor's right, and in some instances the lessee's right, to terminate the lease before the expiration of its term should be addressed. This includes termination for cause (e.g., non-payment of rent), as well as termination under other circumstances (e.g., a third party offer to purchase or condemnation of the underlying water right).

Advance Payment

Advance payment of rent: The lessee should be required to pay rent in advance for several reasons. First, once the water is used, it cannot be recovered for non-payment. Not only will it most likely have been consumed, once it is diverted it counts against the water right and cannot be double counted or added back in during the calendar year in the event lessee defaults. Additionally, because water rights are usable on an annual calendar year basis, once the calendar year has expired, the right to use it during that year has been lost. The unused portion of the water right (whether a surface water permit or a groundwater permit) cannot be banked or carried forward for use in a subsequent calendar year.

Condemnation

Condemnation proceedings: Both surface and groundwater rights are an interest in real property and are subject to condemnation in Texas.[80] Due to the limited availability of new water rights and the length of the lease term, the possibility that a water right could be the subject of condemnation proceedings should be addressed in the lease. The lease should include how the condemnation proceeds should be paid — including whether the proceeds should be paid entirely to the lessor, or allocated in part to the lessee

Texas Markets

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to reimburse the loss of the water right. Condemnation might also be an event triggering a lessee's right to terminate the lease.

Assignability: To protect the parties' expectations under the lease, the lease should address the parties' right to assign the lease. Provisions similar to the following should be considered with respect to the assignee:

(a) A qualified entity capable of performing/complying with the assignor's obligations under the lease terms;

(b) An entity that acknowledges in writing its obligation to fulfill all of the lease terms;

(c) An entity who is "reasonably approved" by the non-assigning party; and

(d) The continued liability of the assigning party for the full and faithful performance of the lease terms by the assignee.

Notice to TCEQ: If the lease involves surface water and is considered a "wholesale water supply contract" within the meaning of section 13.144, Texas Water Code, the party responsible for providing notice to the Commission should be designated in the lease.

CONCLUSION

Similar to a large real estate development project, in addition to the negotiations between the primary parties — the buyer and seller, or lessor and lessee — third party governmental entities are involved (TCEQ and local Groundwater districts for example). Unlike the traditional real estate development project, the governmental entities involved do not necessarily have a lot of experience or a known track record to aide in your decision-making. Moreover, these entities, particularly on the local level can have their own agendas that may hamper negotiations and implementation of your water project. Accordingly, marketing one's water rights and/or developing a water project, and structuring the form of the transaction take time. Patience is a key element.

Due to the importance of developing adequate reliable water supplies to meet the State's projected long-term demands, the need for long-term water deals is great. Because they are long-term, however, the parties need to consider carefully the terms of the deal, including those that are subject to third party influences.

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Footnotes

1 Texas Water Code § 11.121; *Turner v. Big Lake Oil Co.*, 96 S.W.2d 221, 228 (Tex. 1936); *Motl v. Boyd*, 286 S.W. 458, 473 (Tex. 1926); *Domel v. Georgetown*, 6 S.W.3d 349, 353 (Tex. App.–Austin 1999, pet. denied); Hutchins, The Texas Law of Water Rights, 518-519 (1961); and Caroom & Sherman, 45 Texas Practice, Water Development and Water Rights, § 13.3(a), at 491-492 (1997).

2 Texas Water Code §§ 11.142, 11.142.1, 11.142.2; 11.303; see generally Acts of 2001, 77th Leg. R.S., Ch. 966, §2.09 2001 Tex. Gen. Laws 1880, 1886-1887 (SB 2 amending Section 11.142 to authorize the impoundment of up to 200 acre-feet of water for fish and wildlife use, similar to the existing domestic and livestock exemption); 30 TAC §§297.21-297.30).

3 Texas Water Code § 11.081; 11.082, 11.084.

4 Texas Water Code §11.082.

5 Texas Water Code §11.084.

6 Texas Water Code §11.142. Senate Bill 2 amended this Section to authorize "temporary" impoundment of more than 200 AF — without obtaining a permit — if the average storage over 12 months is 200 AF or less. *See* Acts of 2001, 77th Leg. R.S., Ch. 966, §2.09, 2001 Tex. Gen. Laws 1880, 1886-1887).

7 Tex. Nat. Res. Code Ch. 134; Texas Water Code § 11.142(c).

8 Texas Water Code §11.1421.

9 RG-141, A Regulatory Guidance Document For Applications To Divert, Store or Use State Water, 10-11 (June 1995) (hereinafter cited as "RG-141, supra, at ___").

10 *See generally Motl v. Boyd*, supra, at 458; Hutchins, supra, at 356-369; Skillern, *Texas Water Law*, 26-30, 34-36, 66 (1988); Caroom & Sherman, *supra*, at 493-494.

11 Texas Water Code §§ 11.081, 11.082, 11.084, 11.121.

12 Texas Water Code § 11.323.

13 Texas Water Code § 11.307.

14 Booth, *Ownership of Developed Water Rights in Texas: A Property Right Threatened*, 17 St. Mary's L.J. 1185, 1187-1188 (1986).

15 *South Texas Water Co. v. Bieri*, 247 S.W.2d 268, 272 (Tex. Civ. App.--Galveston 1952, writ ref'd n.r.e.).

16 Texas Water Code § 11.084 (prohibiting the sale of an unperfected/unpermitted water right).

17 RG-141, *supra*, at 26 (Table 8 – "Fully Appropriated Stream Segments")

18 Texas Water Code §11.121, § 11.138 and § 11.1381.

19 *See generally* Caroom & Sherman, *supra*, at 505-506.

20 Texas Water Code § 11.134(b)(3)(A); *see generally* Caroom & Sherman, *supra*, at 501-502.

21 Texas Water Code § 11.023(a); *cf.*, 30 TAC § 297.43(a) (identifying the beneficial uses contained in §11.023(a), and adding, *without legislative basis,* "in-stream uses, water quality, aquatic and wildlife habitat or freshwater inflows to bays and estuaries").

Texas Water Markets Footnotes Continued

22 Texas Water Code § 11.023; 30 TAC § 297.43(b).
23 *See* 30 TAC §§ 297.41-297.59 ("Issuance and Conditions of Water Rights").
24 Texas Water Code Ch. 11; 30 TAC Chs. 281, 288, 295, 297; *see generally* RG-141, *supra*, at 13-15. A copy of the Commission's application forms for a new water right, as well as, an amendment to an existing right may be obtained by contacting the Commission or on-line at www.tceq.state.tx.us/subject_water.html.
25 Texas Water Code §§ 11.1272, 11.1272.
26 Texas Water Code § 11.1271; *see generally* 30 TAC Ch. 288.
27 Texas Water Code § 11.1271; 30 TAC § 288.30(1)-(2).
28 Texas Water Code § 11.1272; *see generally* 30 TAC Chapter 288; *Handbook for Drought Contingency Planning for Retail Public Water Suppliers* (TNRCC 2000); *Handbook for Drought Contingency Planning for Wholesale Water Suppliers* (TNRCC 1999).
29 *See generally* McCarthy, *Water Reuse Issues – Post-Senate Bill 1 – Water for the New Millennium* (Texas Water Law Institute, September 30 – October 1, 1999, Austin, Texas).
30 Texas Water Code §11.042; *see generally* RG-141, *supra*, at 6, 8.
31 Texas Water Code § 11.042(b).
32 Texas Water Code § 11.042
33 Texas Water Code § 11.042(b)
34 *Id.*
35 *Id.*
36 Texas Water Code §11.085(b); 30 TAC §§ 295.13, 297.18 *see generally* RG-141, *supra*, at 7; Caroom & Sherman, *supra*, at 505; Jordan, *Interbasin Transfers in Texas and the "Balkanization" of Water Politics* (Texas Water Law Institute, September 30 – October 1, 1999, Austin, Texas)(hereinafter cited as "Jordan, *Interbasin Transfers*, *supra*, at ___").
37 Texas Water Code §11.085
38 Texas Water Code § 11.085(k).
39 Texas Water Code § 11.085(l).
40 Texas Water Code § 11.085(m) – (n).
41 Texas Water Code § 11.085(s) – (t).
42 Texas Water Code § 11.085(v).
43 Jordan, *Interbasin Transfers*, *supra*, at 11.
44 Texas Water Code § 11.085(v).
45 Booth, *supra*, at 1185.
46 Texas Water Code § 11.173.
47 *Id.*; *see* Acts of 2001, 77th Leg. R.S., Ch. 966, § 2.12, 2001 Tex. Gen. Laws 1880, 1887 (amending Section 11.173, Texas Water Code).
48 Public Law No. 99-198, § 1231-1236, 99 Stat. 1354, 1507-1514 (1985).
49 Texas Water Code §§ 11.173(2) (as amended by SB2, § 2.12); 16.053.
50 Texas Water Code § 15.702 *et seq*. and § 15.704.
51 Texas Water Code § 15.704; *see generally Id.* §§ 11.171-11.177 (cancellation of permit, certified filings, and certificates of adjudication for nonuse).
52 Act of June 19, 1997, 75th Leg. R.S., ch. 1010, § 2.16, 1997 Tex. Gen. Laws. 3626 (codified at Texas Water Code §15.7031); *cf.*, *Id.* § 15.7039(a)(10) ("authorizing TWDB Water Bank to accept and hold donations of water rights to meet instream, water quality, fish and wildlife habitat, or bay and estuary inflow needs").
53 Texas Water Code § 15.7031(b).
54 Texas Water Code § 15.705(establishing fees for deposits into the Water Bank); 24 Tex. Reg. 6952-6953 (proposing amendments to 31 TAC § 14(b) providing "fees associated with deposits to or transfer from the Texas Water Trust of water rights or rights to use water or waived.").
55 Texas Water Code §§ 11.301-11.341.
56 Texas Water Code § 11.325.
57 Texas Water Code § 11.326.
58 30 TAC Ch. 303.
59 Texas Water Code § 11.552; *see Id.* § 11.551(3); *see generally Id.* §§ 11.551.
60 30 TAC Ch. 304.
61 12 Mees & W (1843).
62 *East*, *supra*, 81 S.W. at 280.
63 *Texas Company v. Burkett*, 296 S.W.2d 73 (Tex. 1927); *Pecos County WCID No. 1 v. Williams*, 271 S.W.2d 503 (Tex. Civ. App.—El Paso 1954, writ ref'd n.r.e.).
64 *Pfluger v. Clack*, 897 S.W.2d 956 (Tex. Civ. App.—Eastland 1995, writ denied); *see generally* Tex. Prop. Code § 5.001.
65 *Pfluger*, *supra*, 879 S.W.2d at 959.
66 *See generally* Gosdin, *Title Insurance for Groundwater and Surface Water Deals*, 6th Annual The Changing Face of Water Rights in Texas (State Bar of Texas, February 10-11, 2005, San Antonio, Texas).
67 Texas Water Code Ch. 36.
68 Texas Water Code § 36.0015
69 1 S.W.3d 75, 79 (Tex. 1999). This case is commonly referred to as the *Ozarka* case; *cf., Id.* at 81 (Hecht, J. concurring opinion).
70 Texas Water Code § 36.052 (other laws not applicable).
71 Texas Water Code § 36.063 (requiring districts to publish meeting notices in compliance with the Open Meetings Act); *see generally* Tex. Gov't Code Ch. 551.
72 Texas Water Code § 36.101(i); *see Id.* § 36.101(d)-(3), (k).
73 Texas Water Code § 36.404(d); *see Id.* § 36.404(b)-(c), (e).
74 Tex. Gov't Code Ch. 551.
75 Tex. Gov't Code Ch. 552; *see* Texas Water Code § 36.065 (requiring districts to maintain records in a "safe place," and making district records and record keeping practice subject to Chapter 552, Tex. Gov't Code, and Chapter 201, Tex. Local Gov't Code - formerly known as the Texas Open Records Act).
76 Tex. Gov't Code Section 552.205. Details regarding the statutorily mandated signage, its contents, and the rights of a requestor can be found in Title 1, Part 3, Chapter 70 of the Texas Administrative Code. *See* 1 TAC § 70.11 ("Informing the Public of Basic Rights and Responsibilities Under the Public Information Act").
77 See g*enerally Guitar Holding v. Hudspeth County UWCD No. 1*, 263 S.W.3d 910 (Tex. 2008); *South Plains Lamesa RR, Ltd. v. High Plains Underground Water Conservation District No. 1,* 52 S.W.3d 770 (Ct. App. – Amarillo 2001, no pet.).
78 Texas Water Code § 11.173.
79 *See* Texas Water Code § 26.0135; 30 TAC Chapter 220.
80 In the case of condemnation of groundwater rights, the parties will want to consider the provisions of Section 21.0421, Texas Property Code.

Lower Rio Grande Water Rights

CONVERSION OF IRRIGATION RIGHTS TO MUNICIPAL AND INDUSTRIAL RIGHTS

NEW LEGISLATION, COURT CASE AND TRANSACTIONS AFFECTING THE LOWER RIO GRANDE

by Glenn Jarvis. Attorney, (McAllen, TX)

INTRODUCTION

Municipal Needs

Throughout the western United States, the persistent growth of urban populations and expansion of urban services continues to result in increased municipal and industrial demands upon the water supply. In the West, the right to use surface water is typically regulated by the granting of water rights adjudicated under the Prior Appropriation Doctrine ("first in time, first in right"). Most surface water sources have already been "fully appropriated" — i.e., the full amount of available water has already been granted to water users for a recognized "beneficial use." The most prevalent beneficial use is agricultural irrigation. Meeting municipal water needs thus often depends on municipalities obtaining water rights historically held by irrigators. The agricultural-to-municipal transfer of water rights is a thorny issue throughout the West, where various stakeholders face daunting challenges adapting a system of water administration developed in a time of relative abundance to meet current realities.

Perhaps nowhere are these challenges more daunting than along the Rio Grande in Texas, a historically agricultural region that is experiencing exceptionally rapid urban population growth.

This article discusses several agricultural-to-municipal issues that have come to the forefront in Texas concerning the conversion of agricultural water rights to urban uses on the Rio Grande downstream of El Paso. A case involving the marketing, transfer, and conversion of water rights, which involved an amendment to water rights proceeding before the Texas Commission on Environmental Quality (TCEQ or Commission) that was disputed and recently upheld by the Texas Supreme Court, is examined in some detail. This is followed by coverage of a Texas statute passed in 2007, which provides a mechanism for dealing with the conversion of agricultural rights held by water districts to municipal use and transfer to municipal suppliers. Finally, a short update on the status of current marketing of water rights in this region is provided.

BACKGROUND

A general overview of regional geographic terms, population issues vis-à-vis water use, and the water rights regime on the Rio Grande in Texas is helpful in understanding the issues discussed in this article.

Geographic Terminology

Rio Grande Basin

Over time, the Rio Grande Basin as a whole has come to be referred to in two segments: 1) the "Upper Reach" of the Rio Grande (River) denotes the River from its headwaters in the San Juan range of the Rocky Mountains in southern Colorado, down through central New Mexico, and on to Fort Quitman, Texas (located about 90 miles downstream of El Paso, Texas); 2) the "Lower Reach" denotes that portion of the River downstream from Fort Quitman all the way to the Gulf of Mexico.

Texas Reaches

In the Lower Reach of the Rio Grande most of the flow derives from Mexico. While the water in the Upper Reach is all from tributary sources within the United States, flow in the Lower Reach has historically been mixed waters composed of flows from the Upper Reach, substantial inflows of water from several Mexican tributaries, and water from Texas tributaries consisting mainly of the Pecos and Devils Rivers. [30 Tex. Admin. Code, Chapter 303, contains specific rules governing River operations in the Lower and Middle Rio Grande.]

The Lower Reach of the Rio Grande has been further subdivided by custom, law, rules, and regulations into three separate segments: the "Upper Rio Grande" — being that portion of the River between Fort Quitman and Amistad Reservoir (near Del Rio); the "Middle Rio Grande" — being that portion of the River between Amistad and Falcon Reservoirs; and the "Lower Rio Grande" — being that portion of the Rio Grande downstream from Falcon Reservoir (downstream from Laredo) to the Gulf of Mexico. The Lower Rio Grande includes an area called the Lower Rio Grande Valley at the southern tip of Texas where the River flows into the Gulf of Mexico. It is issues relating to these "Upper," "Middle" and "Lower" portions of the Lower Reach of the Rio Grande that comprise the areas discussed in this article (see Map, page 16).

Lower Rio Grande Water Rights

Population Increases

Population Issues vis-à-vis Water Use

Urbanized lands in the region were once agricultural lands. Water rights were obtained for irrigation uses at a time when there was less need for municipal and industrial water. As a result, most all of the Rio Grande water supply was appropriated (sometimes over-appropriated) for agricultural use and those rights have since been adjudicated.

Population in the Middle and Lower Rio Grande regions has more than tripled over the last 50 years, from approximately 400,000 in 1950 to over 1.2 million in 2000 with most of this increase occurring after 1970 (see Figure 1). During the period from 1970 through 1990, six of the 31 fastest growing counties in Texas were within this region and these counties are also among the fastest growing areas in the United States. There is also tremendous growth in the El Paso area in the Upper Rio Grande.

The population distribution in the Lower Rio Grande is concentrated in the Rio Grande Valley area (principally Cameron, Hidalgo, Willacy and Starr Counties) and in the Middle Rio Grande area is centered principally in Webb and Maverick Counties (Laredo and Eagle Pass). In 2000, the combined population of the Valley counties accounted for nearly 89% of the region's total population. It is projected that the population in Cameron and Hidalgo Counties only by the year 2060 will be near 2,800,000, with Webb County (Laredo) reaching over 725,000 and Maverick County (Eagle Pass) growing to over 76,000. Rio Grande Regional Water Planning Group (Texas Water Development Board), *Rio Grande Regional Water Plan 2006* (Pgs. 1-21 through 1-24).

Supply Shortages

The Regional Water Plan identified shortages of supply in all water use categories. For agricultural use no strategy was identified which would fully offset shortages, though it notes that shortages could be reduced by conservation projects. For municipal and industrial use waters, recommended water management strategies to overcome these shortages included: water conservation; desalinization; and the voluntary transfer and conversion of agricultural rights to municipal use water rights — since much of the population growth involves the subdivision of lands that were previously under irrigation.

Continued population growth and expanding needs for municipal and industrial waters have brought about calls for the transfer of water from traditional agricultural use to meet the new demands for municipal and industrial purposes. This has raised challenges and created conflicts between agricultural use and municipal use interests regarding how these water rights will be converted from one use to the other.

Lower Rio Grande Adjudication

Legal Water Regimes in the Lower Reach of the Rio Grande

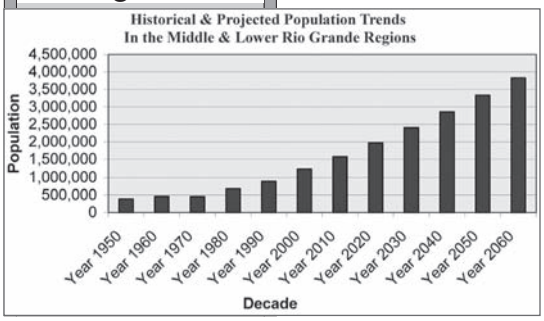
Each of the three River reaches comprising the Lower Reach of the Rio Grande has its own unique legal regime for administering water use.

The water rights in the Lower Rio Grande below Falcon Reservoir were adjudicated by a District Court in Hidalgo County, Texas, over a twenty-year period between 1951 and 1971. The District Court in Hidalgo County (Court) initially took judicial custody of the waters in Falcon Reservoir and established a Watermaster under the direction of the Court while the rights were being adjudicated. Following the final judgment, the Watermaster's office was transferred to the Texas Water Rights Commission (now TCEQ), and thus began water rights administration on the Lower Rio Grande. [See *State v. Hidalgo County Water Control & Improv. Dist. No. 18*, 443 S.W.2d 728 (Tex. App.-Corpus Christi 1969), writ ref'd n.r.e., commonly referred to as the "Valley Water Case."]

In the 1970s and early '80s, the water rights in the Middle Rio Grande segment were adjudicated pursuant to the Texas 1967 Adjudication Act (Vernon's Ann. Texas Civil Stat., Texas Water Code, Subchapter G., § 11.301-341). The Middle Rio Grande adjudication, although it involved some different legal issues than were involved in the Court adjudication, was blended with the adjudication by the Court in the Valley Water Case with respect to management of the reservoirs. This was done at that time because the Amistad Reservoir was then complete, and a decision was made by the Commission and the courts that the Amistad and Falcon reservoir systems would be better utilized through coordinated water management as a unit. The legal regime and water management system in the Middle Rio Grande and Lower Rio Grande were thus merged and managed as a single system.

The Upper Rio Grande segment in Texas was later adjudicated by the Commission (now TCEQ). Since there were no reservoirs in this reach of the River — i.e. from Fort Quitman to Amistad Reservoir — the water rights were adjudicated as regular "run of the river" water rights. "Run of the river" rights are water rights that divert water from a surface water source, as opposed to "storage rights" whose source is water that was stored in a reservoir. Following the adjudication of these "run of the river rights" in the Upper Rio Grande segment, the Commission enlarged the jurisdiction of the Rio Grande Watermaster to include the Upper Rio Grande. (See 30 Tex. Admin. Code, Chapter 303).

Figure 1



Lower Rio Grande Water Rights

From TCEQ's website:
About the Rio Grande Watermaster Program

In the Rio Grande basin, above Amistad, water rights are managed as a "first in time, first in right" stream as they are in other parts of Texas. Water rights in the Middle and Lower Rio Grande are served by the Falcon-Amistad system. Water below Amistad is allocated on an account basis, much like having a bank account with a constantly changing balance. Priority is given to all municipal accounts so, at the beginning of each year, each municipal account's storage balance is set to the authorized water-right amount. The municipal priority is guaranteed by the monthly reestablishment of a municipal reserve in the system of 225,000 acre-feet. That is equivalent to one year's average diversions for all municipal demands below Amistad for Texas users.

Irrigation accounts, on the other hand, are not reset each year and must rely on balances carried forward. Each month, a determination is made as to how much unallocated water assigned to the United States is within the Falcon-Amistad system. If surplus water is identified, it is allocated to irrigation accounts on a monthly basis. When water is used, it is subtracted from the respective account by type of use from the account's usable balance. This system of accounting for water usage was put in place after an international treaty with Mexico was established and in accordance with a district court ruling of 1969.

These events established the operations of the Rio Grande Watermaster in the three reaches of the Rio Grande from Fort Quitman to the Gulf of Mexico. The rules established in each reach reflect the marked differences between the water rights system in the Middle and Lower Rio Grande segments compared to the "run of the river" system above Amistad Reservoir in the Upper Rio Grande segment. Water rights in the Middle and Lower Rio Grande are similar to bank accounts because all water is allocated based upon storage in the reservoirs. In contrast, under 30 Tex. Admin. Code, § 303.23, the distribution of water in the Upper Rio Grande segment is based upon the Prior Appropriation Doctrine of "first in time is first in right" with respect to the exercise of each water right.

As a result of the unique adjudication and management of the Middle and Lower Rio Grande as a single unit of stored water rights — not based upon the Prior Appropriation Doctrine — all of the adjudicated prior appropriation water rights above Amistad Reservoir as a practical matter are "senior" (established earlier in time) and, therefore, superior in use to the stored water rights in and downstream of Amistad Reservoir to the Gulf of Mexico. In other words, under Texas water law the storage water rights in the Middle and Lower Rio Grande have no priority or right to control the use of Rio Grande water by water rights holders in the Upper Rio Grande. As such, the Middle and Lower Rio Grande rights are junior to all rights in the Upper Rio Grande, and "prior appropriation" rights apply only amongst water rights holders within the Upper Rio Grande (see side bar).

COURT CASES CONCERNING THE LOWER REACH OF THE RIO GRANDE

THE *PRESIDIO* CASE

A recent Texas Supreme Court case involved the transfer of water rights from the Upper Rio Grande to the Middle Rio Grande with diversion points at or near Presidio, totaling 8,059 acre-feet (AF) of water per annum with three different, but old (senior) priority dates. The court decision involved many complex water rights transfer issues. Both this decision and the proceedings leading up to it are referred to as the "*Presidio* Case" in this article and will be summarized as it proceeded through TCEQ to the Texas Supreme Court. *Brownsville Irrigation District, et al. v. TCEQ*, et al., 264 S.W.3d 458 (Tex. App.-Austin, August 28, 2008) review denied, Sup. Ct. of Texas, January 9, 2009.

In the administrative proceeding before TCEQ, the Applicants were the seller, Presidio Valley Farms, Inc. (PVF), and the buyers of the water rights, the cities of Eagle Pass and Laredo, and Maverick County, Texas. The Applicants anticipated the problems at hand and the need to demonstrate that water rights in the Lower and Middle Rio Grande would be protected (due to the "no injury rule" – see below under Controlling Law). When filed with TCEQ, therefore, the Applications took into account the complex mix of water right principles that exists between the water administration in the Middle and Lower Rio Grande segments versus the water rights involved in the Upper Rio Grande (discussed above).

PVF's water rights in Presidio County were located near the confluence of the Rio Conchos from Mexico with the Rio Grande below Fort Quitman (see map, next page). The Rio Conchos, and other tributaries in Mexico downstream from the Rio Conchos in Mexico, contribute substantial flows to the Rio Grande below Fort Quitman. The Applicants did not request that these Upper Rio Grande segment water rights be combined or merged in some manner with the stored water rights regime downstream because of the divergent laws, rules, and regulations noted above. Such an action would have resulted in changing the legal characteristics of the rights — a procedure not recognized by any law or regulations. The Applicants sought only to change the diversion points downstream to maintain the legal status of the water rights as "run of the river" rights.

The accounting method presented with the Application to TCEQ thus intentionally avoided the unnecessary complications which could occur if these rights were merged with the stored water rights of the Middle and Lower Rio Grande segments. Accordingly, the Applicants submitted an accounting procedure whereby the amount of water authorized to be diverted at the new downstream diversion points would be based upon the availability of water at designated gauging points downstream in Presidio County, taking into account transportation losses incurred between this upstream location and the new downstream points where water will be taken from the River.

Controlling Law

The Applicants requested an amendment to PVF's water rights that did not increase the amount of water authorized to be diverted or the authorized rate of diversion. The authorized rate of diversion was actually decreased from a combined 173.8 cubic feet per second to a combined 75 cubic feet per second (this constitutes a 57% reduction). This change to the rate of diversion was significant because it reduced the rate (reflected in the capacity of pumps) that water can be taken from the River — thus extending the length of time necessary to divert the volume of water authorized to be taken over the course of a year.

Lower Rio Grande Water Rights

Four Corners Doctrine

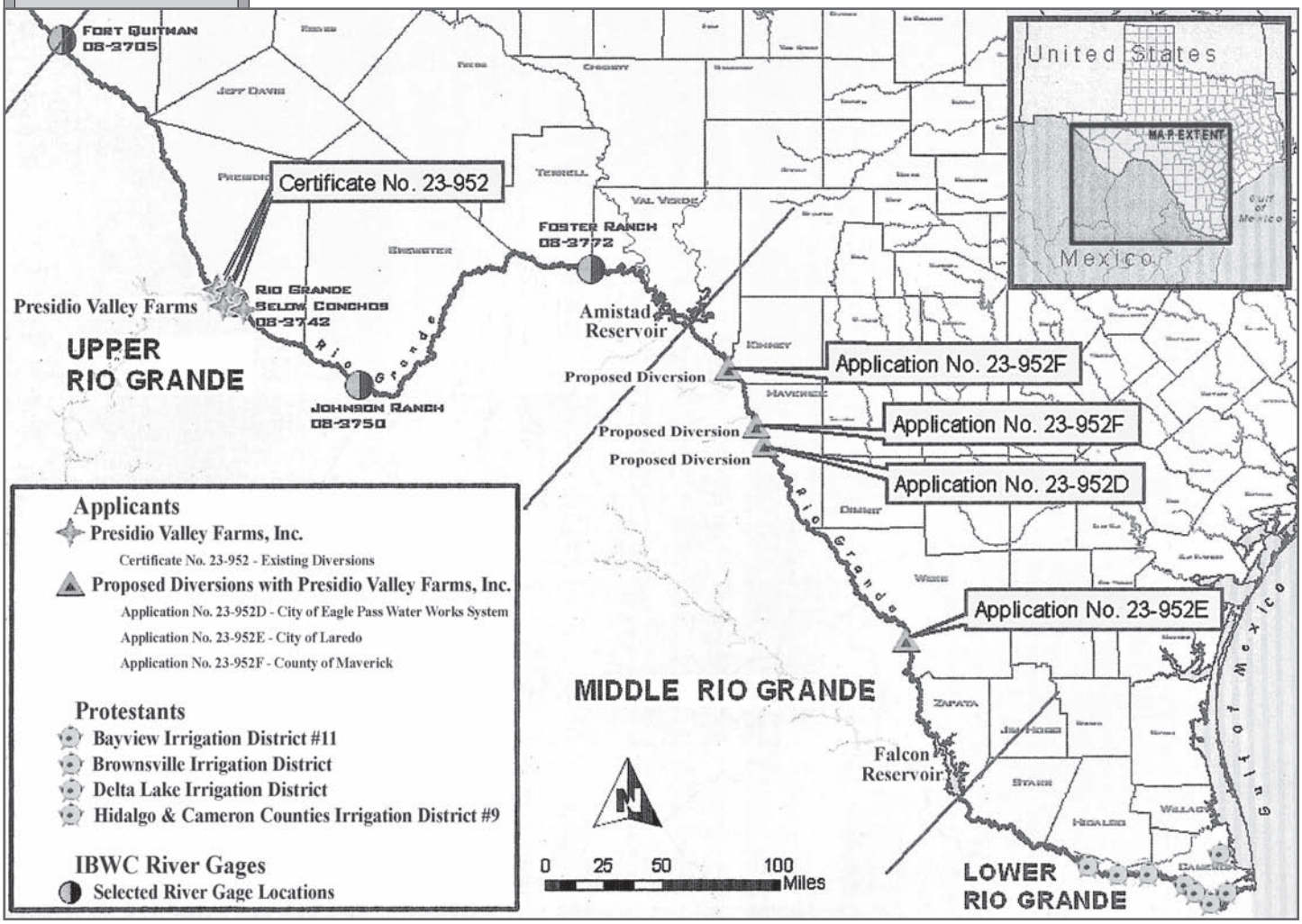
The controlling law in considering the Application was and is Texas Water Code § 11.122(b), which states that a requested amendment to a Texas water right (assuming there is no request for an additional amount of water or increased diversion rate):

> "…shall be authorized if the requested change will not cause adverse impact on other water right holders or the environment on the stream of greater magnitude than under circumstances in which the permit, certified filing, or certificate adjudication that is sought to be amended was *fully exercised according to its terms and conditions as they existed before the requested amendment*." (Emphasis added)

The above emphasized portion of the statue is sometimes referred to as the "four corners doctrine." This doctrine stipulates that the impact analysis of the requested amendment must assume that the water rights being amended were fully exercised according to the terms and conditions of their previous authorization. In the *Presidio* case, for example, it was assumed that the full amount of the diversions authorized in PVF's water rights (as noted, 8,059 AF) was used an annual basis. The statute requires the Commission to grant the amendment if the standards quoted above are met, taking into account other issues identified by the Texas Supreme Court in a recent case involving amendment to water rights in Texas — which is discussed next.

Hearing Requirement

The Texas Supreme Court recently considered the amendment statute (§ 11.122(b), quoted above) to decide whether notice and hearing is required because of the mandatory language "shall be authorized" within §11.122(b). *City of Marshall v. City of Uncertain*, 206 S.W.3d 97, 49 Tex. Sup. Ct. J. 695, (2006). The City of Marshall filed an Application to change the purpose of use of its water rights from solely "municipal use" to "municipal and industrial use" because it had potential industrial use customers who needed a raw water supply for industrial use as opposed to potable municipal use water. It was undisputed that the City had only used 50% of its water rights in the past. The Commission held that §11.122(b) required it to approve the amendment and that a contested case hearing was not necessary. The Supreme Court, however, held a hearing could be necessary — even under the "four corners doctrine" — where the facts and circumstances raised factual issues and that the "subject to other applicable" provisions in §11.122(b) made it necessary to consider other issues, such as the public interest and welfare.



Lower Rio Grande Water Rights

Mandatory Language

Transfers Promoted

Water Accounting Plan

Editor's Note: **The Treaty of 1944** was entered into between Mexico and the US for the "Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande." The treaty distributed the waters in the international segment of the Rio Grande from Fort Quitman, Texas to the Gulf of Mexico. This treaty also authorized the two countries to construct, operate, and maintain dams on the main channel of the Rio Grande. See IBWC website at: www.ibwc.state.gov/home.html.

In the *Presidio* case, the Applicants dealt with these notice and hearing issues in a manner that avoided legal shortfalls. Notice was published and was sent to the hundreds of downstream water rights holders in the Middle and Lower Rio Grande. A contested case hearing was requested by seven Protestants holding downstream water rights in the Lower Rio Grande and a hearing was conducted. However, four of those Protestants withdrew their protests based upon their review of the Draft Amendment by TCEQ staff containing the water accounting plan and protection accorded to downstream water rights.

The *Marshall* case differed from *Presidio* in that the issues of notice and hearing were not before TCEQ. Nevertheless, *Marshall* is instructive because it illustrates that TCEQ's role in a case relating to an amendment to water rights (which is always involved in the sale of water rights) is limited because of the mandatory "shall" language in §11.122(b). The amendment "shall" be granted if the standards of §11.122(b) are satisfied. This statute establishes that if the statutory conditions are met, the Applicants have the right to have their Application granted subject to consideration of other issues, such as public interest and beneficial use of water. The issues explored in the *Marshall* case also demonstrate the strong public policy declared by the Texas Legislature in Senate Bill 1, passed in 1997 to promote the voluntary transfers of irrigation use rights to municipal use.

The Court in *Marshall* (206 S.W.3d at 99) concluded that in water right amendment cases:

> "while §11.122(b) significantly restricts the issues that may be reviewed in a contested-case proceeding, it does not all together preclude one. Depending upon the particular amendment application, the hearing may be necessary to allow the Commission to assess certain limited criteria other than the applications effect on other water right holders, and the on stream environment that the legislature considered necessary to protect the public interest, including assessment of water conservation plans, consistency with the State and any approved regional water plans, and groundwater effects."

TCEQ did not have the Texas Supreme Court's opinion in *Marshall* when TCEQ issued its Order in the *Presidio* case. Nonetheless, the Commission did what the Supreme Court subsequently required in the *Marshall* case: i.e., TCEQ required a contested case hearing and considered in its processing of the Application all of the issues the Supreme Court discussed in *Marshall*.

Adverse Impact on Other Water Rights

The Applicants in *Presidio* asserted that the only substantive issues involved were water accounting and transportation losses. Their water right amendment Application included an Engineering Report of over 30 pages. The Report presented a complex water accounting plan — showing how the water rights could be managed downstream — that the Applicants decided to include so that the Rio Grande Watermaster could manage the downstream diversions based upon flows at PVF, including a deduction for transportation losses. The Report was supplemented based upon requested revisions by TCEQ's staff during TCEQ's administrative process. The water accounting plan was consistent with the divergent water rights systems in the Upper Rio Grande reach and the reach below Amistad. It also took into account the accounting of ownership of the water between the United States and Mexico. Provisions dealing with any adverse impact that occurs with respect to the International Boundary and Water Commission's (IBWC's) determination of the ownership of water between the United States and Mexico under the 1944 Treaty were also included in the Amendments subsequently issued by TCEQ.

The Amendments to the water rights issued by TCEQ in *Presidio* thus protected downstream water right holders by providing proper water accounting procedures based upon flows at the previous PVF diversion points. It also included provisions pertaining to unauthorized diversions and discontinuous flows in the reach between Presidio and Amistad Reservoir.

Within the water accounting system is a transportation loss factor to account for the loss that would occur between the prior upstream diversion point and the requested downstream point. Expert testimony supported the determination of transportation losses. This testimony was accepted and supported by TCEQ's hydrologist and in testimony received from the IBWC. The Protestants produced no controverting evidence, except to assert that the loss factor was different from that which had been applied to IBWC losses in isolated incidents. All of the expert testimony distinguished the IBWC loss calculations as being for a different purpose than was required in the *Presidio* case, and, as such were inapplicable. Testimony from IBWC recognized that there was a difference between IBWC.'s real-time calculations and the Watermaster's accounting of water rights loss. As noted in the testimony, the Applicants' calculation of losses took into consideration the low flow periods of the year, which is a conservative and correct approach with respect to the calculation of losses for a long-term water management system because these are the periods involving the most water loss. In addition, moving the diversion points downstream favors the environment as it leaves water in the Rio Grande for more time and over longer reaches of the river.

Lower Rio Grande Water Rights

Ultimately, the Protestants in *Presidio* did not attack the determination of transportation losses or the water accounting plan. They did, however, contend that TCEQ should have applied the conversion factor established in rules for the Lower and Middle Rio Grande (see next paragraph) instead of finding that the conveyance loss, water accounting plan and other conditions in the issued water rights amendment was "the applicable conversion factor" in the *Presidio* case, as is further discussed below.

Conversion Factor

As background, in 1986 TCEQ established a conversion factor in amendment cases in the Lower and Middle reaches of the Rio Grande. The rules relating to these reaches provide that all "Class A" and "Class B" priority rights in the Lower and Middle Rio Grande which have been or will be acquired for domestic, municipal, or industrial use shall be amended to authorize the change in purpose of use and converted to receive a definite quantity of water in AF per annum, as follows: one AF of Class A irrigation water rights shall be converted to 0.5 AF of water per annum for either domestic, municipal, or industrial purposes; and one AF of Class B irrigation water right shall be converted to 0.4 AF of water per annum for either domestic, municipal, or industrial purposes (see 30 Tex. Admin. Code §303.43). Essentially, Class A rights were based upon prior appropriation or legal paper water rights, and Class B rights were "equitable" water rights based on long historical use that generally were riparian irrigation common law rights found invalid in Texas in Spanish Land Grants and State Grants after 1895 (see *State of Texas, et al. v. Valmont*, 163 Tex. 381, 355 S.W.2d 502 (Tex. 1962)).

Class A & Class B

TCEQ's conversion factor was a recognition of the Prior Appropriation Doctrine's system of priorities. Class A rights were appropriative rights with priority dates and superiority. After *Valmont* (which held that common law riparian rights did not exist for irrigation purposes on land derivative of Spanish Land Grants), Class B rights were granted as a judicial recognition in equity in the adjudication process that the long use of water entitled Class B rights to be granted, but given a status lesser than Class A rights. [See *State v. Hidalgo County Water Control & Improv. Dist. No. 18*, 443 S.W.2d 728 (Tex. App. - Corpus Christi 1969), writ ref'd n.r.e., for the distinctions between Class A and Class B rights.]

Use Preference

Rules were promulgated by TCEQ to deal with stored water rights established by the Valley Water Case and the Middle Rio Grande Adjudication (both referenced above) and are unique to those specific rights. Domestic, municipal, and industrial use rights in the Lower and Middle Rio Grande are unique in Texas in that they are entitled to a priority of allocation ahead of other water rights. The first water allocated from the available water supply stored in the reservoirs is set aside for their use.

The Applicants' request entailed moving diversion points from the Upper Rio Grande, where "run of the river" priority applies, downstream onto the Middle Rio Grande, where the "unique" rules covered in the previous paragraph apply (see map). Their application, however, did not assert that the amended (downstream) rights would take on any characteristic of a "stored water right." As discussed previously, such a change would alter the legal characteristics of the water rights involved, under the Prior Appropriation Doctrine and laws applicable to the Upper (versus Middle) Rio Grande, and would result in a different determination of the amount of water that they would be entitled to divert when they established diversion points downstream of Amistad Reservoir.

Transfer Rule

TCEQ has a special rule relating to transferring points of diversion on the Upper Rio Grande, which states:

> Transfers of the point of diversion or place of use of water rights from the Upper Rio Grande into the Middle or Lower Rio Grande below International Amistad Reservoir will be prohibited unless:
>
> (A) an applicable conversion factor has been approved by the commission;
>
> (B) the commission finds that the transfer would not impair other water rights within the Middle and Lower Rio Grande; and
>
> (C) the commission finds that the transfer would not reduce the amount of water available for allocation.
>
> 30 Tex. Admin. Code §303.42(4)

"Run of the River" Rights

Applicants argued that TCEQ should not apply the term "conversion factor" contained in 30 Tex. Admin. Code §303.42(4)(A) as similar in meaning to the "conversion factor" used in the Middle and Lower Rio Grande rule contained in §303.43. To do so would convert the "run of the river" appropriation rights involved in the *Presidio* case into stored water rights. The Applicants did not request to merge the rights at Presidio with any rights in the Middle or Lower Rio Grande regime. The Applicants asserted that the water that they would be entitled to divert is water available in the Rio Grande at Presidio, which would pass through Amistad Reservoir, and be diverted downstream in such quantities after deduction of the appropriate transportation losses (as determined by the Rio Grande Watermaster pursuant to the Amendments). That is, a "conversion" factor corresponding to stored water rights in Amistad Reservoir is not applicable as these rights would remain "run of the river" rights.

TCEQ maintained that it had applied this special rule in the case by its approval of "an applicable conversion factor" — i.e., the special conditions contained in TCEQ's Order of over 20 pages approving

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the Amendments to the water rights *were* the "applicable conversion factor" — since the special conditions contained many specific provisions to protect downstream rights.

The District Court and Court of Appeals approved TCEQ's Order and Amendments to the Presidio water rights and the Texas Supreme Court denied the petition for review. [See Court of Appeals Opinion in the *Presidio* case, 264 S.W.3d 458 (2008).]

Conversion of Irrigation Water Rights to Municipal on Urban Lands

LEGISLATIVE ACTION ADDRESSES RIO GRANDE VALLEY WATER USE CHANGES

Conversion to Muni Rights

The Texas State Legislature recently addressed how irrigation rights previously used on farm land, which has since been urbanized, would be converted to municipal use. This legislation follows over 20 years of disputes between irrigation water districts and municipal suppliers in the Rio Grande Valley. The "municipal suppliers" are cities or water supply corporations that were initially organized to serve rural residents. Because of the growth in these previously rural areas, many of these suppliers now serve large, urban populations.

Legislation's Scope

In 2007, the Legislature passed a statute governing the conversion of agricultural rights to municipal use rights based upon a consensus compromise on this issue. While it only applies to the Lower Rio Grande, the legislation also impacts the Middle Rio Grande. The legislation sets out a statutory method by which agricultural water rights are to be converted to municipal use and determines the terms of such conversion transactions. (Acts 2007, 80th Leg., Ch. 1430, Vernon's Texas Civil Statutes, Water Code, Subchapter O, Sections 49.501, et seq.) This legislation only covers water districts and municipal water suppliers in counties that border the Gulf of Mexico and Mexico or are adjacent to such a county — basically a four-county area in the Lower Rio Grande Valley.

Supplier Requirements

In accordance with this legislation, when subdivisions are platted and recorded, the municipal water supplier who will serve the subdivision with potable water has two years in which to petition the water district to either: 1) convey the water rights associated with the previous farm land now in the subdivision; or 2) contract over a 40-year period for the delivery of the equivalent amount of water.

"First Right of Refusal"

If the municipal supplier fails to file such a petition within this two-year period, then after notice to other water suppliers in these counties, other water suppliers in the four-county area may opt to purchase the rights at the same terms and conditions as a purchaser from outside the county areas. If no one opts to purchase the rights within 90 days of notice, then the sale may be made to the purchaser located outside the four-county area. The effect on the Middle Rio Grande and one Lower Rio Grande county is that municipal suppliers in the four-county area have essentially the "first right of refusal" to purchase the water rights.

The amount of water rights associated with a subdivision is based upon the number of previously irrigated acres within the subdivision and those acre's prorated share of the district's water rights.

The law provides that a district can provide for the water rights out of its existing municipal use water rights or convert the previous irrigation rights of the district to municipal use through an amendment to its water rights, as provided by TCEQ rules.

Market Value Set

The statute also provides that if the water rights are conveyed to the municipal water supplier, the amount paid to the water district is equivalent to 68% of the prevailing market value of water rights sold in the Lower and Middle Rio Grande. The prevailing market value is determined by the Rio Grande Regional Water Authority (Authority) based upon the price paid in the last three sales transactions of 100 acre-feet (AF) or more during the previous year. If the water is to be delivered on a contractual basis, the law provides for a formula to determine the delivery charge to be paid by the municipal supplier to the water district on an annual basis.

The water district also agrees to designate at least 75% of the proceeds from the sale of water rights for capital improvements of the district, in accordance with the statute.

So far no petitions have been filed under this statute, but the Authority has established the market value in accordance with the statute as $2,218 per AF of municipal use rights after conversion from irrigation rights for the year 2009. *Board Minutes*, Rio Grande Regional Water Authority, January 7, 2009.

Transactions in the Lower and Middle Rio Grande

The reach of river that is comprised of the Lower and Middle Rio Grande has experienced a very active water market. Data compiled indicate a market value in the sale of water rights in the range of $2,000 per AF to $2,250 per AF for municipal and/or industrial use rights — with the most recent sales at the high end of $2,250 per acre-foot. Contract sales of water allocations in specific amounts to be used within a year range from $10 to $30 per AF and have been as high as $60 per AF for agricultural use in drought years. Municipal use water sales range from $45 to $52 per AF and mining use water (same allocation type as irrigation) has ranged up to $212 per AF.

Lower Rio Grande Water Rights

Conclusion

As is true throughout the West, policies, agency action, legislation, and court cases dealing with the change of agricultural/irrigation rights to municipal and industrial rights — and resulting water transactions — will continue to evolve in Texas. Population shifts in the United States to the west and south will continue to fuel regional population growth and expanded commercial and industrial activities. The stress on water supply will certainly continue in the arid and semi-arid West and it is now becoming apparent that similar issues exist in some of the eastern United States where hitherto water supply has not been as critical as in the West. [See *"Gulp - Litigation Won't End the Battles Over Disputed Water Resources in Several Regions of the United States."* Kristin Choo, American Bar Association Journal, September 2008.]

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Glenn Jarvis is an attorney with more than 40 years of experience in the field of water law. He has handled many important water transactions and cases as lead counsel, while also serving as an expert witness in other cases. He often advises water districts, river authorities and landowners on the nuances of state and federal water law, and serves on advisory committees of regulatory agencies. Mr. Jarvis is also a frequent presenter at water law conferences in the United States and Mexico. A recognized authority in the Law of the Rio Grande, surface water law in general, and special issues of western water law, Mr. Jarvis holds a remarkable legal acumen for one of the most precious — and complex — natural resources.

Water Demand Forecasting

OREGON WATER DEMAND FORECASTING

A TRANSPARENT & FLEXIBLE TOOL FOR STATE WATER NEEDS ASSESSMENT

by Ronan Igloria, P.E. (HDR Engineering, Inc, Portland, OR)
and
Andrew Graham (HDR Engineering, Inc, Olympia, WA)

INTRODUCTION

The Oregon Legislature in 2007 provided funding to the Oregon Water Resources Department (OWRD) to complete the Oregon Water Supply and Conservation Initiative (OWSCI). OWSCI is intended as a first step in what will be the development of a comprehensive plan for meeting future water needs in Oregon, and provides a foundation for OWRD's data gathering process. As OWRD states, OWSCI is "an opportunity to take a bird's eye view of water demands and water availability throughout the State, and to strategically develop the tools, methodologies, and budgets required to ensure that those who need water — both in-stream and out-of-stream — will have access to the resource for generations to come."

Demands & Availability

The four OWSCI components approved by the 2007 Oregon Legislature include:

- Water Needs Assessment/Demand Forecast
- Inventory of Potential Water Conservation Projects
- Inventory of Potential Water Storage Sites (above and below ground)
- Community Planning Grants

A fifth component to assess water availability by basin was not directly funded by the legislature, but OWRD is continuing to make progress in this area using available resources. Furthermore, while the bulk of work on the funded components has been completed, OWRD plans to continue to provide updates and build upon these initial efforts as resources allow.

Focus

This article covers the first component of OWSCI, namely the assessment of the water "demands" in Oregon. OWRD retained HDR Engineering, Inc. (HDR) to develop a state/regional water demand assessment. This article describes the data and methodology used in the assessment, presents results from the first-generation water demand forecasting model, and discusses potential applications of this tool for future planning and policy development efforts. While water demands were evaluated for both out-of-stream and in-stream beneficial uses, only the out-of-stream needs are discussed in this article because of the focus on the development and application of the water demand forecasting tool. The out-of-stream water uses include four categories: 1) municipal systems; 2) domestic wells; 3) self-supplied industrial uses; and 4) irrigated agriculture and stock water.

Objectives

Primary objectives of the water demand assessment included:

- Improving understanding of the overall magnitude of water demands for various water use categories in different regions across the state
- Improving understanding of the dynamic trends that affect these uses and how these trends may change in the future

Water Demand Forecasting

- Providing a forecasting tool that can be used to examine alternative scenarios affecting future water needs
- Determining where key data are missing or inadequate, as well as other sources of uncertainty in water demand forecasting, in order to target available budget resources to improve water planning capabilities

HDR's data collection and modeling approach was designed to provide a transparent and flexible tool, which will allow expanded and updated data to be added as OWRD continues with OWSCI and related activities. The demand forecast model was structured to accommodate extensive data on water use at the appropriate spatial resolution and to assess water demands in a variety of planning scenarios. For this initial effort, the data acquired and the input to the model are relatively limited. Demand assessment outputs were structured for three geographic breakdowns: 1) statewide; 2) by county; and 3) by water administrative basin.

Demand Model

DEFINING WATER DEMAND

For the purposes of the study (and this article), the term "water demand" means the expected consumption of water by various water use sectors. The methodology estimates the future consumption of water on a county or regional scale using a select set of factors (e.g. per capita water use, population, irrigated acreage, crop water requirements). Water diversion, conveyance and return flow relationships can be highly complex and variable among different water-use systems. The study does not attempt to segregate water into different end-points, and does not attempt to differentiate between surface water sources and groundwater sources. For purposes of this assessment, water demands are estimated as a total quantity pumped or diverted, without regard to supply systems or supply constraints. A large share of the demand defined in this analysis is currently met with existing supply systems.

Expected Consumption

FORECASTING METHODOLOGY

This study combines elements of per capita and disaggregated demand models, and employs simple numerical calculations developed in a spreadsheet platform.

Method "Transparency"

Reasons for this choosing this methodology include:

- A relatively simple methodology keeps data collection and processing requirements feasible within project budget constraints. This enables the inclusion of the full set of water uses (municipal, domestic, industrial, and agricultural) and to apply the forecast at the statewide geographic scale.
- Econometric techniques require more extensive data collection and data processing. Such methods are more appropriate to situations where data inputs are more consistent or can be more carefully controlled, such as detailed studies of a single water-use category.
- Simple numerical calculations can be reviewed and evaluated easily. Inputs and assumptions can be readily documented and explained. Compared with econometric methods, this makes the model more "transparent" to agency staff or stakeholders who are not trained in advanced modeling techniques.

Alternative Scenarios

- A spreadsheet tool applying numerical calculations offers the capability for OWRD and outside users to run alternative scenarios easily, applying different assumptions from those used to prepare the baseline forecast.

FORECASTING TOOL CAPABILITIES & FUNCTIONS

The forecasting tool was developed with the following anticipated uses:

Anticipate Uses

Model Validation: The forecasting tool contains processed data that a user can review for the different water use categories and different regions within the State. Stakeholders can compare these data — internally within the model itself and externally with other data sources — to help assess model validity and understand model limitations.

Alternative Scenarios: The model is structured to readily enable a user to modify input values used in the water use forecast. These values can be adjusted for any of the four categories of water use. Table 1 (next page) lists input data that can be adjusted. With these parameters, the model offers flexibility for users to construct a wide range of scenarios for population growth, economic activity, water use efficiency, and climate effects throughout the 40-year planning period.

Seasonal Analysis: The forecasting tool incorporates monthly variation in demands, as well as annual totals. The monthly breakdown can support analysis and adjustment of seasonal needs within each of the water use categories.

Forecast to 2050

As noted, the forecasting tool is designed for application at the statewide level, or by county or administrative basin. It is not designed for localized planning, such as a single city, water district, or irrigation district. The demand forecast covers the time period from 2010 to 2050 in five-year increments.

Water Demand Forecasting

Choices & Inputs

The forecasting tool incorporates Visual Basic™ programming code to support interactive use by OWRD staff and/or outside stakeholders. With this tool, users can run their own scenarios for the various water use categories and for any region within the State.

The forecasting tool is configured to generate a forecast based on choices the user makes about key inputs. The forecasting tool has base data that yields a "Reference Forecast" for water demand for each of the water use categories (municipal, domestic well, industrial, and irrigated agriculture). The user can either retain the inputs used in the Reference Forecast, or can modify inputs to construct alternative scenarios. The outputs of the forecasting tool are deterministic — that is, the calculations result in just a single output value for water demand in any given year. This contrasts with the separate uncertainty analysis conducted, which generates a range of demand values in any given year.

Table 1: Parameters that can be Adjusted for Scenarios

Municipal Systems & Domestic Wells[1]	Self-Supplied Industry[1]	Irrigated Agriculture[1, 2]
• Population in the initial year • Percent change over time (growth rate) • Indoor per capita water use by month • Outdoor per capita water use by month	• Total use in the initial year, by month • Percent change over time	• Irrigated acreage in the initial year • Annual change in acreage, by crop • Consumptive use, by crop • Irrigation efficiency • Conveyance efficiency • Allocation of demands from county to administrative basin (i.e. spatial distribution of irrigated agriculture)

1 Variables can generally be adjusted either by county or by administrative basin. Variables can generally be adjusted in five-year increments, allowing the rate of change to be adjusted over the 40-year planning period.
2 Agricultural variables can be adjusted by crop (14 crop groups).

Uncertainty Analysis

Analysis Benefits

The uncertainty analysis completed in this study has four primary benefits:

1) Illustrating the range of water demands that could occur
2) Helping to estimate the effect of data limitations on the initial year estimates
3) Assisting in analyzing the uncertainty inherent in predicting future conditions that affect water use
4) Illuminating which variables make the greatest difference in terms of uncertainty. With this information, analysts can target those variables for further research to improve forecasts

"Monte Carlo" Simulation

The uncertainty analysis is carried out using a procedure known as "Monte Carlo" simulation that is widely used by economists and other analysts to analyze risk and uncertainty. The Monte Carlo simulation runs the model calculations numerous times, for hundreds or thousands of iterations. Each iteration selects values for each variable randomly from a pre-specified distribution. Values that are defined as more probable within the distribution will be selected more frequently than values defined as less probable. Furthermore, the uncertainty in the demand output associated with the combined uncertainty of all of the input variables is taken into account. During each iteration the model outcome (i.e., demand forecast) is calculated independently. The model outcomes can then be displayed as a range. A probability can be associated with each value in the range of outcomes.

Uncertainty Inputs

Inputs to the uncertainty analysis include:

- Selection of specific variables to be varied in the simulations. These are the same variables used in the model or a subset of those believed to be most significant in terms of uncertainty.
- Definition of a probability distribution for each variable selected. For the analysis conducted, the distribution was defined by a high, medium, and low expected value of each variable, and a probability associated with each of these.

For values expected to change over time, the range of values was expanded between 2010 and 2050. This reflects the understanding that those variables with a trend will diverge further from current conditions, and that uncertainty about conditions increases farther out in the future.

Demand Forecast Modeling Output

The demand forecast analysis includes four modeling output results, including a single "Reference Forecast" and three alternative scenarios.

"Reference Forecast"

Best Estimate: "Reference Forecast" — The Reference Forecast represents a single potential future outcome and the modeling team's "best estimate" using the available information compiled during this study and the team's professional judgment. In addition, the study provides a scenario analysis to characterize the uncertainty around the data and demand forecast results, as well as to consider two key issues affecting future water demands: climate change and water conservation.

Alternative Scenarios

Demand forecasts are presented for three alternative scenarios:

"Base Case" scenario extending current water use conditions through year 2050. The base case scenario is used to assess the uncertainty around the demand forecast based on the available data. This is also a useful point of reference for exploring other scenarios developed by users of the forecasting tool.

Water Demand Forecasting

Climate Change

Tool Limitations

Use Sectors

Non-Agriculture Users

Assessment Steps

Separate Industrial Rights

"Climate Change" scenario reflecting potential shifts in climate patterns based on current climate models. The climate change scenario is used to assess the likely impacts on water demand due to the effects of climate change on key variables.

"Conservation" scenario reflecting the potential for improvements in water-use efficiency. The conservation scenario is used to assess the potential reductions in water demand assuming a range of water conservation savings are achieved over time.

Model Limitations

As with any model used to describe or predict complex systems, the forecasting tool has limitations. Users should be aware of these limitations in applying results or using the forecasting tool.

Forecasting tool limitations include:

- Results from the demand forecasting tool are not intended for detailed planning at the local level. The tool output is at the statewide, county, or administrative basin scale and is not prepared for a small area such as an individual city or irrigation district.
- Because of data limitations the results are best viewed as estimates, particularly in the "first generation" output described in this article.
- For purposes of this initial assessment, water needs are estimated as a total quantity, without regard to supply systems or supply constraints.
- These estimates do not reflect future assumptions regarding "economic" relationships, e.g. how the price of agricultural products or the price of water would affect consumption. However, the ability to change variables or factors that define water use (e.g. changes in crop mixes) does offer an indirect way of understanding how water consumption is influenced by these variables. Also, the use of general trends in water consumption over time to forecast future consumption patterns captures some of the underlying economic forces at work in determining the demand for water.

DEMAND FORECAST METHODOLOGY BY WATER USE SECTOR

The out-of-stream water uses in this study include four categories: 1) municipal systems; 2) domestic wells; 3) self-supplied industrial uses; and 4) irrigated agriculture and stockwater. Additional details about the methodology used to estimate water demands are described below for each category. The municipal and domestic wells categories are combined because they have the same base methodology.

Municipal Systems and Domestic Wells

The municipal systems category was defined to include any water system used to provide water to a group of non-agricultural customers. These include urban water systems that distribute water to homes, businesses, schools, and parks. In some areas, industrial water users also receive water from a municipal system. Municipal systems may be private water systems operated by a homeowners association, larger systems managed by private water companies, or public systems operated by a city, town, or water district. The domestic well category is separate and covers single-family homes that have their own wells. These homes commonly are found in rural areas, but can also be present in urban neighborhoods.

The demand forecasting approach for both the municipal and domestic well employ a simple per-capita forecasting approach using the census block group as the basic geographic scale for data collection and processing. There were five main steps to the methodology.

Municipal/domestic demand forecasting methodology included:

- Assigning characteristics to each census block group
- Developing population numbers
- Subdividing population into municipal system and domestic well
- Developing representative per capita demands
- Calculating the baseline forecast

Self-Supplied Industrial

The industrial water use category represents self-supplied industrial and commercial facilities that have their own water rights separate from municipal systems. These include a variety of uses, from small facilities to major industrial plants. It is important to recognize that much of the State's industry is not contained in this category. Most commercial and industrial facilities receive water from municipal systems, and those facilities are covered under the Municipal Systems category of this analysis. The industrial category includes only those facilities with their own, separate supplies.

Self-supplied industrial demand forecasting methodology included:

- Identifying industrial users based on OWRD water rights records
- Determining nominal water rights based on OWRD records
- Applying standard assumptions to all users identified to convert nominal water rights into estimated use

Water Demand Forecasting

Agricultural Uses

The modeling team recognizes that actual water uses at each facility may be considerably different than the values yielded by this approach; therefore, the methodology is viewed as a provisional approach for planning purposes.

Irrigated Agriculture

The irrigated agriculture category includes water used to irrigate farm land. Farms may have their own independent surface or groundwater supplies or may receive water as part of an irrigation district or irrigation company. Stockwatering is also included as part of the agricultural demand. Three steps were used to calculate the baseline water demand for irrigation at the county level.

County level irrigated agriculture demand forecasting methodology included:

- Estimating acreage used for growing each irrigated crop group, by county throughout the State
- Multiplying acres of each crop group by the county-specific, average irrigation requirement for that crop group
- Dividing consumptive use by estimated irrigation efficiency and estimated conveyance efficiency (these are fractional values, so division *increases* the quantity of water)

The total agricultural water use in each county is estimated by summing water use for all of the crop groups grown in that county. These results can also be allocated by Water Administrative Basins.

Monthly Distribution

The model also provides for allocation of total water use to months in the irrigation season for each crop group in each county using a monthly distribution pattern developed from crop-specific regional data. Climate zones defined by the Oregon Climate Service were used to incorporate climatic variation in monthly irrigation patterns. Counties were assigned to climate zones, and selected, major crop groups within each climate zone were assigned a monthly irrigation pattern using the estimated monthly irrigation requirements provided in the Oregon Crop Water Use and Irrigation Requirements Report (Cuenca et al, 1992). The wide variety of crops grown in Oregon was consolidated into 14 "crop groups," or categories of crops that have similar irrigation requirements. An additional category was generated for stockwatering.

Fluctuation Factors

The fluctuations in irrigated acreage are dependent on: water availability limits (i.e., hydrologic limits); climatic conditions (e.g., drought); economic conditions (e.g., commodity prices); regulatory constraints (e.g., water rights and the federal Endangered Species Act); and land use policies (e.g., expansion of development and impacts on land value) — among other factors. Based on the data available, input received from stakeholders, and the judgment of the modeling team, the Reference Forecast generally assumes an overall increase in irrigated acreage statewide over the planning period. The rate of change in irrigated acreage is applied to every crop group uniformly, which assumes that counties will tend to continue to grow their current primary crop groups. While there are market forces that could cause a statewide shift to certain crop types, it was beyond the scope of this project to do such an analysis.

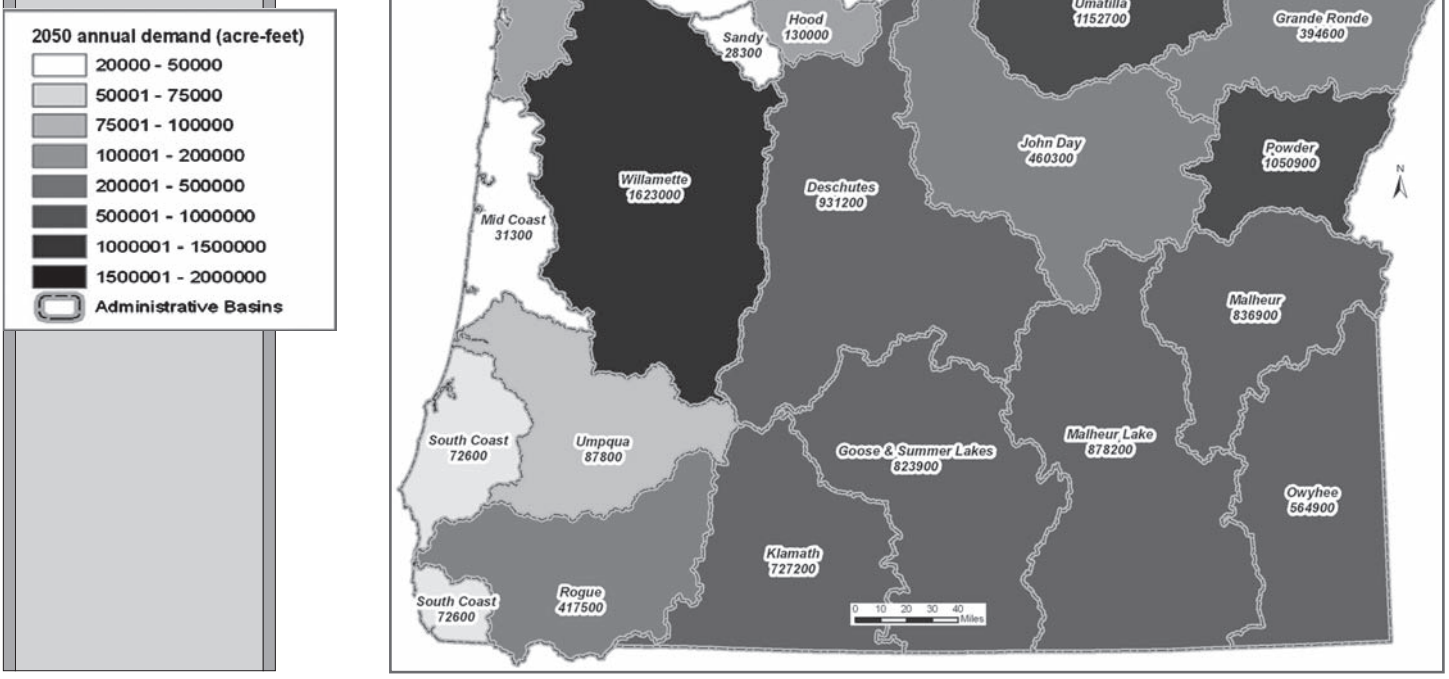


Figure 1: Reference Forecast 2050 - Total Demand by Administrative Basin

Water Demand Forecasting

"Best Estimate" Forecast

Mapped Distributions

Greatest Increase

DEMAND FORECASTING RESULTS

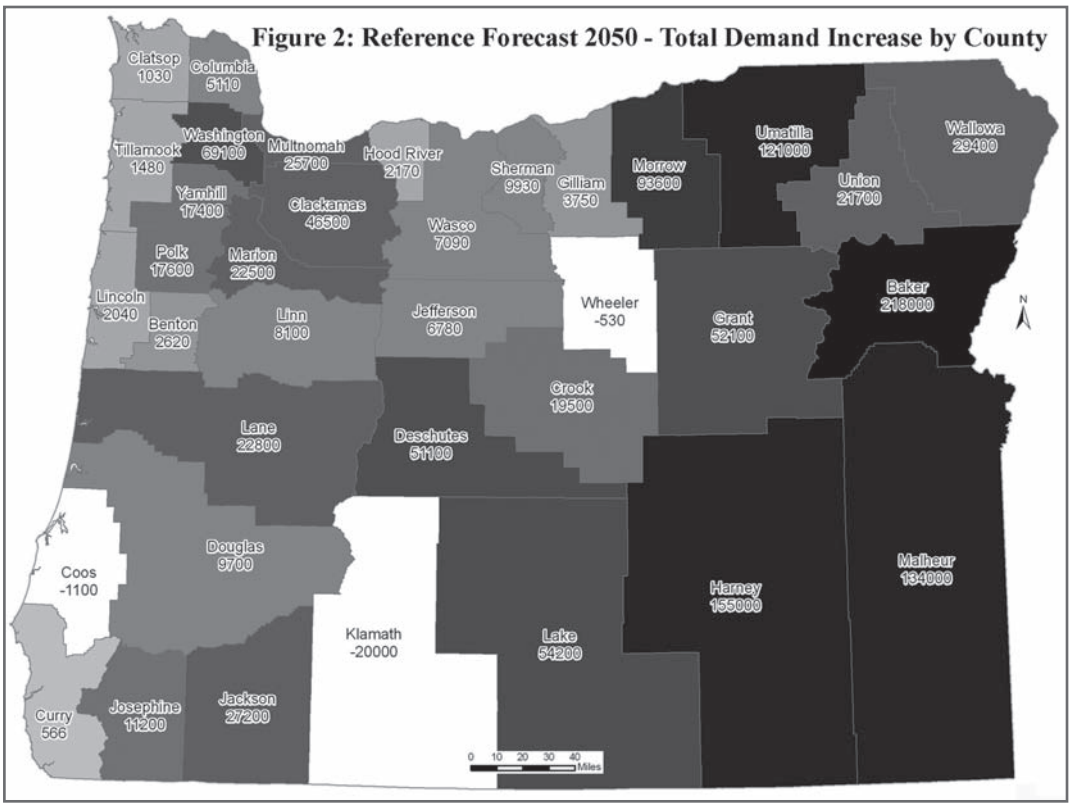
The results of the statewide demand forecast are discussed in terms of the Reference Forecast and the results of the scenario analysis. As noted, the Reference Forecast represents the "best estimate" forecast by the modeling team based on the available data, methodology and professional judgment used in the project. It is considered one potential future outcome. With the uncertainty surrounding each of the input variables, the scenario analysis characterizes the uncertainty around the data used to develop the demand forecast, as well as characterizing the impacts of two key issues impacting water demands: climate change and water conservation.

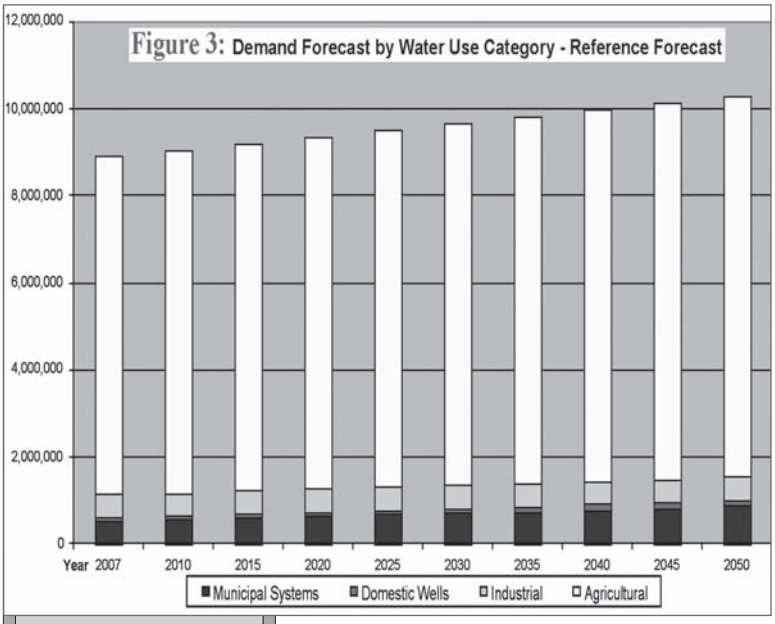
Reference Forecast

Figure 1 shows the total demand distribution by administrative basin in year 2050. **Figure 2** shows the total demand increase by county by the year 2050. The Reference Forecast shows an overall increase of ~1.2 million acre-feet annual demand over the 40-year planning period (~1,100 million gallons per day average demand). The majority of the annual demand increase is due to irrigated agriculture (~900,000 acre-feet) followed by municipal (300,000 acre-feet), and domestic well use (50,000 acre-feet). Irrigated agriculture generally accounts for over 85% of statewide demand. For this study, the industrial demands are considered provisional and projected to remain constant over the planning period because of the limitations on collecting more detailed data. **Figure 3** shows a graph of the demands by category for the Reference Forecast.

Generally, the results of the demand forecast are rather intuitive in terms of the relative magnitudes of the demand increases by water use category and geographic distribution across the State. Not surprisingly, counties and basins forecasted to have the greatest increase in municipal water demand are those that include the larger urban and population centers. Most of the municipal and domestic water demand growth is expected to occur where existing infrastructure exists, including the suburban and rural areas near existing population centers.

Perhaps less anticipated is that the greatest overall increase in water demands are associated with counties and basins in eastern Oregon where the greatest potential for increase or expansion in irrigated agriculture is possible. As an illustration of the potential growth in municipal versus irrigated agriculture demand, counties with the largest municipal and domestic demands include Washington, Clackamas, Deschutes, Multnomah, Jackson, Marion, and Lane counties. These counties represent over 224,000 acre-feet of the municipal demand increase in the State through 2050 (over 18% of total increase). On the other hand, the eastern Oregon counties of Baker, Harney, Malheur, Umatilla, Morrow, and Lake counties — comprise over 750,000 acre-feet of the agricultural demand increase through 2050 (over 62% of total increase).





Scenario and Uncertainty Analysis

The "Reference Forecast" is only one potential future water demand outcome. With uncertainty surrounding each input variable, the scenario and uncertainty analysis provides a robust means by which to explore the range of possible demands. The base case scenario characterizes the uncertainty in demand forecast based on the data and methods used in the model. The changes in agricultural and industrial demands are driven by the uncertainty range defined for the input variables (e.g., irrigated acreage), while municipal demands are driven largely by population growth. By taking account of the uncertainty around the input variables, the increase in total statewide demand can be on the order of 2 million acre-feet under aggressive population growth conditions and increases in irrigated acreage (the increased demand from the Reference Forecast falls within this range). **Figure 4** shows how the total statewide demand forecast from the three scenarios compare.

The changes in statewide domestic well demands are significantly smaller than those for the municipal and irrigated agriculture categories. Because irrigated agriculture generally accounts for over 85% of statewide demand, the change in statewide water demand is driven significantly by the amount of irrigated acreage and the types of agricultural water use practices employed. One of the largest uncertainties is associated with self-supplied industrial demand. In general, this type of industry can have the single largest impact on total demand within a county or basin; alternatively, lack of available water to meet the industry's demand can be the single largest constraint to development or growth.

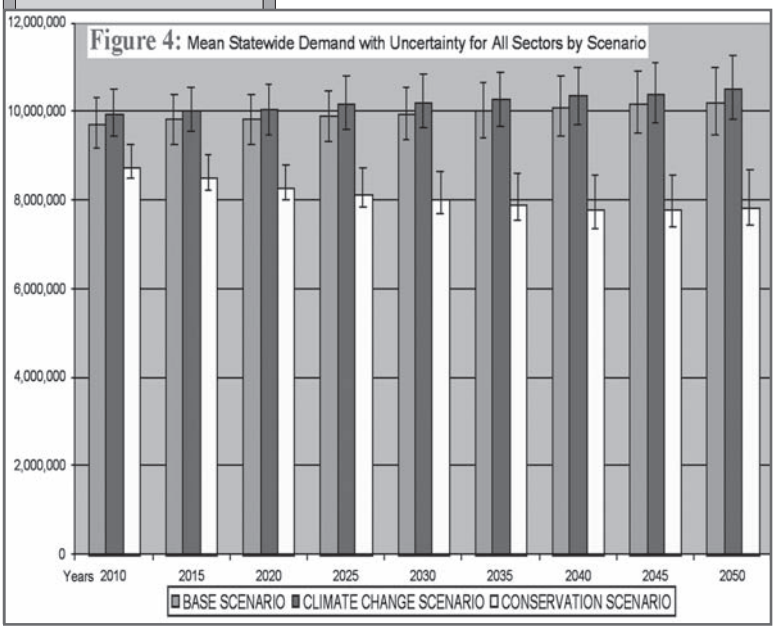
Largest Uncertainty

Water conservation is shown to have a potentially significant effect on overall water demand. However, it should be noted that achievement of the level of conservation modeled would require substantial changes in how the public uses water, as well as significant political and financial investments. Furthermore, the regional demands for each water use category indicate that those impacts will vary across the State. In the State's highly agricultural areas, agricultural conservation measures can yield significant reductions in overall statewide demand. In other areas, the impacts between municipal and agricultural conservation will have more balanced benefits.

Conservation Effects

Climate change is also demonstrated to increase the overall demand statewide — although the impacts are smaller relative to the potential from conservation. Climate change was assessed primarily by adjusting the outdoor per capita water use factor and crop irrigation requirements. The overall impacts of climate change could also affect other factors such as irrigation season, irrigated acreage and population migration. These factors were not explicitly taken into account in the scenarios analyzed; therefore climate change could result in greater impacts on overall water demand than indicated in this study's initial findings.

Climate Change



FINDINGS

The objectives of this study were to gain a better understanding of the water demands in the State, develop tools for assessing water demands, and identify data needs and next steps to improve water planning capabilities.

Key findings from the project include:

Out-of-stream demands in the state are projected to increase significantly over the next 20 and 50 years, driven by continuing demands from agriculture, population growth, and industry. An increase of over 1 million acre-feet annual water demand is forecasted over the next 40 years based on the Reference Forecast.

Management of water use for irrigated agriculture has the largest effect on overall water use in the State. Irrigated agriculture currently accounts for the greatest demands statewide with over 85% of the overall out-of-stream demand, as well as accounting for ~75% of the forecasted increase in demand over the next 40 years.

Water Demand Forecasting

Water Savings

Ronan Igloria, PE, is Utility Management Services Lead for HDR Engineering in Portland, Oregon. He is responsible for utility services related to planning, operations, and management. Ronan specializes in water resources, focusing on water master planning and stormwater and watershed management planning, source water protection, water rights, regulatory compliance, and hydrologic analysis.

Andrew Graham leads HDR's water planning services in western Washington. He holds a master's degree in public policy from Harvard University. He is active in municipal water system planning and conservation. Andrew authored Washington State's Guide to Watershed Planning and Management, and has produced watershed plans for the Yakima Basin and tributaries to the Lower Columbia River. Over the years, he has assisted the State's Departments of Health, Ecology and Agriculture with policy and program development. He and Ronan Igloria recently completed work the statewide forecast of water needs for the Oregon which provided the basis for this article.

Population growth is the key driver and source of uncertainty for growth in municipal water demand in several key counties.

Water conservation can significantly reduce water demands in all water use categories. Using fairly aggressive conservation assumptions, total water savings of approximately 25% can be realized when comparing the Reference Forecast to the mean forecast for the conservation scenario. On average this is equivalent to achieving a water savings of 0.6% per year over the next 40 years. It should be noted that achievement of this level of conservation would require substantial changes in how the public uses water, as well as significant financial investments, i.e., funding to support infrastructure and management improvements.

Climate change is considered an important factor in how future water demands unfold because of the uncertainty it poses on overall water demands in all of the water use sectors — especially on agricultural demands. The climate change scenario modeled is preliminary in nature and additional study is needed to understand its impacts on a local and regional basis. For this study, based on prior studies reviewed, climate change was assumed to have a moderate to fairly extreme effect on water use factors (i.e., an average increase of 8-18% for outdoor per capita water use and irrigation requirements over 40 years).

ON-LINE TOOL AVAILABLE

The demand forecast tool is designed to assist policymakers and stakeholders experiment with their own assumptions in a number of areas that affect overall demand for water including: population growth; per capita use of water; irrigated acreage; crop requirements; and water conservation. OWRD has made the demand forecasting tool available to the public for interactive use. Users can enter different assumptions and create new demand forecasts on-line. Users have the option to experiment with numbers statewide, county-by-county, or basin-by-basin to see what effect differing assumptions could have on water demands. Users can readily see the information and basis for the demand forecast, and can easily manipulate the data to assess various scenarios.

The demand forecast tool is available online at the following website:
http://apps2.wrd.state.or.us/apps/planning/owsci/demand_model.aspx

The entire spreadsheet tool can be downloaded from the following website:
www.wrd.state.or.us/OWRD/LAW/owsci_info.shtml#Water_Demand_Forecast

CONCLUSIONS

The findings from the demand forecast scenarios and the forecasting tool are useful for estimating the current magnitude and distribution of water demands, and understanding general trends for the purposes of policy discussions. However, data gaps highlighted in this study indicate the need to understand the limitations of the model and the uncertainties associated with the demand forecast.

Instream demands were not discussed in this article, because the focus was on the water demand forecasting tool developed as part of the water needs assessment study. In any water supply planning and strategy discussion, however, accounting for instream demands is a critical piece of the overall needs for water and should not be overlooked.

As the State of Oregon celebrates its 150th year and the 100th year of the State Water Code in 2009, adequate water supply and water quality have gained recognition as cornerstones for sustaining Oregon's economy, population, environment and overall quality of life. Several initiatives and activities over the past five years in Oregon indicate momentum is gaining for coordinated and integrated strategies for long-term water management solutions. In many key basins in Oregon, regional planning groups are forging ahead with regional water management and planning frameworks, e.g., in the Deschutes, Umatilla and Rogue basins. Inadequate resources often limit the ability of individual parties and local groups to come together to initiate similar efforts in other parts of the State. Efforts such as this demand assessment study provide not only technical information and tools, but perhaps more importantly provide a basis to begin conversations using a common and unbiased framework. The model's transparency and flexibility makes it an effective tool for OWRD and other stakeholders to use for communicating policy ideas and direction, as well as to initiate regional (basin-wide) coordination and planning.

For Additional Information:

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WATER BRIEFS

GROUNDWATER DECISION AZ
RIGHTS NOT SEVERABLE

The Arizona Supreme Court (Court) recently held that groundwater rights, outside of "Active Management Areas," cannot be severed from the surface estate when land is sold. *Davis/Chino Grande v. Agua Sierra Resources, LLC, et al*., No. CV-08-0163-PR (March 19, 2009). The grantor attempted to reserve rights to the potential future use of groundwater in the deed. The Court decided that "because a landowner has no real property interest in the future use of groundwater...the attempted reservation is invalid." *Slip Op.* at 3.

It should be noted that the case only "involves the potential future use of groundwater that has never been captured and put to reasonable use." *Id.* at 6-7. Under Arizona's common law, groundwater is not appropriable and, instead, may be pumped by the overlying landowner subject to the doctrine of "reasonable use." *In re the Gen. Adjudication of All Rights to Use Water in the Gila River Sys. & Source* ("Gila River IV"), 198 Ariz. 330, 334 ¶ 3, 9 P.3d 1069, 1073 (2000).
For info: Full opinion availabe at: www.supreme.state.az.us/opin/pdf2009/Davis v. Agua Sierra Opinion.pdf

DOE TOXIC WASTE CA
AGENCY FINED FOR SHUTDOWN

EPA announced on April 1 that the US Department of Energy (DOE) will resume cleanup of toxic waste at its Lawrence Livermore National Laboratory (LLNL) in Livermore, California. EPA notified DOE in early January that it must immediately restart its treatment facilities or face escalating fines. DOE will pay a $165,000 fine for shutting down the cleanup systems and failing to restart them as requested. Recent sampling showed that the closure of a treatment unit on the site's perimeter had resulted in an offsite contaminated groundwater plume.

In early 2008, DOE informed EPA that Congress had reduced funding for the cleanup and then began shutting down the cleanup system. EPA advised DOE to seek reprogramming of funds from Congress. By the time this was accomplished, 28 treatment systems had been shut down and 60 percent of the technical support staff had been laid off. Despite receiving full funding in July 2008, DOE had still not restored operation of most of the systems.

Some of the systems at the site have already been restarted and DOE is regaining control of contaminated groundwater. The remaining facilities that need to be restarted are subject to an agreed upon schedule that is enforceable by EPA under a Federal Facility Agreement. EPA and DOE have also agreed to re-evaluate the cleanup in areas where it is no longer effective, and will involve state regulatory agencies and community stakeholders in the decision-making.

LLNL is a Superfund site, listed on the National Priorities List as one of the most contaminated sites in the country. EPA and DOE first signed an agreement to cleanup LLNL in 1988. Groundwater and soil under the site and in neighboring areas are contaminated with volatile organic compounds and other hazardous chemicals.
For info: Wendy Chavez, EPA, 415/ 947-4248, email: chavez.wendy@epa.gov or website: www.epa.gov/region09/lawrencelivermoremain

WORLD'S MAJOR RIVERS US
WATER LAW STUDIES

The Colorado River Commission of Nevada, recently published *World's Major Rivers: An Introduction to International Water Law With Case Studies.* The book is available in pdf format on the Commission's website at no charge.
For info: Daniel Seligman, Primary Author, 206/ 285-1185 or Commission website: http://crc.nv.gov/index.asp?m=wat

CWA ENFORCMENT WY
ILLEGAL DISCHARGE TO CREEK/WETLANDS

The EPA issued a compliance order on March 25 to David Hamilton for violations of the Clean Water Act (CWA) in Worland, Wyoming. Hamilton allegedly violated the CWA by discharging material into Slick Creek and its adjacent wetlands without a permit. Slick Creek and its wetlands are tributaries to the Bighorn River.

In the fall of 2005, Hamilton or persons acting on his behalf rerouted and channelized approximately 4,100 feet of Slick Creek, discharged material into its adjacent wetlands, and filled the original channel without first obtaining a permit from the US Army Corps of Engineers, which is required by the CWA. EPA's order requires Hamilton to restore the impacted areas to pre-impact conditions and grade. Prior to doing the work, Hamilton must submit a plan for EPA's approval that details how the restoration will be accomplished. Failure to respond to EPA orders subjects individuals to additional enforcement.
For info: Diane Sipe, EPA, 303/ 312-6391, CWA compliance web page: www.epa.gov/compliance/civil/cwa/index.html, or Wetlands website: www.epa.gov/owow/wetlands/

NAVAJO NATION USTs SW
PILOT NNEPA INSPECTIONS

During the week of March 24, Navajo Nation EPA (NNEPA) **u**nderground **s**torage **t**ank (UST) inspectors began inspecting storage tanks on behalf of the US Environmental Protection Agency (EPA), kicking off a two-year pilot program between EPA and NNEPA. EPA issued credentials to two NNEPA inspectors, giving them the ability to inspect tanks on behalf of EPA. The NNEPA inspectors will have the ability to write EPA field citations for federal violations as part of a two-year pilot project, the first of its kind in the nation. Similar to traffic tickets, these citations are used to quickly bring facilities into compliance with federal tank regulations. The citations typically range from $500 up to $3,000.

"This program provides additional tools in the Navajo Nation, and will increase field presence, which will likely lead to improved compliance and reduced releases of gasoline. This pilot program may also serve as a model for tribes nationwide," said Jeff Scott, EPA's director of the Waste Management Division for the Pacific Southwest Region. The Navajo Nation stretches over three states and is roughly the size of West Virginia. On these 27,000 square miles, there are over 200 UST facilities.

Leak prevention is critical because unseen leaks caused by corrosion, overfills or other spills can pollute precious limited groundwater supplies. One hole the size of a pinhead can release 400 gallons of fuel per year, enough to foul millions of gallons of fresh water. The inspectors will be examining equipment and reviewing maintenance records to ensure equipment is working properly.
For info: EPA website: www.epa.gov/oust/; NNEPA website: www.navajonationepa.org/

WATER BRIEFS

IDAHO POWER SETTLES ID AGREEMENT AFFIRMED

On March 26, Governor C.L. Otter, Attorney General Lawrence Wasden, and IDACORP and Idaho Power President and Chief Executive Officer LaMont Keen announced that the 1984 Swan Falls water agreement was reaffirmed in a proposed legal settlement between the State of Idaho and Idaho Power Company (IPC). In 2007, IPC filed suit in the Snake River Basin Adjudication (SRBA) as a result of disputes about the meaning of the Swan Falls agreement. IPC asked that the SRBA court resolve issues associated with the ownership of IPC's water rights, and the application and effect of the trust provisions of the Swan Falls agreement. IPC also asked the SRBA Court to determine whether the agreement subordinated the company's hydropower water rights to aquifer recharge. Newspaper reports in Idaho in 2007 had called IPC's lawsuit "the ultimate water showdown."

In 1984, the Swan Falls agreement resolved a struggle between the State and IPC over IPC's water rights at its Swan Falls hydroelectric facility on the Snake River. The agreement provided that IPC's water rights at its hydroelectric facilities between Milner Dam and Swan Falls — south of Boise — entitled the company to a minimum flow at Swan Falls of 3,900 cubic feet per second (cfs) during the irrigation season and 5,600 cfs during the non-irrigation season. The 1984 agreement placed the portion of IPC's water rights *beyond* those minimum flows in a trust established by the Idaho Legislature for the benefit of Idaho Power and the citizens of the state. Legislation establishing the trust granted the State the authority to allocate the trust water to future beneficial uses in accordance with State law. IPC retained the right to use water in excess of the minimum flows at its facilities for hydroelectric generation until it was reallocated to other uses.

The proposed settlement resolves the litigation by clarifying that the water rights held in trust by the State are subject to subordination to future upstream beneficial uses, including aquifer recharge. It also commits the State and IPC to further discussions on water management issues concerning the Swan Falls agreement and the management of water in the Snake River Basin. The proposed settlement recognizes water management measures that enhance aquifer levels, springs and river flows — such as aquifer recharge projects — benefit both agricultural development and hydropower generation. The parties anticipate that the role of such measures will be developed in the implementation of the Comprehensive Aquifer Management Plan recently approved by the Idaho Water Resource Board. IPC also is cooperating in the development and implementation of a recharge project below American Falls Reservoir. The parties agreed to cooperate in exploring approaches to resolve the relicensing of IPC's Hells Canyon Complex hydro project, plus defining the extent of their right to water from American Falls Reservoir.

Certain aspects of the proposed settlement require changes to Idaho statutes and approval by the Idaho Water Resource Board and the SRBA Court. **For info:** Jon Hanian, Governor's Office, 208/ 334-2100; Settlement Agreement available on Idaho Department of Water Resources website: www.idwr.idaho.gov

WATER TRUST MERGER OR THE FRESHWATER TRUST

The nation's first water trust, dedicated to buying water rights to convert to instream flows, recently announced its merger with Oregon Trout and a subsequent name change to "The Freshwater Trust." In the fall of 2008, the two organizations merged and are now two of four programs under The Freshwater Trust umbrella, formed to provide a holistic restoration approach. The other two programs are Healthy Waters Institute and StreamBank.

"While we will remain true to both organizations' original missions, the merge and name change will allow The Freshwater Trust to address stream form, flow and function at the same time," said Joe Whitworth, president of The Freshwater Trust. Founded in 1983 by a group of flyfishing conservationists, Oregon Trout works to protect and restore native fish and their ecosystems. Oregon Water Trust was founded in 1993 and works cooperatively with landowners to keep more water in their rivers and streams by providing a variety of incentives — including market-based compensation, technical assistance and expert advice.

Launched in 2005, Healthy Waters Institute gets students out of the classroom and connects them to the natural world. StreamBank is a web-based tool that assists restoration professionals and landowners in navigating through the complex systems of restoration funding and permitting. **For info:** Adrian McCarthy, TFT, 503/ 222-9091 x30 or website: www.thefreshwatertrust.org

CARBON SEQUESTRATION AZ INJECTION PILOT PROJECT

The Arizona Department of Environmental Quality (ADEQ) and EPA announced March 25 that they have issued permits authorizing the West Coast Regional Carbon Sequestration Partnership (WESTCARB) to inject 2,000 tons of carbon dioxide into an underground saline formation in Joseph City, west of Holbrook, Arizona. The carbon dioxide injection will occur on Arizona Public Service Company's (APS's) Cholla Power Plant property in Navajo County at a depth of about 3,500 feet. The WESTCARB injection project is sponsored by APS and Lawrence Berkeley National Laboratory, with funding from the US Department of Energy (DOE). ADEQ issued a temporary one-year Aquifer Protection Permit (APP), which requires the project to meet Arizona aquifer water-quality standards and to use the best available technology to protect the aquifer from pollutants.

Geologic carbon sequestration refers to the "capture" of carbon dioxide and its long-term storage in underground geologic formations, removing it from the atmosphere. Carbon dioxide can be captured by modifying industrial plants to remove the gas from process or exhaust emissions before their release. The carbon dioxide is then injected into the below-surface formation, which is intended to confine the carbon dioxide and keep it from permeating upward.

Injection wells are also regulated under the Safe Drinking Water Act's Underground Injection Control (UIC) program, which EPA administers in Arizona. The UIC program is responsible for regulating the permitting, construction, operation, and safe closure of injection wells that place fluids underground for storage, enhanced oil and gas recovery, or disposal. The program ensures safe construction and operation of injection

WATER BRIEFS

wells to prevent contamination of underground drinking water resources.
For info: Alexis Strauss, EPA, 415/ 947-8707; EPA's Office of Water website: www.epa.gov/OW/

FLAME RETARDANTS US

NOAA REPORT NOTES CONCERNS

NOAA scientists, in a report issued April 1, stated that Polybrominated Diphenyl Ethers (PBDEs) — chemicals commonly used in commercial goods as flame retardants since the 1970s — are found in all US coastal waters and the Great Lakes, with elevated levels near urban and industrial centers. The new findings are in contrast to analysis of samples as far back as 1996 that identified PBDEs in only a limited number of sites around the nation.

Based on data from NOAA's Mussel Watch Program, which has been monitoring coastal water contaminants for 24 years, the survey found that New York's Hudson Raritan Estuary had the highest overall concentrations of PBDEs, both in sediments and shellfish. Individual sites with the highest PBDE measurements were found in shellfish taken from Anaheim Bay, California and four sites in the Hudson Raritan Estuary. Watersheds that include the Southern California Bight, Puget Sound, the central and eastern Gulf of Mexico off the Tampa-St. Petersburg, Fla. coast, and Lake Michigan waters near Chicago and Gary, Indiana were also found to have high PBDE concentrations.

John H. Dunnigan, NOAA assistant administrator of the National Ocean Service, noted that "Scientific evidence strongly documents that these contaminants impact the food web and action is needed to reduce the threats posed to aquatic resources and human health." PBDEs are toxic chemicals used as flame retardants in a wide array of consumer products since the 1970s. PBDE production has been banned in a number of European and Asian countries, while in the US, production of most PBDE mixtures has been voluntarily discontinued.

The highest concentrations of PBDEs in the US coastal zone were measured at industrial and urban locations. Still, the chemicals have been detected in remote places far from major sources, providing evidence of atmospheric transport. Significant sources of PBDEs introduction into the environment include runoff, municipal waste incineration, and sewage outflows. Other pathways include leaching from aging consumer products, land application of sewage sludge, industrial discharges and accidental spills.
For info: Ben Sherman, NOAA, 202/ 253-5256; Full report available on NOAA website: http://ccma.nos.noaa.gov/PBDEreport/

GROUNDWATER REPORT TX

FLAWS & INEFFICIENCIES

A disastrous statewide drought in Texas paves the way for a report released in March from Environmental Defense Fund (EDF). *Down to the Last Drop* dissects current flaws and inefficiencies with Texas' current groundwater management process and makes recommendations for state action. Co-authors of the report are Laura Marbury, Texas Water Projects Director for EDF and Mary Kelly, Senior Counsel of the Center for Rivers and Deltas at EDF.

"Our state's groundwater resources face many pressures today," Marbury said. "Not only is Texas' population expected to double over the next 50 years, but a variety of interests are lining up to get a straw into the dwindling groundwater pool. If we don't strengthen our groundwater system to handle increasing pressures, we could completely devastate the resource."

According to Texas State Comptroller Susan Combs' report on Texas' water resources, *Liquid Assets: The State of Texas' Water Resources* (February 2009), groundwater provides almost 60 percent of all fresh water available in the state, but that is decreasing due to groundwater pumping in excess of its ability to replenish itself.

Down to the Last Drop highlights three issues: the connection between groundwater and surface water and the lack of consideration this receives currently; flaws in the Groundwater Management Area process, which sets goals for how healthy groundwater resources should be in the future; and opportunities to modernize the groundwater management process. One recommendation in the report concerns regionalizing groundwater management in parts of the state experiencing significant groundwater development — economic and environmental benefits from consolidating into regional entities, similar to the Edwards Aquifer Authority, far surpass single-county management.
For info: *Down to the Last Drop* available on EDF's website: www.edf.org/documents/9326_2009_TX_Groundwater_Report.pdf; *Liquid Assets* available on the Comptroller's website: www.window.state.tx.us/specialrpt/water/

LAKE ROOSEVELT PLAN WA

RECLAMATION RELEASES DRAFT EA

The US Bureau of Reclamation (Reclamation) has released a Draft Environmental Assessment for implementation of the Lake Roosevelt Incremental Storage Release Project. The purpose of the project is to meet objectives established by Washington state's Columbia River Water Management Act, including delivering water from Lake Roosevelt to the Odessa area to relieve a critical groundwater shortage, and protecting Columbia River flows for salmon. The proposed action would increase flows below Grand Coulee Dam during the spring and summer salmon migration. This action was analyzed and included in NOAA Fisheries' 2008 Federal Columbia River Power System Biological Opinion.

Under the proposed action, Reclamation would drawdown Lake Roosevelt by an additional 82,500 acre-feet (AF) in most water years to provide for: irrigation in the Odessa Subarea (30,000 AF); municipal and industrial use (25,000 AF); and increased streamflow in the Columbia River during the main salmon migration period (27,500 AF). The water for municipal and industrial use would be left in the Columbia River until its point of diversion at various points downstream from Grand Coulee Dam. The water provided to the Odessa area would only be available to individuals within the Columbia Basin Project boundary who currently irrigate with a valid state groundwater right.

Under the No Action Alternative, no incremental storage releases would be made from Lake Roosevelt. The reservoir would continue to be operated as it is today. Written Comments on the draft EA are due on April 17.
For info: Dave Kaumheimer, Reclamation, 509/ 575-5848 x232, or Reclamation's website: www.usbr.gov/pn/programs/ea/wash/lakeroosevelt/index.html

CALENDAR

April 16-17 WY
Wyoming Water Law Seminar, Cheyenne. Little America. For info: CLE International, 800/ 873-7130 or website: www.cle.com

April 17 CO
Colorado AWRA Symposium: Compacts, Politics & the Future, Golden. Mt. Vernon Country Club. For info: Colorado website: http://awracolorado.havoclite.com/

April 17 OR
Oregon Water School - Watershed Education Team, McMinnville. Church on the Hill. For info: Megan Kleibacker, OSU Sea Grant Extension, 541/ 737-8715, email: megan.kleibacker@oregonstat.edu or website: http://oregonstate.edu/

April 18 OR
Oregon Water School - Watershed Education Team, McMinnville. Linfield College. For info: Megan Kleibacker, OSU Sea Grant Extension, 541/ 737-8715, email: megan.kleibacker@oregonstat.edu or website: http://oregonstate.edu/

April 19-23 AZ
2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting: The Science Conference: Adapting to Increasing Demands in a Changing Climate, Tucson. Sponsored by the National Ground Water Association and the Ground Water Protection Council. For info: NGWA, 800/ 551-7379, email: customerservice@ngwa.org, or website: www.ngwa.org

April 20 CA
California Water Plan Update 2009 Workshop, Fairfield. Solano County Admin. Bldg.. For info: CDWR website: www.waterplan.water.ca.gov/

April 20-23 TX
19th Annual Membrane Filtration & Other Separations Technologies Short Course, College Station. Sponsored by Texas A&M University - Food Protein R&D Center's Separation Sciences Group. For info: Carl Vavra, Texas A&M, 979/ 845-2758, email: cjvavra@tamu.edu or website: www.tamu.edu/separations

April 20-23 WA
2009 Annual General Meeting: New Science for Managing Uncertainty in Fisheries, Shelton. Little Creek Casino Resort. Sponsored by American Fisheries Society - Washington and British Columbia Chapter. For info: Conference website: www.npic-afs.org/agm/first-call/

April 21-22 OR
Oregon Streamflow Duration Assessment Method Training Session, Portland. USFWS Regional Office, 911 NE 11th Ave.. For info: Scott Clemans, Corps. 503/ 808-4510 or EPA website: http://yosemite.epa.gov/R10/ecocomm.nsf/wetlands/oregonstreamflow

April 21-23 WA
Stormwater Engineering: Civil & Environmental Engineering Professional Development Course, Shoreline. For info: Course website: www.engr.washington.edu/epp/transpeed/swe.html

April 22-24 KS
Western States Water Council 159th Council Meeting, Kansas City. Great Wolf Lodge. For info: Cheryl Redding, WSWC, 801/ 561-5300, email: credding@wswc.state.ut.us or website: www.westgov.org/wswc/meetings.html

April 23 CA
Essential Drought Tools for Urban Water Managers Workshop, Irvine. Irvine Marriott. Sponsored by Water Education Foundation & ACWA. For info: WEF website: www.watereducation.org/

April 23 ID
Idaho AWRA Annual Dinner, Boise. Bardenay Restaurant. For info: Email: kdpeter.h2o@gmail.com

April 23 WA
How to Build a Rain Garden Workshop, South Seattle. NW Environmental Education Center. For info: Becky Abbey, Stewardship Partners, 206/ 292-9875, email: ba@stewardshippartners.org

April 23-24 OR
Oregon Wetlands Seminar, Portland. World Trade Center. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

April 24 CA
California Water Plan Update 2009 Workshop, Bishop. Inyo Mono Title Co.. For info: CDWR website: www.waterplan.water.ca.gov/

April 27-28 OR
Water Quality & Quantity Seminar, Portland. For info: Holly Duncan, Environmental Law Education Center, 503/ 282-5220, email: hduncan@elecenter.com or website: www.elecenter.com

April 27-30 CA
BioCycle International Conference 2009, San Diego. Town & Country Resort & Convention Center. Oreganics Recycling & Composting. For info: Conference website: www.jgpress.com/biocycle50/home.html

April 28-30 OR
International BIOMASS Conference & Expo, Portland. Presented by BBI Int'l. For info: Conference website: www.biomassconference.com

April 28-30 WA
7th Washington Hydrogeology Symposium, Tacoma. Tacoma Convention Center. Sponsored by Ecology & USGS. For info: Ecology Website: www.ecy.wa.gov/events/hg/index.htm

April 29 WA
Making Sustainability Stick: Tools for Change Agents Course, Seattle. NWETC HQ: 650 South Orcas Street, Ste. 220. For info: Conference website: www.nwetc.org

April 30 OR
Making Low Impact Development a Reality - Willamette Valley, Eugene. Lane Community College. Sponsored by Oregon Environmental Council & OSU Extension/ Oregon Sea Grant. For info: Teresa Huntsinger, OEC, 503/ 222-1963 x112 or website: www.oeconline.org/

April 30-May 1 WA
Restoration & Mitigation in Washington, Seattle. Renaissance Seattle Hotel. For info: Law Seminars Int'l, 800/ 854-8009, email: registrar@lawseminars.com, or website: www.lawseminars.com

May 1 OR
Making Low Impact Development a Reality - Rogue Valley, Grants Pass. Josephine County Cthouse. Sponsored by Oregon Environmental Council & OSU Extension/ Oregon Sea Grant. For info: Teresa Huntsinger, OEC, 503/ 222-1963 x112 or website: www.oeconline.org/

May 2-5 OH
River Rally 2008 Conference, Huron. Sawmill Creek Resort. Sponsored by the River Network. For info: Website: www.rivernetwork.org

May 3-6 D.C.
National Clean Water Policy Forum, Washington. Renaissance Washington DC Hotel. Sponsored by National Association of Clean Water Agencies. For info: NACWA website: www.nacwa.org

May 4-5 AZ
Law of the Colorado River Seminar, Phoenix. Arizona Biltmore Hotel. For info: CLE International, 800/ 873-7130 or website: www.cle.com

May 4-6 AK
American Water Resources Assn "Managing Water Resources and Development in a Changing Climate" Conference, Anchorage. Marriott Downtown. For info: AWRA, 540/ 687-8390 or website: www.awra.org

May 4-7 CO
Environment, Energy & Sustainability Symposium & Exhibition, Denver. For info: Conference website: www.ndiae2s2.com

May 4-8 OR
Salmonid Conservation Series (3 Courses), Troutdale. McMenamin's Edgefield. Northwest Environmental Training Center Course. For info: NWETC website: http://nwetc.org/training_or.htm

May 5-11 CA
Intro to Process-Based Stream Restoration, South Lake Tahoe. Inn by the Lake. For info: Northwest Enviromental Training Center website: http://nwetc.org/

May 5-7 OR
Northwest Facilities Expo, Portland. Sustainable Products, Energy-Efficient, Effective & Low-Maintenance. For info: Joyce Lortz, 800/ 827.8009 x4424, email: Joyce.Lortz@cygnusexpos.com or website: www.FacilitiesExpo.com

May 5-8 UT
National Mitigation & Ecosystem Banking Conference, Salt Lake City. Salt Lake Convention Center. For info: Conference website: www.mitigationbankingconference.com

May 6 VA
Taking the Pulse of Our Planet: Tracking Seasonal Signs of Climate Change - USGS Lecture Series, Reston. USGS Hqtrs., 7-8pm. For info: USGS, 703/ 648-4748 or website: www.usgs.gov/public_lecture_series/

May 6 WA
South Sound Science Symposium: "Linking Threats with Indicators", Shelton. Squaxin Island Tribe's Little Creek Casino. For info: Tom Kantz email: TKANTZ@co.pierce.wa.us

May 6 CA
Environmental Justice, Public Health & the Built Environment Conference, Davis. For info: UC Davis website: http://extension.ucdavis.edu

May 6-7 OR
Oregon Streamflow Duration Assessment Method Training Session, Medford. BLM Office, 3040 Biddle Rd.. For info: Scott Clemans, Corps. 503/ 808-4510 or EPA website: http://yosemite.epa.gov/R10/ecocomm.nsf/wetlands/oregonstreamflow

May 6-9 OR
2009 Spring Conference: American Waterworks Ass'n Pacific NW Section, Salem. Salem Conference Center. For info: NW Section website: http://pnws-awwa.org/index.asp

May 7-8 ID
Idaho Water Law Seminar, Boise. For info: Law Seminars Int'l, 800/ 854-8009, email: registrar@lawseminars.com, or website: www.lawseminars.com

May 7-8 OR
The Promise of Development: Natural Resource Issues in a New Economy Conference, Bend. Inn of the 7th Mountain. Sponsored by OSB Environmental & Natural Resources Section. For info: Email: sdobson@osbar.org or website: www.osbarcle.org/

May 10-13
Nutrient Recovery from Wastewater Streams International Conference, Vancouver, B.C.. For info: Conference website: www.nutrientrecovery2009.com/

May 11 WA
CERCLA & MTCA: Advanced Sediment Conference, Seattle. For info: Holly Duncan, Environmental Law Education Center, 503/ 282-5220, email: hduncan@elecenter.com or website: www.elecenter.com

May 11-13 DC
2009 National Hydropower Association Annual Conference, Washington. Capital Hilton Hotel. For info: NHA website: www.hydro.org/

May 11-14 OR
5th National Conference for Nonpoint Source & Stormwater Outreach: Achieving Results with Tight Budgets, Portland. DoubleTree Hotel. Sponsored by EPA. For info: Don Waye, EPA, 202/ 566-1170, email: waye.don@epa.gov or website: www.epa.gov/nps/outreach2009/

May 11-15 WA
Wetland Delineation Intensive Course, Bothell. UW Bothell. For info: UW Engineering, 888/ 469-6499, email: extnadvising@extn.washington.edu or website: www.engr.washington.edu/epp/cee/wet.html

May 12-13 WA
2009 Tribal Habitat Conference, Marysville. Tulalip Inn's Pacific Rim Ballrm.. Sponsored by NW Indian Fisheries Comm'n. For info: Bruce Jones, NWIFC, 360/ 528-4369, email: bjones@nwifc.org or website: www.habitatconference.org/

May 12-14 TX
TCEQ's Environmental Trade Fair & Conference, Austin. Austin Convention Center. Sponsored by Texas Commission on Environmental Quality. For info: TCEQ website: www.tceq.state.tx.us/

May 13 WA
Model Toxics Control Act Seminar, Seattle. For info: Law Seminars Int'l, 800/ 854-8009, email: registrar@lawseminars.com, or website: www.lawseminars.com

May 13 CA
NEPA Overview & Refresher, Sacramento. Sutter Square Galleria, 2901 K Street. Sponsored by UC Davis Extension. For info: UC Davis Extension, 800/ 752-0881 or website: http://extension.ucdavis.edu

The Water Report
Water Rights, Water Quality & Water Solutions in the West
260 N. Polk Street • Eugene, OR 97402

CALENDAR

(continued from previous page)

May 13-14 **WA**
Community Energy Roadmap Pacific Northwest Summit & Workshop, Bellevue. Meydenbauer Center. For info: Marcy, NextGen Today, 604/ 833-4490 or website: www.communityenergyroadmap.com

May 13-14 **ID**
2009 Idaho Wastewater Reuse Conference, Boise. DoubleTree Hotel. For info: Tressa Nicholas, IDEQ, 208/ 373-0116 or email: tressa.nicholas@deq.idaho.gov

May 14 **WA**
Fisheries & Hatcheries Seminar, Seattle. WA State Convention & Trade Ctr.. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

May 14-15 **CA**
California Water Law Seminar, Monterey. Hyatt Regency. For info: CLE International, 800/ 873-7130 or website: www.cle.com

May 15 **WA**
Water Rights Transfers: Participating in the Water Market in Washington State, Seattle. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

May 17-19 **CA**
Waste-to-Fuels Conference & Trade Show, San Diego. Hyatt Regency Mission Bay. For info: Gene Jones, 800-441-7949 or website: www.waste-to-fuels.org/

May 17-21 **KS**
World Environmental & Water Resources Congress Conference, Kansas City. For info: Conference website: http://content.asce.org/conferences

May 18 **WA**
Environmental Reporting & Disclosure Seminar, Seattle. For info: Law Seminars Int'l, 800/ 854-8009, email: registrar@lawseminars.com, or website: www.lawseminars.com

May 18-19 **CA**
Endangered Species Act Seminar: Hot Environmental Issues in Southern California, Palm Springs. La Quinta. For info: CLE International, 800/ 873-7130 or website: www.cle.com

May 18-19 **CA**
13th Annual Water Reuse & Desalinization Research Conference, Huntington Beach. Hilton Waterfront Beach Resort. For info: Water ReUse website: www.WateReuse.org

May 18-21 **CO**
National Hydrologic Warning Council 2009 Conference & Exposition, Vail. For info: Conference website: www.hydrologicwarning.org/

May 19-20 **WA**
Climate Change in the Northwest, Seattle. For info: Holly Duncan, Environmental Law Education Center, 503/ 282-5220, email: hduncan@elecenter.com or website: www.elecenter.com

May 19-22 **CA**
2009 Assn of California Water Agencies Spring Conference & Exhibition, Sacramento. Sacramento Convention Center. For info: ACWA, 916/ 441-4545 or website: www.acwa.com

May 19-23 **WA**
Creating Thriving Rural & Urban Communities through Ecological Restoration - Society for Ecological Restoration International Conference, Lynwood. Lynwood Convention Center. For info: Conference website: www.ser.org/

May 20 **OR**
Advanced Water Rights Bootcamp, Burns. Sponsored by Water for Life and Schroeder Law. For info: Helen Moore, WFL, 375-6003, email: helen.moore@waterforlife.net or website: www.waterforlife.net

May 20 **CA**
Mitigation Measure Development & Monitoring, Sacramento. Sutter Square Galleria, 2901 K Street. Sponsored by UC Davis Extension. For info: UC Davis Extension, 800/ 752-0881 or website: http://extension.ucdavis.edu+J66

May 20-21 **WA**
Construction Site Erosion & Pollution Control (CESCL), Bellevue. For info: UW Engineering website: www.engr.washington.edu/epp/cee/cec.html

May 20-22 **TX**
Water Quality Conference, San Antonio. Hilton Hill Country Hotel & Spa. For info: NWETC website: http://nwetc.org/training_or.htm

May 21 **OR**
Sustainability Using The Natural Step Framework, Portland. DoubleTree Hotel, 1000 NE Multnomah. For info: April Knudsen, Natural Step Network, 503-241-1140 x1, email: april@ortns.org or website: www.thenaturalstep.org/usa

May 27-29 **MT**
14th Institute for Natural Resource Law Teachers, Chico Hot Springs. Sponsored by Rocky Mt. Mineral Law Foundation. For info: Mark Holland, RMMLF, 303/ 321-8100 x106, mholland@rmmlf.org or website: www.rmmlf.org

May 28-29 **OR**
Eminent Domain: Current Developments in Condemnation, Valuation & Challenges Seminar, Portland. World Trade Center. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

May 28-29 **WA**
Three Degrees: The Law of Climate Change & Human Rights Conference, Seattle. UW Law School. For info: Conference website: www.threedegreesconference.org

Are You Missing Any Issues?

Last November the problem-free mailing service The Water Report had used since its inception was sold. The new owners promised identical service. As it turns out, their "identical service" included waiting up to 10 days to mail out to our subscribers and, in the worst instance, failing to deliver at all to ten percent of our readership. This was not immediately evident at our end, and it has taken us over four months to realize the full extent of the problem. For short-changed readers we have identified, we have mailed out the missing issues and extended their subscription by the number of undelivered issues they were short. Unfortunately, the state of the data we got back from the mail "service" may not have allowed us to identify all of the missing issues. If you are missing any issues, please contact us by phone or email (see page 2) and we will do our best to make things right. We sincerely regret any inconvenience these circumstances may have caused you.

Thank You, The Editors