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Water Rights, Water Quality & Water Solutions in the West

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WATER AND WESTERN GROWTH

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INTRODUCTION

The American West's population is growing at the same time that regional water supplies face both continuing and newly arising stresses. Western states continue to experience both an internal population shift toward the sunshine and mountains and an influx of newcomers who fuel the region's absolute population growth. Contrary to any concerns about limited water supplies, people want to live in the West. It is beautiful; large parts of it enjoy mild or bearable winters; it offers a full range of "lifestyle" and outdoor recreation choices; and areas open to habitation are much more plentiful than in the past. The modern service economy — combined with extensive (federally subsidized) highway, air route, and electronic infrastructures — facilitate a far greater range of location choices for individuals and business than did the "old" cowboy/commodity production economy, which remains politically powerful but economically less important. Air conditioning has made year-round desert living feasible for many who otherwise would not bear the discomfort of the Southwest's summers.

There are a range of consequences arising from this surging human tide. As concerns water, urban growth impacts at least four water-related issues of public concern both in the areas which are growing and in areas where the water supply originates.

Western urban growth water impacts:

(1) available surface and groundwater reserves
(2) community amenity levels
(3) the cultural commons represented by small ranch, farm, or raw commodity production communities (see Gary Nabhan, *Heat's On,* Agriculture Headwaters News Perspective: www.headwatersnews.org/p.nabhan052604.html (May 26, 2004))
(4) water dedicated to aquatic ecosystem function support or recovery [Note: The conventional term is "ecosystem restoration," but the terms "recovery" or "revival" are preferable because "restoration" may be narrowly defined as the return to prehuman intervention conditions (see Barton H. Thompson, *Water Management and Land Use Planning: Is It Time for Closer Coordination?* in Craig Anthony Arnold, *Wet Growth: Should Water Law Control Land Use?* 95, 100-102 (Envtl. Law Inst. 2005).

Cities are increasingly asking what kind of physical and cultural landscape they want. Addressing water issues can provide a leverage point to facilitate more intelligent choices about urban form and the society than has previously occured. Some communities, not always confined to the arid West, face supply constraints and must factor these into their growth policies. In other areas, continued urban growth may come at the expense of environmental restoration and the preservation of remnant areas of irrigated agriculture. Cities may wish (or be forced) to integrate their water demands with those of other users. Population booms also threaten to destroy the land and water base of many small communities and landscapes with under-appreciated ecosystem services and values.

Water & Growth

Water Availability

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Historic Disconnect

Shortages

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This article examines the barriers that water, public utility, and land use law pose to using water availability as a strategy to limit population growth. The water-land use linkage programs currently emerging in the region are also explored. The current growth management debate continues to accept growth as inevitable and seeks only to accommodate it through conservation, reallocation of agricultural supplies, and possibly denser urban development. Nonetheless, the exit of the federal government from subsidizing regional development, along with state inaction, is forcing urban areas to begin linking land use and water resources planning for the first time. Western cities may not stop growing, but growth accommodation will be more difficult and more expensive than it has been in the past.

Increasingly, some form of water supply planning will be necessary before growth can continue. Water will be more costly, and the trade-offs between growth and its alternatives will become more intense and obvious. Global climate change adds an additional wild card to the mix.

We are still a long way from achieving sustainable human settlement in the American West.

WATER & LAND USE POLICIES

Barriers to Linkage Fuel Unlimited Growth

In light of the changing demographic, political and physical realities of the region, Western states and local governments can scarcely avoid taking a more coordinated approach to water and land use planning. Historically, however, water and land use planners have worked at different levels of government (water managers reporting to state agencies; land use planning revolving around local government authorities) with little reason to talk to one another. [The historic disconnect between water and land use planning is explored in A. Dan Tarlock and Lora A. Lucero*, Connecting Land, Water, and Growth*, 34 The Urban Lawyer 971 (2002), and 54 Land Use Law & Zoning Digest, No. 4, p. 3 (April 2002); and Lora A. Lucero and A. Dan Tarlock, *Water Supply and Urban Growth in New Mexico: Same Old, Same Old, or a New Era?* 43 Nat. Resources J. 803 (Summer 2003).]

Today, land use planners are increasingly interested in water supply issues as communities face real or perceived shortages. The American Planning Association's 2006 conference notably included a separate track focusing land and water issues. Water managers generally show less interest in delving into local planning issues.

States options to link water and land use policies include:

- Capping Growth
- Continuing Unlimited Growth Accommodation
- Shifting Water Supply Acquisition to Local Governments and Developers
- Constraining Growth to Match Available and Projected Supplies

Legal barriers that complicate states' decisions to choose among these strategies are discussed next, followed by an examination of linkage programs that Western states and cities are beginning to adopt.

Water Law: The Municipal Super-Preference

Water law has consistently supported unrestrained, sprawling urban growth. Water law has served as one of the drivers of suburbanization because all doctrines — the common law of riparian rights, prior appropriation, and the law of groundwater capture — contain a super-preference for accommodating growth (see A. Dan Tarlock and Sarah B. Van de Wetering, *Growth Management and Western Water Law: From Urban Oases to Archipelagos*, 5 Hastings W.-N.W. J. Envtl. L. 163 (Winter 1999). This is not a condemnation of urban growth or water law generally. The dedication of water to urban use is consistent with the long-established scheme of preferences for utilitarian applications of water. It is economically rational. Our point is simply that in major water fights, cities almost always win. We concentrate on Western water law, but the common law of riparian rights equally supports urban growth.

Urban Expansion and the Law of Prior Appropriation

Prior appropriation promoted the West as a democratic, irrigated society (see Sibley, TWR #42). However, the dominant rule of water allocation in the West also turns out to be an ideal law for urban expansion because it is a use-based rather than land-based system of property rights.

Detaching water from land allows the entire flow of a stream to be diverted far from the watershed of origin to serve growing cities. Such diversions serve both California and Colorado. Las Vegas is finding water in distant areas in the state and may actually get a federal reservoir to capture California's runoff before it reaches Mexico. However, the search for new supplies has come at escalating financial and political costs.

Water & Growth

Replacement Cost

Cities have thrived under Prior Appropriation Doctrine. However, in any given situation the doctrine may be invoked by agricultural water right holders with senior rights, with a municipality bearing the cost. An example of such cost increases is found in *City of Barstow v. Mojave Water Agency*, 24 Cal.4th 224, 5 P.3d 853 (2000). The Mojave River basin in southern California is a severely overdrafted groundwater basin. Following a lengthy negotiation which resulted in agreement among over 80 percent of the basin water users, the trial court imposed a physical solution on all pumpers. Under the solution, pumpers were assigned a cost-free production allowance. Pumping in excess of the allowance was subject to a charge dedicated to the purchase of replacement water. [For a prescient defense of the California Supreme Court's holding see Rebecca Sugerman, *The Mojave Basin Physical Solution: It's a Good Idea, But Is It Good Law?* 6 Hastings W.-N.W. J. Envtl. L. 307 (2000).]

Special Rules

Cities benefit from special rules that allow them to acquire water rights in advance of demand. Under the "growing cities" and "progressive growth" doctrines cities, are largely exempt from the anti-monopoly principle that water rights cannot be held for speculative purposes. The "growing cities" doctrine allows cities to perfect a water right to the amount of water that they will need in advance of demand (see *Thornton v. Bijou Irrigation Co.,* 926 P.2d 1, 29 30 (Colo. 1996); *Reynolds v. City of Roswell*, 654 P.2d 537, 540 (1982)). Under the related "progressive growth" doctrine, a city can perfect a water right based on expected anticipated need for the water. *State ex rel. Crider*, 431 P.2d 45, 49 (N.M. 1967); *St. Onge v. Blakeley*, 245 P. 532, 539 (Mont. 1925).

Washington Litigation

While there have been a few judicial exceptions to these doctrines, the end results have been mixed. The Washington Supreme Court limited the reach of the "growing cities" doctrine by holding that actual application to beneficial use rather than capacity of a private municipal water system is the measure of the water right. *State Dep't of Ecology v. Theodoratus*, 135 Wash.2d 582, 589-590, 957 P.2d 1241, 1245 (1998). The court left open the issue of whether the holding applies to municipal water suppliers. The "growing communities" doctrine was strongly endorsed in the dissenting opinion. *Id.* at 1257–1258 (Sanders, J. dissenting). The legislature subsequently (2003) enacted the "Municipal Water Law" which in part reaffirmed the growing cities doctrine.

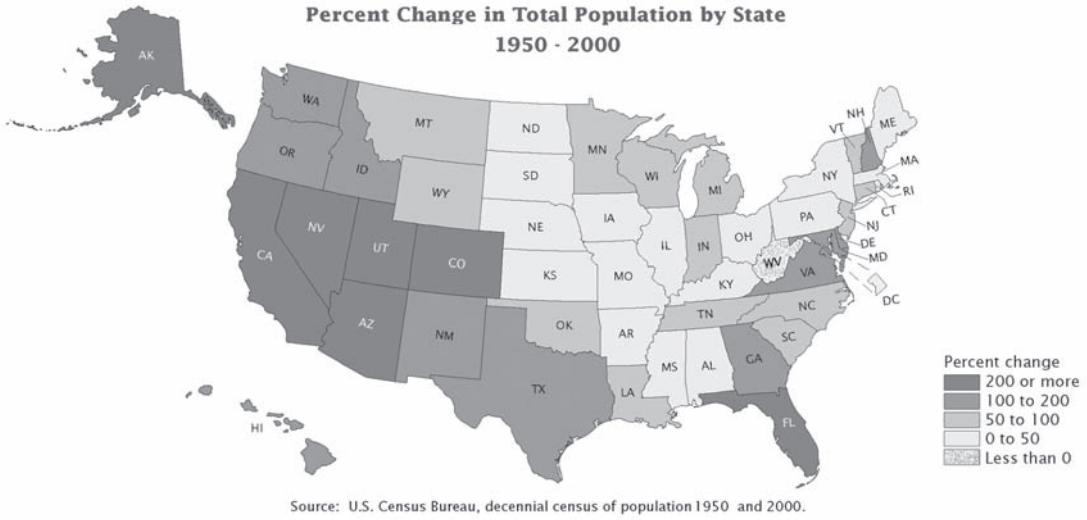
Actual Use

A judicial willingness to limit water rights to actual use is also found in *San Carlos Apache Tribe v. Superior Court*, 972 P.2d 179 (Ariz. 1999). There the court held that the statute that mandates the use of maximum theoretical capacity violates the doctrine of separation of powers, because it prevents a court from basing a decree on a factual determination of the amount of water actually diverted (or stored) and applied to beneficial use.

Public Interest?

Another example of a decision limiting municipal water rights is *WaterWatch of Ore., Inc. v. Water Res. Comm'n*, 193 Or.App. 87, 88 P.3d 327 (2004), which read a public interest standard into the state's due diligence statute (ORS 537.230). This ruling pertained to the issuance of a permit for a proposed municipal diversion that would not apply the water to beneficial use until long after the five-year statutory limit (if ever). The court held that the issuing of this permit was not in the public interest. The power of cities to obtain the water that they think they need for growth is illustrated by the aftermath of this case. The legislature essentially reversed the appellate court by quickly extending the time in which water must to be put to a beneficial use to 20 years. See Michelle Henrie, *Oregon's Municipalities Can Take the Time They Need to Grow*, 7 Water Resources Impact 12 (Nov. 2005).

"Between 1900 and 2000, the mean center of the US population moved about 324 miles west and 101 miles south." (*Demographic Trends in the 20th Century, Census 2000 Special Reports*, November 2002, Hobbs and Stoops)



Water & Growth

Groundwater Issues

Reasonable Use Rule

Correlative Rights

Groundwater: Pumps Have No "Off" Switch

Groundwater law is even more favorable to cities because it imposes fewer legal restraints on water use than the laws governing surface waters. In many parts of the country, accelerating groundwater pumping by municipal suppliers and unregulated private wells is causing water tables to drop and land to "subside" (sink). See Robert Glennon, *Water Follies: Ground-Water Pumping and the Fate of America's Fresh Waters*, 32–34 (Island Press, 2002). Courts have refused to recognize or protect a right to "lift groundwater" (i.e protect an existing water user's ability to access groundwater at a certain depth). See *Wayman v. Murray Corp.,* 458 P.2d 861 (Utah 1969). Neither judicial decisions nor state statutes do a good job of integrating surface and groundwater rights. See Robert J. Glennon and Thomas Maddock, III, *In Search of Subflow: Arizona's Futile Effort to Separate Groundwater from Surface Water*, 36 Aiz. L. Rev. 567 (Fall 1994). Cities have benefited from this lack of coordination.

The right to extract groundwater in many states is controlled by the common law rule of capture, while surface water use is controlled by prior appropriation or dual riparian–appropriative regimes. For example, the reasonable use rule that (loosely) controls groundwater appropriation in places like rural Arizona is a modified rule of capture requiring only that municipalities compensate injured overlying owners when water is transported to non-overlying land. *Higday v. Nickolaus*, 469 S.W.2d 859, 866 (Mo. 1971); *City of Blue Springs v. Central Dev. Ass'n*, 831 S.W.2d 655, 658-659 (Mo.App. W.D. 1992); *Forbell v. City of New York*, 58 N.E. 644, 646 (1900); *Canada v. City of Shawnee*, 64 P.2d 694, 699 (Okla. 1936) (injunction conditioned on city's institution of condemnation action).

California and Nebraska replaced reasonable use with the correlative rights rule to bring groundwater closer to the common law of riparian rights. At most, these rules simply impose additional financial burdens on cities that wish to acquire new groundwater supplies.

California groundwater law divides rights among overlying, appropriative, and prescriptive holders. The California correlative rights rule posits that all overlying owners have a right to a proportionate share of the basin and that any surplus waters are subject to appropriation by non-overlying landowners (*Katz v. Walkinshaw*, 74 P. 766, 771 (Cal. 1902). Non-overlying users may obtain appropriative rights only if there is "surplus water" — i.e. water which is "surplus" to an estimated "safe yield" (see sidebar) in that it may be pumped without detriment to the water table. *Wright v. Goleta Water Dist*., 174 Cal. App. 3d 74, 85-89 (1995). Thus, once the "basin" is defined, this rule formally puts non-overlying municipalities at a disadvantage because in-basin users have preferential rights to use the water. Non-overlying pumpers can also obtain prescriptive rights. These rules are difficult to administer, in large part because most groundwater basins are overdrafted, and in the past the courts have preferred basin-wide solutions that equitably distribute the burdens of limiting groundwater use to safe yield among all basin users.

California has developed special rules for municipalities that insure that the state's correlative rights rule does not cut off access to needed supplies. The famous case of *City of Pasadena v. City of Alhambra*, 33 Cal.2d 908, 938, 207 P.2d 17 (1949), invented a new way to divide basins among municipalities when all the parties' rights were based on prescription (amounts they "had been actually pumping"). The court held that "in order to conserve the basin and preserve the rights of all parties" it was necessary "to limit the takings to the amount of the safe yield and therefore to make a pro tanto or proportionate reduction in the amount which each can be permitted to pump until such time as conditions warrant an increase." This mutual prescription doctrine tends to confirm municipal uses or to promote large-scale regional solutions. It has been limited to conflicts between overlying and non-overlying water rights holders (*Tehachapi-Cummings Water Dist. v. Armstrong*, 122 Cal.Rptr. 918, 1001 (Cal. App. 1975)).

The doctrine of mutual prescription ignored the California Code prohibition on prescription against municipalities. *City of Los Angeles v. City of San Fernando*, 537 P.2d 1250 (Cal. 1975), corrected this error and created a series of favorable rules for Los Angeles. It held that a non-municipal pumper may not prescribe against the state, but a municipal pumper may prescribe against a non-municipal one. *Id.* at 1305-1306. In addition, it announced a liberal safe yield test that will delay the start of any prescriptive period (*Id.* at 1309).

Some states, such as New Mexico and Colorado, allow the state engineer to deny a groundwater appropriation that would impair senior surface rights, or to condition a new appropriation on the retirement of senior surface rights. *City of Albuquerque v. Reynolds*, 379, 439-440 P.2d 73 (N.M. 1962). This level of integration between surface water and groundwater has not, however, ended groundwater "mining" (i.e. diversion of groundwater in excess of an aquifer's safe yield).

Safe Yield is defined as "the maximum quantity of water which can be withdrawn annually from a ground water supply under a given set of conditions without causing an undesirable result." (*City of Los Angeles v. City of San Fernando* (1975) 14 Cal.3d 199, 278 [123 Cal.Rptr. 1, 537 P.2d 1250].) **Undesirable Result** is a gradual lowering of the ground water levels leading eventually to depletion of the supply. (*Ibid*) "A ground water basin is in a state of surplus when the amount of water being extracted from [it] is less than the maximum that could be withdrawn without adverse effects on the basins' long term supply... **Overdraft** commences whenever extractions increase, or the withdrawable maximum decreases, or both, to the point where the surplus ends." (*Id*, at pp. 277-278.)

Prescription is the manner of acquiring property by use that is open, notorious, under claim of right and adverse to the owner's use, for an uninterrupted period of time required by law. **Adverse Use** essentially means without one's permission. **Open and Notorious** generally means regular and highly visible use. Some states do not allow water rights to be acquired by prescription (aka "adverse use").

Water & Growth

Denver's "Not Non Tributory" Water

Colorado's rococo groundwater rules rank among the marvels of modern water law, but the net result is a strong preference for growth in Colorado's Front Range. For example, special rules for Denver's "not nontributary" deep aquifer provide for only a minimal augmentation of streamflow and thus promote use on new subdivisions on overlying land (Colo. Rev. Stat. § 37-90-103 (10.7)(2005); see *Chatfield E. Well Co. v. Chatfield E. Prop. Owners Ass'n*, 956 P.2d 1260 (Colo. 1998)). The Act mentions four aquifers by name but the Colorado Supreme Court has held that the legislative history of the statute supports the conclusion that it applies only to those portions of the four named formations that are located in the Denver basin. *In Re Application of Water Rights of Park County Sportsman's Ranch LLP*, 986 P.2d 262, 268-274 (Colo. 1999).

Arizona Management

Arizona has the most aggressive groundwater conservation regime, but it too allows cities to prosper when water is limited. Arizona is gradually switching from relying primarily on groundwater to obtaining supplies from the Central Arizona Project and recycled water. Water use appears to have leveled off even as population continues to increase. The 1980 Arizona Groundwater Management Act requires that the state establish safe yield limits in designated Active Management Areas. However, the Phoenix Active Management Area may exceed safe yield by 251,000 acre-feet and the state estimates that this overdraft will continue until the 2025 safe yield target date (www.water.az.gov/watermanagement_2005/Content/AMAs/PhoenixAMA/default.htm). Smaller deficits have long been projected for Tucson, but the same result is likely — the 2025 safe yield goal will not be met (*Safe Yield Goal Proving Elusive*, 7 Ariz. Water Resource 1 (Sep.–Oct. 1998), http://ag.arizona.edu/AZWATER/awr/sept98/feature1.html). Skyrocketing urban growth and severe, perhaps more frequent droughts have undermined the initial AMA planning assumptions.

Compact Obligations

New Mexico's long history of groundwater mining to support the Albuquerque corridor is beginning to catch up with it. To meet its downstream Rio Grande compact and treaty obligations, all new uses must be offset by existing ones. Lucero and Tarlock, *supra* n.10 at 805-806.

Groundwater & Local Government Assumptions

California: Counties v. State

Local governments have long assumed that they do not control access to water located within their boundaries because water rights are created and controlled by state law. They have also assumed (and been told) that water rights can be detached from the area of origin and moved to areas of demand. However, these assumptions are eroding in ways that may adversely impact cities. For example, California counties have the legal right to prevent groundwater exports beyond their borders. California has no statewide regulation of groundwater use, and state law allows local agencies to adopt groundwater management plans (Cal. Water Code §§10750, 10753.9 (2005). An intermediate appellate court opinion held that state law does not preempt a county ordinance from prohibiting withdrawals in excess of a safe yield, or from protecting preexisting and reasonably foreseeable overlying beneficial uses. The court dismissed the argument that the ordinance was intended to "hoard" water by protecting projected agricultural growth, invoking the principle that courts do not probe lawmaker motivation. *Baldwin v. County of Tehema*, 36 Cal. Rptr. 2d 886, 893-895 (Cal. App. 3d Dist. 1994).

LAND USE LAW

Growth Management Currently Equals Growth Accommodation

Growth Control

The rate and degree to which cities must accommodate growth has long been a divisive land use issue. Growth management first emerged as a discrete local land use objective in the late 1960s as post-World War II suburbs expanded into farming areas near urban areas. Since the 1960s, some local governments — generally smaller, affluent suburbs — began to question whether they had to accommodate *all* growth, and growth control and management emerged on the agenda.

Density

"Growth management" as an explicit objective went somewhat out of favor when challenged by arguments that it simply raised the cost of housing for many moderate- and low-income families. Smart Growth is the post-1980s growth management strategy, but the objectives are the same: to encourage denser, less automobile-dependent communities, and to preserve open space within an urban region.

Flawed Strategy

As generally practiced today, growth management is little more than a sophisticated unlimited growth accommodation strategy. Cities generally accept growth levels as a given and seek to accommodate it by channeling development within urban growth boundaries and by using subdivision exactions to force new residents to pay for the costs of new public services directly. The law of growth management supports the long history of market preference: Americans have a persistent preference for low-density development (see Kenneth T. Jackson, *The Crabgrass Frontier: The Suburbanization of the United States* (Oxford Press, 1985).

Water & Growth

GW Recharge

Urban sprawl has immediate water supply consequences in areas that depend on groundwater. A recent report by American Rivers and other water and environmental nongovernmental organizations documents how urban sprawl reduces aquifer recharge by paving over recharge areas. American Rivers et al., *Paving Our Way to Water Shortages: How Sprawl Aggravates the Effects of Drought* (2002) (www.americanrivers.org/site/DocServer/PavingOurWayToWaterShortages.pdf?docID=164). See also Sid Perkins, *Paved Paradise: Impervious Surfaces Reduce a Region's Hydrology, Ecosystems—Even Its Climate*, 166 Science News Online No. 10, p. 152, www.sciencenews.org/articles/20040904/bob8.asp (Sept. 4, 2004).

Regional Impacts

In addition, the regional impacts of individual municipal growth management decisions are often ignored. Growth controls tend to produce denser population cores, with many amenities and more massed, usable open space — but they do so only by pushing low-density growth far into adjacent areas. If water is used as a growth control lever, the tension between growth control and affordable housing will be exacerbated. Lawyers and planners who must work with California's new water supply planning and certification requirement, described below, justifiably complain that the water mandates are inconsistent with other statutes mandating affordable housing components in city plans.

Power to Use Water to Restrict Growth is Limited

GROWTH MORATORIA

Deferring Growth

Cities have some authority to defer growth until water and sewer capacity is adequate to serve the new residents. See *San Mateo Coastal Landowners' Assn. v. County of San Mateo*, 45 Cal. Rptr. 2d 117, 136-137 (Cal. App. 1st Dist. 1995); *First Peoples Bank of N. J. v. Township of Medford*, 599 A.2d 1248, 1254 (N.J. 1991); *C.f. Neenah Sanitary Dist. v. City of Neenah*, 647 N.W.2d 913, 918 (Wis. App. 2002) (city need not give objective reasons for refusal to extend sewer service and absent showing of bad faith implied, contractual duty of good faith and fair dealing not violated); *Bailey v. City of Goodman*, 69 S.W.3d 154, 158 (Mo. App. S.D. 2002) (City has discretion to not extend water service to new area in its service area).

Temporary Freeze

Growth moratoria have long been used to support land use planning. Such moratoria freeze development for a limited period of time to allow cities to formulate permanent land use plans for an area slated for development. The extra time is supposed to allow cities to secure water supplies, obtain financing, and construct the necessary infrastructure (Diane Albert, *Building Moratoria: Strategies and Tools for Governing Bodies*, 7 Water Resources Impact 5 (Nov. 2005)).

"Taking"

Cities may impose moratoria on water service. *Swanson v. Marin Mun. Water Dist.,* 128 Cal. Rptr. 485, 490-491 (Cal. App. 1976); *McMillan v. Goleta Water Dist*., 792 F.2d 1453, 1457 (9th Cir. 1986), *cert. denied*, 450 U.S. 906 (1987). However, if a moratorium is a de facto permanent freeze on development the city may be held responsible for a taking of property. *Lockary v. Kayfetz*, 917 Fed.2d 1150, 1155-1156 (9th Cir. 1992). *See* Dennis J. Herman, *Sometimes There is Nothing Left to Give: The Justification for Denying Water Service to New Consumers to Control Growth*, 44 Stan. L. Rev. 429, 443-446 (1990).

Temporary Takings

In 1987, the Supreme Court held in *First English Evangelical Lutheran Church of Glendale v. County of Los Angeles* (*First English*) that a landowner could recover damages for a temporary taking of property, and suggested that courts must now distinguish between unconstitutional temporary takings and "normal delays" in obtaining development permissions. *First English*, 482 U.S. 304, 314-322 (1987).

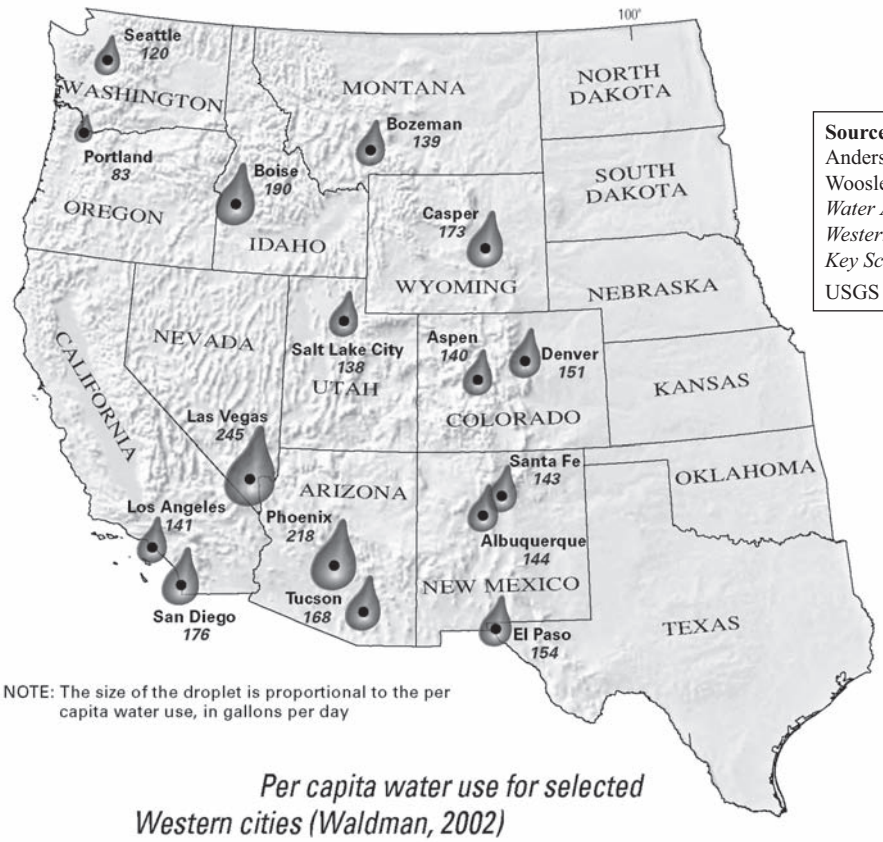
***Lucas* Rule**

The Supreme Court in *Lucas v. South Carolina Coastal Council,* 505 U.S. 1003 (1992) held that if there is a total deprivation of all development potential, the state cannot justify a regulation on either consumer protection or resource conservation grounds. Landowners have subsequently argued that there was no justification for a temporary suspension of the right to develop. However, in 2002, the Supreme Court refused to apply the *Lucas* rule to moratoria and endorsed them as a legitimate planning tool. In *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency*, 535 U.S. 302 (2002), the court characterized the potential taking as regulatory rather than a physical taking, and applied the "*Penn Central* balancing test" to uphold a 32-month moratorium. Under this test, a court must evaluate a regulatory takings claim based on: 1) the economic impact of the regulation; 2) the owner's reasonable investment-backed expectations; and 3) the character of the regulatory action.

***Penn Central* Test**

Thus, the *First English* compensation rule only applies after the court has determined that the moratorium is not a proportional, reasonable, and good faith response to the threats to a community posed by development. *Tahoe-Sierra* can best be characterized as an application of the precautionary principle in that it allowed a public agency a reasonable period of time to respond to a substantial risk of an adverse impact if an activity were not limited. The case does not afford cities an excuse to delay developing new supplies unless they can demonstrate that development poses environmental issues that need to be studied and mitigated. See Matthew G. St. Amand and Dwight H. Merriam, *Defensible Moratoria: The Law Before and After the Tahoe-Sierra Decision*, 43 Nat. Res. J. 703 (2003).

Water & Growth



Per capita water use for selected Western cities (Waldman, 2002)

Source:
Anderson, Mark T., and Woosley, Lloyd H., Jr., 2005, *Water Availability for the Western United States—Key Scientific Challenges*
USGS Circular 1261, p. 26

True Supply Deficit

Judicial treatment of water moratoria is consistent with this analysis. Courts have approved water service moratoria but have suggested they are valid only so long as a true supply deficit lasts. Cities cannot use moratoria permanently to limit growth. *Tahoe-Sierra, supra* and *Palazzolo v. Rhode Island*, 533 U.S. 606, 633 (2001). One of the problems of a moratorium is calculating when there is a shortfall. A drought will satisfy this requirement, but the return of a "normal" wet year may eliminate the supply deficit.

Growth Caps

Invalid Caps

It is generally taken for granted that capping urban growth is off the policy agenda. Although the idea surfaces periodically, no area of the West has sustained a serious attempt to stop, or even cap, growth. The primary economic and political reasons for this reticence are not particularly obscure. The lack of interest in this option also reflects the widespread assumption in land use law that a community cannot isolate itself from the rest of the world. This assumption is supported by the constitutional right to travel, which prohibits a state from barring new residents. The legality of a community to impose a flat cap on growth has been invalidated along these lines. *City of Boca Raton v. Boca Villas Corp.,* 371 So.2d 154, (Fla. Dist. Ct. 1979). However, subsequent cases have held that the right to travel is one of entry, not location — there is no right to locate in a particular community within the state. *Tobe v. Santa Ana*, 892 P.2d 1145, 1161-1166 (Cal. 1995) (no duty to provide camping space to facilitate right to travel for the homeless).

Resource Limit

In addition, several cases have upheld caps for resource-constrained areas. In *City of Hollywood v. Hollywood, Inc.,* 432 So. 2d 1332 (Fla. Dist. Ct. App. 1983), *petition for review denied*, 441 So. 2d 632 (1983), the court upheld a 3,000-unit density cap for small strip of land on the Atlantic coastline. *Home Builders Ass'n. v. Cape Code Comm'n*, 441 Mass. 724, 808 N.E. 2d 315 (2004) found that a building permit cap was valid to protect the sole source aquifer for a town on Cape Cod.

Phased Growth

The leading case upholding phased growth — *Constr. Indus. Ass'n. v. City of Petaluma*, 522 F.2d 897 (9th Cir. 1975), *cert.den*., 424 U.S. 934 (1976) — does suggest there are limits on a city's accommodation strategy. Moreover, courts have invalidated phased growth ordinances if the rate is substantially less than the actual rate of growth in the community. *Stoney-Brook Dev. Corp. v. Town of Freemont*, 474 A.2d 561, 563-564 (N.H. 1984).

On balance, however, it is clear that judicial history has thus far left communities with considerable discretion to use their land use powers to decide where and under what conditions they will accommodate growth.

Water & Growth

Dueling Doctrines

Duty to Serve

Land Use Plans

Water Availability

City Discretion

Water Supply Planning

Service Denials

Many cities may wish to time the rate of growth to "wet" (i.e. reliable and available) water. The power of a city to defer growth puts it at the vortex of two potentially inconsistent doctrines: 1) public utility law's "duty to serve" and 2) land use law's authority for local governments to regulate the timing and manner of development on private land. Municipal water suppliers are generally either public utilities under state law or subject to judicially imposed public utility duties.

Public utilities have a duty to serve all customers within a service area, provided that the system as a whole can absorb the cost and still yield a reasonable rate of return. A leading California case extended the duty to serve to include a duty on water providers to acquire the necessary water supplies to meet projected demands. *Lurawka v. Spring Valley Water Co.,* 146 P.2d 640, 646 (Cal. 1915). The rationale for this ruling is ultimately based on basic ideas of fairness and estoppel ("estoppel" precludes someone from denying the truth of a fact which has been determined by an authoritative body). This ruling is designed primarily to protect those entering into a service relationship with a common carrier or within the service area of a public utility from being denied service the carrier or the utility is able, or should be able, to provide (at least in the short run). The water acquired to meet service obligations has often been sold to consumers at average or other marginal cost — so there has been little, if any, incentive to conserve. These pricing practices are slowly changing, however, as energy security and treatment costs increase (Anne Gonzales, *Liquid Gold*, Sacramento Business Journal (March 14, 2003).

The duty to serve has been criticized as out of step with the modern land use cases that allow cities to control the rate and location of new development short of totally deflecting it to other communities in the region. In response to such concerns, courts have held that the duty to serve does not prevent municipalities from subordinating utility service to land use plans. Municipal discretion includes the power to refuse service until an area is ready for development. See *Dateline Builders, Inc. v. City of Santa Rosa*, 194 Cal. Rptr. 258, 266 (Cal. App. 1983); *Moore v. City Council of Harrodsburg*, 105 S.W. 926, 926 (Ky. 1907) ("In the absence of fraud, corruption, or arbitrary action, the judgment of city official as to extension of water service is beyond judicial control."). Cities also have the power to deny subdivision approvals for new subdivisions with water and sewer service that is inconsistent with a county's land use plan. A Nevada court held that Washoe County (Reno) could prohibit five acre or less subdivisions "until a new water source is available." It also ruled the county's action did not impair state water rights because the power to define rational growth "includes the ability of a county government to determine water availability for itself." See *Serpa v. County of Washoe*, 111 Nev. 1081, 1083–84, 901 P.2d 690, 691–692 (1995). A Washington court held that Spokane County had the power to deny rezoning for riparian land because no central sewer system existed to serve the proposed ranchettes. See *Schofield v. Spokane County*, 980 P.2d 277, 281 (Wash. App. 1999). A state order to a financially strapped city to improve its antiquated sewage system was sufficient reason to terminate previously extraterritorial service in *City of Attalla v. Dean Sausage Co., Inc.*, 889 So.2d 559, 569 (Ala. Civ. App. 2003), cert. denied as to one party. The court in *Gould v. Santa Fe County*, 37 P.3d 122, 127 (N.M. App. 2001) held that the county improperly granted a variance allowing subdivision of a 20-acre minimum lot in a water-stressed area to permit an extended family to live together because it was based on personal rather than statutory factors.

Modern courts have clearly recognized that cities do have the ability to control their growth rates and the discretion to distribute that growth. Indeed, a number of cities already limit service extensions as a de facto growth control tool. Half Moon Bay, California, has done this because of limited available supplies and a lack of sewage treatment capacity. The small coastal town of Bolinas Bay north of San Francisco capped the number of allowable water meters and allows new connections only if a person buys an existing meter. The even smaller community of Rockville, Utah, opted not to build a new water treatment plant explicitly because its leaders do not want to entice more residents to move there.

Emerging Linkage of Water and Land Use Policies in the West

Throughout the West, cities are beginning to realize that new municipal water supplies must be addressed in the context of other competing uses in the watershed or basin, and that there may be limits to the amount of available water to support new growth. This recognition takes many forms.

The most modest step is to incorporate water supply planning into land use planning. For example, water conservation is an element in the emerging Envision Utah regional planning process. Some states have taken the additional step of giving local governments more discretion to coordinate water service and urban growth (see discussion below). Several have taken the far-reaching step of conditioning new development on an adequate water supply (Cal. Govt. Code §66473.7; Ariz. Rev. Stat. §§ 45-401 *et seq*. (1980 Groundwater Management Act) and implementing regulations at Arizona Department of Water Resources, R.12-15-703(b)(Feb. 7, 1995)). For an overview of options for integrating water into land use

Water & Growth

"Wet" Water Requirements

Santa Fe Actions

Acquisition Burden

Supply Options

San Diego Example

Strategies

Local Emphasis

Supply Entitlement?

decision-making see US Environmental Protection Agency, *Growing Toward More Efficient Water Use: Linking Development, Infrastructure, and Drinking Water Policies,* 9–11, at: www.epa.gov/smartgrowth/pdf/growing_water_use_efficiency.pdf).

A few states are moving to require that "wet" water be in place before new developments can be approved. Many other states are imposing greater water assessment and planning duties on local governments. Nevada, for example, requires that all water suppliers prepare conservation plans based "on the climate and living conditions of" the service area (Nev. Rev. Stat. Ann. §540.131). Nevada also requires that future supply assessment be included in the state's mandatory comprehensive regional water plans, although the only mandatory components are drought reserves and future growth margins. §540A.140(3)(b).

Some water-stressed cities, such as Santa Fe, New Mexico, have developed innovative conservation measures. See Harwood, *Santa Fe Water, Resources and Policy Evolving: "Wet Growth" Regulations,* TWR #36. The more extreme step of closing an area to urban development an option that all states and local governments still seek to avoid.

Municipal Water Supply Planning

As concerns future water supply, the issue is only where, not whether, increasing demand will exist. For municipalities, the most common strategy to link water and land use planning is to require water supply elements in comprehensive municipal plans. The link with the most bite places the responsibility for water supply acquisition on local governments and/or developers. This form of growth management pressures municipal water suppliers to acquire the necessary supplies or to devise an alternative strategy to meet future water demands. Water supply planning retains its traditional focus — increasing available water — but expands it to consider a wider range of supply options. As noted, the possibility of limiting growth to conserve alternative uses of water is seldom one of those options.

In many western states, however, water planning elements are only integrated weakly — if at all — into the larger public planning process. Until the 1980s, water resources planning meant primarily project planning. Many planning mandates still tied to this old water resources planning framework.

Cities facing more immediate shortages continue to rely on a mix of supply acquisition options, giving increased weight to conservation as opposed to a simple reliance on the acquisition of new water. Of course, the balance between the two strategies varies from city to city, and conservation cannot carry the entire burden of supplying new growth. Some cities are looking to secure future water supplies by building offstream storage facilities (see Tarrah Henrie, *Why Some Water Districts Decided to Dam It*, 7 Water Resources Impact 9 (Nov. 2005).

The City of San Diego illustrates one possible new growth accommodation model. This growing city faces the double problem of limited natural surface and groundwater supplies and a low-priority Colorado River entitlement. In addition to seeking possible water transfers from the Imperial Irrigation District, the City has linked water supply and growth as part of its ongoing growth management strategy. The City's strategy has allowed it to add some 300,000 new residents since 1990 without increasing its water use during that period (Editorial, *Lakes Saved*, The San Diego Tribune (Jan. 19, 2002).

The San Diego growth management strategy includes: more efficient use of existing supplies; demand management; reallocation of existing supplies through water marketing; more limited new storage and distribution facilities; desalination; and greater conjunctive surface and groundwater use. See San Diego County Water Authority, 2005 Urban Water Management Plan, website: www.sdcwa.org/manage/pdf/2005UWMP/FinalDraft2005UWMP.pdf.

State-Municipal Duty to Assure Adequate Drought-Proof Water Supplies

The following examples of new state legislation and local initiatives in Arizona, California, and Florida illustrate the extent to which the federal government and state governments are devolving much of their historic responsibility for water resources planning to local governments. Throughout the US, local governments are assuming broader water supply planning duties. The focus on water planning retains its traditional focus of locating new, drought-proof supplies. However planning is also being expanded to include greater consideration of the impacts on existing users, watersheds of origin, alternative sources of supply, and demand management-conservation. In addition, these plans can no longer be project wish lists or hydrologically weak assumptions about supply availability. Plans must be realistic assessments of what water will be available under worst case conditions.

Arizona and California view the existence of an adequate, long-term, drought-proof supply of water as an urban consumer entitlement. This entitlement is unconnected to any idea of water as a limit on urban growth, as the Arizona experience illustrates.

Water & Growth

100-Year Demand

CAP Water

Exurban Growth

Pima County Approach

Developer Responsibility

California Provisions

Arizona

As the price for construction of the federally-funded Central Arizona Project (CAP), Arizona had to agree to stop "mining" its aquifers (i.e. pumping to the extent it depletes the aquifer) to support urban growth. Accordingly, in 1980 the state adopted the 1980 Groundwater Management Act (Ariz. Rev. Stat. § 45-401 *et seq*.). Four groundwater basins were included within designated Active Management Areas (AMAs). Despite intense opposition, rules adopted pursuant to the Act imposed a duty on all new developments in these basins — and thus on their municipal suppliers — to establish "a sufficient supply of water which will be physically available to satisfy the applicant's 100-year projected water demand." Ariz. Dept. of Water Resources, R12 15 703(b) (Feb. 7, 1995) The rules are structured to establish an assured water supply by eliminating reliance on continued groundwater mining.

Initially, the rules set off a scramble to acquire agricultural water rights in remote counties. More recently municipal suppliers began paying the high CAP rates for Arizona's under-used Colorado River entitlement. This price shock was alleviated by the creation of the Central Arizona Groundwater Replenishment District, which allows members to secure and withdraw groundwater (see Katherine L. Jacobs and James Holway, *Managing for Sustainability in an Arid Climate: Lessons Learned from 20 Years of Groundwater Management in Arizona, USA*, 12 Hydrology J. 52, 58-60 (2004). As Phoenix and Tucson have used more surface water from CAP, municipal water use has started to decline in part because of a wetter than average cycle, groundwater conservation, and the increasing reliance on recycled ("gray") water for turf irrigation.

Importantly, growth in Arizona is expanding outside the metropolitan areas. Such growth is beyond the reach of the Groundwater Management Act. Populations outside AMAs have doubled since the passage of the Act in 1980, and now total more than one million people (Shaun McKinnon, *Solutions to Water Concerns a Hard Sell to Rural Residents*, The Arizona Republic (June 28, 2005)). There is no consensus as to how to address the environmental impacts of this growth. Arizona's Department of Water Resources reviews building plans to determine whether water supplies will last 100 years, but their determination has no legally binding effect. A review of state records in 2005 revealed that 35 percent of the applications reviewed by the state since 2001 were returned with an "inadequate water supply" finding — but most of those projects proceeded nonetheless (see Shaun McKinnon, *Developers Cashing in on Weak Water Laws*, The Arizona Republic (6/27/2005). As a result, many subdivisions in rural Arizona are constructed with tenuous and unreliable water sources.

Claiming that Arizona's state law "is a joke," the supervisors of Pima County (the county that includes Tucson and its fast-growing suburbs) recently drafted a new policy to take into account the impact of groundwater pumping when deciding whether to grant a rezoning or comprehensive plan amendment (Erica Meltzer, *New Water Policy May Curb Homes on Fringes*, Arizona Daily Star (12/13/2006). The new policy won't apply to developments that draw water from municipal supplies or other providers using renewable supplies, and it will only apply to developments exceeding four acres. The main change from existing procedures is that this new policy will require developers to provide information at the early stages in the process rather than after they have already received rezoning. Projects farthest from renewable water sources will require more extensive mitigation, or may be refused permission to develop.

California

California's approach shifts more of the responsibility to find adequate water supplies directly onto developers. California enacted legislation in 1995, primarily in response to the rapid and dispersed urban growth — and consequent loss of prime agricultural land — in northern California and the San Joaquin Valley. The legislation required cities to have a firm water supply plan in place before large new developments are approved. Unlike Arizona, the statute does not impose a de facto duty on cities to acquire sufficient water rights, and initially it was not enforced. Cal. Water Code §§10910 - 10914.

The California legislature tightened the law in 2001, prohibiting approval of tentative subdivision maps, parcel maps, or development agreements for subdivisions of more than 500 units unless there is a "sufficient water supply." Cal. Govt. Code §66473.7(b)(1) (2005). If the supplier has less than 5,000 connections, the adequate supply requirement applies to any subdivision that will amount to a 10 percent increase in service connections. *Id.* at §66473.7(a)(1).

In California, sufficient supply is defined as the total supply available during a "normal single-dry, and multiple dry years within a 20-year projection." *Id.* at §66473.7(a)(2). To calculate this, the supplier must include a number of contingencies such as availability from water supply projects, "federal, state, and local water initiatives such as CALFED" and water conservation. *Id.* at §66473.7(a)(2)(D). Enforcement is tied to the duty of water suppliers to prepare urban water management plans. Cal. Water Code §10910(c) (2005). Water supply assessments must either be consistent with these plans or meet the available water supply criteria. Assessments may trigger a duty to acquire additional water supplies. *Id.* at §10911.

Water & Growth

EIR Requirements

"Paper" Water

Risks of Reliance

Comprehensive Plans

Permanent Limits

These duties will be enforced primarily under the California Environmental Quality Act (CEQA: Cal. Pub. Res. Code §§ 21000 et seq. (2005)). The process is intended to allow objectors to probe the underlying assumptions and reliability of the data on which the assessments are made. This could be a serious impediment to business as usual, as evidenced by recent CEQA litigation. In *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova*, 40 Cal.4th 412, 150 P.3d 709 (Feb. 8, 2007) the court dealt with specific rules governing this evaluation, including requirements that an Environmental Impact Report (EIR) clearly explain how a project's long-term water needs will be met, what impacts this would have on supply sources, and how those impacts would be mitigated. Note that this is a disclosure requirement rather than a mandate that water definitely be available — the California Supreme Court ruled that CEQA is satisfied if the EIR fully explains the uncertainties and analyzes their impacts and potential mitigation. *Id.*

In 2000, an intermediate appellate court invalidated the EIR prepared in connection with the renewal of the California State Water Project contracts and the subsequent Monterey Water Users Agreement. The court determined that the state drought delivery projections were "paper" water, and that reliance on this phantom entitlement could seduce local jurisdictions to approve developments in excess of the actual guaranteed supply. *Planning and Conservation League v. Dept. of Water Res.,* 83 Cal.App.4th 892, 100 Cal.Rptr.2d 173 (Cal. App. 2000). In 2003, to settle the suit the state agreed, among other things, to drop the word "entitlement" from state contracts and to prepare more accurate supply and delivery forecasts (Settlement Agreement, www.montereyamendments.water.ca.gov (May 5, 2003)).

Similarly, an intermediate court of appeal invalidated an EIR for a 2,555-unit housing and mixed use project in the Santa Clarita Valley north of Los Angeles. The court found that the EIR was not sufficiently detailed because it did not include a discussion of the serious risks of reliance on less-than-projected State Water Project supplies. *Santa Clarita Org. for Planning the Env't v. County of Los Angeles,* 106 Cal. App.4th 715, 131 Cal.Rptr.2d 186 (Cal. App., 2003) (certified for partial publication).

Florida

This article concentrates primarily on the water-stressed West — but other areas of the country are beginning to experience similar stresses. Wet as it is, Florida faces a California-like imbalance between supply and population. Most of the water is in the north, and the population is in the south. Florida is attempting to plan its way to a solution — at least until the political support for large-scale north-south diversions exists. In 2002, the Florida legislature expanded the local government comprehensive plan requirements to strengthen coordination of water supply and local land use planning. One of the most significant new requirements is a 10-year Water Supply Facilities Work Plan. These Plans must: project the local government's needs for at least a 10-year period; identify and prioritize the water supply facilities and source(s) of water that will be needed to meet those needs; and include capital improvements identified as needed for the first five years. Each listed capital improvement must identify a financially feasible revenue source, none of which is speculative or contingent. Each year during the annual update to the five-year schedule, a new fifth year will be added, and capital improvements identified in the 10-year work plan will be incorporated. Initially, only those local governments with responsibility for all, or a portion of, their water supply facilities and who are located within a Regional Water Supply Plan area must prepare and adopt a 10-year water supply work plan. Fla. Stat. §163.3177(b)-(h). *See* Dept. of Community Affairs, Depart. of Environmental Protection, Water Management Dist., Agency Coordination of Comprehensive Planning and Water Supply Planning in Florida, November, 2002, at: http://my.sfwmd.gov/pls/portal/url/ITEM/1D33C54502871D24E040e88D48520D40.

For a summary of Florida's program, see James R. Cohen, *"Water Supply as a Factor in Local Growth Management Planning in the U.S.: A Review of Current Practice and Implications for Maryland,"* 23–39 (University of Maryland, Urban Studies and Planning Program, 2004).

Water-Constrained Growth

Cities which are truly water supply-constrained may be able to limit development permanently for water-related reasons. Courts have upheld communities' discretion to deny development permission in areas with inadequate water supplies, and courts have also held that landowners have no constitutional right to use groundwater if individual well use poses public health risks or if a conservation regime has been put in place.

Courts have consistently held that there is no fundamental right to use water from a particular source. The usual rationale is the protection of public health. Thus, a city may prohibit well use and require public water supply hookups. *E.g. Stern v. Haligan*, 158 F 3d. 719 (3d Cir. 1998). In *Johnson v. Township of Plumcreek*, 859 A.2d. 7, 13 (Commwlth. Ct. 2004) the court rejected the argument that post 9/11 terrorist

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threats dictate a different result. No imminent risk was found and a city does not have a duty to guarantee that terrorists, who are private actors, will not contaminate a water system.

The City of Santa Fe is coming close to making water availability the primary determinant of growth. See Kyle Harwood, *The Evolution of Wet Growth Regulations: City of Santa Fe*, 7 Water Resources Impact 5 (Nov. 2005). The City first restricted new water connections outside city limits unless the customer had a valid, preexisting agreement for water service. Next, the City's Water Budget Administrative Ordinance, enacted in 2003, required all new projects within the city to offset a project's water budget by retrofitting existing toilets with high-efficiency units. *Id.,* note 97 at 6. The 2005 Water Rights Transfer Ordinance requires new, large construction projects to transfer water rights to the city prior to issuance of building permits. See Harwood, TWR #36.

Real water shortages may end up constraining growth in the area surrounding Prescott, Arizona. The groundwater within the designated Prescott Active Management Area (AMA) is in overdraft, but public and private water providers have continued to issue assured water supply commitments for subdivisions. The net result is that "even with maximum reuse of effluent, demands would outstrip supplies through the year 2025" — according to the Arizona Department of Water Resources (ADWR). See ADWR website: www.azwater.gov/WaterManagement_2005/Content/AMAs/PrescottAMA/default.htm (accessed March 2006).

Prescott has very limited surface water supplies to turn to for augmentation. Before ADWR could approve a management plan for the Prescott AMA, a land rush of subdivision applications had Prescott searching for alternative supplies. One potential source is the Big Chino Valley to the north, which provides the source of water for the Verde River, a rare semiarid perennial stream, rich in biodiversity and an important cultural, recreational, and scenic resource.

What are the reasonable expectations of those settling in areas such as the Prescott Valley in reliance on dependable water supplies? How about those living above groundwater being eyed by thirsty growing communities? The US Constitution permits the state to conserve nonrenewable resources for the benefit of other users as well as for future generations. Groundwater pumpers have no constitutional right to a fixed quantity of water or to a fixed water table. In *Doherty v. Ore. Water Res. Dir.,* 783 P.2d 519, 526 (OR.1989) the court held that Oregon groundwater management law "does not mandate depletion to the lowest water level from which irrigation water may be profitably pumped today".

Water rights are property rights, but they differ significantly from land rights. At the heart of western water law is the requirement that a water right is based on the application of water to continued beneficial use. It is the use of water that triggers a constitutionally-protected investment-backed expectation. Thus, there is no constitutional right to the future use of groundwater.

Usufructuary: the right of use to divert water into physical possession for the purpose of putting it to a "beneficial use." One does not own the body or "corpus" of water, but only the right to use it for beneficial use.

The leading case establishing this principle is *Town of Chino Valley v. City of Prescott*, 131 Ariz. 78, 638 P.2d 1324 (Ariz. 1981), *cert. denied*, 457 U.S. 1101 (1982). Arizona groundwater law allows water to be transported within sub-basins of AMAs. The community from which the water was being exported argued that the law took property without due process of law. Invoking the scientifically unsound analogy to things *ferae naturae* (of a wild nature; used to designate animals that are not usually tamed), the court held that "there is no right of ownership of groundwater in Arizona prior to its capture and withdrawal from the common supply and…the right of the owner of the overlying land is simply to the usufruct [see sidebar] of the water." *Id.* at 1328. This statement may not hold in all states. For example, states have recognized that groundwater is a component of the value of land taken by eminent domain. See *Sorenson v. Lower Niobrara Natural Res. Dist.,* 376 N.W.2d 539 (Neb. 1985). Nebraska has since moved from its longstanding opposition to groundwater transfers to acceptance of regulated transfers. Nonetheless, states hold the power to conserve groundwater by deciding how much will be used by whom and under what conditions. That use — not abstract claims of ownership — is the basis of constitutionally protected investment-backed expectations.

"Taking" & Total Deprivation

Lucas Examined

The Supreme Court's decision in *Lucas v. South Carolina Coastal Council*, *supra at 1003* — which held that a beach erosion protection ordinance that prevented the construction of a house was a per se "taking" — may seem inconsistent with this assertion. The Court clearly held that if there is a total deprivation of all development potential, the state cannot justify a regulation on either consumer protection or resource conservation grounds.

Lucas, however, is not applicable to the denial of development permission to inadequately served land on the fringe of an urban or suburban area for two reasons. First, *Lucas* involved one of the two categorical per se takings that the Court recognizes in that state action affectively "wiped-out" all development value on the property. Second, the other fundamental principle embedded in takings jurisprudence is the right to equal treatment (in addition to some minimum rate of return on investment in land). Courts are more likely to balance the public benefit against an individual loss which falls short of a total deprivation if: 1) the area selected for non-development is relatively large; 2) the selected area is not part of an already developed area; and 3) the government's rationale is grounded on adequately documented scientific grounds.

Water & Growth

Police Power

Public Burden

Alternatives

Weighing Consequences

Any land use plan or regulation which limits urban expansion runs the risk of being invalidated as a taking. However, land use policies that link growth restraints to water availability do not raise the unfairness concerns that the Supreme Court's recent taking jurisprudence has identified. Courts have long recognized that the police power can be used to protect land use consumers against risks that they may not fully understand (see Alison Dunham, *Flood Control via Police Power*, 107 U. Pa. L. Rev. 1098 (1959). The police power cannot be used to strip value from property simply by enacting legislation which limits the use of land. However, over time, the police power can be used to dampen expectations and force land owners to adjust to new regulatory environments. Justice O'Connor's concurring opinion in *Palazzolo, supra* at 633, noted that a "regulatory regime in place at the time the claimant acquires the property at issue helps to shape the reasonableness of those expectations." As the Supreme Court made clear in *Lingle v. Chevron, USA*, 125 S.Ct. 2074, 2080 (2005) and *Tahoe-Sierra*, *supra* at 321-322, the primary function of the takings doctrine is to compensate landowners who have been unfairly singled out to bear a burden that should be borne by the public. Comprehensive water supply-based urban limits are not such a case.

Conclusion: Is Water a Limit on Growth?

Experience teaches us that the West's climate and landscapes do not pose insurmountable barriers to large-scale urban settlement. Toward the end of his life, the great western scholar Wallace Stegner said, "California…has the water and the climate and the soil to support a population like Japan, if it has to." (Wallace Stegner and Richard W. Etulain, *Conversations With Wallace Stegner on Western History and Literature* (University of Utah Press, Revised ed., 1990)). This lesson reflects the hard truth that, thanks to technology, we can put a great many people into most areas of the West. The real question, of course, is whether this is a future we wish to embrace.

Experience also shows that resource limits do, in fact, exist. They pose real resource constraints on settlement and quality of life. As population increases and urban conurbations spread ever outward, the resource use choices facing the West become tougher because their opportunity costs increase.

Our challenge today is to understand the continuing consequences of the resource use choices that we have made and the possibility of alternative choices in the future. The late David Gaines, who led the fight to save Mono Lake, understood this. As he put it, his aim was to make people throughout California realize what would be lost if the lake continued to sink. If Californians, and particularly Angelenos, weighed those values, understood them deeply, and decided to sacrifice them for a convenient and inexpensive water supply, Gaines would (so he said) accept the choice. But it had to be a knowing choice. (John Hart, *Storm Over Mono: The Mono Lake Battle and the California Water Future*, 184 (U. of California Press, 1996).

Moreover, we are coming to understand that resource limitations manifest themselves through subtle combinations of political choices, market forces, and climatic factors — rather than in a more dramatic apocalyptic fashion that grabs the public's attention. The early environmental movement was filled with gloomy predictions of an immediate cataclysm that has not come to pass. Whether the impacts of global climate change will manifest themselves in such a fashion remains a matter of speculation (and Hollywood dramatization). In the meantime, we can recognize many signals that we are testing the limits of water in the West: declining and disappearing stocks of anadromous fish and their food webs; escalating economic and political costs of water service for new development; bitter and prolonged legal battles for overallocated river systems; and desperate attempts to build uneconomical and arguably unnecessary water projects in order to convert "paper" water rights to "wet" water.

The solution, of course, is far more complex than linking water and land use planning. The United States is still a growing country premised on a wider range of opportunities compared to most countries of the world. Thus, water availability will never be used as a tool to choke off growth on any large scale. However, we can no longer afford to be as indifferent to the environmental and other costs as we once were. In taking the first step and thinking more deliberately about the consequences of growth, cities facing water supply constraints may begin to alter their course and seek a more sustainable way to live in and with this landscape.

Editors' Note: This article was adapted from a longer piece published in 2006: A. Dan Tarlock and Sarah B. Van de Wetering, *Western Growth and Sustainable Water Use: If There Are No "Natural Limits," Should We Worry About Water Supplies?* 27 PUBLIC LAND & RESOURCES L. REV. 33 (2006).

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Instream Restoration

Willing Landowners

Priority Streams

INSTREAM FLOW RESTORATION

COOPERATIVE, FREE-MARKET SOLUTIONS IN OREGON

by Fritz Paulus, Executive Director, Oregon Water Trust

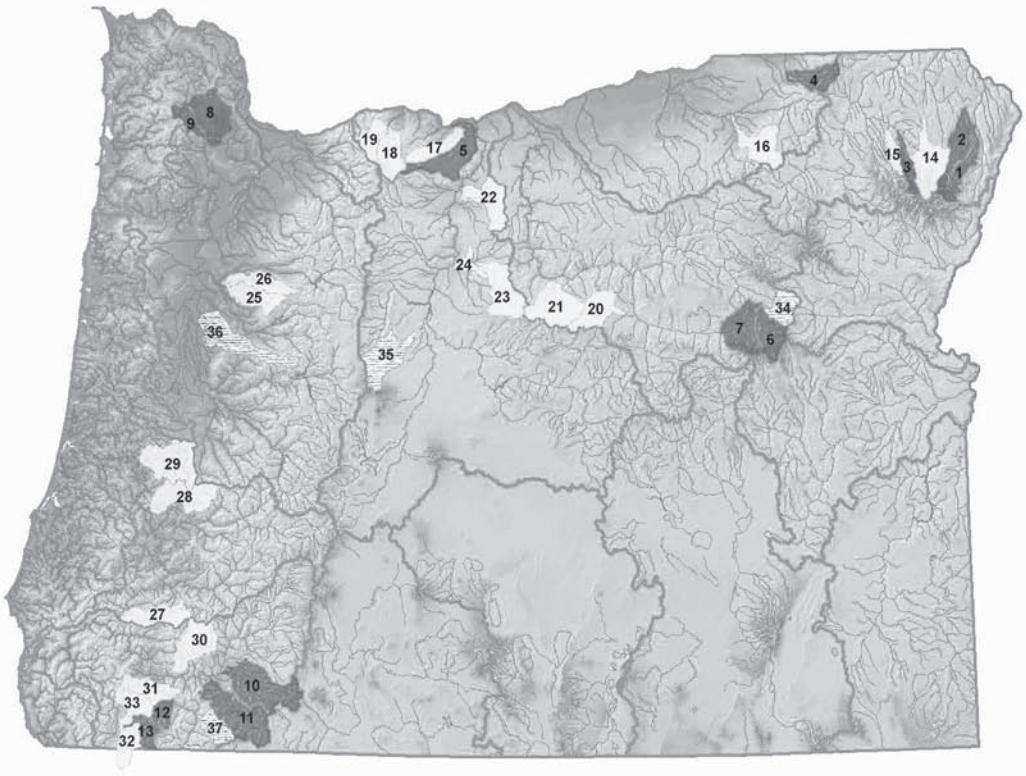
INTRODUCTION

Founded in 1993 as the first of its kind in the nation, Oregon Water Trust (OWT) is a 501(c)(3) not-for-profit dedicated to restoring surface water flows for healthier streams in Oregon by using cooperative, free-market solutions. We craft agreements with willing landowners and compensate them to leave all or a portion of their water right instream in lieu of using it for out-of-stream purposes. In addition to acquiring water rights through gift, lease, or purchase, we also provide financial incentives for landowners to manage their water use in a more fish friendly manner.

Like many Western states, Oregon issues water rights only for "beneficial uses." Until recently, only out-of-stream uses were regarded as "beneficial uses." In many rivers and streams, more water rights were issued than what naturally flows in the stream. This "over-appropriation" of water resources often results in low flows or dry streams during the summer months.

OWT targets efforts in watersheds that have historically supported significant fisheries. Currently, OWT has 37 priority watersheds on the fifth-field hydrological unit code level (OWT priority map is listed at: www.owt.org/priority_basins). Within each watershed OWT identifies priority streams where: 1) low streamflow due to over-appropriation is a limiting factor for fish habitat and water quality; and 2) the potential for converting or modifying existing water rights to enhance instream flows is high. OWT restores flow to small and medium sized streams that provide spawning and rearing for salmon, steelhead, and bull trout. In these systems, small amounts of water can provide significant ecological benefits.

OREGON WATER TRUST PRIORITY WATERSHEDS



Watershed prioritization process considers where:

1) flow is a significant limiting factor for salmon, steelhead and bull trout, and
2) opportunity for restoration exists, and
3) local partnerships are present.

Methodology is further defined in the OWT prioritization document.

Tier 1 Priorities - areas of highest concern where OWT takes a proactive role in pursuing projects.

Tier 2 Priorities - other areas of concern where OWT considers new projects on an individual basis.

Significant Flow Restoration Achieved

Priority Watersheds		
Number*	Watershed	Score
Tier 1		
1	Big Sheep Creek	26
2	Little Sheep Creek	26
3	Lostine River	26
4	Upper Walla Walla River	25
5	Fifteenmile Creek	24
6	Upper John Day River	27.5
7	Strawberry Creek	26
8	Dairy Creek	24
9	Gales Creek	24
10	Little Butte Creek	24.5
11	Bear Creek	23
12	Williams Creek	24.5
13	Sucker Creek	24.5
Tier 2		
14	Upper Wallowa River	26
15	Bear Creek	26
16	Mckay Creek	25
17	Fivemile Creek	25.5
18	East Fork Hood River	25
19	West Fork Hood River	25
20	Mountain Creek	24
21	Bridge Creek	24
22	Buck Hollow Creek	24.5
23	Upper Trout Creek	24.5
24	Lower Trout Creek	24.5
25	Crabtree Creek	25.5
26	Thomas Creek	25.5
27	Middle Cow Creek	24.5
28	Calapooya Creek	23
29	Elk Creek	23
30	Evans Creek	24.5
31	Lower Applegate River	24.5
32	East Fork Illinois River	24.5
33	Deer Creek	23
Significant Flow Restored		
34	Upper MF John Day River	26
35	Wychuss Creek	22
36	Calapooia River	24
37	Little Applegate River	24.5

*This numbering system does not imply ranking of watersheds

Map design by Kimberly Schonck & Michael Mintz, May 2007

Instream Restoration

Statutory Authority

Priority Date Retained

Conversion

New Instream Right

"Senior Rights"

Economic Incentives

INSTREAM WATER RIGHTS ACT

LEGISLATION HELPS CREATE MARKET FOR INSTREAM FLOWS

In 1987, the Oregon Legislature adopted the Instream Water Rights Act allowing public or private entities to lease or purchase water rights and convert them to instream flow rights.

This statute reads in relevant part:

> *Any person may purchase or lease all or a portion of an existing water right* or accept a gift of all or a portion of an existing water right for conversion to an in-stream water right. *Any water right converted to an in-stream water right under this section shall retain the priority date* of the water right purchased, leased or received as a gift (emphasis added). ORS 537.348(1).

With the inception of the Act, water transferred or leased instream is considered a "beneficial use." Prior to this, water left instream was considered "wasted" and was not protected from diversion by other upstream and downstream users. Oregon Revised Statutes (ORS 537.332 and ORS 537.334) now define a "public use" as one category of "beneficial use." Public uses include recreation, conservation of fish and wildlife, pollution abatement, or navigation. ORS 537.332(5).

Consequently, the Act provided a framework in which to create a market to acquire ecologically beneficial water. A person or entity can negotiate with willing landowners to purchase a surface water right and convert it to an instream water right. Another key factor is that a water right acquired through gift, lease or purchase retains its original priority date. Without this provision, acquired water rights would assume a junior status and have limited ecological benefit. Little incentive would exist for a person to acquire water rights under the Act, if not for this ability to retain the original priority date and, thus, better protect the resource.

There are two other methods to create instream flow under Oregon law. These two methods may be initiated only by state agencies and result in creation of instream water rights with relatively junior priority dates. One way is by *conversion* of "minimum perennial streamflows" adopted by the legislature in 1955. In 1987, the state legislature directed the Oregon Water Resources Department (OWRD) to review and "convert" all remaining minimum perennial streamflows to instream water rights to be held by the State for water quality, recreation, pollution abatement, conservation, and navigation puposes. Since then, over 550 instream water rights were created on Oregon's waterways from pre-existing minimum perennial streamflows (ORS 537.346).

The second way to create instream flow is by an application for a new appropriation, submitted by the Oregon Departments of Fish & Wildlife, Environmental Quality, and Parks and Recreation. Such an instream right can only be created by the application of one of these three entities. OWRD has the final say over these applications and has the option to accept, reduce, or reject such requests. Once an instream water right is created in Oregon, OWRD is the owner and holder of all instream water right certificates (ORS 537.336).

Creating instream water rights by acquisition clearly has an advantage over the other two methods, as noted above, because the priority date of the water right is retained when it is transferred to instream use. Thus, acquiring "senior" water rights for instream use is an excellent means to restore streamflows. By statute, instream water rights in Oregon have the same legal status as all other water rights and are regulated in the same way (ORS 537.350). "Senior" water rights under the Prior Appropriation Doctrine (with its fundamental principle of "first in time, first in right") are protected to the full extent of the water right in times of shortage. A senior, instream water right is entitled to regulation to ensure that sufficient water is left instream to satisfy the right — if necessary, by regulation to shut off junior water rights.

CAP-AND-TRADE PROGRAM FOR WATER IN OREGON?

USING MARKET FORCES

Solving environmental problems by using market forces is gaining interest. For example, emissions trading, also known as "cap-and-trade" programs, are being developed to control air pollution by providing economic incentives to achieve reductions in the emissions of pollutants. The Kyoto Protocol creates such a cap-and-trade program to reduce greenhouse gas emissions.

Concerning cap-and-trade plans, Wikipedia notes:

> In such a plan, a central authority (usually a government agency) sets a limit or *cap* on the amount of a pollutant that can be emitted. Companies or other groups that emit the pollutant are given *credits* or *allowances* which represent the right to emit a specific amount. The total amount of credits cannot exceed the cap, limiting total emissions to that level. Companies that pollute beyond their allowances must buy credits from those who pollute less than their allowances or face heavy penalties. This transfer is referred to as a trade. (Wikipedia, The Free Encyclopedia, "Emissions Trading" (August 14, 2007))

Instream Restoration

Availability

The same cap-and-trade concept is applicable in reallocating water for beneficial use. In a sense, Oregon has already capped the use of water in the state. Based on OWRD's "water availability" calculations, most streams are closed to further appropriation of water rights in the summer months. Water availability is the amount of water that can be appropriated from a specific point on a given stream for new out-of-stream consumptive uses. It is obtained by subtracting existing in-stream water rights and out-of-stream consumptive uses from the natural stream flow (OWRD Website, June 21, 2007). This arose in part after OWRD, under the Instream Water Rights Act, converted minimum perennial streamflows into instream water rights and approved new appropriations of instream water rights for water quality, recreation, pollution abatement, fisheries conservation, and navigation (as applied for by an authorized state agency: Oregon Department of Fish and Wildlife, Department of Environmental Quality or State Parks).

Flow "Cap"

These "state-created" instream water rights have priority dates based on the date of application (circa 1955 for minimum perennial streamflows and 1987 or after for the agency applied-for rights). Since most out-of-stream water rights were established many years ago, the state-created instream water rights have *junior* priority dates (later in time) in relation to most other water users on the respective streams. Thus, in many instances, the state-created rights are unlikely to be entitled to regulation of other water users to protect actual instream flow. However, the instream water rights are now added to OWRD's water rights availability calculation, which often results in a finding of "over-appropriation" for a stream (see OAR 690-400-0010(11)(a) for definition of over-appropriation). When a stream is found to be "over-appropriated" — which is true for most streams in the summer months — OWRD will not issue new water rights, thus administratively "capping" the amount of water available in the drier months. This cap is further established by OWRD's Division 33 rules that restrict new water right appropriations that will "impair or be detrimental to the public interest with regard to sensitive, threatened, or endangered fish species." OAR 690-033-0000(1).

Market Impetus

The creation of a cap on water allocation provides impetus for a water market. Because water is a finite resource and people now have less of an expectation to be able to obtain a new water right, this situation should encourage trading of water rights. Concerning such trades, Terry Anderson of Property and Environment Research Center in his recent article *"Fighting or Drinking"* notes:

> Specifically, in the case of changing water supplies, markets have the potential to encourage adaptation if water rights are clearly defined and transferable. For decades western farmers and ranchers have transferred water rights between one another to accommodate variable stream flows. More recently, growing demands for environmental water uses such as pollution dilution or instream flows for fish and wildlife have been met through willing-buyer willing-seller trades. (PERC Reports, p. 11, Summer 2007)

Oregon Success

OWT and others are having success leasing and purchasing existing water rights for instream uses. Since 1987, over 1000 instream leases have been approved in Oregon and 2006 alone saw over 350 lease applications (OWRD, Bob Rice, June 22, 2007). Transactions for instream transfers of water rights have been less robust but the trend is up. As of 2006, over 60 instream transfers and allocations of conserved water had been approved by OWRD, protecting more than 270 **c**ubic **f**eet per **s**econd (cfs) of flow (Rice, 2007). In total, Oregon is achieving great success in comparison to its neighboring states. Through leases and transfers in 2006, Oregon protected 750 cfs instream compared to 70 cfs for Idaho, 30 cfs for Washington, and 14 cfs for Montana (Rice, 2007). The Oregon experiment seems to be working.

TOOLS & INCENTIVES FOR LANDOWNERS

A VARIETY OF PATHS

Honoring Water Users

By providing a variety of incentives to water right holders in exchange for water rights — including compensation, technical assistance, and more efficient use of water — OWT converts or shapes water rights in a way that is mutually beneficial for water users and the environment. The water right holder may choose to work with OWT using short-term, long-term, or permanent water right agreements. As in any craft, we must apply the right tool for the job at hand. In the process we honor individual lifestyles and, when feasible, work with landowners to keep land in agricultural or natural resource production. The following list describes some of the tools that have been developed by the OWT and other water trusts over the last fourteen years. Often a transaction may involve more than one of these tools. In the recent transactions listed later on, there are examples of how these tools have been put to practical use.

Lease

Lease Process

A lease is a temporary acquisition of a water right for five years or less. OWRD has an expedited process to approve instream lease applications. Applications must be filed by June 1 of each year. Typically, irrigators lease their water rights to be left instream for an entire irrigation season and switch to crops that use less water, rotate crops, or let land fallow for the length of the lease agreement.

Instream Restoration

Split Season

Split Season Lease

A split season lease allows an irrigator to use water during a portion of the growing season, and then leave it instream during the rest of the season (ORS 537.348(3)). This transaction works particularly well when an irrigator is growing a crop with multiple harvests, such as alfalfa hay and when the water is needed instream for only a short portion of the growing season, such as late summer or fall. The irrigator receives the revenue from his first harvest and is paid not to use his water during the later part of the season.

Transfers

Permanent or Time-Limited Transfer

A permanent acquisition involves the transfer of ownership of a water right, as well as a change of use to instream flow. A permanent acquisition effectively separates the water from the land to which it was appurtenant (unless the water right and the land are acquired together). For permanent and long-term agreements (i.e., more than five years but less than permanent), a transfer application still must be filed with OWRD. Due to the longer-term nature of deals involving transfers, the administrative process is more time consuming and involves more scrutiny.

"Conserved" Water

Allocation of Conserved Water

Improvements in irrigation and transportation methods often result in using less water to farm the same crop by eliminating leaky ditches or excess evaporation. All or a portion of the saved water can then become protected as an instream water right using the state's Allocation of Conserved Water statute, ORS 537.455 *et seq*.

Trigger Event

Forbearance agreements

These are generally voluntary, short-term agreements where OWT pays a landowner to forbear from certain legally permitted uses of the water right. For example, OWT might contract with a landowner to stop diverting water if the stream flow drops below two cfs. Such an arrangement does not require OWRD approval and it works best when there are no other users who can take the bypassed water.

Tributary Diversion

Point of Diversion Changes

Often a smaller tributary that has critical habitat suffers from low flows when the mainstem river does not. Changing the point at which water is withdrawn from the tributary to the mainstem may mean that enough water is left in the tributary to support environmental needs, while creating little impact on the mainstem. In this type of arrangement, the water user should be unaffected by the change in point of diversion since he/she still is able to divert their full water right.

Source of Water

Source Switch

Switching sources of water (e.g. from surface water to groundwater or stored water) can sometimes result in a net improvement to streamflow. Changing the source of water requires a thorough knowledge of the hydrology of the system to ensure an improvement in one place is not at the cost of damage to another source.

Innovative Cancellation

Voluntary Cancellation or Diminishment

OWT has entered into agreements with landowners to voluntarily cancel or diminish all or a portion of their water right using ORS 540.621. Under that statute, an owner of a perfected water right may certify under oath that the "water right has been abandoned… and that the owner desires cancellation thereof…" In addition to cancelling irrigated acreage, an owner of the water right may use the law to diminish the right by shortening the irrigation season, which would have the effect of creating a permanent split-season use of water. Since the water right subject to be cancelled reverts to the public and is "again the subject of appropriation in the manner provided by law," this tool does not create a protectable instream water right under ORS 537.348. In certain instances, however, it can have the same effect of permanently keeping water instream. For example, this tool works on streams that are closed to further appropriation (due to the fact that OWRD has determined that no water is "available") and where there are no other existing water users who can withdraw the water from the targeted reach.

Increasing Portfolio

OREGON WATER TRUST AGREEMENTS OVERVIEW

BRIEF HISTORY

It has been over 13 years since OWT first paid for an instream lease on Buck Hollow Creek in the Deschutes Basin. Our effectiveness as an organization has increased dramatically. In 1994, OWT's portfolio amounted to two leases totaling slightly over one cfs. In 2006, our portfolio rose to 160 cfs of flow protected for instream use covering 86 streams, representing cooperation with over 200 landowners. This constitutes 52,896 acre-feet of water for the year. One of OWT's founding goals was to ensure that Oregon's salmon, steelhead, and native fish could count on healthy stream flows far into the future. In 2006, OWT made great strides toward this goal, protecting 58 cfs under long term agreements — a 28 cfs increase over the previous year. This constitutes 36% of OWT's overall portfolio. The revised portfolio for 2007 will be tabulated this October, after the irrigation season ends.

Instream Restoration

Water Values

Prices Paid for Leases and Purchases

In 2006, Oregon Water Trust paid $1,041,743 for water right leases and purchases. Water donated for instream use was valued at $115,468. The average price paid by OWT since 1994 for leased water is $16.37/acre-foot/year and $59 per acre (generally inactivating pasture land) per year. Permanent transactions have averaged $139/acre-foot at approximately $1000/acre — or stated another way, about $50,000/cfs. Prices vary depending on the basin, location within the watershed, seniority, and ecological benefit. Whether the transaction involves a lease or an outright purchase, OWT focuses on deals involving less productive lands that have water rights on streams where flow is a limiting factor for anadromous fish habitat. Consequently, we are looking for deals where the instream value is higher than the out-of-stream value. This is the nexus where a market for ecological water can best be created.

RECENT INNOVATIVE OWT TRANSACTIONS

Stored Water Release

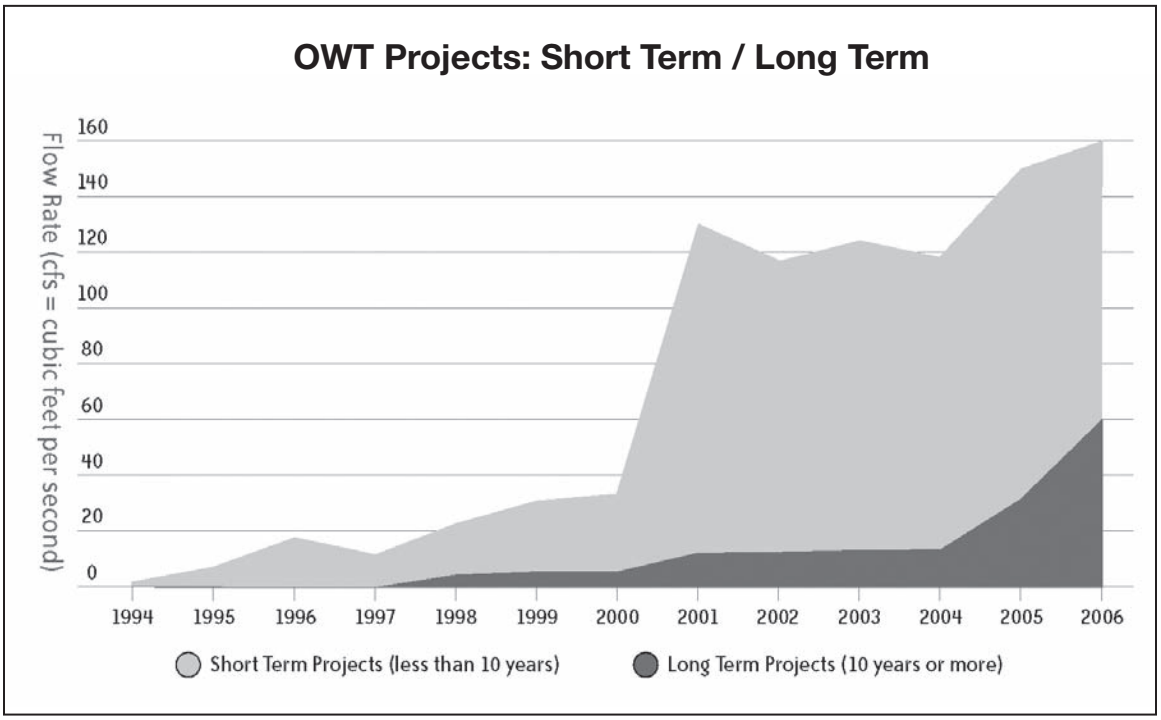
McKay Reservoir Stored Water Contract Purchase and Lease (2006)

McKay Reservoir, located near Pendleton, Oregon, is a Bureau of Reclamation (Reclamation) project that provides water for supplemental irrigation to Umatilla County farmers and for fisheries conservation in the Umatilla River through the Umatilla Basin Project. Working with Reclamation, OWRD, the Confederated Tribes of the Umatilla Indian Reservation, and two landowners, OWT completed two transactions in 2006 that provide stored water from McKay Reservoir to be released into McKay Creek, which then flows into the Umatilla River. The first transaction, a permanent project, results in an average 288 acre-feet of stored water being released for fisheries enhancement per year. The second transaction, a five-year lease, will add another 150 **a**cre-**f**eet (AF) of water per year. For the permanent purchase, OWT paid the landowner $116,400 or approximately $404/AF. Together, this water is an important addition to the fisheries conservation water released into McKay Creek and the Umatilla River through the Umatilla Basin Project. In addition to the ecological benefits, the cooperative agreements represent a unique new streamflow restoration tool that OWT expects will be useful for future transactions in this location and others.

Shortened Irrigation Season

Middle Fork John Day River Season-of-Use Diminishment (2005)

Using the voluntary cancellation statute mentioned above, OWT reached a landmark agreement with a local ranch to alter their water rights to stop irrigating on July 21st each year in perpetuity. The project will preserve 10 cfs of flow in the Middle Fork John Day River and Clear and Vinegar Creeks when it is most needed for rearing and spawning spring Chinook salmon. OWT paid approximately $700/AF to permanently shorten the ranch's irrigation season by 72 days. The instream flow improvement will complement the benefits of roughly $10 million in other habitat protection, restoration and management practices invested by local partners over the last 15 years.



Instream Restoration

Use Change

Evans Creek Farms to Forest Initiative (2007)

In the Rogue Basin, OWT has been working for several years with the owners of the J<>L-5 Ranch, located on Evans Creek. OWT has leased the ranch's 1902 water rights to improve summer water levels in Evans Creek. The experience built trust which led to discussions about how to secure a long-term arrangement to help the creek while maintaining the viability of the ranch. The landowners were considering planting their upper irrigated pastures into trees, utilizing the Oregon Department of Forestry (ODF) Forest Resource Trust Program to offset the cost of planting trees on historically marginal ground. The landowners, OWT, and ODF recognized an opportunity to leverage their programs by planting trees for future generations while leaving Evans Creek with more water for fish. The landowners and ODF executed a contract and recently planted trees in the upper pastures. OWT and the landowners entered into an agreement for a 29-year instream transfer of the ranch's water rights for 25 acres.

Group Leases

Bear Creek Leasing (2006 & 2007)

In 2006, OWT and its partners added almost five cfs of water to Bear Creek in Jackson County. OWT worked with the Talent, Medford, and Rogue River Valley irrigation districts to identify interested district patrons and locate water rights suitable to convert to instream use. OWT and the districts developed a cooperative plan for managing the water in Bear Creek, which typically has low flow and poor water quality in the summer months. The districts and seven patrons each executed a contract with OWT and then submitted instream lease applications to the OWRD. That agency reviewed the lease applications for completeness and to ensure no other water rights would be harmed by the leases. The result was more water in Bear Creek when it was needed most. The program is continuing in 2007.

Group Forbearance

Lostine River Forbearance Agreement (2005-2007)

Over the past three years, OWT has worked with 100 ranchers and other landowners to maintain instream flow in the Lostine River near Enterprise, Oregon. Under agreements with five ditch companies, OWT compensated landowners for keeping a target minimum flow of 15 cfs in the river through the town of Lostine. This year, the agreement compensates irrigators to leave up to 20 cfs in the river. This allows adult Chinook salmon to swim unimpeded up to their spawning grounds high in the Wallowa Mountains. For their participation in this project, the irrigators were presented the "2005 Award of Merit" by the Oregon Chapter of the American Fisheries Society for their efforts in enhancing salmon habitat and improving streamflow.

CONCLUSION

OWT and others are experiencing great success using existing laws and market approaches to reallocate water for fisheries conservation and improved water quality. Oregon's laws concerning instream water rights provide the opportunities and OWT's innovative approaches continue to provide instream flows for Oregon's future.

For Additional Information:

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Oregon Water Resources Department website:

Additional information on Oregon's approach to flow restoration can be found on OWRD's website: www.wrd.state.or.us/OWRD/mgmt_instream.shtml\

Fritz Paulus is the second director of the Oregon Water Trust and has been in this position since April 2003. Fritz graduated from Whitman College, Walla Walla Washington, where he earned a B.A. in Mathematics in 1985. Fritz attended University of Oregon School of Law in 1988 and graduated with a JD in 1991. Fritz is a member of the Oregon State Bar and left the practice of law in 2001 to become a real estate negotiator for the Metro Regional Parks and Greenspaces program located around Portland, Oregon. There he negotiated with landowners to purchase public natural areas and trails, helping to protect and restore open space with funds available through Metro's Open Spaces bond measure. He has also served as President of the urban tree planting group, Friends of Trees.

Nutrient Analysis

Previous Article

Response Indicators

Major Elements

On-Going Refinements

Santa Magarita Study

EPA Push

Shortcomings

NUTRIENT NUMERIC ENDPOINTS

A RESPONSE TO:

"*Nutrient Numeric Endpoints: Not Quite Ready for Prime Time?*" (Jungreis & Thomas, TWR #42)

by Dr. Jonathan Butcher, Tetra Tech, Inc.
and Cynthia Gorham-Test, San Diego Regional Water Quality Control Board

The article of Jungreis and Thomas (*The Water Report* #42, August 15, 2007) provides an incomplete and misleading presentation of the California Nutrient Numeric Endpoints (CA NNE) initiative. Many of the claims made by Jungreis and Thomas reflect specific concerns of interested parties in the Santa Margarita River basin, San Diego County, California. The following response is provided in an effort to set the record straight on the status and intended uses of the CA NNE, particularly as it regards the Santa Margarita.

Background

The *Technical Approach to Develop Nutrient Numeric Endpoints for California* was prepared by Tetra Tech for the US Environmental Protection Agency (EPA) Region IX and the California State Water Resource Control Board in July 2006. The intention of the proposed approach is to select nutrient response indicators that can be used to evaluate risk of use impairment, rather than using pre-defined nutrient limits that may or may not result in eutrophication for a particular water body.

The proposed approach includes three major elements:

- A water body classification framework that uses three Beneficial Use risk classification categories
- Risk-based secondary indicators that are more closely linked to Beneficial Use condition than water column nutrient concentrations
- Simplified modeling tools that can be used to provide initial estimates of the linkage between secondary indicators and water column nutrient concentrations in the absence of calibrated site-specific models. These tools account for site-specific co-factors such as flow, light availability, and others.

The 2006 report is part of a process that will lead to refinements in the classification framework, secondary indicators, and linkage analysis modeling tools through the development of site-specific endpoints. One outcome of this process could be the adoption of the framework and endpoints by various Regional Water Quality Control Boards for use as nutrient numeric criteria.

Following the release of the 2006 report, EPA funded a series of five case studies. These case studies were selected to demonstrate the proposed methods through the development of nutrient numeric endpoints for waterbodies requiring nutrient Total Maximum Daily Loads (TMDLs). A specific objective of the case studies was to test and refine the simplified modeling tools.

The Santa Margarita River was chosen as one of the five case studies. The study was conducted as a scoping exercise, using readily available data and on a small budget (which precluded, for instance, the collection of new data or the development of a detailed project GIS analysis). The Santa Margarita NNE case study was submitted to the San Diego Regional Water Quality Board in January 2007 and distributed to stakeholders for comment. A detailed response to comments was presented to stakeholders on August 21, 2007. Some salient points relevant to the paper of Jungreis and Thomas are summarized below.

Development and Status of the NNE Framework

EPA began the push toward nutrient criteria in 1998 with publication of their *National Strategy for the Development of Regional Nutrient Criteria*. EPA then proceeded to develop national criteria recommendations at the scale of aggregated Level III ecoregions, proposing that the 25th percentiles of all available nutrient data within an ecoregion could be assumed to represent unimpacted reference conditions and could then be characterized as criteria recommendations that would be protective of aquatic life and recreational uses.

Many researchers have demonstrated the potential shortcomings of this approach. Most importantly, nutrient concentrations alone are generally not a cause of impairment of uses (except in the cases when concentrations of nitrate or ammonium are sufficiently high to induce toxicity). Rather, it is the secondary impacts of nutrient concentrations on algal growth, diurnal (daily) **d**issolved **o**xygen (DO) fluctuations caused by algae, and so on that impair uses. Further, the approach essentially guarantees that a percentage of streams will be identified as impaired by nutrients, regardless of whether beneficial uses are actually impacted.

Nutrient Analysis

Multiple Factors

Advisory Groups

"CA NNE" Approach

Risk-Based

"Secondary" Indicators

Tiered Approach (BURCs)

Development Process

One problem is that nutrients are only one of several factors that control algal growth. Particularly in streams, factors such as light availability and shading, channel morphology and substrate, stream gradient, water temperature, and the density of algae-eating insects (and other "grazers") strongly impact the degree to which nutrient concentrations are "expressed" in excess algal growth. This means that two streams with the same nutrient concentrations can have widely different responses, with one stream supporting a healthy aquatic biological community while in the other the biology is degraded and the channel is choked with dense growths of filamentous green algae.

The State of California and EPA Region IX have been working since 1999 to develop an appropriate approach to nutrient criteria. Region IX called together a Regional Technical Advisory Group (RTAG) in 1999. The RTAG included representatives from all State water quality agencies in Region IX, Tribes, other State and Federal agencies, and representatives from industry and environmental groups. In 2001, the California State Water Board created the State Regional Board Technical Advisory Group (STRTAG) to work in parallel with the RTAG and assume responsibility for continuing to move nutrient development forward for California and to better coordinate the activities of the individual Regional Water Boards. The RTAG and STRTAG collaborated in guiding and funding a series of pilot studies on nutrient criteria, culminating with the release in 2006 of the *Technical Approach to Develop Nutrient Numeric Endpoints for California*, which summarizes the proposed CA NNE approach.

Recognizing the significant shortcomings of the statistical approach to nutrient criteria originally proposed by EPA, the CA NNE proposes a different, risk-based approach.

Two key aspects of the CA NNE approach are:

- Determinations of use impairment, and the setting of targets to mitigate impairment, should be based not on nutrient concentrations alone but rather on indicators such as algal density that are more closely related to use impairment. These "secondary" indicators should then be used to infer appropriate nutrient concentration targets that take into account as many of the site-specific co-factors that control the secondary indicators as is possible. The linkage between nutrient concentrations and the secondary indicator response can be made at varying levels of detail, ranging from simplified scoping analyses (such as the NNE tools) to complex, site-specific waterbody response models. This approach recognizes the technical desirability of developing site-specific models to determine nutrient goals while acknowledging the practical constraints of resource limitations.
- Unlike most water quality criteria, the CA NNE approach to nutrient criteria proposes that assessment of use support should not use a simple "either/or" determination; rather, a three-tier approach was recommended that reflects the degree of risk of impairment by nutrients. To this end, three Beneficial Use Risk Categories (BURCs) were proposed. Simply put, BURC I represents waterbodies where nutrient concentrations are sufficiently low that it may be presumed that impairment related to nutrient enrichment does not occur, while BURC III represents waterbodies that have nutrients at sufficiently high levels that there is a scientific consensus that the potential for impairment is high. BURC I would also encompass any waterbodies in which nutrient concentrations represent natural conditions for the area. BURC II represents a gray area in which there is a potential for impairment, but further analysis may be needed. The BURC boundaries are defined in terms of the secondary indicators relative to a specific beneficial use. For instance, the BURC boundaries for Cold Freshwater Habitat (COLD) and Warm Freshwater Habitat (WARM) aquatic life use support will differ. At least in concept, a TMDL should be set at levels sufficient to fall below the BURC II/III boundary.

In moving from concept to implementation, the approach is obviously sensitive to the specification of the BURC boundaries (that is, the corresponding values of the secondary indicators). Provisional recommendations on BURC boundaries were developed based on expert recommendations at a two-day workshop involving the RTAG/STRTAG and including representatives from all of the Regional Water Quality Boards. Jungreis and Thomas comment that "The BURCs were developed via a literature search, entirely outside of the normal regulatory process – and largely utilizing data gathered outside of the arid Southwestern States." We believe that the first part of this characterization is inappropriate, as the RTAG/STRTAG participated closely in the process. Further, the BURCs do not have regulatory status at this time. Indeed, staff from the State Water Board and the Regional Water Boards acknowledged during the development of the NNE that some of the assumptions needed to be tested and that the current boundaries may be set an inappropriate levels (either over or under protection). That is one of the reasons that case studies are being conducted.

It is true that many of the studies that were considered in setting the provisional BURC boundaries used data gathered outside of the arid Southwestern States, because the number of relevant studies available

Nutrient Analysis

Background Issues

Further Testing

Scoping Tools

Framework v. Tools

Data Preferences

Appropriate Compromise

Ongoing Modeling

from this region is limited. The question can be framed in a more useful way by asking whether the BURC boundaries associated with a given beneficial use should be the same across different ecoregions. That, however, is more of a policy issue than a shortcoming of the NNE technical approach.

It should also be noted in the discussion of BURC boundaries that the NNE approach explicitly notes that the BURC I/II boundary should "be set so that it is not less than the expected natural background." The comments of Jungreis and Thomas state that the Santa Margarita Case Study results "suggest a trend towards setting of water quality targets for nutrients…at levels lower than natural background levels." That is simply not the case, as the NNE approach precludes this possibility. What is uncertain at this time is the identification of natural background in this area, for which few unimpaired reference sites are available. Further, hydrologic modifications of the system may make "natural" background difficult to determine. If it can be demonstrated (for instance, through modeling) that natural background concentrations in the Santa Margarita would be higher than concentrations that are calculated to meet the secondary indicator targets, then the NNE approach states that the natural background concentrations would apply. In no case would the NNE approach intentionally set "water quality targets at levels more stringent than those which can be achieved without the influence of mankind," as is implied in the comments from the earlier article.

In summary, while the State has supported the development of the NNE, the specific secondary indicator targets proposed in the *Technical Approach* do not have regulatory status at this time. Indeed, as noted above, the State Water Board Staff concurs that the currently proposed boundaries need to be tested further through case studies. Stakeholder input on the Santa Margarita study will form an important input to this process.

Relationship of the NNE Tools to the NNE Framework

Determining the causal relationship between nutrient loads and impacts on beneficial uses is an inherently complex and site-specific process. However, lack of information is not an excuse for inaction where impairment of uses has been documented. The NNE spreadsheet models were specifically developed as simple scoping tools that can be used to evaluate the linkage between nutrients and secondary indicators associated with use impairment when information on site-specific processes is limited. Tetra Tech's report, *Technical Approach to Develop Numeric Nutrient Endpoints for California* (July 2006), says that these "[R]elatively simple tools can provide initial targets, although site-specific refinements may be needed for individual waterbodies," and further that "it is critical that these tools be used in the context of the overall approach as one of multiple lines of evidence."

It is important to maintain the distinction between the NNE Framework and the NNE Tools. The NNE Framework proposes evaluating use support relative to nutrients through use of secondary indicators (such as algal density and diurnal DO depressions). The NNE Tools are one mechanism to develop an initial evaluation of the relationship between these secondary indicators and nutrient concentrations or loads in the waterbody.

The article by Jungreis and Thomas states that the "Development of the NNE approach…ignored the suggestions of members of the regulated community that a site-specific, dynamic modeling approach must be undertaken in concert with the NNE if the goal is to quantitatively evaluate nutrient-biomass relationships for particular river systems." Tetra Tech agrees that "a site-specific, dynamic modeling approach" is preferable, but disagrees with the contention that requests for use of such an approach was "ignored." Indeed, the 2006 *Technical Approach* states: "Depending on the use, user perceptions, data availability, and economic impact of the decisions, other, more detailed and site-specific tools may be needed for translating secondary indicator targets to nutrient concentration targets." Indeed, use of a calibrated and validated site-specific model is the preferable approach to the development of nutrient control strategies that are protective of beneficial uses. However, it is also true that the development of such models requires a considerable investment in data collection and modeling effort. For many waterbodies at risk from nutrient impairment the funding and expertise to develop site-specific models is simply not likely to be available in the near future. In such cases, reliance on simplified scoping-level tools provides an appropriate compromise that combines available site-specific data and expert opinion (as encoded in model relationships) to provide a first estimate of appropriate targets.

For the Santa Margarita River, at least two more detailed modeling efforts are underway, including a "Watershed Analysis Risk Management Framework" (WARMF) model being developed for the Bureau of Reclamation and a "Loading Simulation Program in C++" (LSPC) watershed model being developed for EPA and the California State Water Resource Control Board. Both have been calibrated for hydrology (although the quality of fit has not been reviewed at this time) and have been used for some water quality applications. However, neither is rigorously calibrated and validated for instream water quality at this time. In particular, they are not calibrated for algal response during summer low flow conditions, which is a

Nutrient Analysis

crucial factor for determination of nutrient-related use support. Sufficient data probably do not exist at this time to complete such a calibration and validation effort. In the event that a dynamic water quality model is calibrated for algal growth, demonstrated to perform adequately through validation, and subject to adequate peer review, predictions from such a model would provide a more rigorous, site-specific basis for nutrient management in the Santa Margarita River. Such site specific analyses would be preferable to the scoping-level estimates obtained from the NNE spreadsheet.

Initial Scoping Benefits

The NNE tools provide another practical benefit in application to waterbodies, such as the Santa Margarita River, where a more sophisticated model is likely to be developed. That is, they provide initial scoping of the nutrient-algal response expected *a priori* in the system. A calibrated site-specific model may well provide results that differ in significant ways from the NNE tool predictions. However, the scoping model application creates a burden of explanation as to why the results differ. This will help ensure that the model development effort addresses potentially significant factors and is transparent to peer reviewers and stakeholders.

Changing Conditions in the Santa Margarita

Appropriate Targeting

Consistent Data

There have been a variety of changes in the management of water in the Santa Margarita River over time. These include the elimination of effluent and reclaimed water discharges, and the substitute provision of up to three cubic feet per second imported Colorado River water at the head of the gorge to satisfy Camp Pendleton's water rights. The Santa Margarita case study relied on available water quality data from 1986 though 2001. It is true that there have been changes in the system that have occurred over time; however, it was necessary to base the analysis on the data that were available. More specifically, the intent of the study was not an assessment of current conditions, but rather a determination of appropriate targets to attain beneficial uses. The targets are primarily a characteristic of the waterbody and climate — so the analysis can be done with any consistent set of data.

Summary

No Regulatory Status

Impairments Identified

The Santa Margarita case study was one of five such studies undertaken to test and refine the CA NNE approach. The Santa Margarita study summarizes the available data and suggests potential appropriate nutrient endpoints. These endpoints, however, do not have regulatory status at this time. Despite the protestations of Jungreis and Thomas, the available data do suggest that beneficial uses in the Santa Margarita are impaired by nutrients. In addition to qualitative reports of dense algal growth, analysis of continuous DO data collected by the Santa Margarita Ecological Reserve from the mainstem of the river within the Santa Margarita Gorge from February 15, 2002 through August 3, 2005 (with gaps) indicate that DO concentration was below 5 mg/L more than 12 percent of the time – whereas the COLD beneficial use has a DO criterion of 6 mg/L. During the summer, diurnal changes in DO concentration are around 5 mg/L. Strong diurnal cycles in pH provide additional evidence that algal growth is driving the observed diurnal cycles in DO.

Impairment is defined relative to beneficial uses and associated water quality standards. It is evident that nutrient-induced algal growth is preventing attainment of DO standards in the Santa Margarita River, and that attaining these standards would require significant reductions in nutrient concentrations. It may be that the DO standards assigned to the Santa Margarita are not appropriate, but that is an issue outside the scope of the CA NNE approach, and one that is not resolvable with currently available data.

Further Data Collection?

In our estimation, the CA NNE tools have performed well in providing scoping-level estimates of appropriate nutrient targets for the Santa Margarita. Such scoping results are by definition uncertain and should err on the side of caution. If more precise results are desired it is incumbent on interested parties to collect the data needed to calibrate and validate a site-specific nutrient response model, consistent with the CA NNE Framework.

For Additional Information:
Dr. Jonathon Butcher, Tetra Tech, Inc., 919/ 485-8278 x103 or email: jon.butcher@tetratech.com
Cynthia Gorham-Test, San Diego Regional Water Quality Control Board, 858/ 467-2957 or email: ctest@waterboards.ca.gov

Dr. Jonathan Butcher, an Associate Director with Tetra Tech, Inc. is an environmental engineer and Professional Hydrologist. He has led research in support of development of California Numeric Nutrient Endpoints since 2003.
Cynthia Gorham-Test is an Environmental Scientist at the Regional Water Quality Control Board in San Diego, CA where she works on TMDLs. Her areas of expertise include nutrient dynamics in waterebodies, sediment quality in estuaries, and freshwater inflow needs for estuaries. Ms. Gorham-Test received a B.S. and M.S. in Biology from Baylor University.

WATER BRIEFS

TRIBAL TREATY RIGHTS WA

FISH PASSAGE DUTY

On August 22, US District Court Judge Ricardo S. Martinez issued a summary judgment order concerning tribal treaty rights that has tremendous ramifications for any entities dealing with obstacles to fish passage. The court ruled that the Tribes' treaty-based right of taking fish imposes upon the State of Washington a duty to refrain from building or operating culverts under state-maintained roads that hinder fish passage and thereby diminish the number of fish that would otherwise be available for Tribal harvest. The order also specified that this duty includes culverts that would "block the passage of fish upstream or down, to or from the Tribes' usual and accustomed fishing places." Order on Cross-Motions for Summary Judgment, *United States v. Washington*, Case No. CV 9213RSM (Aug. 22, 2007), p.12. The proceeding arises from the language in Article III of the 1855 Treaty of Point Elliot ("Stevens Treaties") in which the Tribes were promised that "[t]he right of taking fish, at all usual and accustomed grounds and stations, is further secured to said Indians, in common with all citizens of the Territory…" Order at 2-3.

The court's Order was limited to culverts under Washington state maintained roads. Nonetheless, the Order contained additional language that, at the very least, seems to indicate that local governments and private entities who have infrastructure that impairs fish passage could also find themselves governed by a similar decision. "It was thus the right to **take** fish, not just the right to fish, that was secured by the treaties." (emphasis in original) Order at 10. "Thus, the Tribes were persuaded to cede huge tracts of land—described by the Supreme Court as 'millions of acres'—by the promise that they would forever have access to this resource [fish], which was thought to be inexhaustible…These assurances would only be meaningful if they carried the implied promise that neither the negotiators nor their successors would take actions that would significantly degrade the resource."

The impact of the decision on other factors that impact the Tribes' right to "take" fish — such as instream flows — remains to be seen. The court's language, however, is obviously broad enough to encompass other "actions that would significantly degrade the resource." The decision, even in the most limited application, appears to involve more than 1,000 culverts and, according to the Tribes, at least 249 linear miles of stream. See Order at 4-5. The court also adopted as a standard that the Tribes were entitled to "take" sufficient quantities of fish to provide a "moderate living." Order at 7-8.

Additional proceedings are necessary to develop appropriate remedies. The Tribes requested: (1) an injunction prohibiting the State of Washington and its agencies from constructing or maintaining any culverts that reduce the number of fish that would otherwise return to or pass through the usual and accustomed fishing grounds of the Tribes; (2) that the State identify, within eighteen months, the location of all culverts constructed or maintained by State agencies that diminish the fish; and (3) that the State fix, within five years after judgment, and thereafter maintain all culverts built or maintained by any State agency, so that they do not diminish the fish. Order at 3.

The proceeding was initiated in 2001 when a "Request for Determination" was filed by plaintiffs Suquamish Indian Tribe, Jamestown S'Klallam, Lower Elwha Band of Klallam, Port Gamble Clallam, Nisqually Indian Tribe, Nooksack Tribe, Sauk-Suiattle Tribe, Skokomish Indian Tribe, Squaxin Island Tribe, Stillaguamish Tribe, Upper Skagit Tribe, Tulalip Tribe, Lummi Indian Nation, Quinault Indian Nation, Puyallup Tribe, Hoh Tribe, Confederated Bands and Tribes of the Yakama Indian Nation, Quileute Indian Tribe, Makah Nation, and Swinomish Tribal Community.

Fronda Woods, Assistant Attorney General for Washington, told The Water Report that at the status conference held following the Order, Judge Martinez suggested that the parties attempt to work out an agreement on the remedies needed. Ms. Woods noted that the State is talking with the Tribes' representatives to see if they can work out an agreement as to how to fix the culverts. If no agreement is reached, a trial would be held to decide exactly what remedies would be required.

For info: Complete Order available at: www.indianz.com/docs/court/washington/order082207.pdf

TOXIC DAM DISCHARGES CA

CLEAN WATER ACT & NUISANCE SUITS

On August 22, the Klamath Riverkeeper, the Karuk Tribe of California, and the Pacific Coast Federation of Fishermen's Association (PCFFA) filed a lawsuit against the California Regional Water Quality Control Board (North Coast Region) ("Board") for failing to require reports of waste discharge or issue waste discharge requirements for PacifiCorp's Klamath River dams and reservoirs pursuant to the Porter-Cologne Act. Last February, the groups petitioned the Board to establish limits on the amount of the toxic algae *Microcystis aeruginosa* that can be discharged into the river by Iron Gate and Copco dams. In April, the Board refused to apply waste discharge requirements to PacifiCorp, based on the conclusion that the State of California's water quality laws as they apply to PacifiCorp's operations on the Klamath River are preempted by the Federal Power Act, 16 U.S.C. § 793a *et seq*. The suit filed in California Superior Court in Sonoma County argues that Congress passed the Clean Water Act explicitly to preserve and expand states' authority to regulate water quality. 33 U.S.C. § 1251 et seq.

The dams are located in the northeast corner of California and are owned by the Portland, Oregon based PacifiCorp, which in turn is owned by Berkshire Hathaway (Chairman and CEO Warren Buffett). Although PacifiCorp is also facing the issue of obtaining a Section 401 certification from the Board as part of its Federal Energy Regulatory Commission (FERC) relicensing process for the dams, the problem is that the FERC process might continue for a long time. "Protecting the Klamath River's water quality does not have to wait for the FERC proceeding to run its lengthy course… By developing and issuing WDRs, the Regional Board would put in place its own, state-based process designed to ensure that California's waters are protected even assuming the FERC proceeding drags on for some time." Petition at 21.

In a related matter, on August 16 another federal judge held that a nuisance case against PacifiCorp can go forward to allow tribal members, commercial fishermen, and business owners along the Klamath River to seek monetary damages for water

quality problems allegedly caused by PacifiCorps' operation of dams. Plaintiffs allege that PacifiCorps' conduct in operating the dams has polluted the Klamath River by raising water temperatures above natural levels, reducing dissolved oxygen to levels lethal to fish. In addition, the plaintiffs contend that the heightened temperatures promote the growth of blue-green algae (*Microcystis aeruginosa*) and an associated toxin (microsystin).

US District Court Judge William Alsup rejected PacifiCorp's preemption contention that under California law, the FERC permit precluded nuisance claims (as to monetary relief). The court found that the FERC license "cannot be read as to go so far as to demonstrate 'an unequivocal legislative intent to sanction a nuisance.'…The California Supreme Court has explained that 'although an activity authorized by statute cannot be a nuisance, the *manner* in which the activity is performed may constitute a nuisance.'" *Greater Westchester Homeowners Ass'n v. City of Los Angele*s, 26 Cal. 3d 86, 101 (1979). Order at 9. Judge Alsup ruled that he did not have the authority to require PacifiCorp to immediately alter its dam operations while the case is heard because FERC's authority over dam relicensing preempted such an injunction. He also rejected PacifiCorp's request to delay the case under the doctrine of "primary jurisdiction" while FERC completes the highly contentious dam relicensing proceedings that have been ongoing since 2004. No tribal government is involved in this case.

For info: Craig Tucker, Karuk Tribe, 530/ 627-3446 x3027, email: ctucker@karuk.us, or website: www.karuk.us; Niall McCarthy (Cotchett, Pitre, and McCarthy), Attorney for Plaintiffs in nuisance suit, 650/ 697-6000

NPDES GUIDANCE US

WATERSHED MANAGEMENT PLANS

EPA has published a new technical guidance that will help integrate National Pollutant Discharge Elimination System (NPDES) permits into watershed management plans. "Watershed-Based NPDES Permitting Technical Guidance" is a follow up to the 2003 implementation guidance and leads interested parties through the analysis of watershed data and developing a framework for implementing an NPDES program.

The guidance supports approaches to permitting that may help target the watershed's most pressing environmental needs. The approaches will help achieve water quality-based effluent limitations based on water quality standards while providing opportunities for cost reductions and improved efficiencies such as water quality trading. The guidance includes case studies describing how watershed approaches involving NPDES permitting have been implemented across the country. The agency is accepting comments on the guidance on a continuing basis.

For info: Pat Bradley, EPA, 202/ 564-0729, email: bradley.patrick@epa.gov, or website: www.epa.gov/npdes/watersheds

PIPELINE RELEASES KS

AMMONIA PENALTY $1 MILLION

Mid-America Pipeline Company pleaded guilty September 4th to negligently releasing 200,000 gallons of ammonia into a Kansas creek. The release required the evacuation of nearby residents and killed 25,000 fish. The company agreed to pay a $1 million criminal penalty for negligently violating the federal Clean Water Act. The criminal penalty will be paid into the Oil Spill and Hazardous Substances Clean-Up Trust Fund.

A pipeline owned by the company ruptured in October 2004 approximately six miles west of Kingman, Kansas, releasing approximately 204,000 gallons of ammonia into Smoots Creek that created a vapor cloud forty feet high. Two threatened species were among the fish killed. The company failed to provide correct information to the National Response Center and local responders about the magnitude of the release, delaying a more comprehensive response. The ammonia spread through at least 12 miles of the creek.

As required by law, the company notified the National Response Center, but incorrectly reported that only 20 gallons of ammonia had been released to the creek. For ammonia, companies must report any releases over 100 pounds, which is equivalent to approximately 15 gallons. The company did not submit a revised notification until about six weeks after the release. Anhydrous ammonia is a highly corrosive, toxic and hazardous liquid, and can be fatal to humans if ingested, inhaled or absorbed through the skin.

For info: Roxanne Smith, EPA**,** 202/ 564-4355 or email: smith.roxanne@epa.gov; EPA's Criminal Enforcement website: epa.gov/compliance/criminal/index.html

OPEN RIVERS INITIATIVE US

NOAA FUNDING AVAILABLE

NOAA's Open Rivers Initiative provides funding for the implementation of locally-driven projects to remove dams and other barriers to benefit living marine and coastal resources, particularly diadromous fish. Projects supported through the Open Rivers Initiative have strong on-the-ground habitat restoration components that foster economic, educational, and social benefits for citizens and their communities in addition to long-term ecological habitat improvements. NOAA is currently seeking applications for funding. Potential applicants are invited to contact NOAA Restoration Center staff before submitting an application to discuss goals and objectives. Applications must be received by October 31, 2007.

For info: Tisa Shostik, NOAA, 301/ 713-0174 or NOAA website: www.nmfs.noaa.gov/habitat/restoration/ORI/

COALBED METHANE CO

WATER RIGHT PERMITS REQUIRED

On July 2, a Colorado Water Court held that the State Engineer has a statutory duty to require well permits and augmentation plans when groundwater, which is hydraulically connected or tributary to surface water, is diverted in the course of coalbed methane (CBM) production. *Vance v. Simpson*, District Court, Water Division 7, State of Colorado, Case Number: 2005CW063 (July 2, 2007). The Plaintiffs, ranchers who were concerned that CBM production would impair their water rights, challenged the State Engineer's decision not to require water right permits for the water withdrawal.

The Water Court rejected arguments by the State Engineer and BP America Production Company that CBM water withdrawals did not require a water right permit because they were a byproduct of methane and, therefore, governed under the Colorado Oil and Gas Conservation Commission's

WATER BRIEFS

jurisdiction (Oil and Gas Act, C.R.S. § 34-60-102, *et seq.)* rather than the State Engineer's jurisdiction under the Colorado Groundwater Management Act (C.R.S. § 37-90-101, *et seq.)*. The court found "…an oil and gas well that affects water rights is subject to the *permitting* requirements of the Ground Water Act [citation omitted]. This construction achieves the purpose of the water acts to regulate water rights consistent with the doctrine of appropriation while respecting the technical expertise of the COGCC in protecting the public from the unique hazards associated with construction of wells used for oil and gas operations." Order at 12 (court emphasis). The Water Court relied on statutory construction and its view of the intent of Colorado water law to arrive at its decision.

Another important issue was whether the withdrawal of water for CBM production is an "appropriation of water" under Colorado water law — i.e. "the application of a specified portion of the waters of the state to a beneficial use" as required under C.R.S. §37-92-103(3)(a). BP maintained that the distinguishing quality of a "beneficial use" is the beneficial application of water *subsequent* to its diversion; BP and the State Engineer both argued that the water is not "used," but was merely a byproduct of CBM production. The Water Court, however, cited an old water case for its finding that "the method of diverting or carrying [the water], or making such application" is not material to the question of whether there is an appropriation of water. "The true test of appropriation of water is the *successful application thereof to the beneficial use designed*…" (emphasis in original). *Thomas v. Guiraud*, 6 Colo. 530, 533 (Colo. 1883).

The Water Court also dealt with additional issues, such as the definition of a "well" as contemplated by the Ground Water Management Act, and whether "deference" should have been given to the State Engineer's interpretation of the governing statutes.
For info: Case available at: www.martenlaw.com/news/pdfs/2005CW063-Summary-Judgment-Motions.pdf

HATCHERY FISH RULING NW SALMON LISTINGS VALID

On August 14, US District Court Judge Michael Hogan dismissed challenges to 16 salmon listings under the Endangered Species Act (ESA) and rejected arguments against the National Marine Fisheries Service's (NMFS) new protective regulations for listed salmon populations. The ruling in favor of NMFS' actions provides clarification as to how "natural" salmon populations and hatchery fish are to be treated under the ESA. *Alsea Valley Alliance v. Lautenbacher,* Case No. 06-6093-HO, (D. Or.) (August 14, 2007). The 16 stocks include the Snake River spring/summer and fall chinook stocks, the Upper Columbia spring-run chinook, the Lower Columbia chinook and Upper Willamette chinook, Snake River sockeye, Lower Columbia chum and Lower Columbia coho.

Hogan's 2001 decision on hatchery fish and wild fish led to a re-evaluation of 27 West Coast salmon and steelhead stocks' protected status. *Alsea Valley Alliance v. Evans*, 161 F. Supp. 2d 1154 (D. Or. 2001). In the earlier decision, Hogan found that NOAA had defined an "**e**volutionarily **s**ignificant **u**nit" (ESU) of Oregon Coast coho salmon to include both hatchery and wild fish, then improperly included only the wild fish population in the ESA listing.

The Pacific Legal Foundation (PLF), which represented the plaintiffs in both cases (Alsea Valley Alliance), has vowed to appeal the latest decision. PLF maintains that federal regulators cannot "ignore vast numbers of fish [hatchery fish] when deciding whether salmon are 'endangered' or 'threatened'" (PLF Press Release, 8/15/07).

The court's decision focused on NMFS's approach and its scientific conclusions. The court first noted that NMFS "preliminarily considered the viability of natural salmon populations" and "then considered the extinction risk of population segments comprised of natural salmon populations and hatchery stocks, before making its final listing determinations." After stating that the "ESA does not prohibit this approach" the court held: "[I]n the absence of a challenge to NMFS's scientific conclusions, the ESA does not require that protective regulations treat natural populations and hatchery stocks equally. In the absence of a challenge to NMFS's scientific conclusions, NMFS's determined population segments for listing under a permissible construction of the ESA's definition of 'species.'" Order at 2.

For info: Jan Hasselman, Earthjustice, 206/ 343-7340, ext. 25; Sonya Jones, PLF, 425/ 576-0484; Case available at Earthjustice's website: www.earthjustice.org/library/legal_docs/salmon-ruling-81407.pdf

WATER QUALITY TRADING US EPA TOOLKIT

A new EPA publication will help the regulated community design and implement voluntary water quality trading programs consistent with EPA's 2003 National Water Quality Trading Policy. This new guide will provide stakeholders with detailed guidance on the fundamental concepts of trading which can accelerate water quality improvement and reduce compliance costs. "EPA's Trading Toolkit is the first-ever 'how-to' manual on water quality trading. This Toolkit will be useful not only for permit writers but for anyone interested in designing a trading program to improve water quality," said Assistant Administrator for Water Benjamin H. Grumbles.

Water quality trading is a voluntary option that regulated point sources can use to meet requirements under the Clean Water Act. The Water Quality Trading Toolkit for Permit Writers provides permitting authorities with the tools they need to incorporate trading provisions into required permits. The guide is focused on trading nitrogen and phosphorus, but other pollutants may be considered for trading on a case-by-case basis. The Toolkit discusses the fundamental concepts of designing and implementing trading programs including the relevant geographic scope, effluent limitations and other factors involved in defining a credit. The document also includes a set of appendices which feature detailed case studies based on actual trading programs.

EPA is interested in public comment on the Toolkit. Comments received through the document's website will be considered for future updates. The Toolkit, a Web-based document, is available on EPA's website at: www.epa.gov/owow/watershed/trading/WQTToolkit.html. A limited number of hard copies are also available through the National Service Center for Environmental Publications website: www.epa.gov/nscep/
For info: Enesta Jones, EPA, 202/ 564-4355 or email: jones.enesta@epa.gov

CALENDAR

September 15-20 CA
Ground Water Protection Council 2007 Annual Forum, San Diego, Bahia Resort Hotel. For info: www.gwpc.org/meetings/meetings_forum/meetings_forum.htm

September 16-19 MT
"Sustaining Wild Trout in a Changing World," Conference, West Yellowstone, Holiday Inn. For info: Dirk Miller, 307/ 777-4556, email: dirk.miller@wgf.state.wy.us, or website: www.wildtroutsymposium.com

September 17-18 CA
Energy in California 2007, San Francisco, Parc Fifty Five Hotel. For info: Law Seminars Int'l, 800/ 854-8009 or website: www.lawseminars.com/seminars/07RESCA.php

September 17-18 WA
Introduction to Engineered Log Jam Technology and Applications for Erosion Control and Fish Habitat, Workshop, La Push. For info: Kristine Robson, NW Environmental Training Center, 206/ 762-1976 or email: krobson@nwetc.org or website: www.nwetc.org

September 17-18 NV
Fourteenth Annual Western Water Law Conference, Las Vegas, Mandalay Bay Hotel and Casino. Includes Speakers from: US Army Corps; US Bureau of Reclamation; US Dept of Justice; Pacific Legal Foundation; Colorado River Commission of Nevada; New Mexico Office of the Attorney General; U of Kansas; More. For info: CLE International, 800-873-7130 or website: www.cle.com

September 18 CA
State Water Board Meeting, Sacramento, Coastal Hearing Room (2nd Fl.), 1001 I Street. Video Broadcast of meeting available at: www.calepa.ca.gov/Broadcast/ For info: Jeanine Townsend, Board Clerk, 916/ 341-5600 or email: jtownsend@waterboards.ca.gov

September 18 MA
Implementing Sustainable Development Programs Conference, Boston. RE: Competitive Business Advantage Through Sustainable Approaches. For info: Trinity Consultants, 800/ 613-4473 or website: www.trinityconsultants.com/Training/

September 18-19 CO
Colorado Water Conservation Board Meeting, Grand Junction, Doubletree Inn. For info: www.cwcb.state.co.us/

September 18-19 CA
"California's Water Future: Expanding the Role of Groundwater" Conference, Sacramento, Sacramento Convention Center. Groundwater Resources Association of California 16th Annual Meeting. For info: GRAC, 916/ 446-3626 or website: www.grac.org/am07.asp

September 19-20 WA
Ecology Open House and Community Meeting – Walla Walla Basin Management Guidelines, Walla Walla. RE: Instream Flows, Guidelines for Groundwater Use, Updated Water Management Rule. For info: Ecology website: www.ecy.wa.gov/programs/wr/instream-flows/wallawallabasin.html

September 20 DC
Greening of America From a Federal, State & Local Perspective: Alliance to Save Energy Anniversary Breakfast, Washington, D.C., Russell Senate Office Bldg., 9am-11am. For info: Alliance, 202/ 857-0666, email: info@ase.org or website: www.ase.org/events

September 20-21 CA
2007 Continuing Legal Education Workshop for Water Law Professionals, Pasadena, Pasadena Hilton. Sponsored by: Association of California Water Agencies. For info: www.acwa.com//events/acwa_events.asp

September 21-22 OR
Oregon Lakes Association Annual Meeting, Diamond Lake Resort. For info: OLA website: www.oregonlakes.org

September 24 OR
2007 Sediment Conference: Public Policy, Law & Science, Portland, World Trade Center Two, 25 SW Salmon Street. RE: Superfund at Contaminated Sediment, Fed & State Environmental Cleanup Programs, Local Governments Role, Legal Developments, Sources Identification, Sediment Bioaccumulation & Benthic Toxicity, Ecological & Human Risk Assessments, Resolving Portland Harbor Superfund Site. For info: Holly Duncan, Environmental Law Education Center, 503/ 282-5220, email: hduncan@elecenter.com or website: www.elecenter.com

September 24-26 WA
Water Information Management Systems Workshop, Seattle, Courtyard by Marriott. Sponsored by the Western States Water Council. For info: Cheryl Redding, WSWC, 801/ 561-5300, email: credding@wswc.state.ut.us or website: www.westgov.org/wswc/meetings.html

September 24-26 CO
4th International Conference on Phytotechnologies, Denver, Mark Adams Hotel. For info: Steven Rock, EPA, 513/ 569-7149 or email: rock.steven@epa.gov; Lee Newman, U of SC, 803/ 777-4795 or email: newman2@gwm.sc.edu; or website: www.phytosociety.org/

September 24-25 CO
Climate Change Law Conference, Denver. For info: CLE Int'l, 800/ 873-7130 or website: www.cle.com

September 24-26 MT
Public Land & Resources Law Review Conference "Strategies for a New Energy Future" - Missoula, University of Montana. For info: PLRLR, 406/ 243-6568 or email: plrlr@umontana.edu

September 25 WA
Phase II Municipal Stormwater Permit Training Workshop, Bellevue, Red Lion Inn, 11211 Main Street. For info: Ecology website: www.ecy.wa.gov/programs/wq/stormwater/municipal/workshops.html

September 25-26 VA
Pollution Prevention through Nanotechnology Conference, Arlington. For info: EPA website: www.epa.gov/oppt/nano/nano-confinfo.htm

September 25-26 WA
Society for Ecological Restoration International Conference, Spokane, RE: Restore Ecosystems of the Columbia Basin and the Pacific Northwest. For info: http://earth.golder.com/waawra/ASP/Events.asp

September 25-26 OR
Principles of Scientific Sampling for Environmental Professionals, Troutdale, McMenamins Edgefield. For info: Renata Sobol, Northwest Environmental Training Center, 206/ 762-1796, email: rsobol@nwetc.org, or website: www.nwetc.org

September 26-27 OR
Global Warming and the Effects on Environmental Laws Conference, Portland. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

September 26-29 PA
ABA Section of Environment, Energy & Resources Fall Meeting, Pittsburgh, The Omni William Penn Hotel. For info: American Bar Association, 312/ 988-5724 or website: www.abanet.org/environ/fallmeet/2007/

September 27-28 CO
Colorado Ground Water Management Policy Conference, Colorado Springs, DoubleTree Hotel. RE: Opportunities for Aquifer Recharge & Storage. For info: American Ground Water Trust, 800/ 423-7748 or website: www.agwt.org/workshops.htm

September 27-28 MT
3rd Annual Montana Agriculture Legal Issues Conference, Billings. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

September 28 CA
Desalinization Conference, Santa Barbara. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

September 28 CA
Conservation Easements, San Francisco. For info: CLE Int'l, 800/ 873-7130 or website: www.cle.com

September 28 CA
California Environmental Quality Act (CEQA) Conference, Santa Monica. For info: Law Seminars Int'l, 800/ 854-8009, email: registrar@lawseminars.com, or website: www.lawseminars.com

September 28-October 1 UT
Conjunctive Management of Ground Water and Surface Water Conference, Park City. Sponsored by National Ground Water Association. For info: NGWA, 800/ 551-7379, email: customerservice@ngwa.org, or website: www.ngwa.org

September 30 - October 6 CA
4th International Conference on Irrigation and Drainage & 58th ICID International Executive Council Meeting, Sacramento. Sponsored by the International Commission on Irrigation & Drainage. For info: ICID website: www.icid2007.org

October 1-2 UT
Utah Water Law SuperConference, Salt Lake City. For info: CLE Int'l, 800/ 873-7130 or website: www.cle.com

October 2 WA
Shoreline Permitting Conference, Seattle. For info: Law Seminars Int'l, 800/ 854-8009, email: registrar@lawseminars.com, or website: www.lawseminars.com

October 2-4 CO
Sustaining Colorado's Watershed Conference: Making the Water Quality Connections, Breckenridge, The Village at Breckenridge. For info: Colorado Watershed Assembly, 970/ 872-2433 or website: www.coloradowater.org/conference/

October 3 CA
Climate Change & Water Summit, Santa Monica, Doubletree Hotel. Sponsored by the Water Education Foundation & California DWR. For info: WEF website: www.watereducation.org/briefings.asp#climate

October 3 ID
Palouse Basin Water Summit, Moscow, Best Western University Inn. For info: Palouse Conservation District, 509/ 332-4101 or website: www.iwrri.uidaho.edu/default.aspx?pid=92874

October 3 WA
Pharmaceuticals and Personal Care Products in Water, Northwest Environmental Business Council (NEBC) Luncheon, Seattle. For info: Sue Moir, NEBC, 503/ 227.6361 or 800/ 985-6322, email: Sue@nebc.org, or website: www.nebc.org/

October 3-5 OR
EPA Western Brownfields Workshop, Portland, Doubletree Hotel & Executive Meeting Center (Lloyd Center). For info: EPA, email: wbwregistration@sra.com or website: http://service.govdelivery.com/docs

October 3-5 VA
Environmental Performance Summit (9th Annual), Arlington. For info: The Performance Institute website: www.performanceweb.org/CENTERS/EN/Events/E110/

October 3-6 CO
Land Conservation Rally 2007: New Frontiers of Conservation, Conference, Denver, Adam's Mark Hotel. For info: Land Trust Alliance website: www.lta.org/training/rally.htm

October 4-5 WA
Transboundary Water Resources of Washington State and British Columbia Conference, American Water Resources Association (Washington Section) Annual Conference, Seattle, Museum of History and Industry. RE: RE: Managing Stormwater, Streamflows & Liquid Waste, Climate Change, & Minimizing Impacts on Waterbodies For info: www.wa-awra.org

October 6-9 TX
Flow 2008: Interdisciplinary Solutions to Instream Flow Problems, San Antonio, El Tropicano Riverwalk Hotel. For info: Instream Flow Council website: http://infopoll.net/live/surveys/s31322.htm

October 9-11
The BBI Biofuels Workshop & Trade Show, Portland, Marriott Portland. RE: Near-Term Development of Commercial-Scale Ethanol & Biodiesel Production. For info: www.biofuelsworkshop.com

October 9-12 WA
American Public Works Association (APWA) Fall Conference, Spokane, Davenport Hotel and Tower. RE: Practical Innovation in the Field of Public Works. For info: Sandy Decker, 509/ 625-6979 or email: sdecker@spokanecity.org

October 10 OR
A Common Path for Success + Sustainability Conference, Portland. For info: Oregon Natural Step website: www.or-natural-step.org

October 10-11 CO
Endangered Species Act, Denver, Grand Hyatt. For info: CLE Int'l, 800/ 873-7130 or website: www.cle.com

October 10-11 MT
"Irrigation Management in Transforming Western Landscapes" 2007 Annual Conference, Lewistown. Sponsored by the Montana Section of the American Water Resources Association. For info: Montana Section, 994-1772 or email: water@montana.edu

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October 10-12 **AZ**

"Supporting Regional and International Water Management" - Sustainability of Semi-Arid Hydrology and Riparian Areas (SAHRA) Seventh Annual Meeting, Tucson, Westward Look Resort. For info: Rannie Fox, 520/ 626-6974, email: rannie@hwr.arizona.edu, or website: www.sahra.arizona.edu/

October 10-12 **UT**

Water Policies and Planning in the West: Ensuring a Sustainable Future, Conference, Salt Lake City, Sheraton City Centre, 150 West 500 South. Sponsored by the Western States Water Council. For info: WSWC, 801/ 561-5300 or email: credding@wswc.state.ut.us

October 11 **WA**

Clean Water Act and the National Pollutant Discharge Elimination System (NPDES) Workshop, Seattle. For Info: Trinity Consultants website: www.trinityconsultants.com

October 12 **OR**

The Pacific Northwest as a Climate Hotspot: What It Means for Oregon Agriculture, Pendleton. For info: Kevin Considine, Oregon Environmental Council, 503/ 222-1963 x117, email: kevinc@oeconline.org or website: http://oeconline.org/events/bizforum10-12-07

October 13-17 **CA**

Water Environment Federation Annual Technical Exhibition and Conference (WEFTEC), San Diego. RE: Knowledge and Technology Exchange within the Water and Wastewater Fields. For info: www.weftec.org.

October 13-18 **NM**

12th Annual New Mexico Environmental Health Conference, Albuquerque, Hotel Albuquerque at Old Town. For info: Lorrie Stoller, NMEHC, 505/ 768-2718, email: nmehc@swcp.com or website: www.nmehc.net/

October 15 **OR**

Stormwater Conference, Portland, World Trade Center Two, 25 SW Salmon Street. For info: Holly Duncan, Environmetal Law Education Center, 503/ 282-5220, email: hduncan@elecenter.com or website: www.elecenter.com

October 16 **OR**

Water Rights Sales & Transfers in Oregon Seminar, Salem, Red Lion Hotel. For info: Lorman Education Services, 866/ 352-9539 or website: www.lorman.com

October 16-18 **MT**

Northwest Power & Conservation Council Meeting, Missoula. For info: NWPPC, 800/ 452-5161 or website: www.nwcouncil.org

October 16-17 **IL**

The Big Deal: NBA Brownfields 2007, Chicago, Navy Pier. RE: Deal Making, Education & Networking Opportunities. For info: National Brownfield Association website: www.nbabigdeal.org/

October 17-18 **WA**

Northwest Environmental Summit & Trade Show, Tacoma, Greater Tacoma Convention & Trade Center, 1500 Broadway. For info: Sue Moir, NEBC, 503/ 227.6361 or 800/ 985-6322, email: Sue@nebc.org, or website: www.nebc.org/

October 17-18 **MT**

Large Lakes Conference, Polson, Kwa-Taq-Nuk Resort. Sponsors: Flathead Basin Commission (FBC), the Flathead Lakers, & Confederated Salish & Kootenai Tribes. RE: Protecting Water Quality in Large Lakes Experiencing Rapid Growth. For info: FBC, 406/752-0081 or website: www.flatheadbasincommission.org

October 17-19 **ID**

Pacific Northwest International Section (PNWIS) Annual Conference, Boise, RE: "Powering the Future." For info: Zach Klotovich, 208/ 373-0295 or email: zklotovi@cableone.net

October 18-19 **MT**

7th Annual Montana Water Law, Helena. RE: Permitting Strategies, Water Rights, Technical Tools, DNRC Change Process, Adjudication Rules, Water Policy Updates, US Army Corps Updates, Groundwater Issues & Emerging Issues in Water (David Moon, Editor of The Water Report). For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

October 18-19 **WA**

Hydropower Conference, Seattle. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

October 18-19 **OR**

Water Law Seminar — District Water Management & Conservation Plan Workshop, Welches, Resort at the Mountain. Sponsored by the Oregon Water Resources Congress. For info: OWRC, 503/ 363-0121, email: owrc_info@yahoo.com, or website: www.owrc.org

October 18-19 **AZ**

NEPA, Phoenix, Arizona Biltmore Resort & Spa. For info: CLE Int'l, 800/ 873-7130 or website: www.cle.com

October 19 **OR**

Combating Climate Change on the Regional Level: West Coast Policy & Litigation, Eugene, Knight Law Center, University of Oregon School of Law. For info: Christina Davis, ENR, 541/ 346-1395, email: cdavis6@uoregonl.edu or website: www.law.uoregon.edu/org/jell/climate.php

October 20 **WA**

Washington Water Trust Annual Benefit Evening, Seattle, McCormick & Schmick's Harborside. For info: Kelly McCaffrey, WWT, 206/ 675-1585 x103 or email: Kelly@thewatertrust.org

October 22-23 **CA**

6th International Conference on Pharmaceuticals and Endocrine Disrupting Chemicals, Costa Mesa. RE: Analytical Methods, Sources, Regulatory Approaches & Technologies. For info: Cliff Treyens, National Ground Water Association, 800/ 551-7379, email: ctreyens@ngwa.org or website: www.ngwa.org

October 22-25 **LA**

Interstate Council on Water Policy (ICWP) Annual Meeting, New Orleans, Le Pavillon Hotel. RE: Climate Change Impacts on Water Management; Disaster Risk Management & Recovery; Implementing Integrated Watershed Plans; WRDA Projects & Corps Planning Assistance; Full Day Tour of Katrina Recovery Sites. For info: Peter Evans, Executive Director, 703/ 243-7383, email: phe@riverswork.com or website: www.icwp.org

October 23-25 **OK**

Governor's Water Conference, Oklahoma City. For info: Oklahoma Water Resources Board's website: www.owrb.state.ok.us/

October 24-25 **WA**

Northwest Tribal Water Rights Conference, Shelton, Squaxin Island Tribe's Little Creek Casino & Hotel. Theme: "Climate Change: Impacts to Water, Fish Cultures, Economies and Rights." For info: The Center for Water Advocacy, 541/ 377-0960, website: www.wateradvocacy.org

October 24-25 **CO**

2007 Tamarisk Symposium, Grand Junction, Two Rivers Convention Center. RE: Revegetation, Tamasrisk Problem, Long-Term Solutions. For info: Tamarisk Coalition, 970/ 256-7400 or website: www.tamariskcoalition.org

October 25-26 **WA**

Wetlands in Washington Conference, Seattle. For info: Law Seminars Int'l, 800/ 854-8009, email: registrar@lawseminars.com, or website: www.lawseminars.com

October 28-31 **CO**

2007 Geological Society of America Annual Meeting & Exposition, Denver. For info: GSA, 888/ 443-4472 or website: www.geosociety.org/meetings/2007/index.htm

October 28-November 2 **AZ**

International Symposium on Managed Aquifer Recharge (6th Biennial), Phoenix. For info: Symposium website: www.ismar2007.org/

October 30-November 1 **China**

International Methane Capture Marketplace Exposition, Beijing. RE: Project Opportunities for Investors, Latest Technologies & Services, Technical, Political & Financial Issues. For info: Methane to Markets Partnership website: www.methanetomarkets.org or EPA website: www.epa.gov/methanetomarkets

October 31-November 2 **WY**

Wyoming Water Association 2007 Conference, Cheyenne, Little America Hotel & Resort. RE: Opportunities & Challenges in the Water & Natural Resources Realm. For info: John Shields, WWA, 307/ 631-0898 or email: wwa@wyoming.com

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