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WATER & LAND USE ASSESSMENT TOOL

CALIFORNIA PRODUCES NEW LOCALLY ADAPTABLE ASSESSMENT TOOL
CASE STUDIES TRACK IMPACTS OF VARIOUS LAND USES ON WATER & STORMWATER

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INTRODUCTION

Managing the impacts of development on water resources is an urgent challenge in California. To support more efficient growth with fewer environmental impacts, the California Legislature and Governor have adopted policies to better integrate land use and resource management. The *Land Use Planning and Management: Resource Management Strategy* (RMS), located within California's *2009 Water Plan Update,* calls for Low Impact Development (LID) and Leadership in Energy and Environmental Design (LEED) development approaches to reduce land use impacts on water resources. LID and LEED strategies are suggested to decrease household water consumption, improve the quality of stormwater runoff, decrease the quantity and flow rates of stormwater runoff, and protect downstream riparian habitat.

The 2009 RMS set in motion a study to quantify costs and benefits associated with water-smart land use practices. Following this 2009 initiative, the charter for the RMS in the *2013 California Water Plan Update* proposed designing a new land use decision tool and demonstrating this new tool's application through multiple pilot projects. Implementing this approach, the California Department of Water Resources partnered with Sonoma State University's Center for Sustainable Communities. A Project Team was assembled to conduct four case studies of suburban development in Sonoma County and an "*Integrated Water and Land Management Tool*" (IWLM Tool) was designed and built as part of this project (both the IWLM Tool and associated User Guide may be downloaded free of charge — *see* weblink information below).

Integrated Water and Land Management Tool Online Access Information

The ***Integrated Water and Land Management Tool*** (a Microsoft Excel™ file requiring Microsoft Excel™ to run) is available from the California Water Plan website at:
www.waterplan.water.ca.gov/docs/cwpu2013/vol4/LandUse-toolcalculator.xls

Summary and User Guide: Integrated Water and Land Management Tool is available at:
www.waterplan.water.ca.gov/docs/cwpu2013/vol4/landuse-DWR-SummaryUserGuide-Oct-15-2013.pdf

Land Use Water Impacts

IWLM Tool Principles

Customize Data

Tool Development & Application

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Guiding principles for creation of the IWLM Tool were to:

- Create an open, locally modifiable, and user-friendly tool to help guide land use and land cover decisions
- Quantify relationships between land use alternatives and key water management benefits relating to water supply reliability, flood management, water quality, habitat value, and greenhouse gas emissions
- Quantify the monetary costs of implementing LID and traditional development strategies, including long-term costs
- Compare and contrast outputs from different development approaches, as exemplified in four case study sites

The Project Team found that, although various existing tools are available to guide practitioners, those tools that are easy to use generally could not be modified to reflect local conditions. Further complicating matters, those calculators that could be modified possessed challenging user interfaces that required extensive background knowledge. As one result of these findings, the Team determined that a user-friendly calculator with the ability to customize and save local data would be a valuable asset and set about producing such a tool. Case studies were then conducted, compared, and contrasted using the IWLM Tool. This new tool allows users to specify different residential land cover and infrastructure choices and compare development outcomes. It is particularly useful at the lot and neighborhood levels.

The Project Team's efforts produced a report: "*Integrating Water and Land Management: A Suburban Case Study and Locally Adaptable Tool*" (Report) — on which this article is based (*see*: www.waterplan.water.ca.gov/docs/cwpu2013/vol4/landuse-DWR-Report-October15-2013-2.pdf). The Report contains two major parts: 1) developing the tool; and 2) applying the tool to four residential developments in Sonoma County, California, as a proof of concept. The Report includes preliminary conclusions arising from the analysis of the case studies. However, the primary contribution of this research and development effort is the new, open-source *Integrated Water and Land Management Tool*. Already field-tested and ready to use, the IWLM Tool will further grow and develop over time as additional case studies and applications are completed.

The California Department of Water Resources (CDWR) provided the initial funding for this pilot project, and entered into an interagency agreement with Sonoma State University (SSU), with generous data resources from the Sonoma County Water Agency. Detailed research, data collection, tool design, and refinement was provided by SSU students (student contributors are listed in the posted Report).

PROJECT DEVELOPMENT

Review of Existing Tools

Prior to developing the IWLM Tool, the Project Team surveyed existing LID and stormwater planning tools. Many cities and organizations are already committed to installing Low Impact Development (LID) and Green Infrastructure and have developed their own tools (including guides, reports, and calculators) to guide practitioners.

Existing tools review included:

- An inventory of key factors and criteria used to develop the tools and their relevance to IWLM Tool development
- Examining the context of each project and what contributed to their successes and failures
- Identifying gaps in knowledge

A comprehensive table of available tools with detailed descriptions can be found in the Report's Appendix 5.3.

Gap Analysis

The existing water-land tools form an excellent point of departure for the IWLM Tool. There is no single tool, however, that incorporates all the calculations and features we would like to include.

Gap analysis findings included:

Web-based tools are hard coded. While Web-based tools, like the National Stormwater Management Calculator, were visually appealing and the most intuitive, the source information was often hidden so that we could not see the numbers or formulae they used for their calculation methods and could not change the variables if we wanted to customize the calculations using locally derived data from our area. These tools were useful for understanding the inputs and outputs often considered in tool development, however, and the importance of creating a user-friendly interface.

Excel-based tools offer more transparency and flexibility. Though the user interfaces of Excel spreadsheets felt more technical than Web-based tools, they allowed for more customization. In particular, an unlocked Excel-based tool provides the desired flexibility, allowing users to calibrate the tool to local information or conditions, refine background numbers based on new research, and add new technologies as they become available.

Locally calibrated models are scarce. There is a lack of tools that reflect community-specific costs and benefits. Though Los Angeles and San Francisco stormwater calculators exist, the tools are not coded in such a way that another location could alter the numbers to best fit their local conditions.

Lot and neighborhood scale is rare. Each tool tends to work best at one spatial scale. In California, "Urban Footprint" — a tool recently developed in California by Calthorpe Associates to address a variety of urban development impacts — enables trained users to conduct broad regional analysis of water management and land use (*see* Calthorpe website: www.calthorpe.com/files/ > "Regional Planning"). The available stormwater calculators can be applied to lots or neighborhoods but are very specific to reducing runoff volumes. There are no planning tools with comprehensive metrics at the lot and neighborhood levels.

Scalability is rare. Currently, no tools allow the user to scale a project up from the parcel, to the block or neighborhood, and on to larger spatial regions. There are few tools that assess impacts over time. Without spatial or temporal scalability, it is difficult to assess cumulative impacts of local actions.

Tool Attributes

After reviewing existing tools and identifying gaps, the Project Team developed a tool that is comprehensive, accessible, modifiable, and scalable.

Comprehensiveness: Because one objective of this tool is to broadly consider costs and benefits of land use planning for integrated water management, the Project Team compiled a comprehensive set of metrics that address: water quantity; water quality; flood risk; habitat; and climate change adaptation and mitigation. Refined over multiple tool iterations, the Project Team ultimately chose to focus on: impervious surfaces; stormwater runoff; outdoor irrigation requirements; greenhouse gas emissions associated with outdoor water use; and the monetary costs of implementing a land use / land cover plan. These metrics are useful, relevant indicators of key water management concerns and are also possible to derive from streamlined inputs and transparent calculations.

Accessibility: Another primary objective was to create a tool interface that is accessible to non-technical users who may have little experience in hydrology or water resource management. Homeowners, developers, and planners should feel comfortable with the tool interface, the data inputs, and the tool outputs.

Accessibility is addressed through the following choices:

Excel-based. Microsoft Excel is commonly available and widely familiar. All data and calculations are transparent.

Simple inputs. The Project Team identified the smallest number of data inputs that could be easily measured and reasonably address the multiple designated water metrics. After discussions with landscape architects, hydrologists, and a climate action planner, and several rounds of testing with the case studies, we identified a streamlined set of inputs.

Clear outputs. Beyond being comprehensive, the metrics used in this analysis were selected for their clarity. Outputs can be visualized and compared relative to one another. People without a background in hydrology can assess and understand the relative impacts of different development choices.

Modifiability: This tool is open and transparent. Any users may alter the tool as they see fit.

Update with local data. Given the varying environmental conditions and construction costs through California, locally specific data are essential to reliable calculations. The tool we developed is calibrated to Sonoma County, the site of our test studies. Cost information and weather data are focused on Sonoma County. Some of the data from Sonoma County will hold true elsewhere, while other information may not. Users with knowledge of their local environment and construction costs may easily update the tool.

Alter calculations. Similarly, if a user is interested in a calculation, all cells are unlocked and modifiable. Any calculation can be updated to better reflect new policies, emerging knowledge, or locally specific needs.

Build your own scenarios. Water-smart development is not all or nothing. There is a range of solutions that are appropriate in different locations and meet different project goals. As a result, the tool acts like a menu. Users can choose the features most appropriate for their site or add new data inputs as necessary. Everything can be customized.

Land Use Water Impacts

Flexibility

Assessing Cumulative Impacts

Relevant Metrics

Non-Technical User-Friendly

Meaningful Comparisons

Local Data Update

Crafting Solutions

Land Use Water Impacts

Spatial Data

Scalability: The tool allows the user to examine water supply benefits at many spatial scales. The most accurate results come from the lot and neighborhood levels, where users can fine-tune data for land areas, water consumption, and the costs of components to compare different development scenarios. The user can also save custom neighborhood profiles.

Beyond the neighborhood, the tool accepts inputs of acreage for a number of predefined neighborhood types as well as neighborhood information customized to better represent other specific conditions. The tool scales output values by neighborhood area. For example, a user may decide that a town is composed of 70 acres of traditional development and 30 acres of local standard SUSMP development.

Extrapolating from the neighborhood is subject to many inaccuracies. One challenge is that it is necessary for the user to categorize the whole area into a smaller subset of neighborhood types. This may prove difficult, particularly in areas that have been slowly developing over a long period of time, since development styles change incrementally. An additional challenge is that the tool assumes that all the areas within a neighborhood category will have the same outputs. In actuality, differences in behavior and microclimates may cause two areas that are similarly developed to exhibit different resource use.

All inaccuracies in the neighborhood specifications will be compounded when scaled over larger areas (e.g., watersheds). Yet, despite the limitations of bottom-up projections — as is done within this tool — extrapolating regions from neighborhoods can be a valuable and practical method for envisioning the cumulative impacts of small choices.

Metrics Development

Tool Metrics and Data

Within the metrics output by the IWLM Tool there are embedded assumptions, decisions, and data limitations. There are also important factors that were challenging to quantify and, thus, capture in the tool's output. Volume 4 of the 2013 California Water Plan Update (available soon at: www.waterplan.water.ca.gov/cwpu2013/prd/index.cfm) will include an overview of the IWLM tool's nine metrics, a discussion of the figures and sources used for each metric, a discussion of the limitations of the output data from the tool, and some notes on qualitative considerations.

THE INTEGRATED WATER AND LAND MANAGEMENT TOOL

Available Tools

After reviewing existing water-land tools, the Project Team determined that there are not currently any open, accessible tools calibrated to California that help users to simply evaluate development alternatives at the lot and neighborhood scale. The Report includes tables comparing existing tools and the full Project Team evaluation of existing tools will also be included in California Water Plan Update Volume 4 (web access information above).

Drawing inspiration from the Green Infrastructure Valuation Toolkit and the National Stormwater Management Calculator, the Project Team designed the IWLM Tool to address the shortcomings found in other methods (*see* Report's Section 2 for more information on IWLM Tool development).

Designed for ease-of-use and addressing a wide range of spatial scales, the IWLM Tool should prove useful to a wide range of users.

Range of Users

IWLM tool users may include:

- **Homeowners** interested in testing possible retrofits to their properties, examining costs versus benefits.
- **Residential Developers** seeking to evaluate different design strategies.
- **Local Agency Officials** including planning and public works staff, and elected and appointed decision-makers, such as council members and planning commissioners. The IWLM Tool is intended to be useful for evaluating the effectiveness of water conservation measures being considered in a project or by suggested redesign or conditioning. Local agencies may also use the model to help generate standards that would apply to new developments through general plans, zoning, and subdivision regulations; design guidelines; or other planning documents designed to give guidance to private project proponents.
- **Regional Agencies and Researchers** seeking to envision cumulative impacts of development or evaluate alternative futures.

Conservation Effectiveness

Input Categories

IWLM Tool Inputs

The IWLM Tool requires inputs from two major categories: 1) land cover; and 2) water infrastructure. From these inputs it calculates nine outputs.

Within the Excel workbook, the user selects the tab for the spatial scale of interest. For example, a homeowner might select the "Lot" tab. On the Lot tab, the homeowner specifies the areas of all the land cover types on their lot (in square feet) and answers questions like, "Is there an irrigation controller?" At

Land Use Water Impacts

the neighborhood level, it is also necessary to specify data on public infrastructure. The user will input the square footage of asphalt and maintained parks, for example. The Report referenced above includes a comprehensive "User Guide" with input specifics.

IWLM Tool Outputs

From the inputs, the IWLM Tool calculates nine metrics. Four of the metrics relate to water and five relate to costs:

Water Calculations

Water metrics

1) Percent impervious surfaces
2) Stormwater runoff (from impervious surfaces)
3) Outdoor water requirements
4) Greenhouse gas emissions (arising from capture, conveyance, and treatment of applied outdoor water)

Cost Projections

Monetary metrics

1) Cost of implementation
2) Cost over 10 years
3) Cost over 20 years
4) Cost over 50 years
5) Cost over 100 years

Working With the IWLM Tool

To maintain the highest level of transparency and accessibility, the Project Team chose to build the IWLM Tool in Microsoft Excel. As noted above, the Tool is now available for download and can be used by anyone running Excel.

Tool Adaptability

Within the Excel workbook, all the calculations and data are visible and editable. Users are invited to view, scrutinize, and change the tool to reflect local policies, practices, services, and emerging information (*see* Report, Appendix 5.1).

In the Excel workbook, calculations are divided into three spatial scales: 1) Lot; 2) Neighborhood (e.g., Planned Unit Development); and 3) Town/City/Region/Watershed. Calculations at the Lot and Neighborhood levels were carefully developed in concert with the case studies.

Town/City/Region/Watershed calculations are extrapolations from Neighborhood outputs. As a result, the tool is most accurate when examining water and land at the lot and neighborhood scales. Results from broader spatial scales should be used only for broad visioning exercises.

Cautions and Limitations

Preliminary Planning

The IWLM Tool provides a systematic, rational, and quantitative method of evaluating the costs, benefits, and effectiveness of various water conservation measures. Yet, due to gaps in data and necessary simplifying assumptions within the tool, it is best suited for preliminary planning at the lot and neighborhood levels. This tool should not be used in place of a more specific hydrological analysis to calculate volumes of stormwater runoff. In addition, applications of the tool beyond the neighborhood should be for visioning purposes only. The Urban Footprint model — recently developed in California by Calthorpe Associates to address a variety of urban development impacts — may be most appropriate for expert users for large regional and statewide modeling efforts (*see* Report, Section 2.1).

Alternatives Evaluation

The output data from the IWLM Tool are most reliable when evaluating alternatives at the same lot or neighborhood site. Differences in topography, microclimate, and soil will lead to slight differences in water consumption, runoff, and cost output between different sites. For example, when comparing two lots with equally sized lawns, the theoretical water consumption will be the same. In actuality, one lot may be warmer and drier than the other, necessitating more water (*see* Report, "Sensitivity Testing" in Section 3.4).

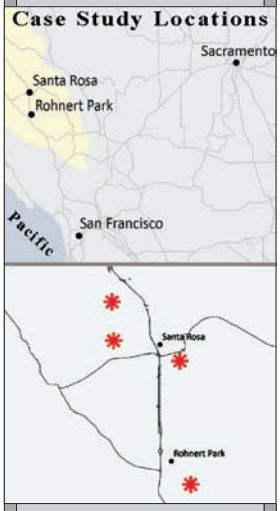
Traditional Materials

Furthermore, until there is more data on many LID building materials and methods, the tool's output will be strongest when evaluating traditional materials. For example, assessing changes in the water and cost metrics if turf grass is substituted for a brick patio will be reliable because the material costs, installation costs, maintenance costs, and lifespans are fairly well documented for these materials. In contrast, comparing the costs and benefits of bioswales will be less accurate because data are less developed for relatively new LID and LEED strategies.

Appropriate Updating

Finally, because the case studies are located within Sonoma County, the tool was developed with data from Sonoma County. Differences in microclimates, labor, prices, and local behavior will impact the accuracy of the tool in other areas. Though some data may be transferable, we suggest that numbers and formulas be reviewed and updated with information that is as locally specific as possible. In general, accuracy will vary depending on location, land covers being analyzed, the scale of analysis, and the metric under evaluation. It is up to the individual user to review the calculations and assumptions, update the tool with local data, and apply the tool with caution (*see* User Guide for more information).

Land Use Water Impacts



Study Sites Practices

Suburban Focus

Differing Stormwater Regimens

"Proof of Concept"

CASE STUDIES

The IWLM tool was applied to case studies to test and develop the tool in the context of real-world examples and then examine the differences of real world land use alternatives with metrics from the tool.

All case study sites are located in Sonoma County, California. Sonoma County is an excellent area to study suburban residential development because it has a wide range of development approaches, from traditional pre-water code developments to innovative, conservation-oriented developments. The case study sites are in the cities of Santa Rosa and Rohnert Park. Rohnert Park is home to 43,062 and the city's median household income in 2000 was $67,097 in 2007 (Demographic Profile, 2010). Santa Rosa has a population of 169,292 as of 2011 (Santa Rosa, California, Quick Facts, 2013) and its median household income was $59,838 in 2009 (City Profile, 2010).

Stormwater Policies and Practices

The Project Team selected four residential developments that capture the spectrum of stormwater practices (*see* Report, Section 3.1 — specific outdoor water practices at each site are summarized in a table in Appendix 5.5).

Case study sites included:

1) **Traditional.** A single-family detached subdivision predating stormwater policies and not explicitly incorporating LID or LEED strategies
2) **Local Standard.** A subdivision meeting an earlier local requirement known as a Standard Urban Stormwater Mitigation Plan (SUSMP) and implementing some LID strategies
3) **GreenPoint.** GreenPoint is being built to surpass the minimum California building and energy requirements and is "GreenPoint rated." The GreenPoint rating requires that the subdivision satisfy requirements in energy efficiency, resource conservation, indoor air quality, water conservation, and community (*see* http://greenpointproperties.com/).
4) **One Planet.** One Planet will be a 200-acre mixed use, solar powered, zero waste community. The projected development is designed with water conservation and quality as major components meeting the objectives of "One Planet" — an international environmental development organization (*see* www.oneplanetcommunities.org/).

Site Attributes

All of the case studies are suburban developments. The Project Team chose to initially focus the IWLM Tool on the suburban realm because suburbia is the dominant form of development in California.

In Sonoma County, at the time of this study, the developments with the most innovative approaches to water management were either partially built or approved and not yet built. There were no residential developments that were built to CALGreen standards (i.e., environmentally friendly building standards overseen by the California Building Standards Commission, *see*: www.bsc.ca.gov/Home/CALGreen.aspx).

The four case studies selected for this study have different stormwater approaches. One was built pre-regulation, one adheres to local codes, one meets GreenPoint standards, and one achieved One Planet certification. There is no single rating system by which all the developments can be evaluated (*see* table comparing the stormwater policies, Report, Appendix 5.5).

Using GIS, the Project Team digitized and summarized the land covers and water infrastructure for each case study at the lot and neighborhood scales. The case studies show different land cover types and water infrastructure profiles, resulting in different consumption metrics. As a proportion of total land cover, all case study neighborhoods have approximately the same amount of transportation infrastructure. As a proportion of total land cover, the neighborhoods all have very different amounts of green space.

Applying the Tool

After quantifying the land cover and water infrastructure for the case studies, we evaluated the lots and neighborhoods using the IWLM Tool.

Conducting "proof of concept" testing, the Project Team analyzed how the different policies and practices at each case study site led to different IWLM Tool outputs. While conclusions were arrived at, this is preliminary research. The tool is best for evaluating alternatives at the same site. Nonetheless, for the purposes of testing and demonstrating the IWLM Tool, in this section comparisons are made across the case studies.

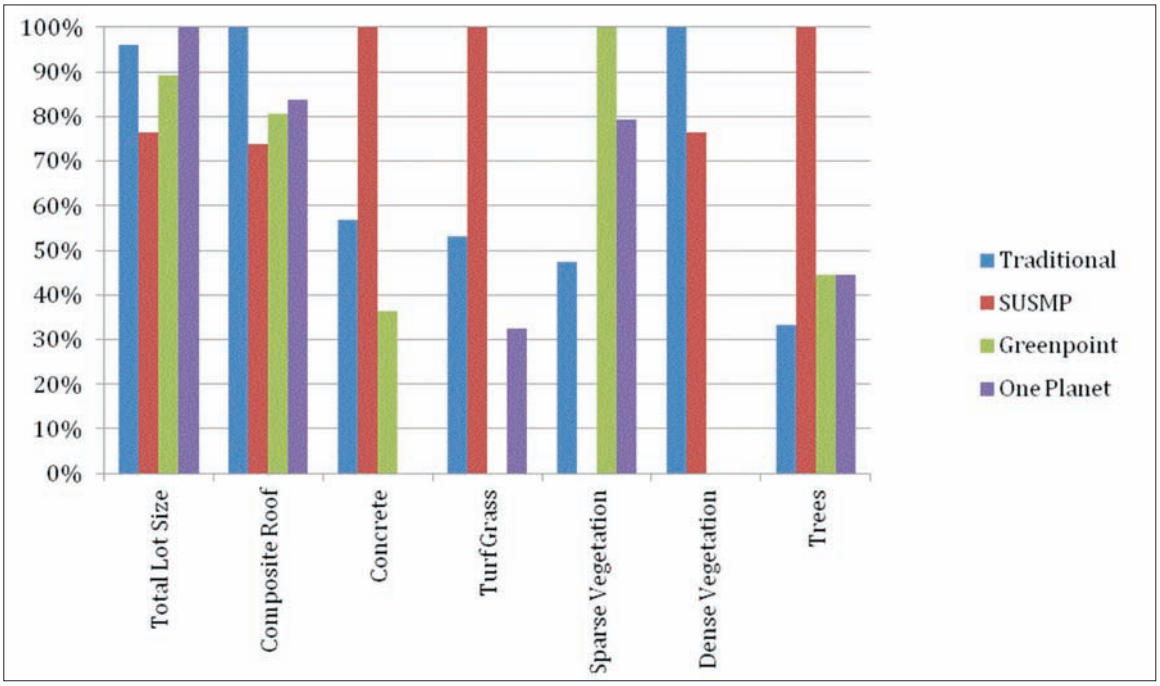
Land Use Water Impacts

Traditional Lot

Lots
Photo & Digitized Overview of Representative Traditional Lot:

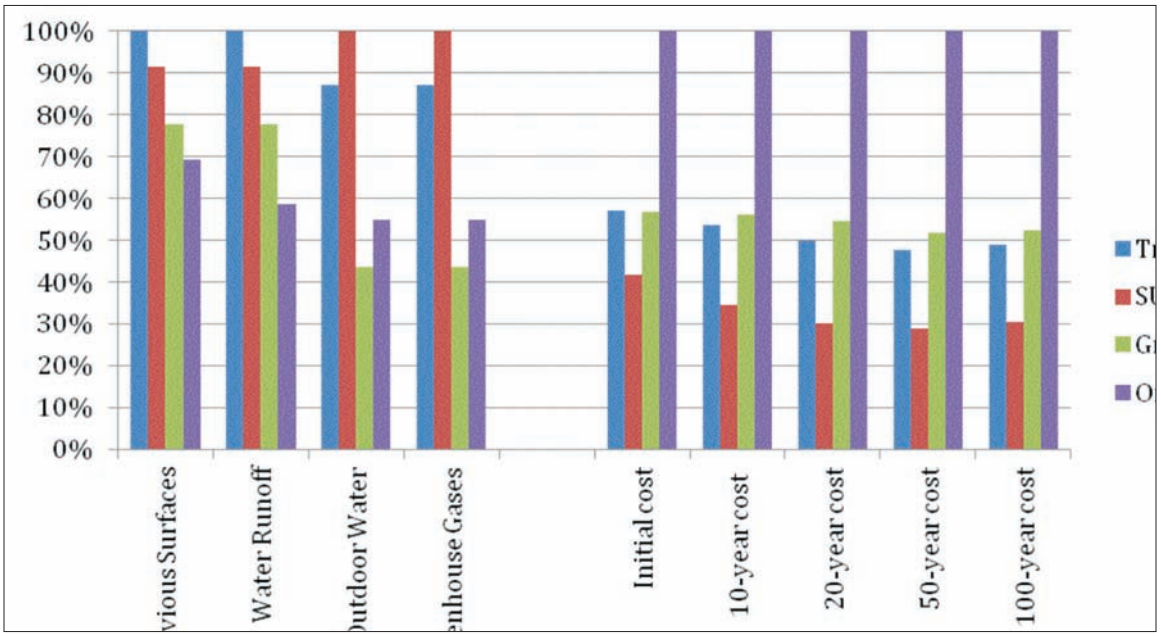
Following bar charts represent land covers present at more than one site, visualized on a normalized scale:

Land Cover Comparisons



From the chart, it is easier to read that Local Standard (SUSMP) is the smallest lot with the smallest roof area but has the largest amount of concrete and turf grass. In comparison, GreenPoint and One Planet have little turf grass. In fact, the standard, representative GreenPoint lot has no turf grass at all.

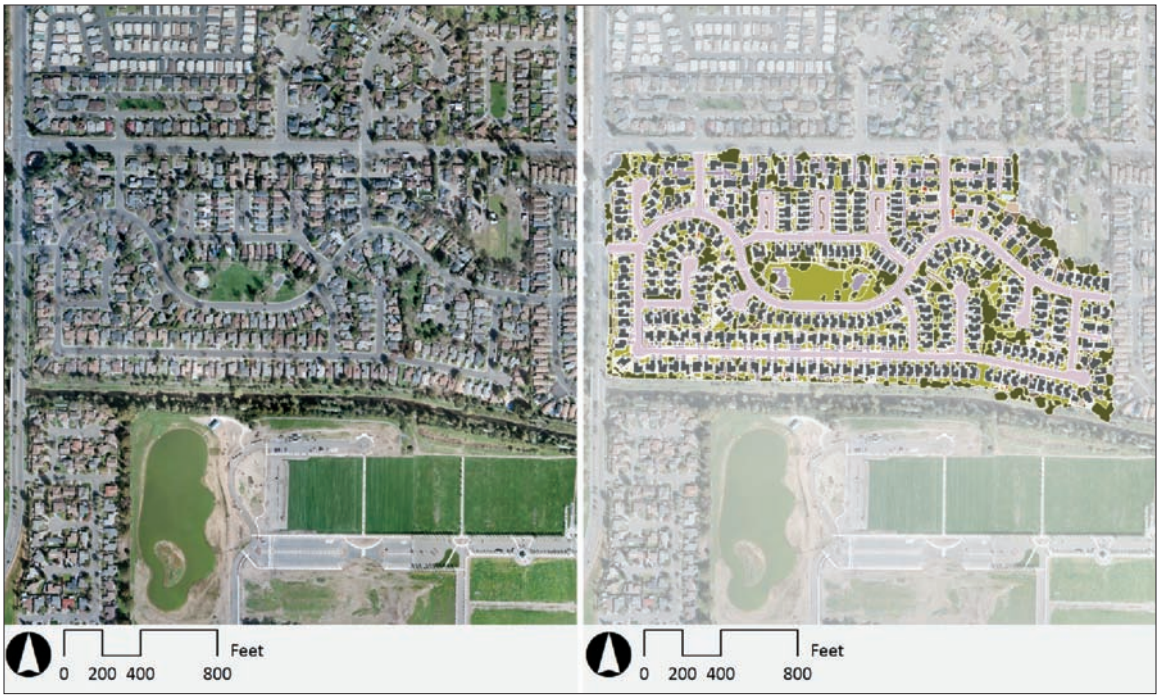
Land Use Water Impacts



The Traditional lot has the greatest amount of impervious surfaces, followed by Local Standard (SUSMP). While the Traditional lot has approximately half as much concrete as SUSMP, the larger square footage of its roof contributes to site imperviousness. The monthly water runoff from Traditional is also the highest because it has the greatest amount of impervious surfaces.

Neighborhoods

Photo & Digitized Overview of Representative Traditional Neighborhood:



Unlike the lots, which are similarly sized, the neighborhoods included in this study are of vastly different sizes. The neighborhoods also have different proportions of single-family and multifamily units. The One Planet development even includes a commercial core and office space. Comparisons among the developments is difficult because of their variation in size and number of units, and differences in land uses. After assessing the input values (*see* conclusions, below), we determined it was currently necessary to:

- Compare the developments by evaluating resource/monetary intensity per acre
- Limit comparisons to residential-only developments

In the future, when the tool is developed to handle non-residential and mixed-use developments, it will be possible to compare all of the case studies side-by-side.

Land Use Water Impacts

Benefits

Useful Comparisons

Hardscape Reduction

Infrastructure Choices

Green Costs

LID Comparisons

Beneficial Attributes

Hardscape Issues

Case Study Findings and Conclusions

This study advances efforts to quantify the cumulative impacts of local development choices over space and time. The IWLM Tool allows people without highly technical backgrounds to compare and contrast development approaches, test the impacts of small choices, and evaluate a suite of water and monetary metrics.

After the tool was applied to four case study sites in Sonoma County, initial results indicate that smart land use and land cover choices have the potential to simultaneously save on construction costs and benefit water quality, flood safety, and water supply reliability. The case studies demonstrate that more recent projects with innovative water management standards show less overall water consumption and runoff than older developments. It is noted that there are not that many variations in the style of development and that the case studies are a fair representation; nonetheless, with the limited number of case studies, it is not yet possible to make broad generalizations. Further studies evaluating built developments at different densities and with different stormwater approaches are necessary. Even so, applying the IWLM Tool to the case study sites clearly demonstrates that it is possible to compare and contrast land use and land cover choices with relation to water and cost metrics.

Developing the tool is a work in progress. It is an open-source tool that can be easily accessed, scrutinized, and expanded. As the tool is revised and used to study more development approaches, its utility and value will grow.

Other case study findings include:

- Reducing hardscape is a critical component of minimizing water resource impacts. In the context of the case studies, it was possible to minimize impacts while using standard building materials, like concrete.

- Neighborhood infrastructure choices are sufficiently large and impactful that they have the potential to dwarf lot-level performance. The design that had the worst overall environmental performance at the lot level had the best environmental performance at the neighborhood level, due to a large constructed wetland. Similarly, the development that had the least applied outdoor water per lot did not have the least as a neighborhood because of a moderately sized shared turf grass park.

- The most environmentally sensitive development was also the most expensive, due to high-end land cover choices, more elaborate site infrastructure, and full costs that are often not calculated.

OVERALL FINDINGS & CONCLUSIONS

There are currently few user-friendly tools that test and compare LID scenarios. The existing tools either are not specific to California or are more narrowly and technically focused on reducing stormwater runoff. There is a lack of tools that are transparent, accessible, modifiable, scalable, and comprehensive. The IWLM Tool provides a methodology to readily and meaningfully link land cover and water infrastructure choices with water and monetary metrics.

Other major findings and conclusions of the study include:

- **Tool Effectiveness:** The IWLM Tool effectively demonstrates real differences in consumption at the lot and neighborhood levels when applied to case study sites. The tool is easy to use and locally adaptable. It is most useful for preliminary planning and conceptual design. This tool should not be used in place of a more specific hydrological analysis to calculate volumes of stormwater runoff.

- **Hardscape Considerations:** Hardscaping, such as asphalt and concrete, is expensive to build and maintain. Reducing hardscape is a critical component to minimizing water resource impacts. By decreasing the footprint of hardscaping, projects save money while simultaneously reducing water runoff. In general, reducing total hardscape square footage is more important than substituting for more porous, LID-friendly materials. In the context of the suburban case studies, it was possible to minimize costs and impacts while still using standard building materials, like concrete. In a more urban context, or when reduced hardscape is not a development option, more expensive porous materials may be a viable alternative. Matching design strategies with development context is a useful future trajectory of the tool.

Land Use Water Impacts

Conventional Materials Costing

- **Traditional Materials:** Common building materials can be intelligently sited to further decrease impacts on water resources. For example, if a small concrete driveway is graded to drain into a permeable surface, the impacts will be even less than if it's graded to drain into the street. By minimizing new hardscape and creatively draining and diverting water, it is possible to create a low-cost development that is also low-impact.

- **Output Strengths:** The IWLM Tool's output is strongest when evaluating conventional materials. For example, assessing changes in water and cost metrics if turf grass is substituted for a brick patio is reliable because costs and lifespans are well known for these materials. In contrast, comparing the costs and benefits of bioswales is less well documented.

Infrastructure Importance

- **Public Infrastructure Impacts:** In all of the case studies, the environmental and monetary impacts of public infrastructure (primarily stormwater pipes and detention) were sufficiently large that they overwhelmed many of the lot-by-lot choices. Public infrastructure may be the most critical component of a development. With further development of lifecycle costs calculations, it is likely that there will be an increasingly strong case for green infrastructure.

Policy Questions

- **Stormwater Policy Needs:** Due to small sample size and site-specific conditions, it is premature to extrapolate major conclusions on stormwater policies. Expansion of the study is needed to evaluate a larger sample of developments and more comprehensively document the relationships between policies and outcomes.

Indicators v. Specifics

- **Useful Indicators:** Calculating specific runoff volumes with simple inputs is not possible — at a minimum, these calculations require information on slope, soil, and surface roughness. Instead, the tool delivers metrics of percent imperviousness and peak runoff from impervious surfaces. The first is a useful indicator of watershed health; the second may help approximate the size of stormwater retention interventions (rainfall data can be updated to reflect the design storm of interest).

Water Needs Variability

- **Water Need Variability:** The IWLM Tool relies on a crop coefficient method (the Water Use Classifications of Landscape Species — "WUCOLS") for assessing applied outdoor water needs. The crop coefficient method is sensitive to local environmental conditions, so depending on a site's microclimate, actual landscaping needs may be higher or lower.

- **Greenhouse Gases:** The greenhouse gases associated with municipal water vary by region. Embedded greenhouse gases depend on the amount of energy used in the process of conveying and treating water and on the local power supply profile.

Green Pricing Data Needs

- **Green Infrastructure Costs:** It is challenging to find reliable price data for green infrastructure. The components are less standardized, there are few companies installing green infrastructure technology, and the field has a shorter history.

Maintenance Documentation

- **Maintenance Costs:** Maintenance costs are not well documented for many construction components. While more maintenance information is available for traditional infrastructure and land cover choices than for newer LID/LEED materials and approaches, full operations and maintenance cost schedules are rare.

Replacement Cost Burden

- **Lifecycle Costs:** Lifecycle costs are difficult to calculate, due to lack of data. In addition to operations and maintenance data, it is necessary to have information on the costs of replacing infrastructure (rather than new construction), which is not widely available for all components. Understanding who bears cost burdens over time may change the interpretation of the lifecycle cost metrics. It is possible, for example, that such cost metrics would reveal that short-term savings at the lot or neighborhood level lead to onerous, long-term expenses carried by the municipality.

- **Evaluating Higher Densities:** One of the challenges of examining per acre metrics is that dense developments intrinsically use more resources per acre. For this reason, it may seem as though the tool opposes density. This is not the case.

Mixed-Use Evaluation

- **Metrics for Mixed Use Developments:** More challenging than denser developments will be developing comparative metrics for neighborhoods with non-residential uses. The primary difficulty is determining how to allocate resource consumption. Determining fair metrics will require analysis of many mixed-use developments and, possibly, surveys of shopping and work travel patterns.

Land Use Water Impacts

Challenges

Further Development Needs

IWLM TOOL FUTURE: CHALLENGES & OPPORTUNITIES

NEXT STEPS

The starting point for the IWLM Tool focused on lower-density, suburban developments, but it will be necessary to grow the scope of the tool to reflect more of the land cover decisions facing planning and development practitioners today. At present, the IWLM Tool is not equipped to handle mixed-use developments. This will be a critical next step.

Refining iwlm tool metrics and expanding its scope faces three urgent challenges:

- Expanding lifecycle costs calculations
- Refining metrics to fairly evaluate denser developments
- Determining the best method for evaluating resource consumption in mixed-use environments.

Further expansion and refinement of this tool will depend on further funding, whether by government, the private sector, or a public/private partnership.

Recommended "next steps" include:

- Distribute and test the tool at planning, building, and public works departments
- Validate results of recorded outdoor water use and cost data in different climates
- Conduct case studies of high-density residential and mixed-use projects
- Conduct case studies at broader spatial levels, including the city, county, and watershed
- Improve cost calculations by revising lifecycle costs and folding externalities into per unit valuations

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Texas Groundwater Takings

Groundwater Ownership

Limited Withdrawals v. Rule of Capture

Right to Groundwater

Texas' Taking Clause

Takings Classifications

Physical Taking

GROUNDWATER REGULATION & "TAKINGS" IN TEXAS

by Deborah C. Trejo, Kemp Smith LLP (Austin, TX)

INTRODUCTION

We do not yet know the future of groundwater regulation in Texas in light of potential and current takings claims premised on a landowner's ownership of groundwater in place beneath their land. We do know that the Texas Legislature has declared **g**roundwater **c**onservation **d**istricts (GCDs) to be "the state's preferred method of groundwater management through rules developed, adopted, and promulgated by a district in accordance with" Chapter 36, Texas Water Code.[1] GCDs have been at work throughout the state to adopt groundwater management plans, participate in regional planning, adopt rules, and regulate withdrawals, with varying degrees of success. In most instances where GCDs have been formed and are operational in managing shared groundwater supplies, landowners' withdrawals have been or will be limited to amounts they have historically used or reasonably need at present, consistent with the determined "availability" of water within an aquifer.[2] As not all landowners are content to be limited *below* the theoretical right under the Rule of Capture — to pump as much water as the aquifer and their pumps could withdraw without waste for the highest and best use of their land — takings lawsuits have been threatened and filed against the governmental entity now doing the limiting — GCDs. Among other things, this poses the question of what property the GCD has "acquired" or "taken" that requires compensation and where the funds will come from to pay for any court-determined compensable loss.

Prior to the *Edwards Aquifer Authority v. Day* decision, the Texas Supreme Court had never addressed whether or not the common law Rule of Capture right to groundwater was constitutionally protected and thus, capable of being "taken" by groundwater regulation.[3] *Day* has now been resolved — landowners have a constitutionally protected right to groundwater beneath their land, prior to capture, that may be the subject of a regulatory takings claim.[4] However, the extent to which such claims will succeed will depend on the facts of each case in light of takings law in Texas and ultimately, perhaps, on whether any entity is available to pay a successful plaintiff's judgment.

BACKGROUND

TAKINGS LAW INVOLVING GROUNDWATER REGULATION IN TEXAS

As a result of the *Williamson County Regional Planning Commission v. Hamilton Bank of Johnson County* requirement that takings claims under the United States Constitution are not ripe for a lawsuit until a plaintiff has sought, and been denied, just compensation in a state court,[5] most takings claims in Texas are based on the takings clause of the Texas Constitution, article I, section 17. That clause provides: "No person's property shall be taken, damaged or destroyed for or applied to public use without adequate compensation being made… ." The similar language in the federal and state constitutional prohibitions against takings has led Texas courts to generally rely on the US Supreme Court's interpretation of the federal takings clause when construing Texas' takings provision.[6] Although the Texas Constitution prohibits the "damaging" of property as well as the "taking" of property, plaintiffs in cases against groundwater districts have pled that their property was "taken" by groundwater regulation, not "damaged."[7]

The paradigmatic governmental taking "requiring just compensation is a direct…appropriation or physical invasion of private property."[8] However, where government regulation is "so onerous that its effect is tantamount to a direct appropriation or ouster," such regulatory takings may be compensable.[9] These "[t]akings can be classified as either physical or regulatory."[10] The physical occupation or invasion of property — when the property itself is taken — is considered a "physical taking."[11] A regulatory taking involves, first, government regulation that denies the property owner of all economically beneficial or productive use of his property — generally referred to as a *Lucas* taking (based on *Lucas v. South Carolina Coastal Commission*). The second type of regulatory taking involves regulation that so interferes with the landowner's right to use and enjoy his property as to constitute a taking — usually referred to as a *Penn Central* taking (analyzed under the *Penn Central Transportation Co. v. City of New York* factors). Both of these types of takings are generally referred to as "regulatory takings."[12] Whether there has been a taking is a question of law for the court to decide, not a question of fact for the jury.[13]

Physical Takings

Landowners alleging a physical taking by groundwater regulation are confronted with significant challenges in pleading a legally valid claim. If they succeed in doing so, they may enjoy the benefit of

Texas Groundwater Takings

recovering just compensation for even the limited property interest they can establish has been taken.[14] A physical taking generally occurs when the government directly appropriates private property or takes action resulting in the equivalent of a "practical ouster of…possession."[15] Physical takings are "relatively rare, easily identified, and usually represent a greater affront to individual property rights" than regulatory takings.[16] Physical takings involve the acquisition of property for public use versus regulatory takings, which prohibit the private uses of property.[17] In the lead physical takings case, *Loretto v. Teleprompter Manhattan CATV Corp*., the US Supreme Court held that where government causes a permanent physical occupation of property, it must provide compensation for a physical taking.[18] A physical taking has also been found where governmental action results in the destruction of property or government imposes a servitude on property.[19]

Property Acquisition

Tulare Lake

Landowners in Texas have relied on the Federal Court of Claims' decision in *Tulare Lake Basin Water Storage District v. United States*[20] as support for treating government regulation of groundwater withdrawals as a physical taking.[21] More recent federal case law involving physical takings claims with respect to water regulation, however, provides little hope for this approach. The *Tulare Lake* case involved a suit by California water users against the US, claiming that their contractually conferred rights to use water were taken when the federal government imposed water use restrictions under the federal Endangered Species Act to protect two fish species.[22] Judge Wiese wrote the court's decision — which diverged from earlier federal courts' instructions about the distinctions between physical and regulatory takings — and held that the restrictions on water withdrawals imposed by the federal government constituted a physical taking of plaintiffs' contractually guaranteed rights to a particular amount of water.[23]

Casitas Case

Indeed, Judge Wiese himself refused to apply the reasoning in *Tulare Lake* in the subsequent *Casitas Municipal Water District v. United States* case (*Casitas I*).[24] In *Casitas I*, a water district brought suit against the US for an alleged physical taking caused by restrictions on surface water diversions imposed by the government to protect endangered species.[25] In deciding whether or not the plaintiffs had a cognizable physical takings claim, the *Casitas* court reconsidered its decision in *Tulare Lake*.[26] On further reflection, and in light of the Supreme Court's reaffirmation of the distinctions between physical and regulatory takings in *Tahoe-Sierra v. Preservation Council v. Tahoe Regional Planning Agency*,[27] Judge Wiese held that because the government did not physically invade property or direct "the property's use to its own needs," but rather restrained the owner's use of property, there could be no physical taking.[28] In fact, in the initial appeal, the Federal Circuit Court of Appeals affirmed the analysis used by the district court for reviewing physical takings claims (although it reached a different result). The Federal Circuit held that because the government required the plaintiff to build a fish ladder *and then divert* water — that the plaintiff had contractual rights to use — away from its own canals to the fish ladder to protect an endangered species, a physical taking had occurred.[29] The takings claim at issue in the *Casitas I* case was ultimately dismissed as not ripe in *Casitas VII* because the plaintiff failed to show that it had suffered any impact to its ability to beneficially use water as a result of the government action, and, therefore had not shown that any physical taking had occurred as of the date of trial.[30] [Editor's Note: "not ripe" means that the case is not ready to be litigated, i.e. that the harm asserted by a plaintiff has not yet occurred.]

Restrained Use

Groundwater Regulation

The Texas Supreme Court in the *Day* decision left open the question of whether groundwater regulation may constitute a physical taking. "It is an interesting question, and one we need not decide here, whether regulations depriving a landowner of all access to groundwater — confiscating it, in effect — would fall into the category" of a physical invasion of property, thus eliminating the need for the application of a *Penn Central* balancing test in order to find liability for a taking.[31] However, the *Day* court indicated there is no taking on the facts of the *Day* case where landowners retain some access to groundwater,[32] and the recent *Bragg v. Edwards Aquifer Authority (Bragg)* case also found no physical taking (see below).[33]

Categorical or *Lucas* Takings

Deprivation of Use

Plaintiffs alleging that groundwater regulation has caused a taking have an incentive to claim a "categorical" taking under the *Lucas* case*'s* analysis. This is especially true if the property considered by the court to be affected can be limited to something *less* than the landowner's interest in all of the real property, because the analysis involves a simple determination of the value of property before and after regulation.[34] To establish a *Lucas* taking, a plaintiff must prove that the action of the government deprives them of all economically beneficial or productive use of their property.[35] A regulation denies all economically beneficial or productive use of property if it "renders the property valueless."[36] Thus, landowners must prove, as a matter of law, that groundwater regulation has deprived their relevant property of all value. One commentator has suggested that *Lucas* may not be applicable to takings claims involving water in Texas;[37] however, in light of the Texas Supreme Court's decision in *Day*, which indicates that where groundwater regulation denies a landowner of "all economically beneficial use of his property" there would be a *Lucas* taking,[38] this argument would seem to be a nonstarter in Texas, as evidenced by the recent *Bragg* decision which found there was no *Lucas* taking.[39]

Texas Groundwater Takings

Penn Central Factors

"Parcel as a Whole"

Relevant Parcel

Entire Property Examined

Groundwater Value

Bundle of Property Rights

***Penn Central* Takings**

The most likely analysis applicable to the claim that groundwater regulation has resulted in a taking is the *Penn Central* analysis; however, it is also the most unwieldy.[40] To determine whether the government has unreasonably interfered with a landowner's right to use and enjoy property under *Penn Central* requires consideration of:

- the character of the governmental action;
- the economic impact of the regulation; and
- the extent to which the regulation interferes with the investment-backed expectations of the landowner.[41]

In reviewing governmental action under this standard, a court will engage in an "essentially ad hoc, factual inquir[y]," looking at all three of these factors.[42] In *Penn Central*, a historic preservation regulation that resulted in prohibiting plaintiffs from developing their property in the airspace above their existing building was held not to constitute a taking of their property.[43] The premise of the *Penn Central* analysis is that a regulation that substantially furthers important public purposes may so frustrate distinct investment-backed expectations as to comprise a taking. And although the historic preservation regulation was found not to be a taking in that case, the case nonetheless mandates that the impact of a regulation on the "parcel as a whole" be considered.[44]

DETERMINING WHETHER PROPERTY HAS BEEN TAKEN

REQUIRES IDENTIFICATION OF THE RELEVANT PARCEL

In determining whether or not a regulatory taking has occurred under the US Constitution, courts have consistently applied the "parcel as a whole" rule, comparing "the value that has been taken from the property with the value that remains in the property."[45] However, plaintiffs in takings cases against groundwater conservation districts in Texas have taken the position that the relevant parcel where a landowner has been deprived of their groundwater right is the groundwater estate alone.[46]

Traditionally, in regulatory takings cases, the "parcel as a whole" serves as the denominator in the fraction used to evaluate the economic impact of the challenged governmental action.[47]
As the Supreme Court stated in *Penn Central*:

> "Taking" jurisprudence does not divide a single parcel into discrete segments and attempt to determine whether rights in a particular segment have been entirely abrogated. In deciding whether a particular governmental action has effected a taking, this Court focuses rather both on the character of the action and on the nature and extent of the interference with rights in the parcel as a whole.[48]

Courts in Texas, when confronted with the issue, have adopted the "parcel as a whole" rule,[49] although the Texas Supreme Court has not expressly addressed the issue.[50] Courts may consider the value of a single interest in property to determine the value of property as a whole, but such consideration does not alter the fundamental "parcel as a whole" rule. For example, courts allow the value of a mineral estate to be used to determine land value, and the Texas Legislature has authorized the value of groundwater rights to be determined separately in eminent domain actions as part of determining land value.[51] The San Antonio Court of Appeals in the recent *Bragg* decision determined that where the groundwater interest impacted by governmental action is "not the source of their business — they do not buy, sell, or lease water as a commodity" — a takings analysis should be based on an evaluation of the landowners' interest in property as a whole.[52]

The "parcel as a whole" rule did come under fire in *Lucas*, where Justice Scalia, the opinion's author, argued that "the rule does not make clear the 'property interest' against which the loss of value is to be measured," and indeed, may not apply in every case.[53] Notwithstanding Scalia's concern, the "parcel as a whole" rule was strongly reaffirmed in 2002 by the Supreme Court in the *Tahoe-Sierra* decision, leaving little doubt that it is the default rule in regulatory takings cases.[54]
As the Court stated in *Tahoe-Sierra*:

> This requirement that "the aggregate must be viewed in its entirety" explains why, for example, a regulation that prohibited commercial transactions in eagle feathers, but did not bar other uses or impose any physical invasion or restraint upon them, was not a taking. It also clarifies why restrictions on the use of only limited portions of the parcel, such as setback ordinances, or a requirement that coal pillars be left in place to prevent mine subsidence, were not considered

Texas Groundwater Takings

VILLERE'S PECAN TREE

Parcel Determination

Groundwater Estate

Severability Irrelevant

Appurtenant Rights

Value Determination

Texas Property Code

regulatory takings. In each of these cases, we affirmed that "where an owner possesses a full 'bundle' of property rights, the destruction of one 'strand' of the bundle is not a taking."[55]

In determining what exactly the "parcel as a whole" is, a court focuses on "the economic expectations of the claimant with regard to the property" and whether a given property is treated as "a single economic unit."[56] Additional considerations in defining the parcel include: "(i) the degree of contiguity between property interests; (ii) the dates of acquisition of property interests; [and] (iii) the extent to which a parcel has been treated as a single income-producing unit."[57] Generally, the relevant parcel is considered to be all of the landowner's contiguous, affected property.[58] In the *Bragg* case, the relevant parcel was held to be the Braggs' commercial pecan orchards.[59]

A smaller parcel may be appropriate where only a smaller parcel is owned or regulated. The Fifth Circuit considered whether an ordinance banning quarrying or mining within city limits constituted a taking under Texas law in *Vulcan Materials Co. v. City of Tehuacana.* The Fifth Circuit, making a guess about how state courts would address the issue, held that although the "parcel as a whole" rule applied, because Vulcan only possessed a leasehold right to quarry limestone the relevant parcel was limited to Vulcan's quarrying right within the city's regulatory jurisdiction.[60] *Vulcan* relies on *Whitney Benefits, Inc. v. United States*, decided by the Federal Circuit, which also considered the effect of a regulation on a separate estate — the coal estate.[61] In *Whitney Benefits*, the plaintiffs' interest in the coal estate alone was at issue, and the court found that their purchase of the land overlying the coal estate was done only as part of their coal mining investment. Thus, other uses of the land, including farming, would be speculative based on the record.[62] There are, of course, outlier cases that have not applied the "parcel as a whole" rule, but they have been the exception rather than the norm and have generally preceded the US Supreme Court's recent reaffirmance of the "parcel as a whole" rule in *Tahoe-Sierra*.[63]

Plaintiffs and their amici (friends of the court) in cases against groundwater conservation districts have argued for a broad departure from the "parcel as a whole" rule in Texas. Their reasoning is that because a groundwater estate may be severed from the surface estate in Texas, and because section 21.0421 of the Texas Property Code allows the value of groundwater rights to be determined separately in eminent domain actions as part of determining land value, the "parcel as a whole" rule in takings cases involving groundwater rights in Texas should be disregarded.[64] One commentator relies on section 21.0421 to argue that the provision "may have…simplified the prosecution of a regulatory takings claim involving groundwater [and] foreclosed any judicial debate about the relevant parcel of property taken by groundwater regulation."[65] However, neither the severability of groundwater estates, nor the language of section 21.0421 of the Texas Property Code, may be read as justification for disregarding the "parcel as a whole" rule in Texas.

Where plaintiffs hold an interest in an entire property, that property is treated as the relevant parcel: "Although various aspects associated with the ownership of real property may be severable, and under state law may be 'property' in and of themselves, they cannot be segregated from the bundle for the purposes of takings analysis."[66] This is as true where the regulated rights are to water as it is where the rights are to some other species of real property.[67] In *City of Corpus Christi v. Davis*, the Austin Court of Appeals held that where governmental action deprived a landowner of littoral rights, those rights should be valued as part of the market value of land.[68] [Editor's Note: littoral rights are rights relating to ownership of property that abuts an ocean, sea, or lake.] The court adopted the view expressed in Nichols' Law of Eminent Domain, § 13.23, that in determining compensation for the deprivation of water rights appurtenant to real property, "it is not proper to evaluate separately such appurtenant rights. Consideration is given only to the effect of such appurtenances upon the market value of the property to which they are appurtenant."[69] It is, therefore, entirely irrelevant that groundwater interests are generally severable from land and may be treated as a separate estate for some purposes under Texas law.

Section 21.0421 of the Texas Property Code merely crafts an exception to the general rule in condemnation cases that separate estates in land are only valued as a means to arrive at a more accurate reflection of the land value.[70] Section 21.0421 expressly allows project enhancement to be considered in: (1) condemnation cases; (2) initiated by political subdivisions; (3) to take the fee title; (4) in order to develop the groundwater rights.[71] By its terms, the exception applies only in condemnation proceedings and it requires consideration of the value of groundwater rights in addition to the value of the surface estate.[72] Indeed, section 21.0421(c) provides that even if special commissioners or a court finds that the condemned real property may be used by the political subdivision to develop groundwater rights, compensation shall be based on both the value of the real property, excluding the value of the groundwater rights, and the value of the groundwater rights apart from the land — hardly conclusive support for strictly valuing groundwater rights apart from land.[73]

Texas Groundwater Takings

***Bragg* Decision**

In *Bragg*, the federal district court considered whether the relevant parcel for a takings could be limited to the groundwater estate in the regulated Edwards Aquifer. That court rejected such an approach, noting:

> Even assuming Plaintiffs are correct that the groundwater estate is a divisible, already vested property interest, Plaintiffs' request that such property further be divided into specific geographic sources is insupportable. The Texas laws relied upon by Plaintiffs do not differentiate between water sources, meaning that if a regulatory taking has occurred, Plaintiffs must show how the denial of the D'Hanis Orchard application extinguishes all "economically beneficial or productive use" of the property's groundwater estate.[74]

However, following a remand from federal court, the state district court treated the two properties owned by plaintiffs differently — for one property, the parcel as a whole rule was applied, and for the other, only the plaintiffs' groundwater estate in the Edwards Aquifer was considered.[75] The trial court's failure to consider the relevant parcel for one property was reversed and remanded in the recent appellate decision.[76] Logically, in a case involving the regulation of groundwater rights, plaintiffs should establish a factual and legal basis for consideration of the impact of regulation exclusively on some or all of the groundwater estate, something which was not shown in the *Bragg* case.[77]

TAKINGS CASES IN TEXAS INVOLVING GROUNDWATER REGULATION

Historical Use Limitation

Rule of Capture

Premature Claim

The Texas Supreme Court first addressed whether regulation by a groundwater conservation district constituted a taking in *Barshop v. Medina County Underground Water Conservation District*.[78] In *Barshop*, the Texas Supreme Court considered whether the provisions of the Edwards Aquifer Authority Act (EAA Act)[79] — authorizing groundwater withdrawal permits to be issued based on historical use — constituted a facial taking.[80] In other words, did the EAA Act *always* operate (on its "face") to effect unconstitutional takings because, among other things, landowners without historic Edwards Aquifer use were not entitled to a permit under the Act — and thus, were deprived of their ability under Texas' Rule of Capture to divert as much water as they could successfully pump and beneficially use. The *Barshop* court assumed (without deciding) that the plaintiffs had a vested property right in groundwater, recognizing that "we have not previously considered the point at which water regulation unconstitutionally invades the property rights of landowners,"[81] and held that such a claim was premature as the Act had not yet been applied to deny landowners of any property.[82] The court observed that affected landowners may be able to challenge the application of the EAA Act to their property but warned: "It will be the landowner's burden to establish a vested property right in the underground water which the Authority eviscerated. The landowner will also have to prove damages and the failure to receive adequate compensation from the State."[83]

Ownership Right

Groundwater Regulation Detail

"Commons" Rationale

In the more than seventeen years since the *Barshop* decision, the Texas Supreme Court has yet to address any "as applied" takings claims based on groundwater regulation. However, the *Day* case does provide some direction to Texas courts on how to conduct a taking analysis with regard to governmental regulation of groundwater rights. Although the *Day* court's holding with respect to takings is only on the question of whether landowners hold a constitutionally protected right to groundwater in place beneath their property (for purposes of bringing a takings claim), the court discusses at some length the standards and legal tests used under *Penn Central* that may be applicable to a takings claim based on groundwater regulation — and how these tests and factors might play out with respect to the *Day* plaintiffs.[84] Though the court ultimately remanded to the trial court the issue of whether plaintiffs have suffered a compensable taking as a result of the application of the EAA Act's regulatory scheme, in discussing the character of the governmental action at issue the court went into considerable detail explaining what it likes and what it does not like with respect to groundwater regulation.[85] Even though not binding as precedent, these statements may indicate how the Texas Supreme Court, and other Texas courts, might analyze other cases involving groundwater regulation. In its discussion of groundwater regulation, the Texas Supreme Court notes, "As with oil and gas, one purpose of groundwater regulation is to afford each owner of water in a common, subsurface reservoir a fair share."[86] Further, the Texas Supreme Court observes that "a landowner cannot be deprived of all beneficial use of the groundwater below his property merely because he did not use it during an historical period and supply is limited."[87] The plaintiffs and the Edwards Aquifer Authority (EAA) have since settled the *Day* litigation and the case was dismissed by agreement of the parties.[88]

In *Bragg v. Edwards Aquifer Authority*, the Braggs, pecan farmers in Medina County, successfully alleged a taking based on first, the EAA's denial of one permit application (due to no use of groundwater

Texas Groundwater Takings

Historical Use Limits

EAA's Position

Damage Calculations

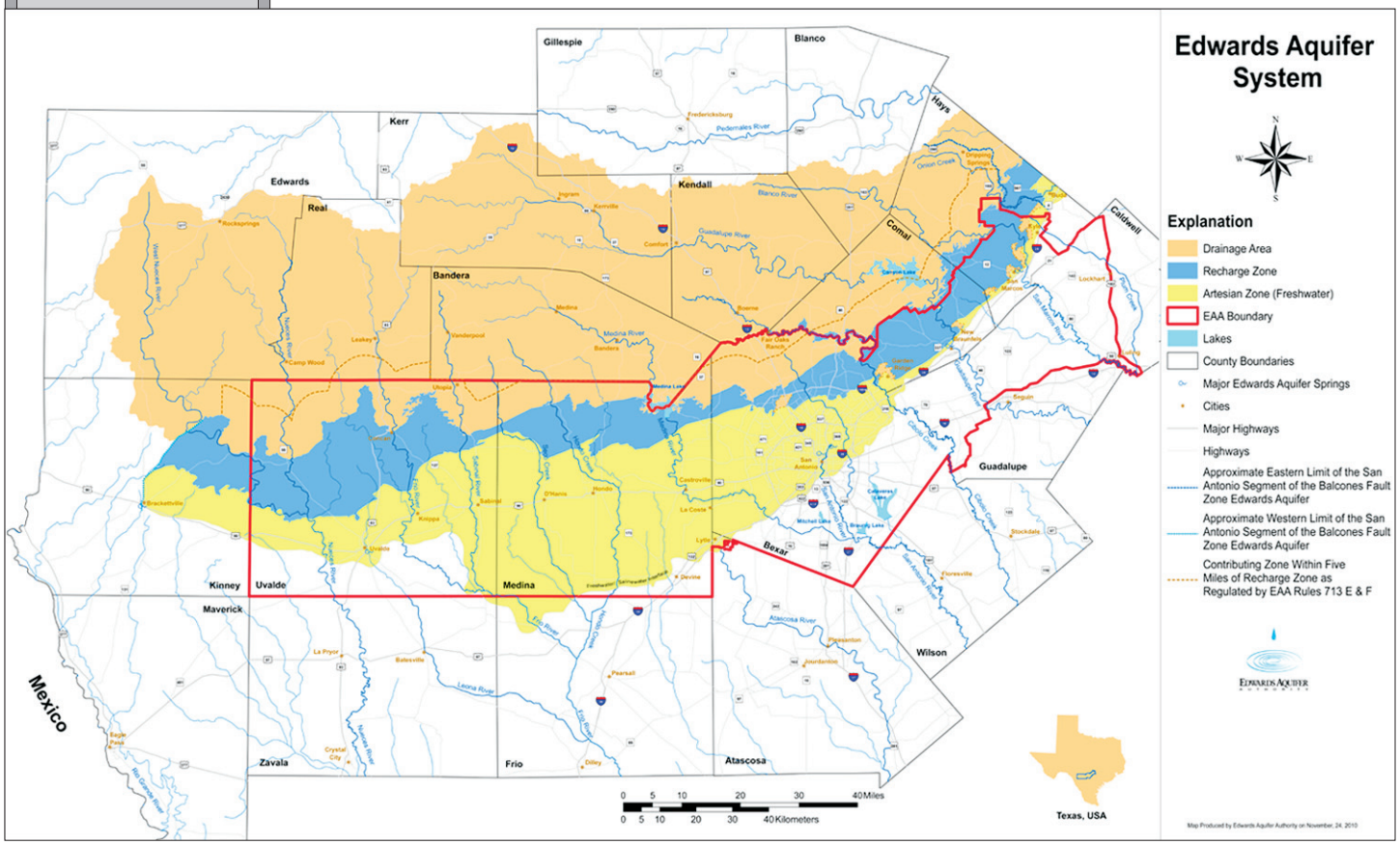
Braggs' Appeal

during the EAA Act's historical period), and second, the granting of another permit application for less than the amount requested (because the plaintiffs were not given credit for withdrawals occurring outside of the EAA Act's historical period).[89] In 2011, the trial court issued a judgment holding that the Braggs suffered a regulatory taking of both of their orchards under the *Penn Central* analysis, and are entitled to approximately $135,000 in compensation with respect to the D'Hanis orchard and $598,000 in compensation with respect to the Home Place orchard.[90] Both sides appealed.[91]

The EAA argued on appeal that the trial court's judgment should be reversed because, among other reasons: (1) the EAA is not liable for a taking because its actions on the Braggs' permit applications were mandated by the State of Texas; (2) the applicable statute of limitations bars the Braggs' takings claims; (3) the EAA Act increased the value of one of the Braggs' orchards so no compensation is owed; (4) the trial court improperly determined the adequate compensation owed for a taking of the other orchard; and (5) the trial court improperly determined that the Act and its implementation caused a taking of the orchards.

In assessing the just compensation amount for the two permitting decisions — the complete denial of the permit application for one well and the partial granting of a permit for the other well — the district court in *Bragg* used two completely different calculation methods.[92] For the complete denial, the amount was based on evidence regarding the difference in value between agricultural land in the area with an Edwards Aquifer well and land without such a well.[93] For the partial granting, the amount was based on the difference between the number of acre-feet requested and the number granted, multiplied by evidence regarding the value of an acre-foot of Edwards Aquifer permitted rights in the market that has developed for such rights.[94] Using these different methods, the compensation awarded by the trial court with respect to the well that received 120.2 AF of Edwards Aquifer permitted rights (partial granting) results in much higher compensation for the well that received no permitted rights (complete denial).

The Braggs requested on appeal that the district court's judgment be modified to correct (by increasing) the amount of just compensation to which the Braggs are entitled. The Braggs argued that the district court was required to value the Braggs' groundwater rights *separately* from the land and failed to do so, plus committed other valuation and calculation errors.[95] The Braggs also argued that they have suffered a categorical or *Lucas* taking of their property (eliminating the need for a *Penn Central* analysis) because: (1) EAA regulation prevents them from withdrawing sufficient water and, therefore, denies them all economically viable use of their lands; and (2) the EAA's actions on their permit applications constitute physical takings of their groundwater.[96]



Texas Groundwater Takings

Value of Property

Damages Review

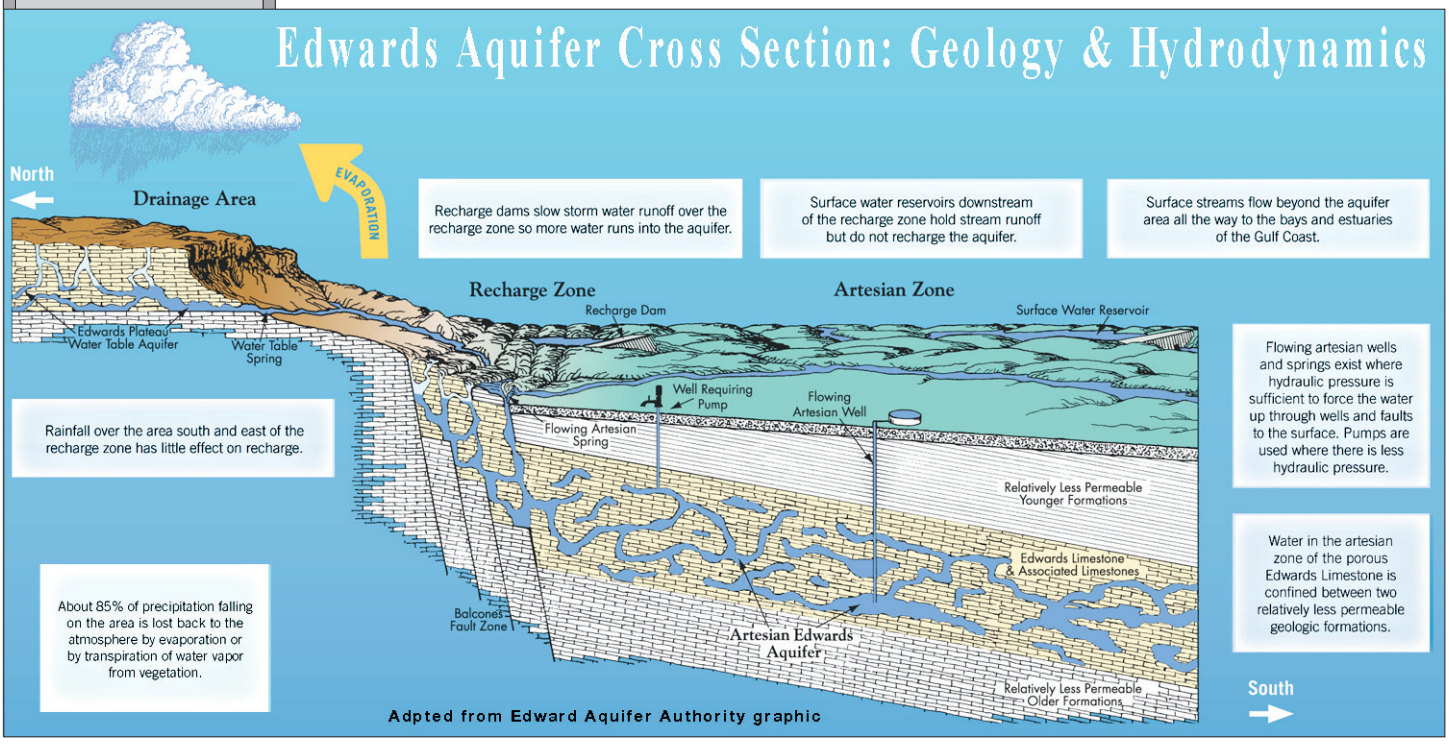
Statute of Limitations

Mandatory Regulation

Transfer & Use Issues

In its decision, the San Antonio Court of Appeals (appellate court) found that the record supported the trial court's finding that a regulatory taking of the Braggs' D'Hanis and Home Place orchards had occurred due to the EAA Act's limitations on groundwater withdrawals on the Braggs.[97] In doing so, the appeals court reviewed the trial court's *Penn Central* analysis.[98] First, although the appellate court acknowledged that the economic impact factor under *Penn Central* properly considers the diminution in value of property caused by the regulation, the appellate court did not evaluate evidence in the record of the appraisals of the Braggs' orchards before and after the regulation (which showed that the Home Place Orchard increased in value). Instead, the appellate court found that the Braggs' testimony — that they were required to expend substantial sums on the irrigation of their crops, which increased as a result of the EAA Act — had sufficient impact to support the finding of a taking. This finding came despite the evidence presented by the EAA that the increased irrigation costs were ten percent or less.[99] Second, the appellate court found the investment-backed expectation factor favored finding a taking, as the Braggs indisputably purchased their orchards prior to the EAA Act's passage and, thus, had reasonable expectations to irrigate with Edwards Aquifer groundwater.[100] Third, the appellate court reviewed the character of the governmental action prong, labeling it the "nature of the regulation" factor. The appellate court found that the importance of the EAA Act to protect the Edwards Aquifer weighed heavily against finding a compensable taking.[101] Concluding "that the permitting system imposed under the Act resulted in a regulatory taking of both the Home Place Orchard and the D'Hanis Orchard," the appellate court reversed the ruling on the issue of the compensation to be paid for the takings, finding that the trial court improperly calculated the damages. The case was remanded for a new trial to determine the difference between the value of the Braggs' orchards with unlimited access to Edwards Aquifer water *before and after* the limitations imposed by the Act at the time the permit decisions were made in 2004 and 2005.[102] The appellate court rejected the EAA's argument that the 10-year statute of limitations barred the Braggs' takings claims. Also rejected was the argument that the EAA is not the proper party liable for any takings caused by the EAA's nondiscretionary implementation of the EAA Act, even though the appellate court admitted that the EAA's actions were mandated by the EAA Act.[103] The appellate court did not consider the Braggs' physical taking or *Lucas* taking claims.[104] The Braggs motion for rehearing was denied.[105] Petitions for review to the Texas Supreme Court are expected by both the Braggs and the EAA.

In West Texas, the Middle Pecos GCD (District) has been sued by Fort Stockton Holdings, L.P. in an appeal of the District's decision denying its permit application and for a regulatory taking.[106] Fort Stockton Holdings sought a production permit and transport authorization from the District for the same aggregate amount of withdrawal rights in its historical use irrigation permits — but for a different type of use (municipal and industrial) and for transport and use outside the district. After a contested case hearing, the board of directors of the District voted to deny the permit application on the grounds that: (1) the



Texas Groundwater Takings

Speculation

applicant failed to establish that the proposed withdrawals would not cause unreasonable effects on surface and groundwater resources and on existing permit holders; (2) the amount, purpose, and place of use of the water to be produced were found to be speculative; and (3) because the applicant sought to convert the authorization in its historic use permit to an authorization for the same withdrawal amount for another purpose of use outside the district, granting the permit would violate the principles set forth in *Guitar Holding Company v. Hudspeth County Underground Water Conservation District No. 1*.[107] The trial court denied — due to a late filing — the District's motion to dismiss the case for lack of jurisdiction and the District has brought an interlocutory appeal (pending) on that jurisdictional issue. Thus, the takings claim remains pending.[108] [Editor's Note: An interlocutory appeal allows an appellate court to decide a legal issue before the rest of the case is heard.]

Potential Takings Claims

Since *Day* was decided in February 2012, five landowners within the jurisdiction of the EAA with no historic use have filed applications for groundwater withdrawal permits with the EAA despite the fact that the statutory deadline for such applications passed more than sixteen years ago. These landowners do not qualify for a permit under the express terms of the EAA Act.[109] The EAA's general manager has recommended denial of the applications and they have been referred to the State Office of Administrative Hearings. The application denials, however, are likely to be the basis for takings claims in state district court against the EAA.

Several other contested permit applications are now pending before local districts regulating groundwater around the state, which may also ultimately result in new takings cases being filed.

CONCLUSION

Ownership & Rule of Capture

EAA Defenses: Statute of Limitations

Crippling Costs

The Texas Supreme Court in *Day* and the San Antonio Court of Appeals in *Bragg* have set the stage for more takings claims against the EAA and **g**roundwater **c**onservation **d**istricts (Chapter 36 GCDs), which have a duty to manage groundwater resources. Such takings claims may also be brought against other governmental entities such as municipalities that might have a reason to limit or regulate water wells. The very nature of the ownership interest that landowners who are subject to regulation for use of groundwater beneath their land — and the extent of their reliance and investment-backed expectations under the common law Rule of Capture — makes defining and quantifying the right that has been regulated and potentially taken a complicated task. In any case, once the extent of the regulated right is defined, traditional valuation approaches may be employed and the value of the deprived groundwater right should be evaluated in light of the "parcel as a whole." How takings claims against districts will play out on the merits may depend, in part, on how the EAA's defenses, including the statute of limitations, plays out in pending takings cases, including *Bragg*. Regarding the statute of limitations, for instance, countless landowners who have been affected by the EAA Act since it was passed in 1993 have not yet been to the courthouse.

Groundwater districts are funded by fees assessed on users and statutorily-limited real property taxes,[110] and the potential costs of litigation could be crippling for the districts. In the EAA region alone, which encompasses all or parts of eight counties in South-Central Texas (including Bexar County and the nation's seventh-largest city, San Antonio),[111] the number of landowners overlying the Edwards Aquifer who have a restriction on their exercised or unexercised common law right to withdraw groundwater under the Rule of Capture is staggering.[112]

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Ms. Trejo has represented parties in some of the litigation referenced herein. The comments and opinions expressed in this paper are solely those of the author and do not reflect the position of any client of Ms. Trejo or Kemp Smith. This article is adapted from a presentation that Ms. Trejo made at the Texas Water Law Conference put on by CLE International in Austin, Texas on October 8, 2013.

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Groundwater Regulation & "Takings" in Texas Footnotes

1 Tex. Water Code Ann. § 36.0015 (West 2008).
2 *See e.g., id.* § 36.1132 (West Supp. 2013-14).
3 *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814 (Tex. 2012) (*Day*)
4 *Id.*
5 *Williamson Cnty. Reg'l Planning Comm'n v. Hamilton Bank of Johnson City*, 473 U.S. 172, 195 (1985).
6 *See Sheffield Dev. Co. v. City of Glenn Heights*, 140 S.W.3d 660, 669 (Tex. 2004); *City of Austin v. Travis Cnty. Landfill Co*., 73 S.W.3d 234, 236-37 (Tex. 2002); *City of Corpus Christi v. Pub. Util. Comm'n of Tex.*, 51 S.W.3d 231, 242 (Tex. 2001).
7 *See, e.g., Edwards Aquifer Auth. v. Bragg*, No. 04-11-18-CV, 2013 WL 4535935 (Tex. App.—San Antonio Aug. 28, 2013, mot. for r'hrg filed).
8 *Lingle v. Chevron U.S.A., Inc*., 544 U.S. 528, 537 (2005).
9 *Id.*
10 *Mayhew v. Town of Sunnyvale*, 964 S.W.2d 922, 933 (Tex. 1998).
11 *Lowenberg v. City of Dallas*, 168 S.W.3d 800, 802 (Tex. 2005).
12 *Westgate, Ltd. v. State*, 843 S.W.2d 448, 452 (Tex. 1992); *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1015 (1992); *Penn Cent. Trans. Co. v. City of New York*, 438 U.S. 104, 124 (1978).
13 *City of College Station v. Turtle Rock Corp*., 680 S.W.2d 802, 804-05 (Tex. 1984).
14 *Loretto v. Teleprompter Manhattan CATV Corp*., 458 U.S. 419, 437 (1982) (explaining that once a physical occupation is established, a court shall consider the extent of the occupation to determine the amount of compensation due).
15 *Lucas*, 505 U.S. at 1014 (quoting *Transp. Co. v. Chicago*, 99 U.S. 635, 642 (1879) (internal quotations omitted)).
16 *Lowenberg*, 168 S.W.3d at 801-02 (quoting *Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg'l Planning Agency*, 535 U.S. 302, 324 (2002)).
17 *See City of San Antonio v. El Dorado Amusement Co*., 195 S.W.3d 238, 244-45 (Tex. App.—San Antonio 2006, *pet. denied*).
18 *Loretto*, 458 U.S. at 434-35 (finding a taking where cable lines installed on plaintiff's property pursuant to government regulation that required landowners to permit installation of cable lines).
19 *See, e.g., Tarrant Reg'l Water Dist. v. Gragg*, 151 S.W.3d 546, 558 (Tex. 2004) (finding that landowners could recover for flooding of their property caused by the construction and operation of a reservoir and a dam); *Steele v. City of Houston*, 603 S.W.2d 786, 791-93 (Tex. 1980) (finding that landowners could recover for fire set in house by police); *City of Houston v. McFadden*, 420 S.W.2d 811, 813-15 (Tex. Civ. App.—Houston [14th Dist.] 1967, writ ref'd n.r.e.) (finding a taking where vibration and noise from low-flying airplanes intruded on private airspace); *City of Austin v. Teague*, 570 S.W.2d 389, 394 (Tex. 1978) (granting recovery for property owner who lost all use of property when the city denied a development permit and sought to impose a servitude on land for a scenic easement).
20 49 Fed. Cl. 313 (Fed. Cl. 2001).
21 *See e.g., Appellees' Response Brief and Cross-Appellants' Reply Brief, Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935.
22 *Tulare*, 49 Fed. Cl. at 314-16.
23 *Id*. at 319.
24 *Casitas Mun. Water Dist. v. United States*, 76 Fed. Cl. 100, 102 (Fed. Cl. 2007) (Wiese, J.), *dismissal on other grounds aff'd by* 708 F.3d 1340 (Fed. Cir. 2013).
25 *Casitas I*, 76 Fed. Cl. at 102.
26 *Id*. at 103.
27 535 U.S. 302, 323-25 (2002).
28 *Casitas I*, 76 Fed. Cl. at 106.
29 *Casitas Mun. Water Dist. v. United States*, 543 F.3d 1276, 1288-96 (2008).
30 *Casitas Mun. Water Dist. v. United States*, 708 F.3d 1340, 1360 (Fed. Cir. 2013).
31 *Day*, 369 S.W.3d at 839.
32 *Id*.
33 *Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935.
34 *See Mayhew v. Town of Sunnyvale*, 964 S.W.2d 922, 935 (Tex. 1998); *see also* Robert Meltz, *Takings Law Today: A Primer for the Perplexed*, 34 Ecology L.Q. 307, 330-31 (2007).
35 *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1015 (1992). Note that a regulatory taking may also result from a regulation that results in actual physical invasion. *Id.*
36 *Mayhew*, 964 S.W.2d at 935.
37 *See* S. E. Hayes Lusk, *Texas Groundwater: Reconciling the Rule of Capture with Environmental and Community Demands*, 30 St. Mary's L.J. 305, 339-40 (1998) (relying on B. H. Thompson, Jr., *Takings and Water Rights*, in Water Law: Trends, Policies and Practice 43, 48 (K. M. Carr & J. D. Crammond eds., 1995), discussing difficulty of applying takings jurisprudence to water rights which are not real property interests); Joseph L. Sax, *Rights That "Inhere in the Title Itself": The Impact of the Lucas Case on Western Water Law*, in Water Law: Trends, Policies and Practice, at 83-84 (traditionally water rights are not possessory interests in which one can own water).
38 *Day*, 369 S.W.3d at 839-40.
39 *Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935.
40 *See* Meltz, *supra* note 35, at 333-47.
41 *Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 129 (1978); *Palazzolo v. Rhode Island*, 533 U.S. 606, 633-34 (2001); *see also Day*, 369 S.W.3d at 839-40; *Sheffield Dev. Co. v. City of Glenn Heights*, 140 S.W.3d 660, 672 (Tex. 2004).
42 *Penn Cent*., 438 U.S. at 124; *see also Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1015 (1992).
43 *Penn Cent*., 438 U.S. at 130-38.
44 *Id*. at 127; *see also City of Dallas v. Blanton*, 200 S.W.3d 266, 273-79 (Tex. App.—Dallas 2006, no pet.).
45 *Keystone Bituminous Coal Ass'n v. DeBenedictis*, 480 U.S. 470, 497 (1987); *see also Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg'l Planning Agency*, 535 U.S. 302, 327 (2002); *Concrete Pipe & Prods. v. Constr. Laborers Pension Trust for So. Cal*., 508 U.S. 602, 643-44 (1993); *Andrus v. Allard*, 444 U.S. 51, 66 (1979); *Penn Cent. Trans. Co. v. City of New York*, 438 U.S. 104, 130-36 (1978).
46 *See, e.g., Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935, *24-26.
47 *See Cane Tenn., Inc. v. United States* (*Cane II*), 60 Fed. Cl. 694, 698-99 (2004).
48 *Penn Cent*., 438 U.S. at 130-31; *see also Keystone Bituminous Coal*, 480 U.S. at 497.
49 *See, e.g., Town of Flower Mound v. Stafford Estates Ltd. P'ship*, 71 S.W.3d 18, 44 (Tex. App.—Ft. Worth 2002), *aff'd*, 135 S.W.3d 620 (Tex. 2004) (referencing *Penn Central* and *Keystone Bituminous Coal* for the proposition that the impact on the parcel as a whole must be considered); *Estate of Scott v. Victoria Cnty.*, 778 S.W.2d 585, 590 (Tex. App.—Corpus Christi 1989, no writ) ("Where a [property] owner possesses a full bundle of property rights, the destruction of one strand of the bundle is not a taking, because the aggregate must be viewed in its entirety."); *City of Corpus Christi v. Davis*, 622 S.W.2d 640, 646-47 (Tex. App.—Austin 1981, writ ref'd n.r.e.) (adopting the "proper rule" that because water rights are appurtenant to real property, compensation should be measured by comparing the effect on the value of water rights on the land to which they are appurtenant).
50 *See generally Day*, 369 S.W.3d 814; *Sheffield Dev. Co. v. City of Glenn Heights*, 140 S.W.3d 660, 671 n.56 (Tex. 2004) (quoting Justice Scalia in *Lucas* expressing dissatisfaction with the rule); see also Timothy Riley, *Wrangling with Urban Wildcatters: Defending Texas Municipal Oil and Gas Development Ordinances Against Regulatory Takings Challenges*, 32 Vt. L. Rev 349, 394 (2007) (describing Texas jurisprudence with respect to the parcel as a whole rule as unsettled).
51 *Coastal Indus. Water Auth. v. Trinity Portland Cement Div'n, Gen. Portland Cement Co*., 523 S.W.2d 462, 466-68 (Tex. Civ. App.—Houston [1st Dist.] 1975, writ ref'd n.r.e.); Tex. Prop. Code Ann. § 21.0421 (West Supp. 2012-13).
52 *Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935, *27.

53 *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1016 n.7 (1992).
54 *Tahoe-Sierra Pres. Council, Inc. v. Tahoe Reg'l Planning Agency*, 535 U.S. 302, 327 (2002); *see, e.g., Appolo Fuels, Inc. v. United States*, 54 Fed. Cl. 717, 726-27 (2002) (distinguishing *Whitney Benefits, Inc. v. United States*, 926 F.2d 1169 (Fed. Cir. 1991), and applying parcel as a whole rule); *Cane Tenn., Inc. v. United States* (*Cane I*), 54 Fed. Cl. 100, 105 (2002).
55 *Tahoe-Sierra*, 535 U.S. at 327 (internal citations omitted).
56 *Norman v. United States*, 429 F.3d 1081, 1091 (Fed. Cir. 2005); *see also Brace v. United States*, 72 Fed. Cl. 337, 348 (Fed. Cl. 2006).
57 *Brace*, 72 Fed. Cl. at 348.
58 *See, e.g., id.; Walcek v. United States*, 303 F.3d 1349, 1355-56 (Fed. Cir. 2002); *Karam v. State*, 705 A.2d 1221, 1227 (N.J. Super. Ct. App. Div. 1998); *see also* Dwight H. Merriam, *Tahoe-Sierra Preservation Council, Inc. v. Tahoe Regional Planning Agency—Rules for the Relevant Parcel*, 25 U. Haw. L. Rev. 353 (2003).
59 *Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935, *27.
60 *Vulcan Materials Co. v. City of Tehuacana*, 369 F.3d 882, 889-91 (5th Cir. 2004).
61 *Whitney Benefits, Inc. v. United States*, 926 F.2d 1169 (Fed. Cir. 1991).
62 *See id*. at 1174. *But see Cane I*, 54 Fed. Cl. at 106 (declining to follow analysis in *Whitney Benefits*).
63 *See, e.g., Fla. Rock Indus., Inc. v. United States*, 18 F.3d 1560, 1562-63 (Fed. Cir. 1994) (treating as relevant only the smaller parcel for which section 404 Clean Water Act permit was sought); *Loveladies Harbor, Inc. v. United States*, 28 F.3d 1171, 1174 (Fed. Cir. 1994) (treating as relevant only the separate parcel for which the landowner sought a Section 404 permit, applying a "flexible approach, designed to account for such factual nuances"); *see also Karam*, 705 A.2d at 1228 (distinguishing *Florida Rock* and *Loveladies Harbor* as cases that "involved large tracts of acreage that had been segmented into smaller parcels for development at different times, and either because of the configuration of the property or its history, the divided parcels had been considered as separate and distinct entities or units").
64 *See, e.g., Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935; Brief of Respondent Day and McDaniel at 28, *Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814 (Tex. 2012).
65 *See* Phil Steven Kosub, *Water for a Public Purpose: Governmental Acquisition of Water Rights by Involuntary Means*, in Essentials of Texas Water Resources, at 632 State Bar of Texas (2009).
66 *Villas of Lake Jackson, Ltd. v. Leon Cnty*., 906 F. Supp. 1509, 1516 (N.D. Fla. 1995). *See also Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935, *27.
67 *See City of Corpus Christi v. Davis*, 622 S.W.2d at 646-47.
68 *Id*.
69 *Id*. at 647 (quoting 4 Nichols, Law of Eminent Domain § 13.23 (3d ed. 1980)).
70 *Exxon Pipeline Co. v. Zwahr*, 88 S.W.3d 623, 627-30 (Tex. 2002).
71 Tex. Prop. Code Ann. § 21.0421(a) (West Supp. 2013-14); see House Research Org., Bill Analysis, Tex. H.B. 803, 78th Leg., R.S., at 2 (2003) ("[I]n a case where a city is condemning land solely for its groundwater resources, a landowner may not be compensated according to the purpose for which the city plans to use the land."); Sen. Comm. on Jurisprudence, Bill Analysis, Tex. H.B. 803, 78th Leg., R.S. (2003) ("[T]he law does not allow the fair market value of that groundwater to be considered in the compensation paid to the landowner.").
72 *See* Tex. Prop. Code Ann. § 21.0421 (West Supp. 2013-14).
73 *Id*. § 21.0421(c). *See also Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935, *27.
74 *Bragg v. Edwards Aquifer Auth*., No. SA-06-CV-1129-XR, 2008 WL 596862, at * 3 (W.D. Tex. Jan. 9, 2008).
75 *Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935, *24.
76 *Id*. at *27.
77 *See id*.
78 925 S.W.2d 618 (Tex. 1996). The Texas Supreme Court had earlier affirmed the Houston Court of Appeals' decision in *Beckendorff v. Harris-Galveston Coastal Subsidence Dist*., which held that the legislation creating the Harris-Galveston Coastal Subsidence District to regulate groundwater withdrawals was constitutional, although not challenged on takings grounds. 558 S.W.2d 75, 81-82 (Tex. Civ. App.—Houston [14th Dist.] 1977), *aff'd*, 563 S.W.2d 239 (Tex. 1978).
79 Act of May 30, 1993, 73rd Leg., R.S., ch. 626, 1993 Tex. Gen. Laws 2350, as amended, available at http://edwardsaquifer.org/legislation-and-rules/the-eaa-act.
80 *Barshop*, 925 S.W.2d at 628-631.
81 *Id*. at 626.
82 *Id*. at 630-31.
83 *Id*.
84 *Day*, 369 S.W.3d at 839-43.
85 *Id*. at 840-43.
86 *Day*, 369 S.W.3d at 840.
87 *Id*. at 843.
88 No. 04-04-294-CVA (218th Dist. Ct., Atascosa Cnty., Tex. dismissed July 15, 2013).
89 *Bragg v. Edwards Aquifer Auth*., 06-11-18170-CV (38th Jud. Dist. Medina Cnty., Tex. Mar. 25, 2011). The Braggs also alleged federal civil rights claims against the EAA, all of which were dismissed. *Bragg v. Edwards Aquifer Auth*., No. 08-50584, 342 Fed.Appx. 43, 2009 WL 2486935, at *1 (5th Cir. Aug. 14, 2009).
90 *See also Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935.
91 *Id*. at *3.
92 *Id*. at *1.
93 *Id*. at *22.
94 *Id*. at *21.
95 *Id*. at 22-25
96 See Appellees' Response Brief and Cross-Appellants' Reply Brief, *Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935, however, these claims are not discussed in the opinion.
97 *Edwards Aquifer Auth. v. Bragg*, 2013 WL 4535935 at *21.
98 *Id*. at *13-21.
99 *Id*. at *15-17.
100 *Id*. at *17-20.
101 *Id*. at *20-21.
102 *Id*. at *21-28
103 *Id*. at *3-13.
104 *Id*. at *28, n. 14.
105 *See* http://www.search.txcourts.gov/Case.aspx?cn=04-11-00018-CV.
106 *Fort Stockton Holdings, L.P. v. Middle Pecos Groundwater Conservation Dist*., No. P-7047-83-CV (83rd Dist. Ct., Pecos Cnty., Tex. Nov. 6, 2012, appeal filed).
107 263 S.W.3d 910 (Tex. 2008) (holding that the district's rules governing permits to transport groundwater out of the district exceeded the district's statutory authority, where those rules protected and preserved the amount of historical use of irrigators, without taking into account that purpose of use).
108 *Pecos Cnty. v. Fort Stockton Holdings, L.P*., No. 08-12-343-CV (Tex. App.—El Paso Nov. 6, 2012, appeal filed).
109 EAA Act § 1.03(1), 1.16(d).
110 *See* Tex. Water Code Ann. §§ 36.201-.207 (West 2008 & Supp. 2013-14) (district revenues).
111 1993 Tex. Gen. Laws 2350, as amended, § 1.04 (establishing EAA territorial boundaries).
112 *See* http://quickfacts.census.gov/qfd/states/48000.html.

Las Vegas Water

LAS VEGAS WATER RIGHTS DECISION

JUDGE OVERTURNS STATE ENGINEER APPROVALS

by David Moon, Editor

INTRODUCTION

Engineer Overturned

The long running battle over water rights applications for Las Vegas has taken another turn with a decision by Senior Judge Robert Estes of the Seventh Judicial District Court of Nevada. The decision overturned the Nevada State Engineer's (State Engineer's) allocation of some 84,000 acre-feet per year of groundwater in four rural valleys that the Southern Nevada Water Authority (SNWA) planned to pump and pipe to Las Vegas. *White Pine County, et al. v. Jason King, P.E., Nevada State Engineer*, Case No. CV1204049 (Dec. 11, 2013). The overturned rulings concern the State Engineer's grant of groundwater rights to SNWA in Spring Valley, Cave Valley, Dry Lake Valley, and Delamar Valley. These four valleys straddle the Utah-Nevada state line. The matter, which has been remanded back to the Nevada State Engineer for reconsideration in accordance with the decision, was before Judge Estes on consolidated appeal from rulings 6164, 6165, 6166, and 6167.

Issues on Remand

In a sweeping decision issued December 11, the Judge remanded (sent back) the State Engineer's rulings "for recalculation of water available from the respective basins; for additional hydrological study of Delamar, Dry Lake and Cave valley; and to establish standards for mitigation in the event of a conflict with existing water rights or unreasonable effects to the environment or the public interest." *Slip Op*. at 1-2. The decision rejected the State Engineer's March 2012 approval of water rights for SNWA, although parts of the State Engineer's decision remain valid, as discussed below.

Judge Estes issued his ruling in favor of appellants: Great Basin Water Network; White Pine County, Nevada; Millard County and Juab County, Utah; Ely Shoshone Tribe; Duckwater Shoshone Tribe; Confederate Tribe of the Goshute Reservation; and the Presiding Bishop of the Church of Latter-Day Saints on behalf of the Cleveland Ranch.

SNWA APPLICATIONS HISTORY

1989 Applications

The water right applications at issue were originally filed in 1989 by the Las Vegas Valley Water District (LVVWD). SNWA succeeded LVVWD as the real party in interest in 1991. Thus began a tumultuous history of the groundwater applications. *See* Water Briefs, *TWR* #69, #72, and #77 for additional information on previous decisions by the State Engineer and the Nevada Supreme Court. The proposed water conveyance system would utilize a network of pumps and pipelines extending more than 300 miles and costing up to $15 billion.

Largest Interbasin Transfer

Judge Estes' decision provides some history of the applications and additional information in the "History" section of the ruling. *Slip Op*. at 2-4. At the end of that section, Judge Estes notes that the "basins [sic] size has been compared to New England" and that the applications represent "likely the largest interbasin transfer of water in U.S. History." *Id*. at 4.

Earlier Rejection

The Great Basin Water Network (GBWN), one of the appellants in the case, is a coalition of environmentalists, rural communities, sportsmen and Tribes. GBWN formed in 2004 to fight SNWA's plans to divert water from aquifers in northern Nevada to support growth in the Las Vegas Valley. GBWN prevailed in an earlier case before the Nevada Supreme Court. That earlier case overturned the award of water rights to SNWA in the same basins that are at issue in the present case and forced new hearings on the applications. The State Engineer held hearings in compliance with that earlier ruling between September 26 and November 18, 2011. These hearings resulted in approval of the water rights for SNWA in March 2012 and it is these approvals which were just rejected in Judge Estes' decision. *See* Water Briefs, *TWR* #98.

DISTRICT COURT'S DECISION

Judge Estes' 23-page decision provides the appellants with a significant victory, while also giving SNWA and the State Engineer much to contemplate as they decide how to proceed from this point. In his Conclusion, the Judge stated that "[A]fter an in-depth review of the record, this Court will not disturb the

Las Vegas Water

findings of the Engineer save those findings that are the subject of this Order." *Id*. at 23. Thus, the State Engineer's specific findings in the March 2012 approvals stand unless otherwise addressed in Judge Estes' decision. Most notable in this regard are the following findings regarding need, good faith, and financial ability:

Need, Good Faith, Financial Ability

- SNWA provided substantial evidence of the need for additional water and that current available supplies are insufficient to meet projected future water demands under normal conditions
- SNWA provided substantial evidence that it intends to construct the work necessary and put water to beneficial use with reasonable diligence
- SNWA provided substantial evidence of financial ability and a feasible conceptual plan of development

Judge Estes did, however, reject significant portions of the State Engineer's approval of the water rights applications (see below) based on his findings that many of the State Engineer's findings were not based on substantial evidence in the record and were therefore "arbitrary and capricious." It is important to note that Judge Estes was reviewing an appeal, and that the Court was therefore confined to reviewing the administrative record — as opposed to being able to consider additional information outside the record of the decision under appeal. The Court set forth the standard of review it follows in such a case as follows: "In reviewing the record, the Court must treat the State Engineer's decision as 'prima facie correct, and the burden of proof shall be upon the party' challenging the decision. NRS 533.450 (9). The Court may not substitute its judgment for that of the State Engineer, but is limited to determining whether there is substantial evidence in the record to support the decision." *Id*. at 5.

Standard of Review

Water Availability: Groundwater Recharge, Discharge Equilibrium and the Public Interest

The Court addressed the issue of groundwater availability in Spring Valley and the need to assure that the SNWA's use would not result in groundwater mining. "The Engineer defines groundwater mining as pumping exceeding the perennial yield over time such that the system never reaches equilibrium." *Id*. at 10. Judge Estes also noted that "the policy of the Engineer for over one hundred (100) years has been to disallow groundwater mining. This policy remains today." *Id*. The Court also cites *Pyramid Lake Paiute Tribe of Indians v. Ricci*, 245 P.3d 1146, 1147 (2010), where the Nevada Supreme Court held that "the perennial yield of a hydrological basin is the equilibrium amount or maximum amount of water that can safely be used without depleting the source."

Groundwater "Mining"

The Court specifically found that "the Engineer's own calculations and findings, show that equilibrium, with SNWA's present award, will never be reached and that after two hundred (200) years, SNWA will likely capture but eighty-four (84%) of the E.T. [evapotranspiration]. Further, this court finds that losing 9,780 afa [acre-feet annually] from the basin, over and above E.T. after 200 years is unfair to following generations of Nevadans, and is not in the public interest. In violating the Engineer's own standards, the award of 61,127 afa is arbitrary and capricious." *Slip Op*. at 12-13.

Mining Shown

Public Interest

Monitor, Manage and Mitigate Plan

The next area the Court discussed involves the proposed Monitor, Mitigate and Manage Plan (MMM Plan). The State Engineer adopted the MMM Plan created by SNWA and the federal National Park Service, Bureau of Fish and Wildlife, and Bureau of Indian Affairs. The heading to this part of the opinion sums up the problem the Court found with the MMM Plan: "There Are No Objective Standards As To When The Mitigation Part of the Monitor, Manage and Mitigate Plan Go Into Effect." *Id*. at 13.

Objective Standards

After detailing the limited data available on the complex issues involved, the Court discussed the State Engineer's finding that "[S]electing specific standards before a full baseline is developed would be premature. It would not lead to sound scientific decisions." Judge Estes, however, took a different view about such a situation. "Thus, if SNWA, and thereby the Engineer, has enough data to make informed decisions, setting standards and 'triggers' is not premature…If there is not enough data (as shown earlier, no one really knows what will happen with large scale pumping in Spring Valley), granting the appropriation is premature. The ruling is arbitrary and capricious." *Id*. at 16.

Insufficient Data

The Court also found fault with the lack of a specific standard concerning the potential drop of the water table. "The Engineer found that lowering the Spring Valley water table by 50 feet is 'reasonable,' but has avoided any mention of what is unreasonable. Nor did he state how monitoring will be accomplished, or what constitutes an impact, potential or otherwise…The Engineer gives a vague statement of how mitigation can be done, but has no real plan or standard of when mitigation would be implemented. Without a stated, objective standard, the ruling is arbitrary and capricious." *Id* at 17.

Water Table Drop

The Court found the lack of standards for impacts from the groundwater use was another problem. "Impliedly, the Engineer has ceded the monitoring responsibilities to SNWA. 'The State Engineer finds that [SNWA] has the ability to identify impacts of the project through its environmental monitoring plan.' ROA 000193. Yet, the plan has failed to set any standard of how impacts may be recognized. Essentially, the Engineer is simply saying, 'we can't define adverse impacts, but we will know it when we see it.'" *Id*. at 18.

Impacts Standards

Las Vegas Water

Objective Standard Required

Triggers Necessary

Water Availability

"Paper Rights"

Extent & Time of Interference

Availability Recalculation

Standards

Conflict With Existing Rights

Status Unclear

Judge Estes concluded this part of the opinion by stating that the uncertainty of impacts and lack of objective standards required him to remand the matter back to the State Engineer. "The Engineer rightly recognized his 'heavy burden of ensuring' that this water project is environmentally sound…A heavy burden indeed and one which is not complete. Several of the Protestants noted that the MMM Plan is filled with good intentions but lacks objective standards. This Court agrees. Granting water to SNWA is premature without knowing the impacts to existing water right holders and not having a clear standard to identify impacts, conflicts or unreasonable environmental effects so that mitigation may proceed in a timely manner. Based on the above, this mater must be remanded to the State Engineer until objective standards can be established and stated — as to when mitigation must occur." *Id*. at 18.

Later in the opinion, Judge Estes ruled similarly regarding the MMM Plan for the CDD Valleys (Cave, Dry Lake, and Delamar Valleys). *Id.* at 20-23. "As stated in the Plan, a definition of an unreasonable adverse effect, i.e. a trigger, a standard, a threshold must be defined…Absent a thorough plan and comprehensive standards for mitigation, any mitigation, (or lack thereof) is subjective, unscientific, arbitrary and capricious. This matter must be remanded to the Engineer so that objective standards may be established." *Id*. at 23.

Recalculation of Unappropriated Water: Conflict with Existing Rights

The Protestants (appellants) argued that the new appropriations in Cave, Dry Lake, and Delamar Valleys would allow SNWA to take water that has already been awarded to earlier established water rights. "The Engineer tacitly acknowledges the double appropriation of the same water but rationalizes it in two different ways. First, he refers to the rights in Coyote Springs as 'paper water rights.'" *Id*. at 19. Judge Estes found this assertion unpersuasive. "Exactly what the Engineer means by 'paper water rights' is unclear, but this Court takes it to mean: valid, existing rights. If the rights were invalid, there would be no over appropriation."

The second assertion of the State Engineer was that SNWA's use (upgradient in the groundwater basin) would not measurably affect down-gradient supply, if at all, for hundreds of years. The State Engineer had found that "if no measurable impacts to existing rights occur within hundreds of years, then the statutory requirement of not conflicting with existing water rights is satisfied." *Id*. at 20. The Court disagreed with that interpretation of Nevada's statute governing the granting of water rights, NRS 533.370 (2). "The statute is unequivocal, if there is a conflict with existing rights, the applications 'shall' be rejected." *Id*. Court and agency decisions in many western states have grappled with these issues regarding the proper standards for the extent of interference with existing rights and the time it may take for impacts to be felt.

Judge's Orders for Remand

In the Conclusion of the decision, the Judge set forth the four actions the State Engineer must comply with on remand:

- Millard and Juab counties in Utah (i.e. Snake Valley, Utah) must be added to the mitigation plan "so far as water basins in Utah are affected by pumping of water from Spring Valley Basin, Nevada"
- the State Engineer is required to undertake a "recalculation of water available for appropriation from Spring Valley" to assure that "the basin will reach equilibrium between discharge and recharge in a reasonable time"
- the State Engineer is ordered to "[D]efine standards, thresholds or triggers so that mitigation of unreasonable effects form pumping of water are neither arbitrary nor capricious in Spring Valley, Cave Valley, Dry Lake Valley and Delamar Valley"
- "[R]ecalculate the appropriations from Cave Valley, Dry Lake and Delamar Valley to avoid over appropriations or conflicts with down-gradient, existing water rights." *Id*. at 23.

CONCLUSION

As *The Water Report* went to press there was still no official word from State Engineer Jason King as to whether his office would appeal the District Court's rulings. One can expect that this battle will last for several more years and involve a return to the Nevada Supreme Court before the matter is finally decided.

Readers should refer to Judge Estes' opinion (weblink below) for additional details and explanation regarding the decision and specific factual findings in this extremely, complex case.

For Additional Information:
David Moon, The Water Report, 541/ 485-5350 or thewaterreport@yahoo.com
Complete Decision available at: www.greatbasinwater.net/pubs/WPEngineerCV1204049.pdf;

WATER BRIEFS

RIO GRANDE COMPACT TX/NM

SOLICITOR GENERAL'S BRIEF FILED

On December 10th, US Solicitor General Donald B. Verrilli, Jr., filed the *Brief for the United States as Amicus Curiae* (*Brief*) with the US Supreme Court (Supreme Court) in a legal action brought by Texas against New Mexico. *State of Texas v. State of New Mexico and State of Colorado*, No. 141, Original. The *Brief* was filed in response to the order of the Supreme Court inviting the Solicitor General to express the views of the US, before the Supreme Court decides whether or not to hear the case. Texas, New Mexico, and Colorado have previously filed briefs in the case. The case is before the Supreme Court because the United States Constitution provides original jurisdiction to the Supreme Court for any disputes between States.

The *Brief* encourages the Supreme Court to exercise its original jurisdiction and hear the case brought by Texas. "Texas alleges an interstate dispute of sufficient importance to warrant this Court's exercise of its original jurisdiction, and there is no other forum in which the controversy practicably can be resolved. New Mexico's challenges to the complaint's legal sufficiency turn on the interpretation of the Compact and thus should be resolved on their merits. At this threshold stage, Texas has adequately pled an injury to its sovereign rights under a reasonable interpretation of the Compact." *Brief* at 10-11.

This dispute between Texas and New Mexico concerns rights to water in the Rio Grande Basin, which is 700 miles long with a drainage basin of approximately 34,000 square miles. The 1938 Rio Grande Compact (Compact) apportions the water of the Rio Grande Basin among the States of Colorado, New Mexico, and Texas. Texas filed the complaint in order to enforce its rights under the Compact. *See* Act of May 31, 1939, ch. 155, 53 Stat. 785; Compl. App. 1-20.

Under the terms of the Compact, Colorado is required to deliver a specific amount of water to the New Mexico state line. New Mexico is then required to deliver a quantity of water to Elephant Butte Reservoir in New Mexico, which is approximately 105 miles north of the Texas state line. Elephant Butte Reservoir (Elephant Butte) is a federal Bureau of Reclamation (Reclamation) project that was "authorized, constructed, and had been distributing water pursuant to contracts with irrigation districts in southern New Mexico and western Texas before the States entered into the Compact." *Brief* at 2. Elephant Butte is the largest reservoir in the Rio Grande Project (Project) and was completed in 1916. The water stored in Elephant Butte is for the downstream use of the Elephant Butte Irrigation District (New Mexico) and the El Paso County Water Improvement District No. 1 (Texas).

Texas is complaining that New Mexico has depleted Texas's "equitable apportionment" under the Compact by allowing the diversion of surface water and pumping of groundwater that is hydrologically connected to the Rio Grande *below* Elephant Butte. An "equitable apportionment" represents the amounts allocated by the Compact, as negotiated to by the three States and also ratified by the US Congress (Congress ratifies such water compacts between the States to settle controversies). Texas is asserting that "the surface and groundwater depletions allowed by New Mexico 'have increased over time until, in 2011, they amounted to tens of thousands of acre-feet of water annually.'" *Brief* at 9.

Texas is asserting that the diversions of surface water and groundwater below Elephant Butte by New Mexico water users results in diminishing the amount of water that flows into Texas — which Texas is entitled to under the Compact. New Mexico, however, has taken the position that the Compact does not obligate it to deliver a specific amount of water to the Texas state line but instead only requires New Mexico to release a specified amount of water from Elephant Butte. On this basis, New Mexico asserts that Texas fails to allege a violation of the Compact. *See* Water Briefs, *TWR* #107. "If Texas is correct that New Mexico violates the Compact by allowing New Mexico water users to use Rio Grande surface water, tributary flow, or return flows below Elephant Butte beyond what is authorized in the Compact — and if New Mexico users are thereby significantly intercepting or impairing the flow of Project water that Texas is entitled to receive under the Compact — such interference would be actionable." *Brief* at 12.

The Solicitor General's Brief also recommended to the Supreme Court that it "provide a mechanism for the parties to address potentially dispositive legal issues. Resolution of those issues, which could be placed before the Court through a motion in the nature of a motion to dismiss, could significantly facilitate disposition of the controversy." *Brief* at 11. Essentially, the Solicitor General is suggesting that the Supreme Court grant Texas leave to file its complaint and also grant New Mexico leave to file a motion to dismiss, so that issues of Compact interpretation that New Mexico believes are controlling would be decided before the case proceeds further.

The *Brief* provides excellent information regarding the Rio Grande Compact, the Project and many of the assertions made by the States. It is recommended reading for anyone seeking more details about the current controversy.

For info: *Brief* available at: www.tceq.texas.gov/assets/public/agency/statements/texas-vs-nm-solicitor-general.pdf

INDIAN WATER CLAIMS WEST

SETTLEMENT OF RESERVED RIGHTS

The Native American Rights Fund and the Western States Water Council's hosted the 13th Biennial Symposium on the Settlement of Indian Reserved Water Rights Claims at the Buffalo Thunder Resort near Santa Fe, New Mexico, on August 13-15, 2013. The Pueblos of Pojoaque, Tesuque, Nambé, and San Ildefonso hosted the Symposium. These Pueblos are involved in the Aamodt water rights adjudication of New Mexico and are the focal parties of the April 19, 2012 Settlement Agreement and Aamodt Litigation Settlement Act, a part of the Claims Resolution Act of 2010.

Every two years, NARF and WSWC bring together tribal peoples, federal and state representatives,

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water lawyers, technical experts and interested parties to review the successes, opportunities and challenges experienced in the resolution of Indian water rights through settlement and to celebrate the accomplishments of the previous two years. Over 160 people came together at the Buffalo Thunder Resort of the Pojoaque Pueblo to listen, share stories, and discuss settlement strategies.

As of May 15, 2013, there are 28 competed settlements, 21 federal implementation teams and 17 federal negotiation teams appointed to settlements. In addition, there are two settlements pending in Congress. It is anticipated that finalizing settlements in the future will likely be more difficult for of a host of reasons: the challenges of obtaining federal funding; the increasing competition for limited water supplies; and the increasing need for new and improved water storage and delivery infrastructure.

Presenters discussed what it takes in terms of time, resources, experts, and expectations to prepare for settlement talks. Others talked about the technical work necessary to understand and develop solutions for water issues in communities. They noted that one never has enough information, time, or money to do what all the participants think is needed and that expectation adjustment is an important part of the process. Federal staffers discussed how and when to interface with Congress, staffers, and the Office of Management and Budget. They emphasized the need for building relationships in Washington D.C. long before the settlement comes to Capitol Hill. They also noted the probability that adjustments will be required by staffers based on their knowledge of what it takes to get a bill through the legislative process. A comparison of the federal water right settlement process in 1993 and that of today provided lessons learned over the last twenty years.

Tribal representatives spoke about how difficult this process can be as well as some of the benefits of engaging in settlement negotiations. Many speakers addressed the need for parties to understand each other's interests, similarities, and differences as they work together to build relationships needed to reach a resolution of Tribal water rights, while addressing water-related community problems.

Based on their participation in the Aamodt water adjudication, the host communities of Nambé, Pojoaque, Tesuque, and San Ildefonso Pueblos shared their experiences and recommendations with Tribes and other likely participants who are embarking on a water rights settlement path. They also reflected on the challenges that could arise. At the end of the conference, the settlement experience was summed up: although many of the challenges faced over the years remain the same, Tribes and other negotiation participants have found new approaches to overcome these challenges and to succeed in resolving the nature and specifics of their water rights.
For info: Conference materials available on WSWC's website at: www.westernstateswater.org/settlement-of-indian-reserved-water-rights-claims-symposium-presentations/; the New Mexico School of Law's Tribal Law Journal at: http://tlj.unm.edu/ will soon publish a full summary of the conference

COMPACT REPORT MT

COMPACT COMMISSION

The Montana Reserved Water Rights Compact Commission (Commission) released its "*Report on the Proposed Water Rights Compact - Between the State of Montana and The Confederated Salish and Kootenai Tribes of the Flathead Reservation*" (Report) in mid-December. Montana Governor Steve Bullock had directed the Commission to prepare the Report to address issues and questions that arose concerning the proposed water rights compact during Montana's 2013 Legislative Session. For a thorough discussion regarding the proposed Compact, *see CSKT Water Rights Compact Unratified: Montana Legislature Refuses to Ratify Confederated Salish and Kootenai Tribes Compact* by Weiner & Stermitz (*TWR* #114: August 15, 2013). The Report uses a question and answer format to address the issues and concerns that have arisen regarding the proposed compact; it provides extensive details regarding reserved water rights and the specifics proposed for adoption.

The Compact Commission is an entity unique to Montana. It was created as a state agency specifically to negotiate quantification agreements (compacts) with Indian tribes and federal agencies that claimed federal reserved water rights in Montana. The Commission has previously completed seventeen compacts with six tribes and five federal agencies in Montana. The two bills that would have advanced the negotiated settlement in the 2013 Legislature were killed in committee. This marked the first time in the Commission's 34-year history that the legislature declined to ratify a reserved water rights settlement presented to it by the Commission.

The Commission intends to submit the proposed compact to the 2015 Montana Legislature for approval. If the compact is not approved, the Confederated Salish and Kootenai Tribes of the Flathead Reservation will submit claims to the Montana Water Court for adjudication in Montana's on-going state-wide adjudication process. As noted in the Introduction to the Report, "[B]ecause of their early priority date and large geographic scope, the Tribes' water rights have the potential to negatively impact existing state-based water rights and future water availability throughout western Montana and possibly well east of the Continental Divide." Report at 4.
For info: Compart Report available at: www.dnrc.mt.gov/rwrcc/Compacts/CSKT/WaterCompactReportLR.pdf

DROUGHT MANAGEMENT CA

WATER TRANSFERS EMPHASIS

The California Department of Water Resources (DWR) has mobilized a new drought management effort to prepare for and reduce potential impacts of what is expected to be a third straight dry year in 2014. DWR Director Mark Cowin said the department is focusing its personnel and programs "to offset potentially devastating impacts to citizen health, well-being and our economy."

Among DWR's principal concerns is the plight of farmers who must operate with markedly less water than needed for crops. Especially vulnerable to dry conditions will be farmers — and the farm communities that depend on agricultural jobs — on the west side of the San Joaquin Valley. DWR will also be watching for drinking water impacts

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in small rural communities whose fractured rock groundwater sources will be stressed by a third dry year.

DWR is working with the US Bureau of Reclamation (Reclamation) and the State Water Resources Control Board to expedite transfers of water from areas with relative abundance to locations with critical water needs. "Voluntary water transfers will be key to DWR's drought response, as they hold the potential to alleviate critical shortages," Cowin said. "We are making arrangements to bring additional resources with expertise in water transfers to advise the Drought Management Team to assure that the 2014 water transfers approval process is administered efficiently." DWR has released a schedule and process for streamlining water transfers in 2014, as directed by Governor Brown Jr.'s May 20 executive order. "We will continue to work with voluntary buyers, sellers, the State Water Resources Control Board and the Bureau of Reclamation to ensure an efficient process," Cowin said. California Department of Food and Agriculture Secretary Karen Ross complimented DWR on its efforts to respond quickly. "While 2014 water allocations are not finalized until spring, farmers and ranchers make key decisions in January and February," said Secretary Ross. "By acting now to streamline water transfers and provide clarity, the administration is helping our agricultural communities prepare for the coming water year."

Supplementing the water transfer program, DWR is working with Reclamation and the federal and state wildlife agencies to improve Delta operations next summer to enhance water delivery capability while meeting endangered species protections. Cowin said DWR recognizes there will be regional impacts due to dry conditions next year. "It's still early in the water year," he said. "The January and February snow surveys will allow us to evaluate water conditions on a statewide basis. As we monitor water conditions, we will consider actions to be included in a potential governor's drought proclamation."

For info: Elizabeth Scott, DWR, 916/ 712-3904, mescott@water.ca.gov or www.water.ca.gov/waterconditions/droughtinfo.cfm

BAY DELTA PLAN CA

RELEASED FOR PUBLIC REVIEW

The State of California and its federal partners have announced the release of the a draft Bay Delta Conservation Plan for formal public review. The release is a key step toward completion of a final plan. The review period ends on April 14, 2014. Citizens, organizations, and government agencies are urged to review and comment on the documents. From mid-January through mid-February, experts will be available at public meetings to facilitate review of the plan, and to hear public comments on the plan and accompanying environmental documents.

The Bay Delta Conservation Plan aims to both stabilize water deliveries from the Delta and contribute to the recovery of 56 species of plants, fish and wildlife over the 50-year life of the plan. The Legislature delineated those co-equal goals in the 2009 Delta Reform Act. The plan seeks to protect delivery of the mountain snowmelt that supplies water to two-thirds of the state's population from San Jose to San Diego and thousands of Central Valley farms. It focuses on the estuary where the snowmelt flows, the Sacramento-San Joaquin Delta, and aims to both reverse the ecological decline of the region and modernize a water system that now depends on hundreds of miles of earthen levees vulnerable to earthquake, flood, and rising sea levels. The 9,000-page Bay Delta Conservation Plan and its corresponding 25,000-page EIR/EIS reflect significant revisions since the informal release of administrative review drafts last spring and summer.

The plan proposes to change the way the State Water Project (SWP) and Central Valley Project (CVP) divert water from the Delta. It proposes the construction of new intakes in the north Delta along the Sacramento River about 35 miles north of the existing pumping plants. Twin tunnels would carry the water underground to the existing pumping plants, which feed canals that stretch hundreds of miles to the south and west. A northern diversion on the Sacramento River is intended to minimize environmentally harmful reverse flows in the south Delta that are caused when the existing pumping plants draw water from nearby channels.

The Bay Delta Conservation Plan is a habitat conservation plan under the federal Endangered Species Act and a natural community conservation plan under California law. It describes 22 separate conservation measures that would be undertaken by the California Department of Water Resources, operator of the SWP, in coordination with the US Bureau of Reclamation, operator of the CVP. The plan seeks to provide a stable regulatory environment for operation of the SWP, while working toward the recovery of imperiled fish species. Water users served by the SWP and CVP – primarily in Southern California, the Santa Clara Valley, and the San Joaquin Valley – would pay most costs under the plan, including the entire $16 billion cost associated with new intakes and tunnels.

For Info: Nancy Vogel, 916/ 651-7512, Nancy.Vogel@water.ca.gov or http://baydeltaconservationplan.com

OIL & GAS DATABASE US

WATER QUALITY LAW TOOL

The Getches-Wilkinson Center for Natural Resources, Energy, and the Environment recently launched the first component of a searchable, comparative database for oil and gas law in partnership with Temple University's Public Health Law Research program and its LawAtlas.org website. The Oil & Gas - Water Quality dataset is a comparative tool for examining water quality laws and regulations related to oil and gas activities in Colorado, Montana, New Mexico, New York, North Dakota, Ohio, Pennsylvania, Texas, Utah, West Virginia, and Wyoming. The database allows policymakers, local governments, industry and citizens to study the scope of water quality law in their state or to make comparisons with other states.

An interactive map allows for easy navigation across different jurisdictions, and downloadable PDFs are available that document each state's water quality regulations. The project will add water quantity and air quality components to the database later this year. For additional details on the Best Management Practices (BMP) project, see the website listed below.

For info: Kathryn Mutz or Matt Samelson, GWC, oilandgasbmps@colorado.edu or www.oilandgasbmps.org/

WATER BRIEFS

ESA SETTLEMENT CA
TRIBE & IRRIGATION DISTRICT

On December 20, the Karuk Tribe and Klamath Riverkeeper announced that they have reached a settlement with Montague Water Conservation District (MWCD) that will dismiss litigation the groups filed in August 2012. The suit, filed in the US District Court in Sacramento, alleged that MWCD's dams and diversions on the Shasta River lead to the illegal killing of endangered coho salmon populations in the Shasta River. According the complaint, MWCD violated the federal Endangered Species Act (ESA) by killing ESA-listed salmon without a take permit. MWCD operates and maintains Dwinnell Dam and reservoir, and water diversion structures on the Shasta River, Parks Creek, and the Little Shasta River in California.

The Settlement Agreement (Agreement) focuses on a new management strategy for Dwinnell Reservoir, as opposed to cutting flows to irrigators, that was designed so MWCD would not see a big difference in the volumes of water it diverts. "We worked hard to find a solution that would start the fisheries restoration process but keep our neighbors in agriculture whole," said Karuk Chairman Buster Attebery. Historically, MWCD has diverted approximately 22,000 acre-feet of water a year on average. The Agreement allows MWCD to divert 20,500 acre-feet for irrigation although in dry years that amount may be reduced and in wet years MWCD will be able to divert more. Water models predict that average diversion over time will be nearly the same as historic average diversions.

The Agreement will result in 2,250 to 11,000 acre-feet of water being released from Dwinnell Dam for fisheries benefits each year, with the exact volume for any given year dependent on how wet the preceding winter was. The 33-page Agreement provides numerous details on how the release regime will be implemented. Currently, fish only receive a few hundred acre-feet of water a year in the Shasta River from Dwinnell Dam, if any, according to the Karuk Tribe. Craig Tucker, Klamath Coordinator for the Karuk Tribe, said "The bottom line is, whereas fish have gotten little to no water from the dam since 1926, starting now they will get 2,250 to 11,000 acre-feet a year based on precipitation."

The Agreement noted that MWCD stated that it had "since at least 2005 been voluntarily investigating and implementing measures to improve fishery conditions within the Shasta River, Parks Creek and Little Shasta River, including but not limited to instream dedications of water and development of a long term water conservation and habitat enhancement project, each in coordination with federal and state resource agencies… ." Agreement at 2-3.

The flow plan stemming from the agreement is temporary. Under terms of the settlement, MWCD will have to develop a long-term flow plan and habitat restoration measures that will be subject to a formal Endangered Species Act permitting process including public input. That process is scheduled to begin late in 2014.

For info: Copy of the Settlement Agreement is available upon request from *The Water Report*; Craig Tucker, Karuk Tribe, 916/ 207-8294, ctucker@karuk.us or www.klamathrestoration.org

TEMPORARY FLOODING US
TAKINGS AWARD - $5.8 MILLION

The Federal Circuit Court of Appeals issued a "takings" decision on December 3 in favor of the plaintiff, who had complained about government-induced flooding to their property caused by the operation of a US Army Corps of Engineers' (Corps') project. *Arkansas Game & Fish Commission v. United States*, Nos. 2009-5121, 2010-5029 (Dec. 3, 2013). The Federal Circuit Court of Appeals (Federal Circuit) previously held that Arkansas Game & Fish Commission "failed to establish that increased flooding of its property during the period 1993-2000 constituted a taking that is compensable under the Fifth Amendment to the Constitution…The Supreme Court reversed, holding that government-induced flooding can quality as a Fifth Amendment taking even if it is temporary in duration. *Ark. Game & Fish Comm'n v. United States*, 133 S. Ct. 511 (2012)." *Slip Op*. at 2. The Supreme Court remanded the case to the Federal Circuit to determine whether the Corps' actions gave rise to a temporary taking as found by the Court of Federal Claims (trial court) and whether the trial court's judgment should be upheld. The Supreme Court noted that the United States had challenged "several of the trial court's fact findings, including those relating to causation, foreseeability, substantiality, and the amount of damages." 133 S. Ct. at 522.

After considering the issues remaining in the case that the government had preserved for review, the Federal Circuit ultimately upheld the trial court's decision, awarding $5.8 million to the plaintiff. Readers who are particularly interested in "takings" law should review the opinion for additional details on those issues beyond the brief notice provided here.

For info: Complete Decision at: www.cafc.uscourts.gov/images/stories/opinions-orders/9-5121.Opinion.11-27-2013.1.PDF

CLIMATE/INFRASTRUCTURE US
GAO REPORT ON FEDAGENCY ACTIONS

In 2009, a law — commonly referred to as the SECURE Water Act — and a presidential executive order directed federal agencies to address the potential impacts of climate change.

The federal Government Accountability Office (GAO) was asked to review agency actions to address climate change impacts on water infrastructure. A GAO report issued in November, 2013, (GAO-14-23) examines: 1) actions taken by the US Army Corps and the US Bureau of Reclamation since 2009 to assess and respond to the potential effects of climate change on water infrastructure; and 2) challenges, if any, faced by the Corps and Reclamation in assessing and responding to the potential effects of climate change on water infrastructure, and the steps the agencies are taking to address them. GAO analyzed the agencies' climate change adaptation guidance and planning documents and interviewed agency officials and other key stakeholders, including water users, environmental groups, and researchers. The GAO report found that these agencies are:

- identifying the data and tools needed by water managers to address climate change, which will help guide federal research efforts
- obtaining needed climate data by collaborating with other agencies, such as by sharing some costs associated with maintaining USGS's

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stream flow measurement activities, which are valuable to Corps water planning and management
- integrating climate science into water resource management decision making through activities such as developing and communicating science to inform climate adaptation
- collaborating in the development of a climate change science training program for water resources managers

For info: Steve Morris, GAO, 202/ 512-3841 or morriss@gao.gov
Report website: www.gao.gov/assets/660/659024.pdf

TMDLS US

EPA ANNOUNCES NEW PROGRAM VISION

EPA has announced a new collaborative framework for implementing the Clean Water Act Section 303(d) Program with states. The 303(d) Program requires states to develop lists of impaired waters, establish priority rankings for waters on the lists, and develop Total Maximum Daily Loads (TMDLs) for these waters. The new *Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program* document details enhancements made to the CWA 303(d) Program. This New Program Vision is intended to enhance overall efficiency of the 303(d) program, and in particular, encourages focusing attention on priority waters and provides states flexibility in using available tools beyond TMDLs to attain water quality restoration and protection.

With the recognition that there is not a "one size fits all" approach to restoring and protecting water resources, states will now be able to develop tailored strategies to implement their CWA 303(d) Program responsibilities in the context of their water quality goals. Accountability will be ensured through a new CWA 303(d) Program measure for FY 15 for tracking success in implementing these efforts to restore and protect the Nation's streams, rivers and lakes.

While the Vision provides a new framework for implementing the CWA 303(d) Program, it does not alter state and EPA responsibilities or authorities under the CWA 303(d) regulations.

For info: http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/programvision.cfm

MERCURY CONSUMPTION US

WOMEN'S BLOOD-LEVELS DECLINE
EPA REPORT

In a report issued last November — *Trends in Blood Mercury Concentrations and Fish Consumption Among U.S. Women of Reproductive Age, NHANES, 1999-2010* — EPA presents the results of a study on trends in blood mercury levels in women of childbearing age. EPA looked at data from 1999-2010 from the Centers for Disease Control and Prevention (CDC) National Health and Nutrition Examination Survey (NHANES), to see whether there was a trend in blood mercury concentrations and in fish consumption among women of childbearing age.

The data showed that mercury levels in women of childbearing age dropped 34 percent from a survey conducted in 1999-2000 relative to follow-up surveys conducted from 2001 to 2010. Additionally, the percentage of women of childbearing age with blood mercury levels above the level of concern decreased 65 percent between the 1999-2000 survey and the follow-up surveys from 2001-2010.

People are exposed to mercury mostly through the consumption of finfish and shellfish. Mercury released into the environment is converted to methylmercury (MeHG) in soils and sediments, and over time, bioaccumulates in finfish and shellfish. MeHg exposure to infants before birth is associated with adverse health effects, for example, neuropsychological deficits in IQ and motor function.

During the survey period there was very little change in the amount of fish consumed. However, there was a statistically significant decreasing trend in the ratio of mercury intake to fish consumed that is consistent with women shifting their consumption to fish with lower mercury concentrations.

For info: Jeff Bigler, EPA, 202/ 566-0389 or bigler.jeff@epa.gov
EPA website: www.epa.gov/hg/advisories.htm ("Reports and Chemical Fact Sheets")

WETLANDS RESTORATION TX

RE-EXCAVATION METHOD SUCCESSFUL

More than 135 acres of prairie wetland habitat have been restored near Houston with a new method that may help additional acreages be recovered, according to Texas A&M AgriLife Extension Service experts.

Prairie wetlands at Sheldon Lake State Park have been restored over a 10-year period using a novel approach of re-excavating soil covered up by other land-use situations, particularly agriculture, said Marissa Sipocz, AgriLife Extension wetland program manager in Houston.

"The method we have used has changed how freshwater prairie wetland restoration and creation will take place along the Gulf Coast," Sipocz said. "The genius of this method relies on its simplicity: re-excavation of the original soils."

The method uses high-tech, precision equipment to dig added soil out of an area until the original soils are exposed. These "hydric soils" are more conducive to the growth of plants that thrive in shallow water.

The method was pioneered by Andy Sipocz, biologist for the Texas Parks and Wildlife Department (TPWD). Prior to this method, wetlands were commonly created by digging a depression randomly on the landscape, often not in the type of environment and soils that encouraged wetland plant growth.

Beginning in 2003, AgriLife Extension partnered with Texas Sea Grant, TPWD, and US Fish & Wildlife Service to begin restoration of the Sheldon Lake State Park. The area originally was coastal prairie with pine and oak tree savannas dotted by marsh basins, a landscape that once covered millions of acres along the Texas-Louisiana Gulf Coast, according to the wetland team, which includes people with the Texas Master Naturalist program, TPWD and AgriLife Extension.

"Wetlands also store rainfall runoff and remove pollutants from surface waters, thus reducing downstream flooding and improving the water quality of Carpenters Bayou and Galveston Bay," Sipocz stated.

For info: Contact: Marissa Sipocz, TAMU, 281/ 218-6253 or m-sipocz@tamu.edu
Full news release at: http://today.agrilife.org/2013/11/27/37847/

WATER BRIEFS

COASTAL NONPOINT POLLUTION CONTROL PROGRAM DISAPPROVAL OR EPA & NOAA INITIATE DISAPPROVAL PROCESS

On December 19, 2013, the National Oceanic and Atmospheric Administration (NOAA) and the US Environmental Protection Agency (EPA) announced the opening of a 90-day public comment period on the agencies' proposal to disapprove the State of Oregon's Coastal Nonpoint Pollution Control Program.

Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA) requires states and territories participating in the federal Coastal Program to develop Coastal Nonpoint Pollution Control Programs. These programs include enforceable mechanisms a state will use to implement management measures to prevent and control polluted runoff in coastal waters. CZARA is jointly administered by NOAA and EPA. Thirty-four states and territories participate in this program. EPA and NOAA must approve a state's Coastal Nonpoint Pollution Control Program. If the federal agencies do not approve a state's program, federal funding for coastal land management and pollution control programs is reduced.

Forestry is the main land use within Oregon's Coastal Nonpoint Pollution Control Program boundary. Based on 1992 GIS data, it comprises 90 percent of the area. Urban land uses comprise only one percent. The remaining land use types are eight percent agriculture and one percent water and wetlands.

According EPA and NOAA, improvements are needed in the Oregon program in three areas: 1) forestry practices; 2) septic tank management; and 3) land development practices. The agencies state that Oregon needs to better control impacts from timber harvesting, including: measures for protecting small and medium sized streams; measures to protect landslide prone areas; and measures to address runoff from forest roads built prior to modern construction and drainage requirements. Oregon also needs to ensure that septic systems are inspected and properly maintained and that sediment runoff from new urban development does not enter rivers and streams.

EPA and NOAA also have concerns about nonpoint source impacts from agricultural activities and are inviting comments from the public on the state's agricultural program as well.

Under the terms of a settlement agreement, EPA and NOAA are required to make a final decision by May 15, 2014. The settlement agreement is the result of a 2009 lawsuit filed against NOAA and EPA by the Northwest Environmental Advocates (NWEA) challenging the agencies' joint administration of CZARA with respect to Oregon's Coastal Nonpoint Pollution Control Program.

NWEA sued in 2009 (*NWEA vs. EPA/NOAA*), contesting the federal government's conditional approval of Oregon's program. NWEA alleged Oregon's program was not sufficient to meet federal requirements under CZARA, and that EPA and NOAA had to either approve or disapprove Oregon's program rather than continuing to work with the state to iron out any remaining problems. In September 2010, a federal judge ordered EPA and NOAA to do the following:

- Publish a Federal Register notice by November 15, 2013, proposing approval or disapproval of Oregon's Coastal Nonpoint Pollution Control Program plan. [Due to the federal shutdown, EPA and NOAA published their proposed decision in December.]
- EPA and NOAA must issue a final decision by May 15, 2014.

According to the terms of the subsequent settlement agreement between NWEA and NOAA/EPA in 2010, the federal agencies can only approve Oregon's plan if they find that Oregon has successfully addressed three issues: 1) new development in urban areas; 2) onsite septic systems; and 3) forest management. As noted, all three of these areas have, thus far, been found to be deficient by NOAA and EPA.

In early November 2013, EPA and NOAA informed Oregon that they planned to initiate a proposed disapproval of Oregon's plan in December, but that Oregon would have the opportunity to submit additional information during the 90 day public comment period for their consideration before the federal agencies issue a final decision in May 2014.

Program disapproval would result in significant reductions in federal grant funds that help Oregon reduce nonpoint pollution statewide and address growth management and other environmental issues in the coastal region. The Oregon Department of Environmental Quality currently receives about $2 million a year in Clean Water Act Section 319 grant funds. This funding would drop by 30 percent a year starting in the next federal fiscal year, and the disapproval could lead to a complete loss of funding in the next few years. Likewise, the Oregon Department of Conservation and Development currently receives about $2 million annually in Coastal Zone Management Act Section 306 grant funds. This funding would also drop by 30 percent in the next fiscal year if the program is disapproved.

Oregon has expressed a desire to continue working with NOAA and EPA towards full approval and the federal agencies have stated that they are ready to help Oregon achieve that goal.

"Oregon is a leader in coastal management, and we hope it can be a leader in protecting coastal water quality from nonpoint source pollution, too," says Margaret Davidson, acting director of NOAA's Office of Ocean and Coastal Resource Management.

"Nonpoint source pollution is the most significant remaining water quality issue in the state and the nation," notes Dennis McLerran, EPA's Regional Administrator for the Pacific Northwest and Alaska. "EPA and NOAA are committed to continuing to work with Oregon to develop a fully approvable Coastal Nonpoint Program."

If EPA and NOAA finally disapprove Oregon's program, it will set a precedent. Ten other states have conditionally-approved programs, as does Oregon, but EPA and NOAA are not planning to take final action on those plans without more work to resolve outstanding issues. Oregon would be in the same position if it were not for EPA and NOAA's settlement of the *NWEA vs. EPA/NOAA* litigation.

For info: The proposed findings document and supporting information that NOAA and EPAA used to make this decision are available for download on the NOAA website at http://coastalmanagement.noaa.gov/czm/6217/findings.html.
Oregon Agencies' Joint Press Release is available at: www.oregon.gov/deq/docs/121913disapprovalCoast.pdf

CALENDAR

January 15 AZ
WRRC/AZ Water Workshop: Transforming Research into Practice, Tempe. Salt River Project PERA Club, 1 E. Continental Drive. For info: https://wrrc.arizona.edu

January 15 NE
Groundwater Quality in Nebraska Seminar, Lincoln. UNL East Campus, Hardin Hall Auditorium, 3:30-4:30pm. Presented by Nebraska Water Center. For info: http://watercenter.unl.edu/

January 16-17 CA
Environmental Planning & Site Analysis Course, Sacramento. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, http://extension.ucdavis.edu/

January 18-19 CO
12th Annual Research & Management Conference: Riparian Restoration in the Western US, Grand Junction. Colorado Mesa University. Presented by Tamarisk Coalition. For info: www.tamariskcoalition.org/programs/conferences/2014

January 21-23 LA
2014 UIC Annual Conference, New Orleans. Hotel Monteleone. Presented by Ground Water Protection Council. For info: http://gwpc.site-ym.com/events/event_details.asp?id=361226

January 22 NE
Rural Private Wells: Concerns & Well Owner Responsibilities Seminar, Lincoln. UNL East Campus, Hardin Hall Auditorium, 3:30-4:30pm. Presented by Nebraska Water Center. For info: http://watercenter.unl.edu/

January 23 CA
CEQA & Climate Change: An In-Depth Update, Sacramento. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, http://extension.ucdavis.edu/

January 23 TX
Gulf Coast Water Conservation Symposium, Houston. United Way Resource Ctr. For info: Jennifer Walker, Gulf Coast Efficiency Network, 512/627-9931

January 23-24 WA
21st Annual Endangered Species Act Conference, Seattle. Grand Hyatt Seattle. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

January 23-24 CA
Building a Water & Energy Efficient California - 2014 California Irrigation Institute Conference, Sacramento. Arden West Hilton. For info: www.caii.org/

January 24 AZ
Agri-Business Council of Arizona's Perspective on Water & Agriculture in Arizona (Brown Bag), Tempe. WRRC Sol Resnick Conf. Rm., 350 N. Campbell Ave. For info: https://wrrc.arizona.edu/

January 24 CA
Understanding GIS Modeling for Sustainable Communities Course, Sacramento. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, http://extension.ucdavis.edu/

January 28-31 GA
The Environmental Bootcamp, Atlanta. DoubleTree Atlanta Buckhead. For info: www.epaalliance.com/environmentalbootcamp-jan14.html

January 29-31 CO
Colorado Water Congress Annual Convention, Denver. Hyatt DTC. For info: www.cowatercongress.org/cwc_events/Annual_Convention.aspx

January 30 AK
Permitting Strategies in Alaska Seminar, Anchorage. Dena'ina Convention Ctr. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

January 30 CA
Water Technology Conference: Water & Energy, La Verne. University of La Verne. For info: http://laverne.edu/waterconference2014/

January 30 AZ
Little Colorado River: Failure of the Settlement & Triumph of Social Media, Tempe. U of Arizona College of Law, Rm. 160, 1201 E. Speedway Blvd., 4-5pm. Stanley Pollack, WSP Distinguished Speaker. For info: https://wrrc.arizona.edu/

January 31 CA
Environmental Law Update Conference, San Francisco. Hotel Nikko. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

February 2-5 NM
National Ass'n of Clean Water Agencies Winter Conference, Santa Fe. La Fonda on the Plaza. For info: www.nacwa.org/

February 3-7 WA
13th Annual Stream Restoration Symposium, Stevenson. Skamania Lodge. Presented by River Restoration Northwest. For info: www.rrnw.org/Home

February 3-7 AK
Alaska Forum on the Environment, Anchorage. Dena'ina Convention Ctr. For info: http://akforum.com/

February 5 CA
Overview of California Water Rights Course, Sacramento. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, http://extension.ucdavis.edu/

February 6-7 CA
Environmental Planning & Site Analysis Course, Sacramento. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, http://extension.ucdavis.edu/

February 6-7 FL
Florida Water Law & Policy Conference, Orlando. Hyatt Regency. For info: CLE Int'l, 800/ 873-7130 or www.cle.com

February 6-7 DC
Natural Resources Damages Seminar, Washington. Thurman Arnold Building. For info: Law Seminars Int'l, 800/ 854-8009, registrar@lawseminars.com or www.lawseminars.com

February 8 CA
California Water Law Symposium, San Francisco. UC Hastings College of Law. For info: Vincent Lu, waterlawteam@gmail.com or www.waterlawsymposium.com/

February 12 NE
Social Capacity: Getting Producers to the Conservation Table Seminar, Lincoln. UNL East Campus, Hardin Hall Auditorium, 3:30-4:30pm. Presented by Nebraska Water Center. For info: http://watercenter.unl.edu/

February 12 CA
CEQA Update, Issues & Trends, Sacramento. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, http://extension.ucdavis.edu/

February 14 CA
Thresholds of Significance in Environmental Planning Course, Sacramento. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, http://extension.ucdavis.edu/

February 18-20 WA
Northwest Hydroelectric Ass'n Annual Conference, Seattle. Marriott Downtown Waterfront Hotel. For info: Jan Lee, NWHA, 503/ 545-9420, h20kw@aol.com or www.nwhydro.org

February 18-20 CO
Tamarisk Coalition's 11th Annual Conference, Grand Junction. Colorado Mesa University. For info: 970/ 256-7400 or www.tamariskcoalition.org

February 20-20 CA
Planning & Environmental Law Course, Sacramento. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, http://extension.ucdavis.edu/

February 20-21 NV
2014 Family Farm Alliance Annual Conference, Las Vegas. Monte Carlo Resort. For info: www.familyfarmalliance.org

February 20-21 NM
Land & Water Summit 2014: Drought as an Opportunity for Change, Albuquerque. Sheraton Airport Hotel. Sponsored by Xeriscape Council of New Mexico & Arid LID. For info: www.xeriscapenm.com/

February 21 CO
Colorado Water Law Conference - 12th Annual, Beaver Creek. Westin Riverfront. For info: CLE Int'l, 800/873-7130 or www.cle.com

February 25 GA
American Water Works Ass'n & World Environment Federation Utility Management Conference, Savannah. Hyatt Regency. For info: www.awwa.org/conferences-education/conferences.aspx

February 25-27 DC
2014 ACWA DC Conference, Washington. The Liason Capitol Hill. Presented by Ass'n of California Water Agencies. For info: https://acwa.eventready.com/index.cfm?fuseaction=reg.info&page=Welcome&event_id=1462&regid=~~~&flow=reg

February 25-28 TX
Environmental Awareness Bootcamp, San Antonio. Hyatt Place San Antonio. For info: www.epaalliance.com/environmentalbootcamp-feb14.html

February 26 NE
A Vision for Ultra-High Resolution Integrated Water Cycle Observation & Prediction System Seminar, Lincoln. UNL East Campus, Hardin Hall Auditorium, 3:30-4:30pm. Presented by Nebraska Water Center. For info: http://watercenter.unl.edu/

February 26 OR
Communicating the Value of Water to Your Customers Workshop, Salem. Salem Convention Ctr., 200 Commercial Street SE. Presented by Oregon Ass'n of Clean Water. For info: Janet Gillaspie, gillaspie@oracwwa.org or www.oracwa.org/

February 26-27 Canada
International Conference on Stormwater and Urban Water Systems Modeling, Toronto. Marriott Courtyard Toronto Brampton. For info: www.chiwater.com/Training/Conferences/conferencetoronto.asp

February 26-28 TX
SPCC & Stormwater Compliance Workshop, San Antonio. Hyatt Place San Antonio. For info: www.epaalliance.com/spccstormwaterworkshop-feb14.html

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

CALENDAR

(continued from previous page)

February 26-28 NV
Lower Colorado River Tour, Las Vegas. Presented by Water Education Foundation. For info: www.watereducation.org/toursdoc.asp?id=2979

February 27 CO
2014 Martz Winter Symposium: Natural Resources Industries & the Sustainability Challenge, Boulder. Wolf Law Bldg. For info: www.colorado.edu/law/research/gwc/events

February 27-28 CA
3rd Annual Hydraulic Fracking Seminar, Santa Monica. Bacara Resort. For info: The Seminar Group, 800/ 574-4852, email: info@theseminargroup.net, or website: www.theseminargroup.net

February 27-March 2 OR
Public Interest Environmental Law Conference: "Running Into Running Out", Eugene. University of Oregon. Presented by the Environmental & Natural Resources Law Center. For info: http://pielc.org/

February 28 OR
Freshwater Trust Gala & Auction, Portland. Kridel Grand Ballroom. For info: Dominique, FT, 503/222-9091 x14 or Dominique@thefreshwatertrust.org

February 28 CA
Project Planning for Permit Integration Course, Sacramento. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, http://extension.ucdavis.edu/

March 3-7 NC
Nexus 2014: Water, Food, Climate & Energy Conference, Chapel Hill. University of North Carolina, Friday Ctr. Presented by the Water Institute at UNC. For info: http://nexusconference.web.unc.edu/?doing_wp_cron=1369772477.6436951160430908203125

March 5-7 TX
Texas Water Conservation Ass'n Annual Convention, The Woodlands. Waterway Marriott Hotel. For info: http://www.twca.org/

March 12 NE
A New Approach to Source Water Protection Planning: Groundwater Site Investigations Seminar, Lincoln. UNL East Campus, Hardin Hall Auditorium, 3:30-4:30pm. Presented by Nebraska Water Center. For info: http://watercenter.unl.edu/

March 13-14 CA
Planning & Environmental Law Course, Sacramento. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, http://extension.ucdavis.edu/

March 16-18 CA
2014 WateReuse California Annual Conference, Newport Beach. Marriott Hotel. Presented by WateReuse Ass'n. For info: www.watereuse.org/conferences/california/14