Assembly
California Legislature

SELECT COMMITTEE ON REGIONAL APPROACHES TO ADDRESSING THE STATE'S WATER CRISIS

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The Future of Stormwater: Capture, Store and Supply

May 18, 2012
TreePeople Conference Center, Los Angeles

Throughout the 20th Century, California's growing cities covered open lands in their watershed with pavement, thereby generating stormwater pollution. Consistent with that century's general approach toward storms and floods, early flood management or "control" emphasized moving storm flows out of the city and downstream as quickly as possible. As freeways extended the reach of cities, new suburban developments included storm drains to draw stormwater toward the rivers and out to sea. Those developments led to greater polluted stormwater runoff, from both residential and industrial properties. As that stormwater flowed downstream, it collected the detritus of modern urban living and delivered that pollution to California's famous coastal beaches. Storms often cause some Southern California beaches to close for several days, as the ocean processes the pollution toward the open sea and the ocean bottom.

For the last 40 years, the federal and state governments have pursued efforts to clean up the nation's rivers, focusing first on river discharges from sewers and industrial sites. Since 1987, Section 402 of the federal Clean Water Act has required water quality regulators to address discharges from city storm drains, formally called "municipal separate stormwater sewer systems" or MS4s. The state and regional water quality boards have issued permits for MS4 discharges, as well as stormwater discharges from construction and industrial sites. Such regulation has often led to controversy, as the costs of cleaning up or reducing stormwater discharges flow to California companies and residents.

In the last decade, those stormwater cleanup costs have shifted attention to the potential for stormwater as a valuable water resource. The issue of stormwater has transformed from a "water quality problem" to a "water supply opportunity." Changes in stormwater regulations have led to collaboration between the public and private sectors, to design new communities that reflect principles for "low-impact development," including reduced stormwater runoff. MS4 permits now require new developments to include designs that retain much of the stormwater on-site. Public water and sewer agencies also have moved from a focus on pushing stormwater downstream, to a focus on how to retain and store water upstream. This hearing will concentrate on the potential opportunity for stormwater to become a significant part of the Southern California water supply.

I. History of Stormwater Regulation

As Los Angeles' population began to grow rapidly at the beginning of 20th century, rainwater once absorbed by miles of undeveloped land began to runoff the newly paved and developed areas, leading to an increased amount of water flowing into Los Angeles' local creeks and rivers. These natural waterways could not contain the increased amount of water and the region experienced catastrophic and deadly floods in the late 1920s.

In response to those floods, the Army Corps of Engineers lined the Los Angeles River and Ballona Creek with concrete in the 1930s and '40s, and initiated the development of an underground urban drainage system. The result was a complex 1,500-mile system comprised of more than 30,000 catch basins and 100 miles of open channels. The Government's intent was to increase public safety by reducing the river's ability to scour and move sediment and boulders downstream. This concrete river also provided the stage for many movies and television shows – from *Grease* to *24* – but disconnected the river's floodplains and communities from its natural resources, including groundwater recharge.

State-Federal Water Quality Laws. The shift to reducing river pollution began in the 1960s. The California Legislature passed the Porter-Cologne Water Quality Control Act in 1969. Congress passed the Clean Water Act in 1972. Implementation of both these acts concentrated on what was perceived then as the immediate problem – sewer and industrial discharges to the nation's rivers. The National Pollutant Discharge Elimination System (NPDES) prohibited discharges without a permit by requiring dischargers to obtain permits for discharging into rivers and move toward eliminating their pollutant loads. NPDES succeeded, at least in part, because of a large infusion of federal money for municipal sewage treatment plants.

The United States Environmental Protection Agency (EPA) initially exempted stormwater from NPDES, but a federal court overturned that exemption in 1977. *NRDC v. Costle*, 568 F.2d 1369 (D.C. Cir. 1977). EPA then developed some "best management practices" (BMPs) for reducing stormwater discharges. Implementation of those BMPs, however, was inadequate. In 1987, Congress passed amendments to the Clean Water Act that required control of stormwater discharges by municipal separate stormwater sewer systems (MS4), starting with large (<250K) and medium-size (100-250K) cities. These amendments incorporated stormwater into NPDES, requiring cities to control and then reduce stormwater discharges. The Clean Water Act also requires states to prioritize "impaired water bodies" and develop "total daily maximum loads" (TMDL) for the pollutants in those impaired water bodies, which includes stormwater pollutants.

Federal-State Regulation. EPA issued stormwater regulations, and the Los Angeles Regional Water Quality Control Board (Regional Board) issued the first municipal stormwater permit to Los Angeles County and its 84 incorporated cities in 1990. So began a decade of debate and controversy as to the responsibility of cities to control and eliminate stormwater discharges. Large cities like Los Angeles developed programs to comply with stormwater permits by reducing stormwater runoff through an abatement program in the "Watershed Protection Division" in the Department of Public Works. In 1998, the City adopted a stormwater statute that regulated discharges into its storm drains, allowing City regulators to enforce the NPDES permit against individual dischargers and take corrective action against serious offenders.

TMDL Process. The TMDL process also affected stormwater regulation. Litigation over the State's adoption of TMDLs in the Santa Monica Bay watershed led, in 1998, to a consent decree between the EPA and environmental groups, requiring the Regional Board to adopt and enforce all TMDLs within 13 years, prescribing the schedule for adopting certain TMDLs. The Regional Board adopted and EPA approved TMDLs for the LA River that included stormwater pollutants, such as trash. TMDLs also included wet and dry weather standards for bacteria on Los Angeles beaches near the LA River's mouth.

These TMDL requirements helped galvanize action throughout the LA River watershed to address stormwater pollution. In 2004, the City of Los Angeles voters approved Measure O, a $500 million bond to improve water quality, public health and the environment. This funding provided the necessary resources for TMDL compliance and pollutant removal projects. While Measure O funded some watershed improvement projects, the City remained focused on the stormwater "quality problem," with the Bureau of Sanitation taking the lead.

II. Emergence of Stormwater Supply Opportunity

Over the last 20 years, the Southern California focus on stormwater pollutant reduction has led to the recognition of a potential opportunity for stormwater to enhance Southern California water supplies. Stormwater regulation required cities to reduce pollutant loads, often with expensive treatment facilities. Reaction to regulation and the costs of compliance led to development of methods to reduce stormwater flows, especially in new developments. Permits for construction required builders to control runoff from their property while under construction, and MS4 permits required retention of stormwater on-site. When required to retain stormwater, builders developed new methods for retaining the water – often called "low-impact development" or LID. The question remained, however, of what to do with that water.

Reduced Reliability of Imported Water. Reduced reliability of imported water also has affected the perspective on the potential of stormwater as a water supply. The City of Los Angeles settled long-standing litigation over the environmental effects of its exporting water from the Owens Valley. The Owens Valley reduced its contribution to the City's supply from 90% to around 50%. California agreed to reduce its diversions from the Colorado River, leading to Southern California suffering as much as a 50% reduction. Finally, because of the Sacramento-San Joaquin Delta's ecosystem decline, the State Water Project has reduced its exports substantially below its 2006 peak. This reduced reliability of imported water has led many Southern California water agencies to increase investments in local water supply options, especially groundwater that can be recharged with stormwater.

Coastal Basin Opportunity. The nature of the Southern California coastal plain provides a unique opportunity for capturing stormwater. Its rivers are relatively short and manageable. The Los Angeles River is only 48 miles, much of it in the City. Its groundwater aquifers have space for additional storage – more than 2 million acre-feet. Because Southern Californians are surrounded by mountains and ringed by beaches, they can more easily identify with their watershed and connect to its resources.

Stormwater Supply Studies. In order to exploit the stormwater opportunity, studies have helped assess the potential for stormwater as a supply. The Council for Watershed Health, which

advocates for a "fully integrated flood protection/water conservation system," began a study of the potential for stormwater as water supply in 2000. The Council published conclusions from its Water Augmentation Study (Study) in 2010, and continues to manage water monitoring programs throughout the watershed. While surface water storage may be limited, the Basin's groundwater aquifers have substantial unused capacity. The Study estimates that 194,000 acre-feet of water naturally infiltrates to groundwater aquifers, and current spreading grounds add another 202,000 acre-feet. Increased stormwater capture could add an additional 384,000 acre-feet of water to aquifers annually. The Study also assessed the risks to groundwater quality from stormwater infiltration as relatively small. The Study found no apparent trends to indicate that, over the long-term, stormwater infiltration will negatively affect groundwater quality.

The Southern California Water Committee completed a report examining the intersection between stormwater permit conditions and policies for stormwater as water supply. Its task force recommended greater coordination between water supply plans and water quality regulation.

Stormwater Infrastructure Projects. Infrastructure projects in stormwater capture also have demonstrated the potential for water supply. The Select Committee previously viewed the video *Miracle on Elmer Avenue*, where a neighborhood was transformed by redesigning hard surfaces, landscaping and drainage facilities to capture and use stormwater, instead of stormwater flooding the streets. The City of Los Angeles Bureau of Sanitation has been working on stormwater projects throughout the City, from the Northeast San Fernando Valley to South Central and out on the Westside. The Bureau's more significant projects include:

- **Elmer Green Street** - Sun Valley community of the Northeast San Fernando Valley
- **Riverdale Green Street** - Elysian Valley community (NE Los Angeles)
- **Garvanza Park Rainwater Capture Project** - Highland Park (NE Los Angeles)
- **South Los Angeles Wetlands Park** - South Central
- **Westside Park Rainwater Irrigation Project** - Mid-City
- **Penmar Park Rainwater Capture Project** - West Los Angeles

Tujunga Wash. The County of Los Angeles also has played an instrumental role in developing the "Tujunga Watershed Project" to capture and store stormwater in groundwater aquifers. Since 2005, communities in the eastern San Fernando Valley have collaborated to take advantage of what they describe as "our strongest regional opportunity to secure a sustainable local water supply while enriching native habitat and improving quality of life for residents." The Legislature has appropriated some bond funds in support of this project, but much of the financing has come from local sources. For more information on the Tujunga project, go to:

- http://www.theriverproject.org/tujungawash/index.html

Los Angeles River. While much of the 20th Century work on the Los Angeles River applied the "flood control" approach of moving water downstream quickly, some agencies have used spreading grounds, for decades, to infiltrate stormwater to replenish groundwater aquifers. The Water Replenishment District, which replenishes the Central and Westside Groundwater Basins in southern Los Angeles County, offers the best example. The City of Los Angeles currently is implementing a plan to revitalize the River, including taking out some concrete where water might infiltrate to aquifers. The City's Department of Water and Power also has adopted a 2010 Urban Water Management Plan with targets for expanding stormwater capture to infiltrate the San Fernando Valley aquifer for subsequent water supply uses.

- http://www.lariver.org/index.htm

Santa Ana River. Communities along the Santa Ana River have long relied on stormwater infiltration to replenish the groundwater aquifer. The Orange County Water District has one of the most significant stormwater/groundwater recharge projects in the state, diverting water from the River to a treatment plant before infiltrating the stormwater into the groundwater. The active nature of this project led OCWD to obtain a water right from the State Water Resources Control Board for diverting this stormwater. The Select Committee visited this facility in 2009.

- http://www.sawpa.org/ or http://www.ocwd.com/

Rainwater Capture. In addition to the large agency stormwater projects, individual landowners can make a difference, capturing rainwater off their roofs before it enters a stream or stormwater drain. While existing law remains ambiguous as to whether rainwater capture requires a water right, homeowners all across Southern California have begun installing some form of rainwater capture system. The Southern California economy benefits from thriving businesses that design, manufacture, and install rainwater capture systems. When the City of Los Angeles offered rain barrels to homeowners, the response was overwhelming and the City ran out quickly. The program was 400% oversubscribed.

- http://www.lastormwater.org/

The Legislature also is considering AB 1750 (Solorio) to resolve the legal ambiguities as to whether landowners can capture rainwater. The bill recently passed the Assembly 73-0. AB 1750 allows rainwater to be used for non-potable purposes, both outside and inside a home. In a closely related action, the California Building Standards Commission is now considering adoption of a new Chapter 17 on rainwater capture systems, from the Uniform Plumbing Code of the International Association of Plumbing and Mechanical Officers (IAPMO).

- http://www.leginfo.ca.gov/bilinfo.html

Stormwater and Recycled Water. State and local agencies have recognized a connection between recycled water and stormwater. Both water sources are part of the same water system and cycle. Treated water may be discharged to waterways during storms or it may be recycled for later use or it may be captured for replenishing groundwater. In 2009, when the State Water Resources Control Board developed its "Recycled Water Policy," it included goals for using more stormwater for water supply. It set a 2020 goal of 500,000 acre-feet of stormwater use and a 2030 goal of 1 million acre-feet.

Legislation. As the many stormwater efforts proceeded in the last decade, legislation has developed to assist local efforts to improve stormwater management. Legislation generally has emphasized a "watershed approach" to resolving the stormwater *problem*. SB 310/Ducheny (Chapter 577, Statutes of 2009), for example, authorized local agencies complying with stormwater management orders from regional water quality boards to create a watershed plan and impose a fee to comply with the regulatory orders. As stormwater capture projects have developed, legislation has applied this same watershed approach to take advantage of the *opportunity* for stormwater to provide water supply. SB 790/Pavley (Chapter 620, Statutes of 2009) created the Stormwater Resource Planning Act, which authorized development and grants for implementing "Stormwater Resource Plans" that improved one or more aspects of water quality or water supply. SB 790 took the first steps from the state legislative perspective to recognize the value of stormwater as a "resource" instead of a problem.

The 2009 Delta/Water Legislation also promotes stormwater as water supply, although not explicitly. SB 1 X7 (Simitian) – the Delta bill – adopted a policy to reduce reliance on the Sacramento-San Joaquin Delta for future water supplies. That policy depends on Southern California developing greater reliance on its own local water resources, especially groundwater. As a result, many Southern California agencies have begun improving water-use efficiency and developing their local water resources, such as the Orange County Water District's aggressive groundwater recharge program from stormwater.

III. The Future of Stormwater

Legislative and project developments in past years have positioned stormwater to play a critical role as one part of Southern California's water supply portfolio. The problem of stormwater quality, especially at Southern California's famous beaches, led to substantial efforts to fix a problem. The tools, however, were limited because stormwater management assumed the 20th Century model of flood control, moving stormwater toward the beaches as quickly as possible, with large-scale water treatment as the only tool. When stormwater managers recognized the value of stormwater as a water supply resource, the opportunity of stormwater became apparent.

Southern California water leaders have laid the groundwork for a bright future for stormwater as a water supply resource. Interestingly, regulators at the regional water quality boards changed the stormwater question when they required new development to retain much of its stormwater on-site. Because Southern California, especially in the Inland Empire, has continued growing, developers have invested in this new stormwater strategy. Water agencies like the Santa Ana Watershed Project Authority supported those investments with their own investments in groundwater recharge. The City and County of Los Angeles, which are more built-out, also have invested in reformulating their stormwater strategies for water supply.

Community leaders from government and grass-roots groups have identified obstacles, worked on eliminating them, and now develop opportunities for stormwater as a key part of the region's water future. Collaboration among agencies and stakeholders has been critical to success. The Elmer Avenue Project, which the Committee reviewed at last year's landscape water-use hearing, shows how a multi-million dollar flood control project was transformed into a project to restore a neighborhood ravaged by stormwater backing up in their streets. By rebuilding the neighborhood to capture the rainwater and stormwater, its groundwater gained the benefit of recharge. Elmer Avenue provides a model for the future.

Low-Impact Development Ordinance. The City of Los Angeles has laid a foundation for the future with its Low-Impact Development (LID) ordinance, adopted last year and taking effect this week. Central to that legal framework is rainwater and stormwater capture. The ordinance requires new and redevelopment projects to capture the first ¾ of an inch of rainwater from a storm event and replace 500 square feet of impervious surface. The City offers a helpful handbook on best management practices for low-impact development on its stormwater webpage – www.lastormwater.org. This landmark legislation transforms the culture of development to move away from impervious surfaces that lead to stormwater runoff. As Los Angeles continues its evolution, the stormwater problem will become a water supply opportunity.

Stormwater Finance. Funding for stormwater projects – both quality and supply – has come from a variety of federal, state and local sources, but funding will continue to present a challenge. As the U.S. Army Corps of Engineers has recognized the value of stormwater capture, its Southern California flood projects have begun incorporating elements into its projects or funding local watershed restoration projects. The State has contributed bond funds from Propositions 13, 40, 1E and 84. When placing a flood bond on the ballot in 2006, the Legislature introduced the concept of "stormwater flood management" and provided the flexibility to allow the Department of Water Resources to develop the idea through grants to local stormwater projects.

While federal and state funding has contributed to stormwater projects, local funding has provided the foundation for the success that Southern California has achieved. In responding to stormwater regulation 20 years ago, cities began developing programs and fees to pay for those programs – before Proposition 218 limited agency authority to impose stormwater fees. In the City of Los Angeles, for example, a stormwater quality mitigation fee costs approximately $28 per household annually, while Santa Monica charges approximately $120. The City of Los Angeles is on record as needing $100-120 per household to comply with its stormwater master plan. These fees have contributed substantially to the ability to build stormwater projects that improve water quality, and have jump-started projects to capture stormwater for water supply.

Proposition 218's requirements for voter approval of stormwater charges may indirectly promote stormwater projects for water supply. Article XIII-C of the California Constitution requires voter approval for new or increased taxes and fees, but provides an exception for water rate increases. The California Court of Appeals has held that stormwater fees do not fall into that exception. *See, Howard Jarvis Taxpayers Association v. City of Salinas*, 98 Cal.App.4th 1351 (2002). The result is that costs for stormwater projects built for water supply may be paid by water rates that have fewer procedural requirements under Article XIII-C, while stormwater quality fees require voter approval.

Proposed County Stormwater Fee. The County of Los Angeles is considering placing a new county-wide stormwater parcel fee on the ballot in 2013. The potential fee would generate approximately $287 million in revenues, based on a typical $54 per-parcel charge. It would allocate 50% to regional projects and 40% to individual cities. While the funding would help with regulatory compliance, it emphasizes stormwater projects with multiple benefits, including water supply, and encourages cities to adopt low-impact development rules. The Board of Supervisors will consider this summer whether to place this fee on the ballot.

Changing Perspective. Looking ahead, expanding stormwater capture for water supply will require a change in the public's perspective. Watershed groups and agencies already have started a campaign to help the public understand the connection between the runoff from their property and the region's rivers and beaches. Industry already complies with regulatory permits. A campaign for an expanded stormwater fee may contribute to greater public understanding. This hearing is another step in expanding public understanding of the opportunity that stormwater offers to improving Southern California's water supply reliability.