Phase III: Neighborhood Retrofit

Multipurpose watershed demonstration projects will retrofit small neighborhoods to illustrate sustainable design. These projects will address such issues as:

- water conservation
- storm water capture for infiltration or reuse
- enhancement of wildlife habitat and open space
- stream restoration
- pollutant source reduction and monitoring
- groundwater recharge
- watershed education and community outreach
- flood reduction
- native and drought-tolerant landcsaping
- parks and recreational opportunities

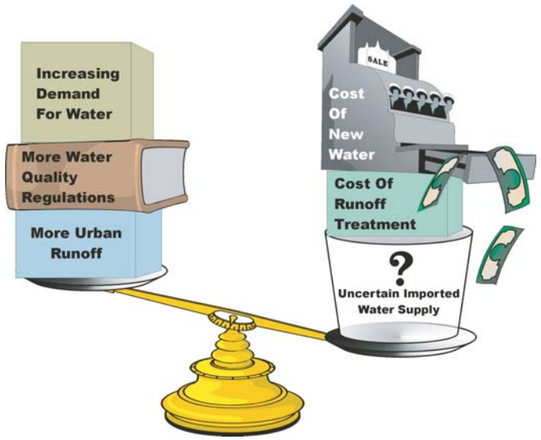
Conversion to native landscaping: promotes water conservation, reduces pesticide use and attracts wildlife

Stream restoration and park creation: bringing streams back to the surface to create a neighborhood park incorporates a treatment wetland to promote groundwater recharge. The pictures below illustrate a neighborhood stream restoration and park project by North East Trees.

Before (left): *city street in Korea Town with underground storm drain*

After (below): *storm drain brought to the surface & integrated into a neighborhood park*

Southern California faces increasing uncertainty with respect to water supply availability and maintaining water quality. Urban runoff, from stormwater and overuse of water for irrigation and other outdoor needs, carries pollutants that degrade our waterways and are subject to increasing regulation at significant cost. Traditional imported water sources are at risk due to legal and environmental constraints, and alternative new water supplies from ocean desalination or recycling still face economic and regulatory hurdles. With the population in Los Angeles County expected to grow by 2 million people (about 17%) by 2020, the demand for fresh water will continue to grow.



Why infiltration? As urbanization has increased the area of paved surfaces over the past several decades, urban runoff has increased tenfold. On average, about 550,000 acre-feet of runoff flow to the ocean annually from the Los Angeles area coastal watersheds, about one-third of our annual water use. With nearly 2 million acre-feet of unused storage capacity in local groundwater basins, capturing more runoff for infiltration could substantially increase local water supplies. Reducing urban stormwater volumes reduces pollutant loads to surface waters and reduces demand on the flood control system. Increasing infiltration also helps to restore the natural hydrology and treatment function of the soil that has been lost to urban development.

Are there drawbacks to infiltration? There are some concerns that infiltrating stormwater merely transfers pollution problems from the surface to the groundwater. While the soil layer does provide natural treatment, more study is needed to determine what conditions are most and least favorable for pollutant removal.

What do we need to know before promoting increased infiltration? There are a number of questions that this study will address to better characterize the potential benefits of infiltration. The most important is the potential impact on groundwater quality, and assessing appropriate geographic, geologic and hydrologic conditions for infiltration. Additionally, we need to know whether the additional groundwater recharge will provide sufficient water supply to offset the cost of implementation and extraction, compared with the cost of developing new water supplies. We also need to assess all of the potential benefits and barriers (environmental, regulatory, social and economic) to determine the best approach for implementation.

How do we assess the impacts of infiltration? The focus of the early phases of the Water Augmentation Study is to monitor the fate and transport of runoff-borne pollutants by measuring stormwater quality at the surface, as it infiltrates through the soil and to groundwater. Phase 1 of our study focused on water quality assessment on single parcels utilizing infiltration structures, by monitoring two locations for one season. Phase II expands the monitoring in time and scope, adding new sites with different land uses and infiltration techniques, and monitoring all sites for several years.

Taking a broader view. Infiltration is not the only means of addressing water supply and water quality issues. We believe that an integrated, comprehensive approach to water management is necessary to maximize benefits. The latter phase of our study will incorporate demonstration projects on a neighborhood scale. We propose to retrofit several small neighborhoods or drainage areas with state of the art "Best Management Practices" (BMPs) to address water conservation, pollution reduction and treatment, flooding, and habitat and stream restoration. Specific techniques will depend upon the sites selected, but may include conversion to native drought-tolerant landscape, use of irrigation controllers, facilities to capture runoff for infiltration or reuse, "daylighting" buried stream channels for restoration, and adding greenspace and habitat areas.

Determining the location of demonstration project areas will utilize a community-based approach providing opportunities for watershed education and neighborhood involvement in designing projects. These demonstration projects will be monitored for water quality as well as for reduction of runoff and water use, changes in property values, and other benefits. Neighborhood-scale projects will provide real-world models of sustainable design and will serve to integrate many on-going efforts in the region to address flood management, water quality, and environmental restoration.

Our long-term strategy is to quantify the benefits, costs, and risks of infiltration, characterize appropriate conditions for infiltration, and provide a comprehensive assessment of the potential for augmenting water supply, reducing water pollution, and providing additional environmental and social benefits through infiltration in combination with other strategies. Our goal is to demonstrate how these approaches can be applied on a regional scale in Southern California as well as in other geographic regions.

Who We Are

The Water Augmentation Study is a long-term research project led by the Los Angeles & San Gabriel Rivers Watershed Council in collaboration with the following partners:

- California Department of Water Resources
- City of Los Angeles Dept of Water and Power
- City of Los Angeles Watershed Protection Division
- City of Santa Monica Environmental Programs
- Los Angeles County Dept of Public Works
- Metropolitan Water District of Southern California
- Regional Water Quality Control Board Los Angeles
- United States Bureau of Reclamation
- Water Replenishment District of So. California

The Watershed Council is a nonprofit organization of community groups, government agencies, business and academia engaging stakeholders in dialogue about resolving environmental and regulatory issues, and in promoting watershed health. Our stakeholders include water suppliers, wastewater agencies, Los Angeles and Orange Counties, cities within the watershed, environmental groups and others. Our mission is: to facilitate a comprehensive, multi-purpose, stakeholder-driven consensus process to preserve, restore and enhance the many beneficial uses, economic, social, environmental and biological, of the Los Angeles River and San Gabriel River watersheds ecosystem through education, research, planning and mediation.

Scope and Schedule

Phase	Task	2000	2001	2002	2003	2004	2005	2006	2007	Funded	Results
1	Assess prior studies	xx	xx							Y	Literature Review
1	Develop monitoring approach to assess impacts on groundwater quality	xx	x							Y	Monitoring Plan
1	Pilot study: water quality monitoring at 2 sites with infiltration BMPs		xxx	xx						Y	Phase I Report
2	Additional monitoring sites: install BMPs, install monitoring equipment, dfdf collect samples, analyze results			xx	xxxx	xxxx	xx			Y	New monitoring sites, Phase II Monitoring Report, Assessing Groundwater Impacts
2	Characterize infiltration behavior from surface through subsurface to groundwater				xxxx					Partially	
2,3	Assessment of and collaboration with other on-going studies				xxxx	xxxx	xxxx	xxxx		Partially	Value Added
3	Design and implement demonstration projects and monitoring program					xx	xxxx	xxxx	xxxx	N	State-of-the-art design models
3	Develop model for site suitability & feasibility assessment: geology, soils, groundwater depth, land use, etc.					xxxx				N	GIS database & modeling tools
3	Continued monitoring of water quality, soil, water movement to groundwater						xxxx	xxxx	xx	N	Monitoring for long-term effects
3	Analyze all results; assess impacts, costs, benefits, site suitability							xxxx	xx	N	Phase III Monitoring Report
3	Develop regional approach for implementation in So. Cal and other urban areas								xxxx	N	Program Assessment Report

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The Los Angeles Basin Water Augmentation Study

Phase I: Pilot Study

The Pilot Study was designed to assess the impacts of infiltration on groundwater quality, by monitoring stormwater runoff, infiltration in the vadose zone, and groundwater at two sites in the Los Angeles area.

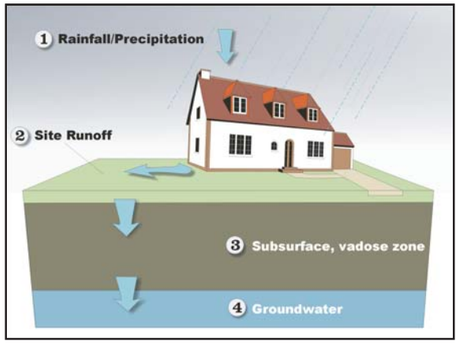
Before - *Broadous Elementary School in Pacoima with typical paved playground*

Photos courtesy of TreePeople

After - *In a project led by TreePeople, the schoolyard was redesigned to replace much of the asphalt with landscaping, and includes an underground infiltration field to capture and recharge all of the runoff.*

Phase II: Expanding the Scope

Additional residential, commercial and industrial sites added to the monitoring program. Selected sites were retrofitted with infiltration BMPs and will be monitored at four discrete locations:



Residential Property

Commercial Property

BMP designs direct runoff into planted areas to filter pollutants and increase infiltration.