

Nature-Based SOLUTIONS

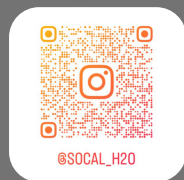
Nature-based solutions (NBS) are actions that aim to protect and sustainably manage both natural and modified ecosystems in efforts to address environmental and societal challenges. They offer eco-friendly alternatives to conventional stormwater infrastructures by mimicking natural hydrological processes to control stormwater at its source, reduce runoff, enhance water quality, and yield ecological and social benefits. Some NBS within urban settings include practices such as green roofs, bioswales, rain gardens, permeable pavements, and constructed wetlands. Implementing NbS in Southern California presents an opportunity to address the dual challenges of flooding and drought while enhancing community resilience. Research shows these strategies can effectively reduce stormwater runoff volumes and improve water quality by filtering pollutants through soil and vegetation. Moreover, NbS can also play an important role in habitat creation, increased biodiversity, and improved urban aesthetics.

Water SUPPLY SECURITY



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Stormwater Management in Southern California



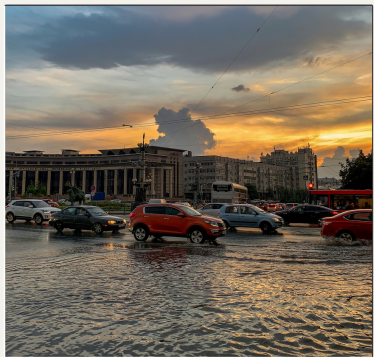
An Introduction Into the Significance of Nature-Based Solutions for Urban Stormwater Management

WATER SUPPLY SECURITY

Stormwater Management via NBS #1

What is STORMWATER?

- Stormwater is any water from rainfall, melting snow, and ice.
- It can...
 - soak into permeable grounds
 - stay on land surfaces to inevitably evaporate
 - runoff into the nearest bodies of water.
- Urban regions throughout Southern California typically generate greater amounts of stormwater runoff due to the increased area of impermeable surfaces that come with city streets and sidewalks.



URBAN RUNOFF

Stormwater MANAGEMENT

Stormwater management refers to the control and use of stormwater runoff from precipitation events as a valuable water supply source. Its main goals are to protect our environment and create healthier, sustainable communities.

Benefits for urban ecosystems

INCREASED WATER SUPPLY

Reused stormwater maintains/restores natural hydrological cycle.

IMPROVED WATER QUALITY

Reduces runoff and removes pollutants responsible for poor water quality. Extracts harmful nutrients, heavy metals, pathogens, etc.

GREATER GREEN SPACE

Enlarges space for recreation, wildlife diversity, and tree canopy.

SOCIOECONOMIC BENEFITS

Well-designed urban stormwater management systems can alleviate some problems stemming from historic and persisting inequities within underserved communities.



UNIQUE CHALLENGES in Southern California

DROUGHTS

Southern California frequently experiences prolonged drought periods, which strain water resources and complicate stormwater management efforts.

FLOODING

When rain does occur, flash flooding often follows due to rapid runoff from impervious surfaces like roads and buildings. The mix of steep topography and limited natural drainage exacerbates flood risks, leading to property damage and public safety concerns.

CONTAMINATION & POLLUTANTS

Stormwater runoff can transport a variety of pollutants from impervious surfaces. It flows directly from urban landscapes and streets into local bodies of water with little to no treatment, making water unsafe for use and consumption. (ALSO dangerous for aquatic ecosystems)

EQUITY

Historically inequitable planning/development practices have led to uneven distribution of resources and flood-resistant spaces in cities. Californian BIPOC communities have higher concentrations of impervious surfaces than predominantly white neighborhoods, which include more green spaces better suited for stormwater infiltration.

INFRASTRUCTURE LIMITATIONS

Many existing stormwater management systems in Southern California are outdated and unreliable in handling increasing intensity and frequency of rainfall events associated with climate change. Upgrading and maintaining this infrastructure is a significant challenge for local governments.

FINANCIAL

Large-scale capture projects require extensive cost, maintenance, and land to manage stormwater properly.