

Advancing Stormwater Capture for Greener Schools in Los Angeles

Executive Summary



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AUTHORS

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Founded in 1987, the Pacific Institute is a global water think tank that combines science-based thought leadership with active outreach to influence local, national, and international efforts in developing sustainable water policies. From working with Fortune 500 companies to frontline communities, our mission is to create and advance solutions to the world's most pressing water challenges. Since 2009, the Pacific Institute has also acted as co-secretariat for the CEO Water Mandate, a global commitment platform that mobilizes a critical mass of business leaders to address global water challenges through corporate water stewardship. For more information, visit pacinst.org.

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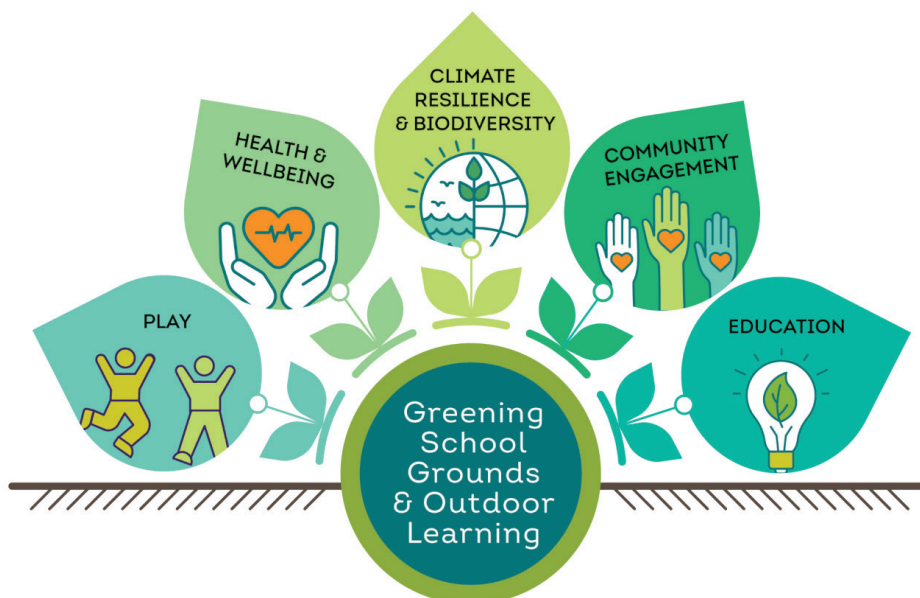
All conclusions and recommendations expressed herein, and any errors or omissions, are those of the authors.

Executive Summary

In communities across the United States, schools provide an enriching and safe environment for children to learn and grow. Yet urban schools, particularly those serving under-resourced communities, are often covered in asphalt and offer little green space. The lack of shade, combined with intensely hot temperatures, can create dangerous conditions, with reports of asphalt reaching 140 degrees Fahrenheit and rubber surfaces reaching 165 degrees Fahrenheit (Klivans 2023). During heavy rains, runoff from these impervious surfaces floods and drains into the surrounding community. Climate change has exacerbated these impacts, leading to more extreme weather events, including hotter temperatures, severe droughts, and intense storms.

Intentionally incorporating green space into school campuses, or “greening” schools, means creating outdoor areas that minimize asphalt and prioritize a natural environment, providing benefits for the students, the surrounding community, and the environment, as seen in Figure ES-1. A key school greening strategy is the thoughtful and directed management of stormwater runoff. When applied in a school setting using nature-based approaches, stormwater capture can add much-needed green space, lower playground temperatures, and help reduce neighborhood flooding (Earth Economics and Amigos de los Rios 2023). These benefits can extend beyond the students to reach the surrounding community.

FIGURE ES1: Benefits of School Greening to Students



Source: *Children & Nature Network*

THE PROJECT

Los Angeles (LA) County is the most populated county in the United States, and its public school system is comprised of 80 school districts that serve 1.3 million elementary through high school students. Situated in an already hot and arid region, LA County students face rising temperatures and more climate extremes, with asphalt temperatures nearly hot enough to fry an egg on the ground (Nittle 2023). This report provides community-based organizations in LA County with technical information on the potential for stormwater capture on public school campuses and identifies areas with the greatest potential for additional co-benefits. It also offers recommendations to advance the uptake of stormwater capture on school campuses. The findings and recommendations can inform ongoing discussions and decisions about the role of stormwater capture in supporting school greening, as well as regional water supply reliability, water quality improvements, flood risk reduction, and heat island mitigation in LA County. While focused on LA County, the findings and recommendations may be broadly applicable to school campuses in urban areas across the country.

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OUR APPROACH

This study provides a high-level estimate of the potential for stormwater capture on public school campuses in LA County and the associated co-benefits. The total stormwater capture potential estimated in this study represents the total amount of stormwater runoff generated from impervious surfaces on school campuses based on average annual rainfall conditions. For the technical analysis, the Pacific Institute collaborated with 2NDNATURE Software (2NDNATURE), a science and software company that provides stormwater management tools for the public and private sector to inform policy and decision-making.

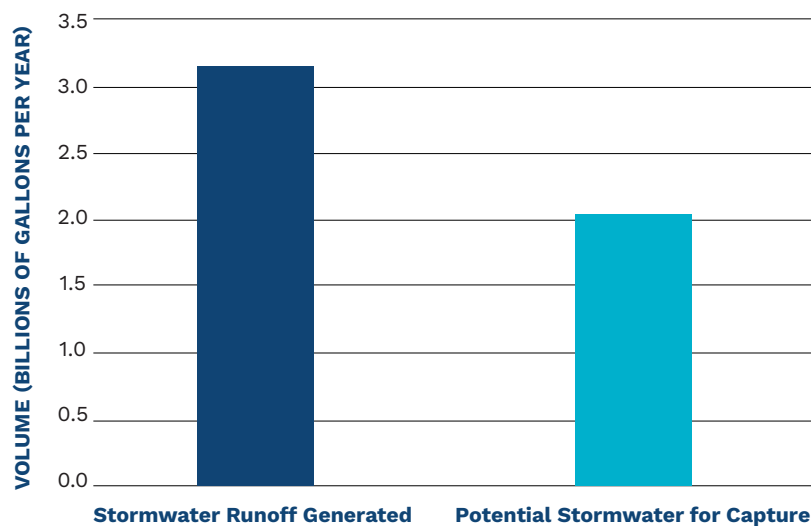
Stakeholder engagement helped ensure the study was centered around the goals, needs, and knowledge of staff from community-based organizations and public agencies working in LA County. The project team engaged staff from the Council for Watershed Health and the Los Angeles chapter of the Trust for Public Land and met with 12 other local stakeholders from LA County to ensure that the project design and outcomes aligned with the goals and needs of key stakeholders.

KEY FINDINGS

Stormwater Capture, Pollution Prevention, and Impervious Area

We estimate that the total stormwater runoff generated from 1,888 LA County public school campuses is approximately 3.15 billion gallons (9,510 acre-feet) per year. Of this amount, about 2.04 billion gallons (6,190 acre-feet) per year could potentially be captured to augment water supplies (Figure ES-2). Capturing and using this runoff can offset municipal demand and contribute to greening of school campuses without increasing demand and putting additional pressure on regional and local water supplies. Managing this stormwater would also help prevent approximately 1,220 tons of pollutants from entering local waterways and the ocean each year.

FIGURE ES2: Volume of Stormwater Runoff Generated on LA County School Campuses



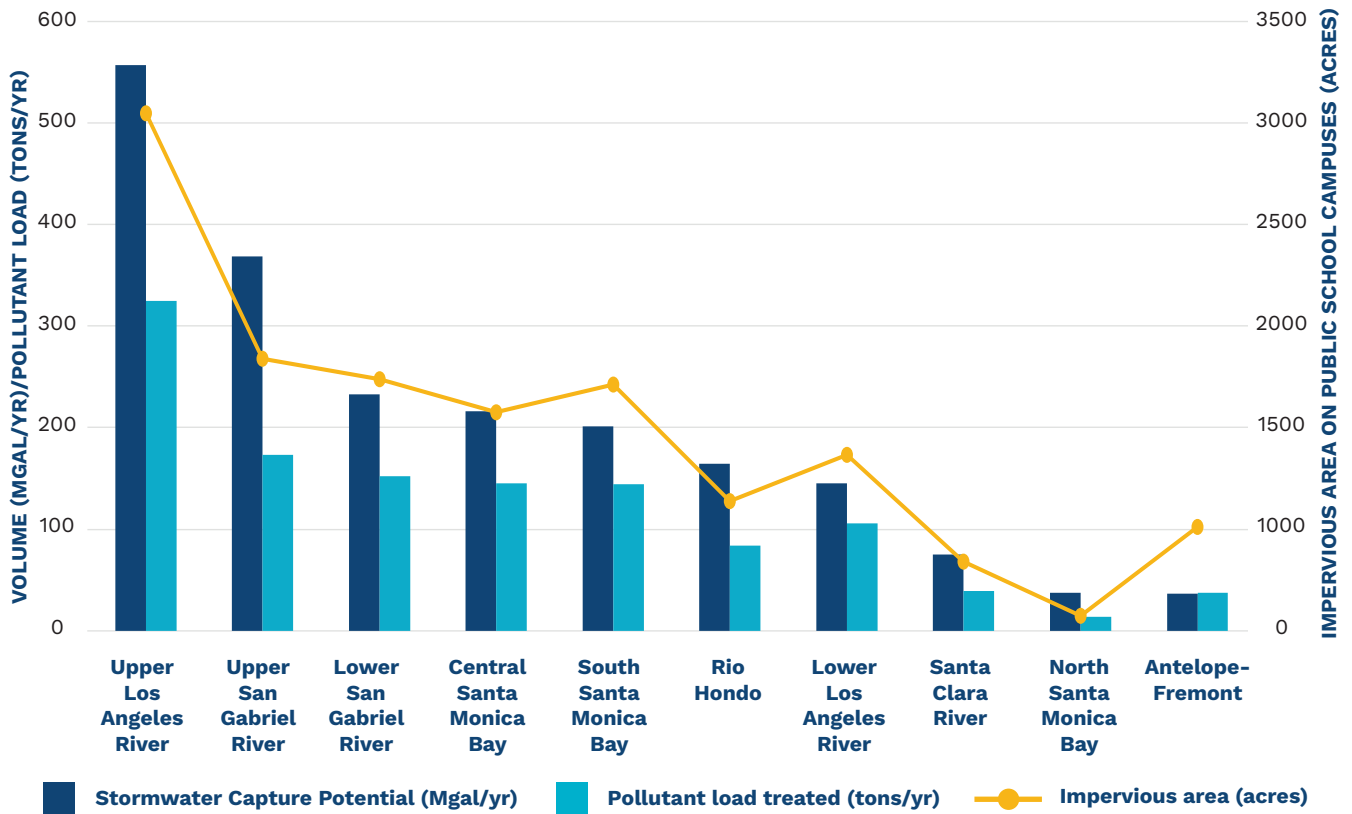
Findings by Watershed

School campuses are distributed across 10 major watersheds in LA County. Across these watersheds, the stormwater capture potential from public school campuses is greatest in the Upper Los Angeles River watershed, where approximately 557 million gallons (1,710 acre-feet) per year of stormwater runoff may be available for capture and use (Figure ES-3). This is 27% of the total volume potentially available for capture and use from public schools in LA County.

The Upper Los Angeles watershed also offers the highest potential for pollution mitigation through stormwater capture and use from public schools, with approximately 324 tons of pollution prevented from entering waterways each year (Figure ES-3). Reducing pollution from stormwater entering the upper reaches of the Los Angeles River contributes to the health of the upper watershed, as well as the lower watershed and Pacific Ocean. The Lower Los Angeles River watershed, with the potential to mitigate 106 tons per year of pollution from stormwater runoff from schools, is one of the most polluted waterways in LA County according to water quality monitoring (Heal the Bay 2023). These results underline one of the key co-benefits of stormwater capture.

A high amount of impervious area on public school campuses includes the Upper and Lower San Gabriel River watersheds and the South and Central Santa Monica Bay watersheds. Combined with the Upper Los Angeles River watershed, these five watersheds contain more than 75% of the impervious area on public school campuses in LA County. Replacing some of this impervious area on school campuses with green space can help reduce urban heat, providing a more comfortable and safer environment for students, staff, and nearby communities. Reducing urban heat is also linked to creating school environments where students can be physically active and be learning-ready when they return to the classroom. According to the Center for Disease Control, “Students who are physically active tend to have better grades, school attendance, cognitive performance (e.g., memory), and classroom behaviors (e.g., on-task behavior)” (CDC 2022).

FIGURE ES3: Stormwater Capture Potential (Mgal/yr), Pollution Prevention Potential (tons/yr), and Impervious Area (acres) on Public School Campuses by LA County Watershed



CONCLUSIONS AND RECOMMENDATIONS

School greening would not only help manage stormwater coming from school campuses, it would also help build more resilient communities by mitigating urban heat island effects, decreasing localized flooding, and improving water quality. Drawing on insights gleaned from data analysis and stakeholder conversations, we offer the following recommendations to create an enabling environment to advance the uptake of stormwater management strategies across school campuses in LA County and realize stormwater capture potential.

Use a Multi-Benefit Lens When Planning and Implementing Stormwater Projects

Recommendation: State and local programs and policies around stormwater management should expand the types of benefits and costs evaluated in stormwater planning decisions, and require consideration of multiple benefits in planning and implementation of stormwater management projects on school campuses.

Encourage Strategic Partnerships Between Community Organizations and School Districts

Recommendation: School districts and community-based organizations should seek strategic partnerships with one another to maximize the benefits of stormwater management on school campuses. School districts should advance this goal by proactively reducing the barrier to entry for partnerships with community-based organizations.

Engage Students and Staff in the Planning and Implementation of Stormwater Projects on School Campuses

Recommendation: State, local, and school district programs, policies, and funding opportunities should require consideration of benefits to students as part of stormwater project planning and implementation.

Prepare for New Regulatory Requirements

Recommendation: Equip school districts with the necessary resources and tools to proactively manage stormwater. In this way, schools can get ahead of regulatory needs and employ stormwater as an asset that can improve water quality and address local challenges in a way that contributes to the vibrancy of a community.



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