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The Potential of Transforming Vacant/Underutilized Lands into Urban Green Space in Nashville, Tennessee Based on a Targeted Spatial Analysis

Urban tree coverage is crucial for environmental health, offering oxygen, air filtration, and UV protection while mitigating urban heat and runoff. Despite Nashville's adequate canopy coverage, heat islands and climate vulnerabilities persist, exacerbated by urban sprawl and deforestation. This study aims to identify underutilized permeable land in Nashville, Tennessee that can be repurposed for expanding the urban tree canopy, thereby reducing urban heat and improving the environment. A bird's-eye analysis of Nashville and Davidson County using Geographic Information Systems (GIS) was conducted to locate underutilized permeable land, such as memorials (e.g., Fort Negley), golf courses (e.g., Ted Rhodes), highway interchanges (e.g., US-70S and I-440), parks (e.g., Centennial Park), sports fields (e.g., Vanderbilt practice fields) and land struck by the 2020 Nashville tornado outbreak . These areas were assessed for tree-planting potential, considering land ownership and municipal policies. Additionally, opportunities for green roofs and reforestation of unused parking lots were evaluated. The analysis revealed that Nashville has extensive permeable but underutilized land. For instance, city-owned spaces, including parking lots near the Centennial Sportsplex, can accommodate trees, potentially reducing localized temperatures by up to 10°F. Transforming abandoned lots and integrating green roofs could further enhance canopy coverage. A targeted canopy expansion across identified sites could increase urban tree coverage by approximately 15%, adding to the effect of mitigating heat and improving air quality. These findings underscore the need for strategic land use and policy adjustments where necessary to enhance tree canopy coverage. By prioritizing underutilized areas, Nashville can address urban heat challenges and improve environmental quality and community well-being.