

# NWC Experimental Green roof



Green roofs have been shown to affect the surface energy balance and can help in mitigating urban heat islands. However, the cooling of green roofs due to evapotranspiration strongly depends on the climatic conditions and further studies are necessary to determine the cooling effectiveness for various atmospheric conditions. The pronounced seasonal variability, primarily of atmospheric moisture, observed in Norman, OK make the chosen site a prime location for such studies. The site is also known to have strongly variable flow and turbulence patterns which allows us to study plant and cooling performance under adverse and more ideal wind climates.

As green roofs are increasingly implemented in the semi-arid North American plains new applications of the technology will be required for contextualization. These climate conditions may alter the standard performances of green roof systems. Therefore, we initiated an interdisciplinary research project aimed at investigating the ecological performance of green roof systems and their impact on the surface energy balance. Primary investigation areas include plant performance, changes in the radiation balance, cooling efficiency for various climatic conditions, and impacts on building daylighting.

Previous studies in prairie environments show native plants do provide ecological services including energy reduction. However, conventional sedum roofs may be at risk of underperformance in high temperature environments due to the physiological limitations of the plant. Thus, we are investigating impacts of soil moisture in sedum monocultures and sedum-native polycultures relative to the surface energy balance. Additionally, daylighting concerns involving reflective 'glare' by cool roofs (white EPDM) are being examined for mitigation potential via green roofs.

This study contributes to the ongoing work of the prairie green roof research group and extends current atmospheric studies at the NOAA National Weather Center.

#### Investigators:

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