

Climate change will stress stormwater drainage systems

The storm that dropped over 10 inches of rain on the Keene, NH area this past weekend will be a more frequent phenomenon due to climate change, according to two New Hampshire researchers. Michael Simpson and Latham Stack headed a research team within the Environmental Studies Department at Antioch New England Graduate School in Keene, NH. Their recently completed study is groundbreaking because it is the first to identify the specific costs required to prepare for the more intense storms induced by climate change.

According to lead scientist Latham Stack, studies of this kind are crucial to helping communities prepare for the impacts of climate change: "Because of the persistence of greenhouse gases in the atmosphere, the impacts of climate change are now unavoidable. We may have a window of opportunity to prepare civil infrastructures. While expensive, these preparations can be affordable if undertaken far enough in advance."

Just days before the storm that hit the City this weekend, the research team reported their findings to Keene's Cities for Climate Protection Steering Committee. The researchers' analysis found that current engineering design specifications for culvert sizing are inadequate to handle the rainfall intensities predicted under climate change. The team's model projected substantial culvert failure in their study area of the White and Black Brook watersheds in the northwest sector of the city.

These culverts will fail because they have insufficient capacity for the increased flow of water coming down the watershed. Undersized culverts act as a dam, causing water to backup and overrun roads. The results are both flooding of neighboring properties and undercutting and erosion damage to culverts and roads.

The research team's rain gauge on Dunbar Street recorded 11.5 inches falling on Keene in 24 hours during this weekend's storm. This amount of rain is almost triple the design standard currently used by engineers to size culverts. The resulting damage and flooding, not only in the study's watersheds but throughout Keene, will have a substantial fiscal impact on the City's budget. The Antioch study estimated the cost of upgrading culverts and found this to be expensive, but comparatively small in relation to costs incurred by the private and public sectors in the wake of the current storm.

Project leader Michael Simpson noted that "Our research focused only on a small section of Keene, NH, but the model we developed to project climate change induced culvert failures could be applied to any region of the world."

This study makes an important contribution to preparing communities for climate change.

Source: Antioch New England Graduate School

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