

## **When what you see isn't what you get: how viewshed analysis is impacted by Digital Surface Model resolution.**

A key factor for improving models of ecosystem benefits is the availability of high quality spatial data. High resolution LIDAR data are now commonly available and can be used to produce more accurate model outputs. However, increased resolution leads to higher computer resource requirements. We encountered these tradeoffs when running viewshed analysis for wetlands in the Woonasquatucket watershed (130 km<sup>2</sup>) in Rhode Island with 1-m LIDAR-derived Digital Surface Models (DSMs).

To identify a resolution that is both sufficiently accurate and feasible on a watershed scale, viewshed analyses were run with a range of DSM resolutions (1-100m) for a subset of addresses within the watershed. The total area of viewsheds and the area of visible wetlands within viewsheds were compared across DSM resolutions to identify possible thresholds where an increase in DSM resolution causes a rapid decrease in the quality of the viewshed. Both over estimation and under estimation of viewsheds occurred at coarser resolutions. Processing times were compared across these resolutions to determine what processing benefits might result from lowered resolution. In addition to informing a justifiable resolution for analysis in our study watershed, model error relative to input resolution is useful in estimating the accuracy of viewsheds created in areas where higher resolution LIDAR data is not yet available.