

Abstract

Geographic Information Systems (GIS) have proven very useful in analyzing damage to infrastructure. The amount of data that can be stored and analyzed for geographic features surrounding structures is endless. In the field of bridges, GIS is very useful in analyzing geographic features related to the river and watershed near the respective bridge. In August 2011, Hurricane Irene caused unprecedented tropical storm damage throughout Vermont. In this report, analysis was conducted in an attempt to figure out why some bridges failed due to flooding from the storm and some did not. The area of study was the greater White River watershed in central Vermont, and within this watershed, riverbed slope for individual bridges was analyzed using ArcMap. Within this area, 4 bridges failed and 6 were damaged due to Irene. 10 unaffected bridges were randomly chosen for comparison. Analysis found that for this small sampling of bridges, there did not seem to be a direct, obvious correlation between riverbed slope and bridge failure. However three out of four failed bridges were located on river locations with a high percent grade relative to the rest of the bridges examined (above 5%). Past studies have shown that faster, higher flow can lead to bank failure due to erosion and scour, and if the banks around a bridge fail there is a good chance that the bridge will fail. It is safe to assume that a steeper riverbed slope would have a correlation with increased river flow rate, but in order to make a definite conclusion about the relation to bridge failure a larger study area would be necessary.