6.3.3 Rapid Assessment of Storm-related Damage Using Commercial Remote-sensing Imagery

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Recent storms such as Hurricane Sandy and Tropical Storm Irene seriously disrupted transportation networks by destroying numerous roads and bridges and blocking others with rocks, sand, and other debris. A coordinated response to these disruptions was slowed by the difficulty in assessing both the magnitude of individual breaks and the region-wide extent of the damage. Commercial remote-sensing imagery could have played a larger role in damage assessment, but there was no effective way to rapidly and comprehensively evaluate the large volume of data made available to the public through the U.S. Geological Survey's Hazard Data Distribution System (HDDS). To help remedy this problem, we developed a modeling approach that identified major breaks in transportation networks while efficiently handling large imagery datasets covering extensive geographic areas. Using eCognition (Trimble) software, we identified spectral and contextual incongruities in post-disaster imagery and compared them to available GIS thematic layers depicting road centerlines (available for many states). For inland areas affected by stream and river flooding, water covering or bisecting roads was the most reliable indicator of storm damage; for coastal areas affected by tidal surges, sand and other debris were the most important indicators. Road-network disruptions identified by these landscape incongruities were exported to a point layer for subsequent display and further review in traditional GIS software. The modeling approach developed for this project is transferable to disaster-response officials and imagery analysts, and it can be modified as necessary by other users to accommodate regional differences in data availability, type, and quality.