

Quick Terrain Modeler™

Application Notes: Floodplain Mapping

Background:

Flood plain mapping is perfectly suited to airborne LiDAR surveys. Today's LiDAR technology can map vast areas with an unprecedented level of speed, accuracy and economy. Since flooding impacts vast areas of terrain, frequently crossing county and state boundaries, it is very helpful to visualize and analyze the impact of various flood stages. Armed with this information, governments at all levels can prepare for floods in advance, refining and rehearsing the interagency coordination and activity required in a flood emergency. The Quick Terrain Modeler can assist in this process by simulating flood impacts in enormous 3-D terrain models and giving users at all levels a very intuitive understanding of the potential impacts of various flood stages. The Quick Terrain Modeler will never replace complex hydrological models or the experience and expertise of industry experts, but it will serve as a useful tool for understanding flooding impact in a terrain.

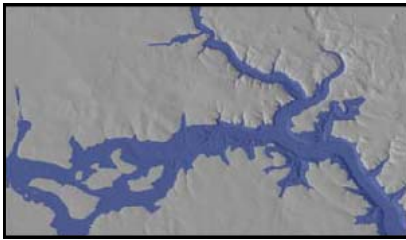


Figure 1: The Quick Terrain Modeler's Flood Simulation tool instantly simulates the impact of a flood in a terrain ("Bathhtub" model of flooding).

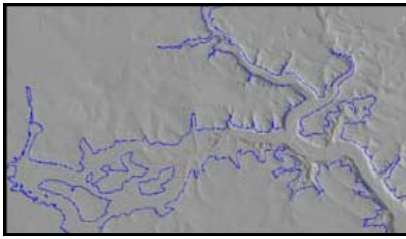


Figure 2: Once a flood is simulated, the Quick Terrain Modeler can draw a contour around the impacted area, then export the contour line as a shape file. Users can also instantly calculate flood volume and total area of flood impact.

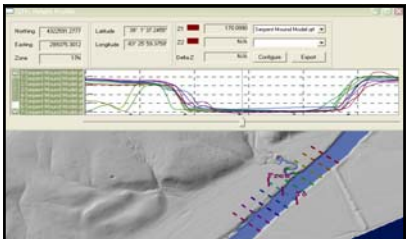


Figure 3: Multiple parallel cross sections make stream bed measurements simple and accurate. Cross sections can be selectively compared against each other and/or sampled and exported to other applications.

Challenge	Quick Terrain Modeler Solution
LiDAR survey data files are too large to visualize in their entirety.	Quick Terrain Modeler quickly builds huge models (up to 77 mi ² at 1m posting) without decimation or tiling and navigates through models in real time.
Flood simulation is complex and time consuming.	Quick Terrain Modeler simulates simple flooding scenarios in real time and can export the results in a variety of formats.
Communities need to be aware of flood risks.	Quick Terrain Modeler can create AVI fly-through's of flood simulation for wide distribution and playback on standard Windows media players.
Hydrologists need cross section of stream beds and other topological features.	Quick Terrain Modeler's multiple cross section tool allows rapid measurement and export of cross sections. Users can import vectors (.shp) of desired profiles and export sampled results.
It is difficult to monitor terrain evolution over vast areas.	Quick Terrain Modeler's change detection and volume calculation tools make terrain monitoring and measurement fast and simple.
It is important to monitor terrain steepness for purposes of remote location ingress/egress as well as rockslide or mudslide hazard assessment.	Quick Terrain Modeler quickly highlights terrain of user specified steepness. Results can be exported as a GeoTIFF.

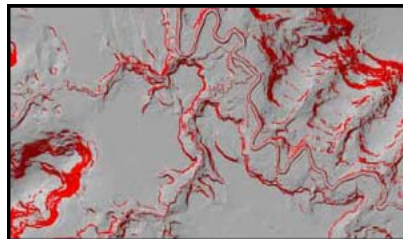


Figure 4: The Quick Terrain Modeler's slope analysis tool quickly highlights terrain of specific steepness (or flatness). Slope models can be exported as GeoTIFF's.

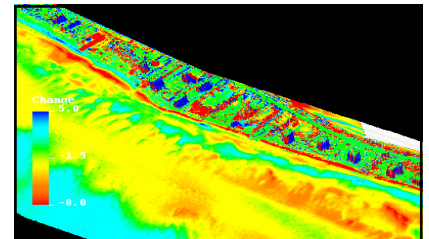


Figure 5: Change detection on two surveys of over 2 million vertices each takes 5 seconds. Engineers can monitor the impact of flooding and erosion over time.