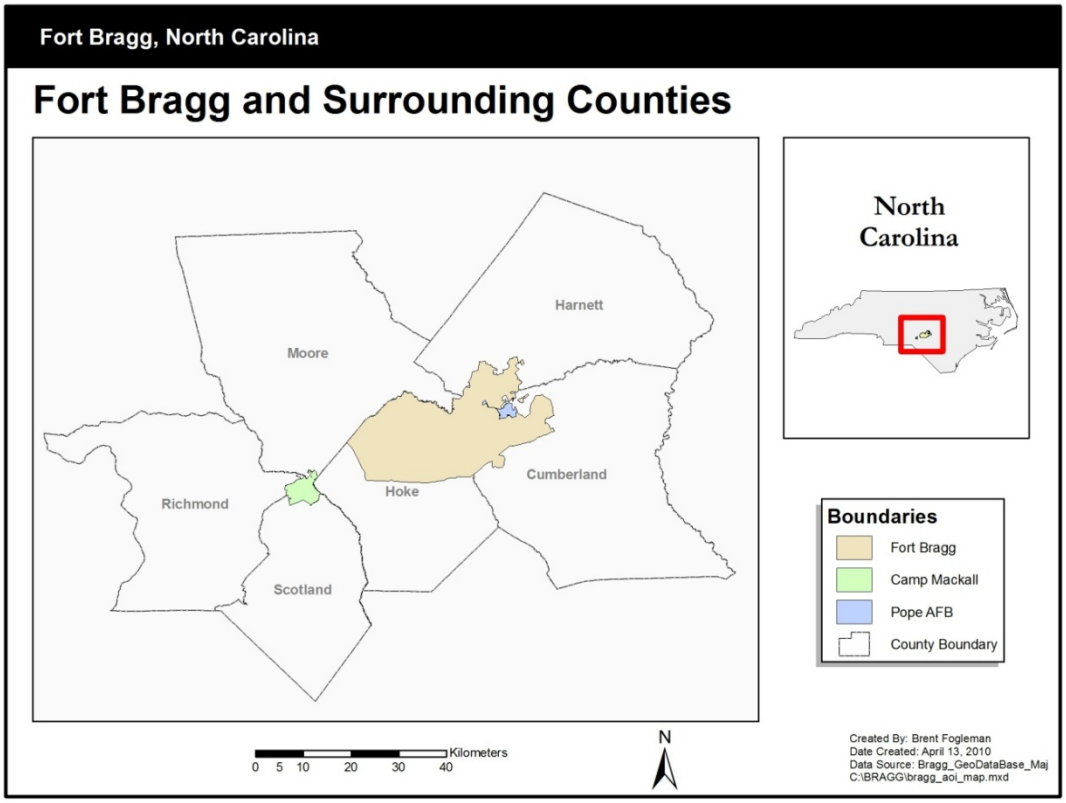


Figure 2.1: Fort Bragg installation boundaries.

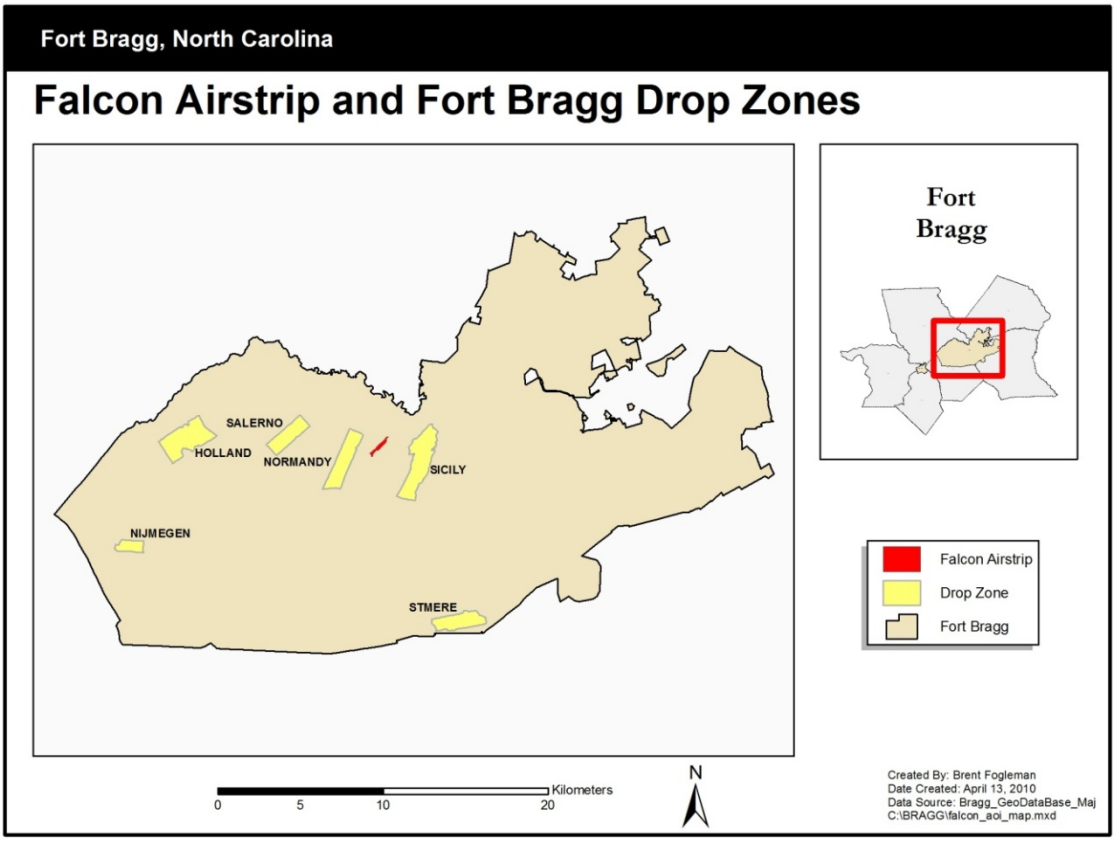


Figure 2.2: Falcon Airstrip and Fort Bragg Drop Zones.

(a) (b) (c)

Figure 2.3: The erosion seen in these images are typical of the dirt roads in and around Falcon Airstrip. (a) failed attempts were made to reduce the erosivity of the road, (b) a gully is forming along the airstrip, (c) vehicular traffic on the airstrip is disturbing the vegetation and further loosening the sandy soil.

Figure 2.4: Orthophotograph of the project site from 2007.

Figure 2.5: The concentrated flow in this eroded gully resulted in depths up to four meters.

Figure 4.1: TanGeoMS hardware configuration.

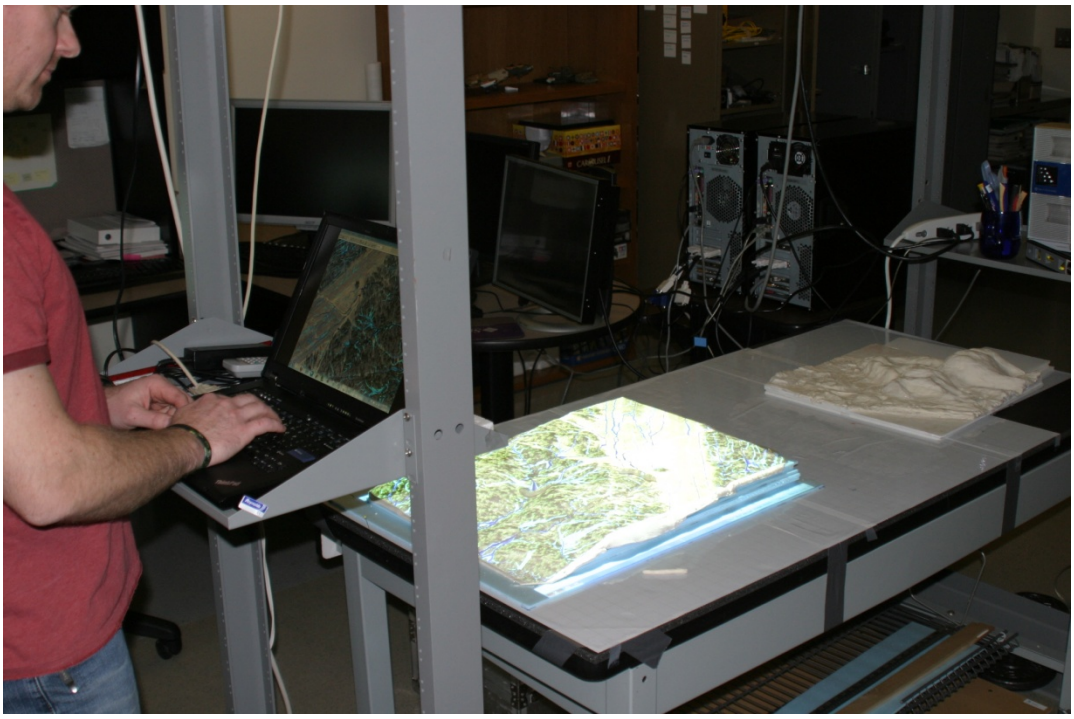


Figure 4.2: TanGeoMS offers “plug-in-play” for analysis and visualization.

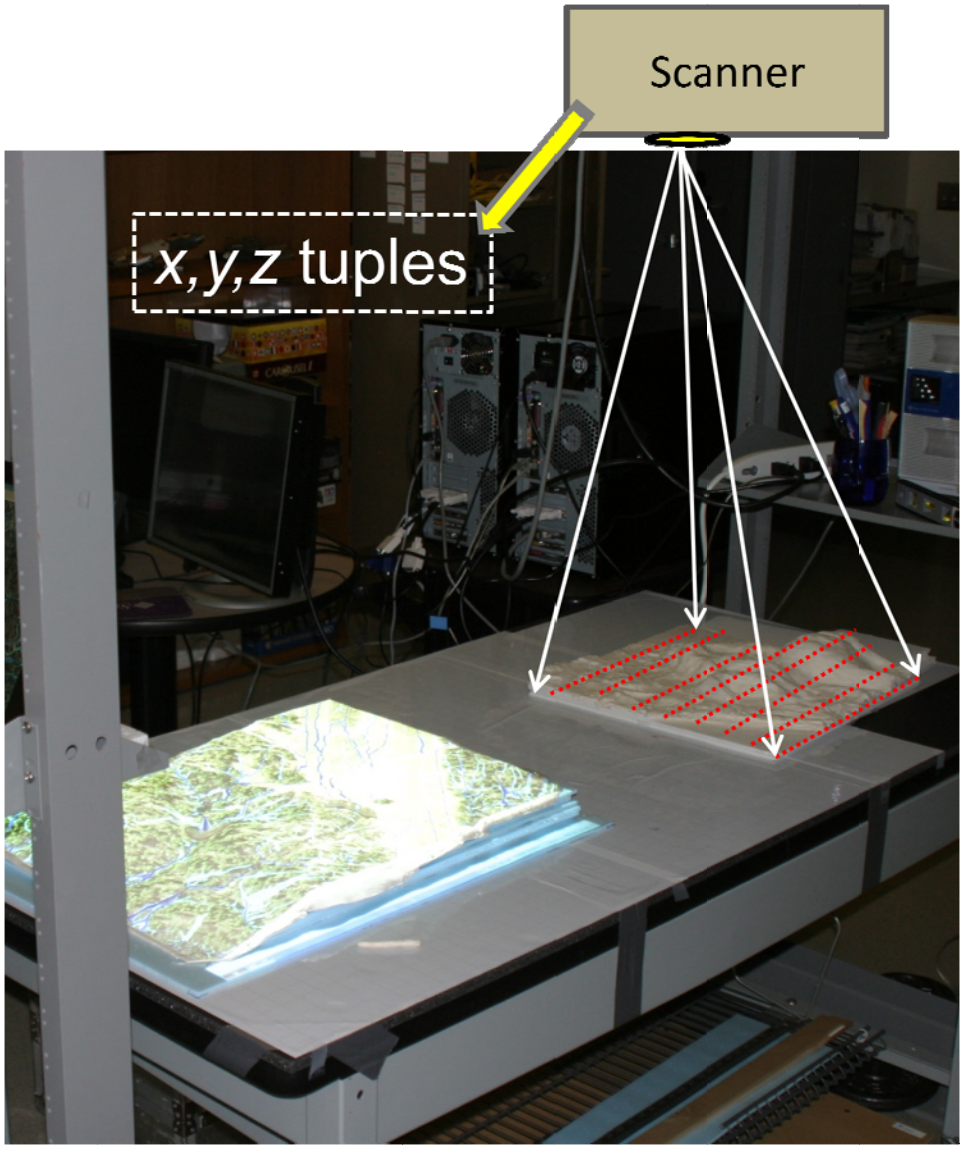


Figure 4.3: The scanner laser beam makes three passes over the model collecting nearly 300,000 points and stores them as *xyz* tuples.

Figure 4.4: TanGeoMS promotes collaboration.

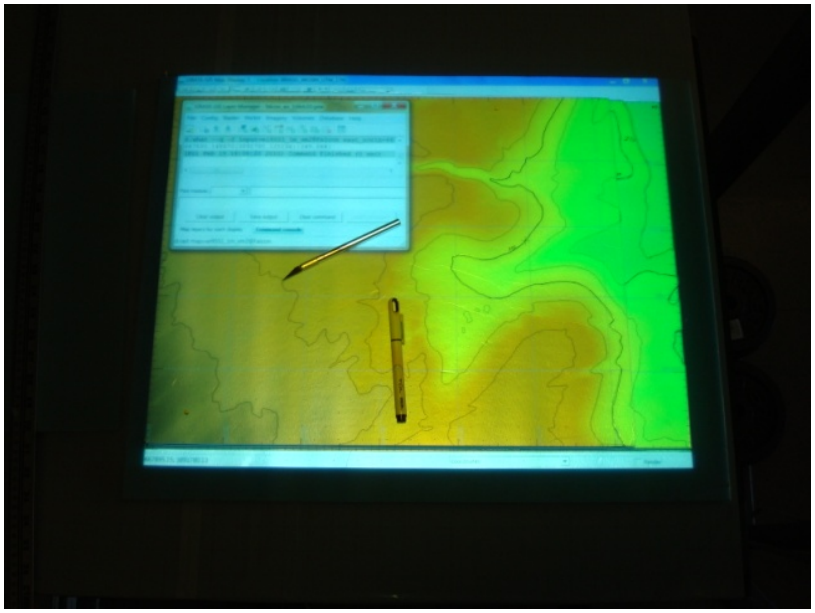


Figure 4.5: Projecting 3-meter contour intervals on the foam work surface in preparation for tracing and cutting.

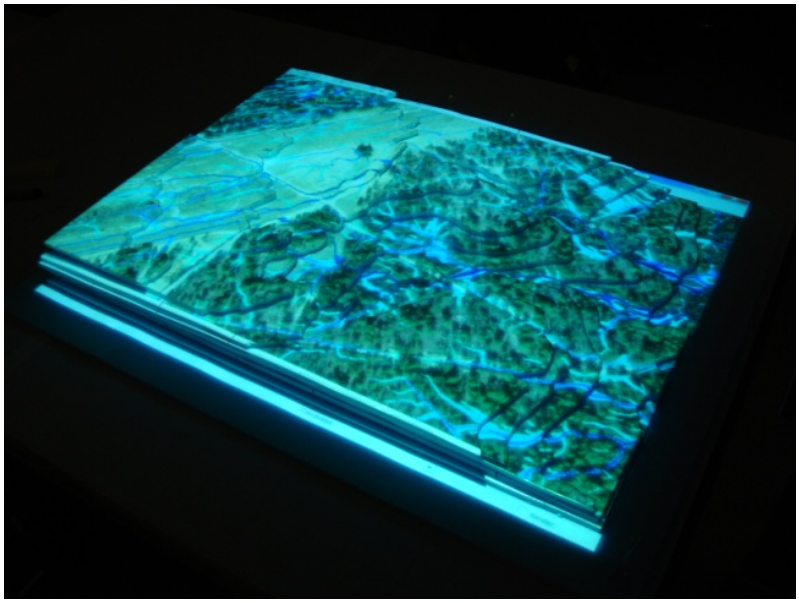


Figure 4.6: Contour levels are cut, stacked and pinned in place.

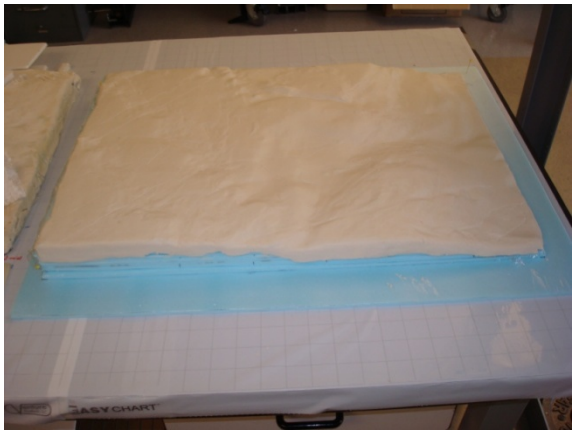


Figure 4.7: Plasticine is placed over the contours to create a malleable surface.

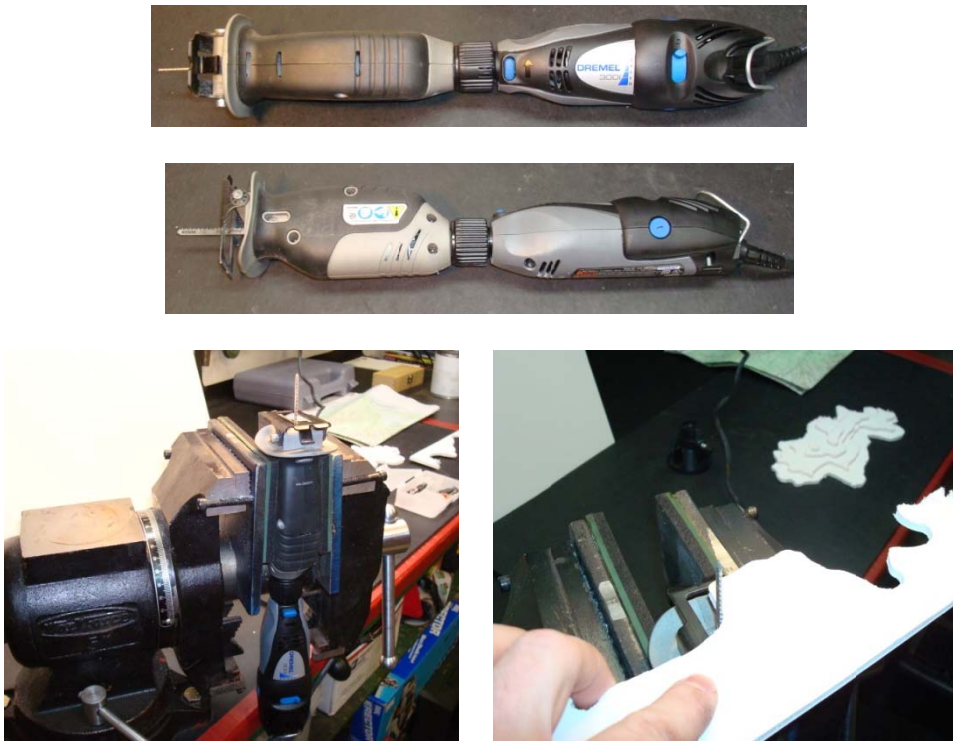
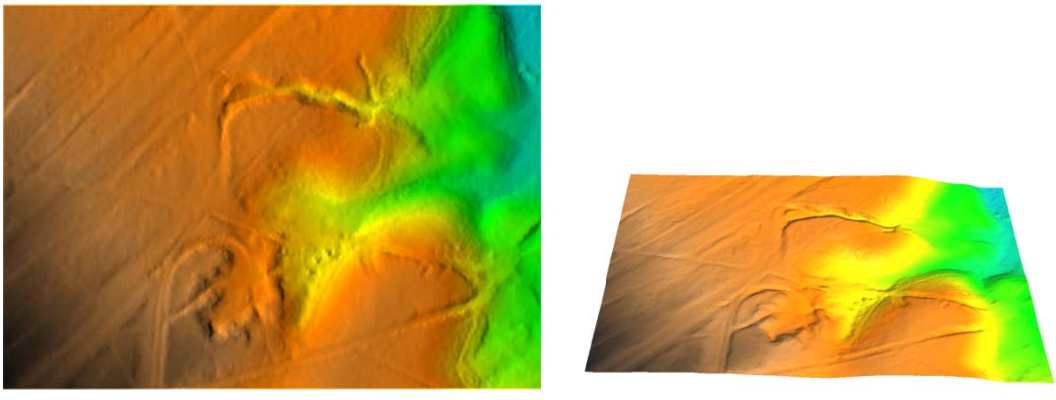
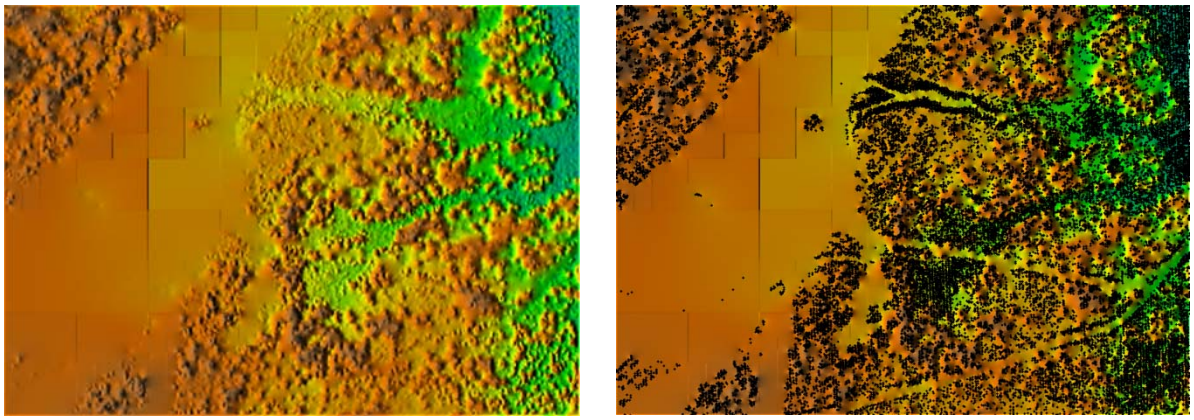


Figure 4.8: Proto-type cutting station was developed to cut contour levels.



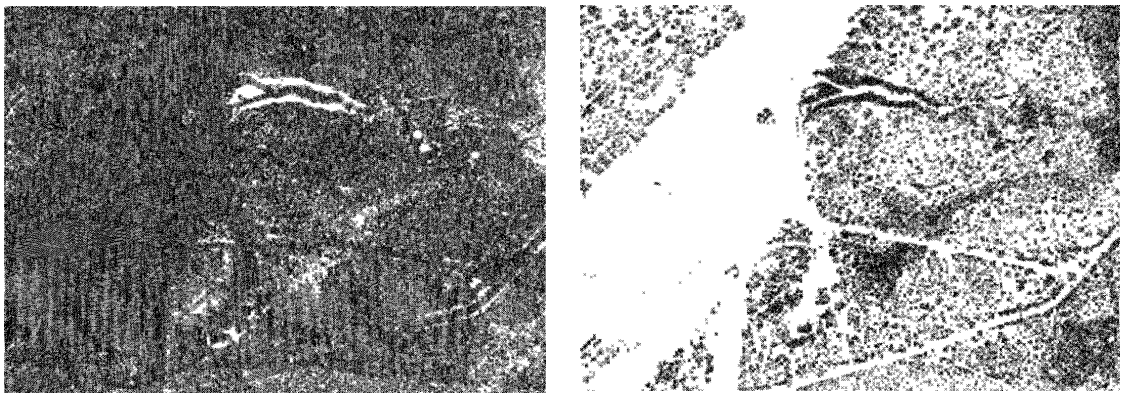
(a) (b)

Figure 4.9: The real world DEM in (a) 2D and (b) 3D images.



(a) (b)

Figure 4.10: (a) The raster map produced with the multiple-return data contains large block segments on the airstrip because the data only includes the first return, representing the top of the canopy. (b) Sampled points have overlain the image.



(a) (b)

Figure 4.11: (a) 2,168,992 bare-earth points were returned in the region and (b) only 193,032 multiple-return points were returned.

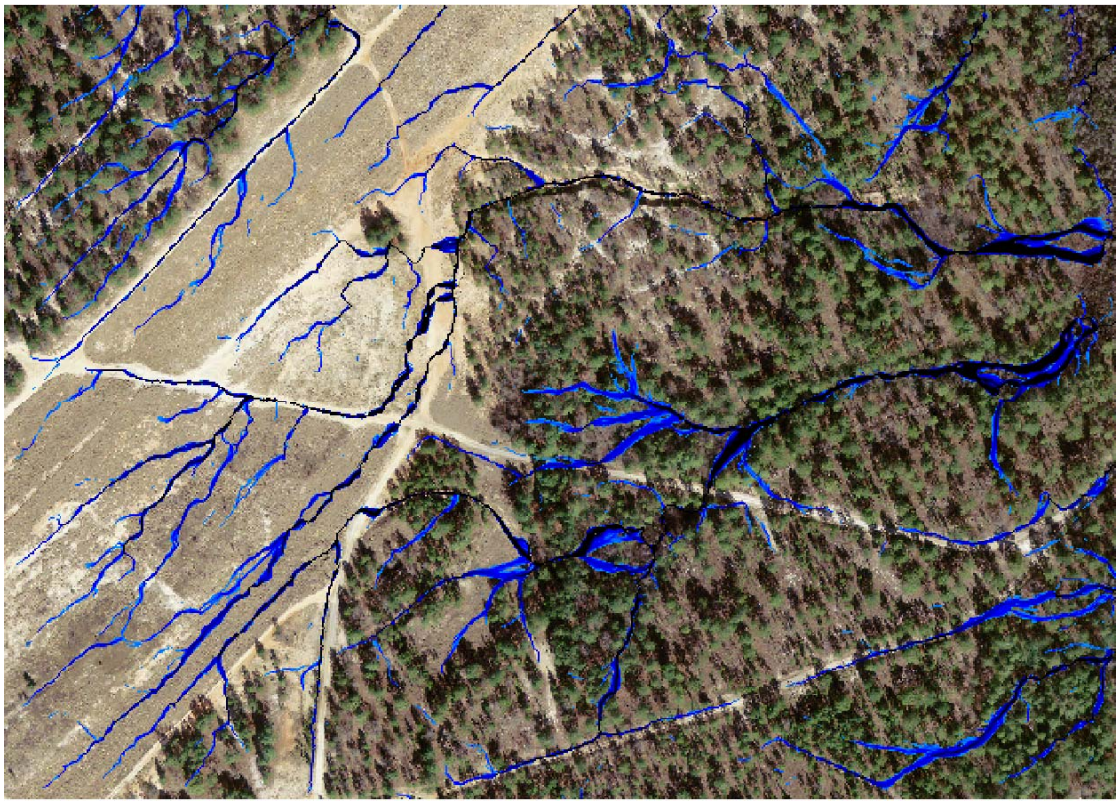


Figure 4.12: Simulated high flow accumulation values calculated with *r.watershed* overlain an orthophotograph. Darker areas indicate higher concentrated flow.

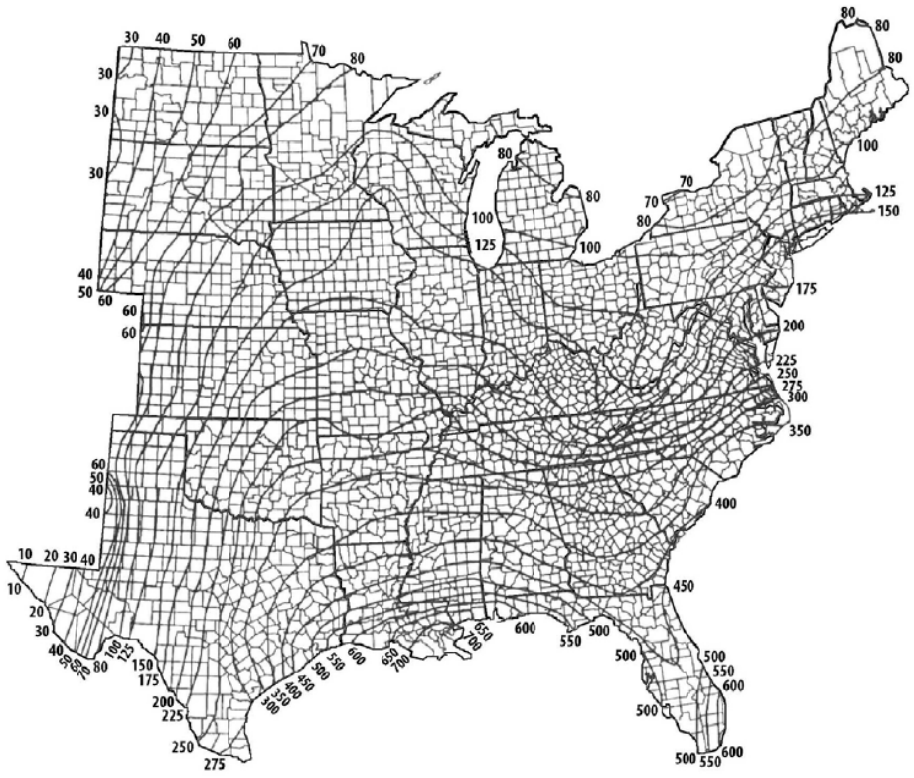
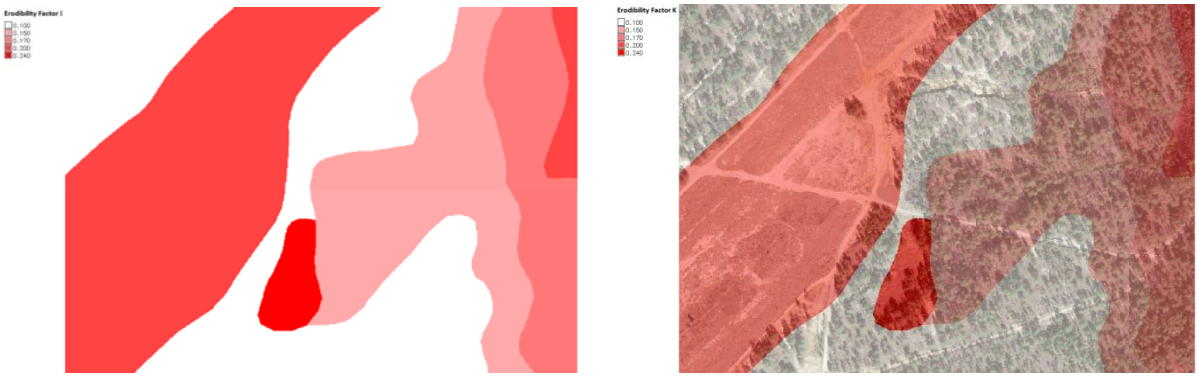
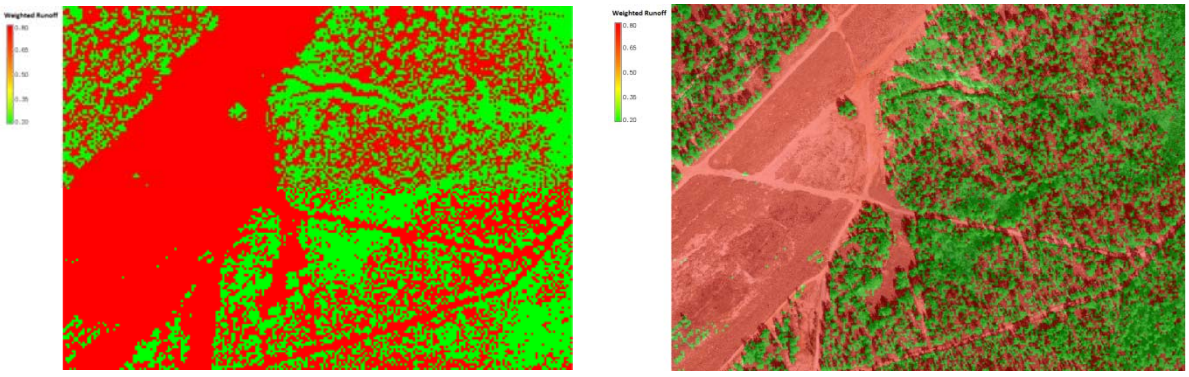


Figure 4.13: *R-Factor* was visually interpolated from an isoerodent map. (Interior, 2006)



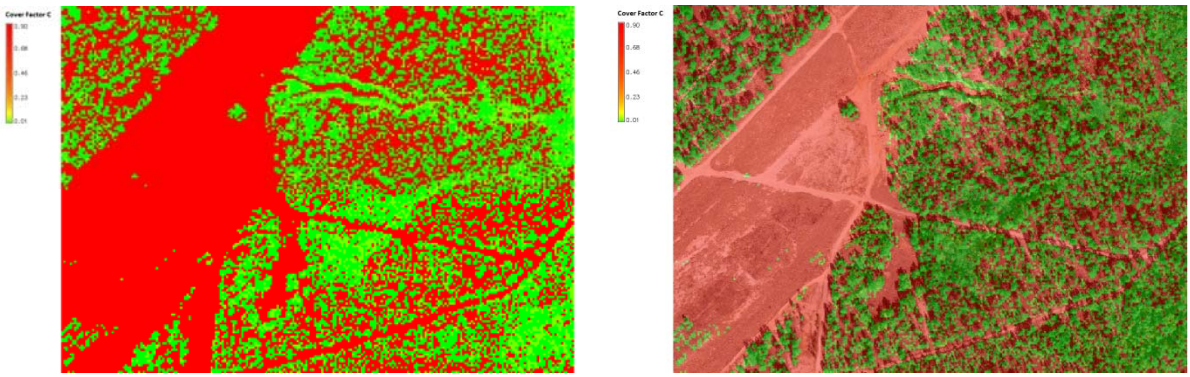
(a) (b)

Figure 4.14: A spatially-variable *K-factor* raster map was created to more accurately assess soil loss potential in the area of interest.



(a) (b)

Figure 4.15: A weighted flow accumulation (*U*) raster map was calculated as a function of cover factor *C*. The vegetation height map was recoded to reflect 80 percent rainfall excess through areas with bare soil and to reflect twenty percent rainfall excess in vegetated areas.



(a) (b)

Figure 4.16: A spatially-variable *C-factor* was applied to the erosion models.

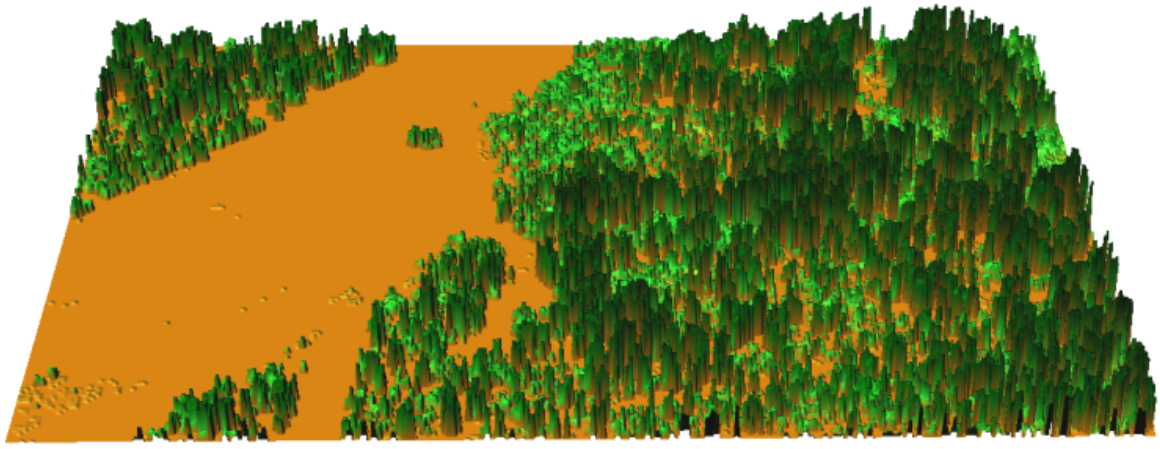
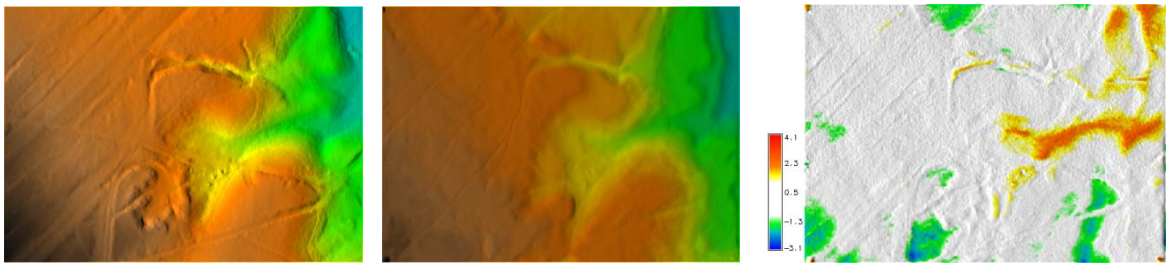
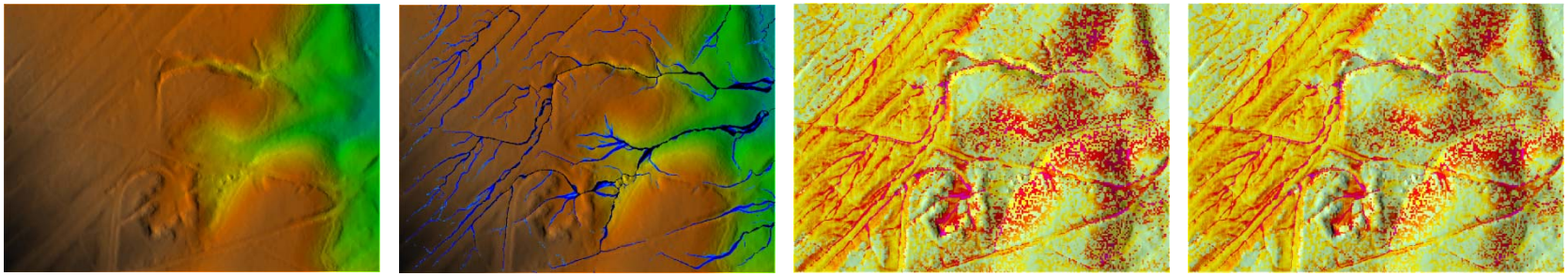


Figure 4.17: A 3D view of the vegetation. Brown indicates little to no vegetation.



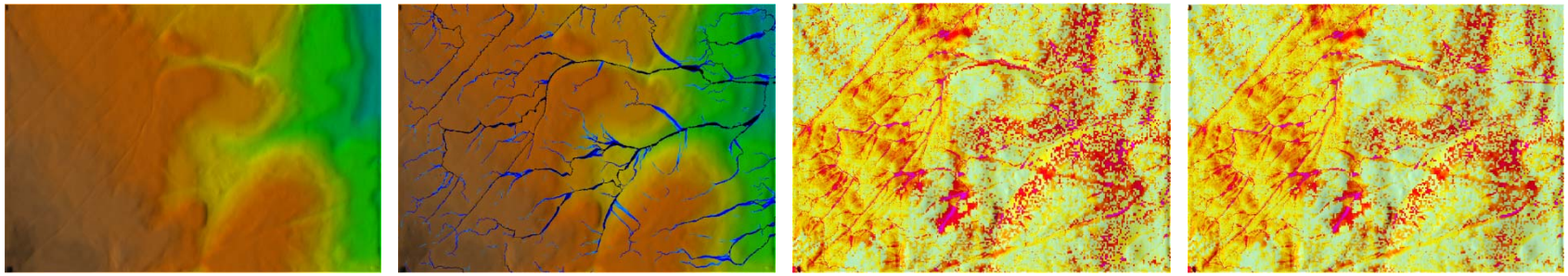
(a) (b) (c)

Figure 5.1: The real-world DEM (a), the initial model scan (b), and the difference between the two (c).



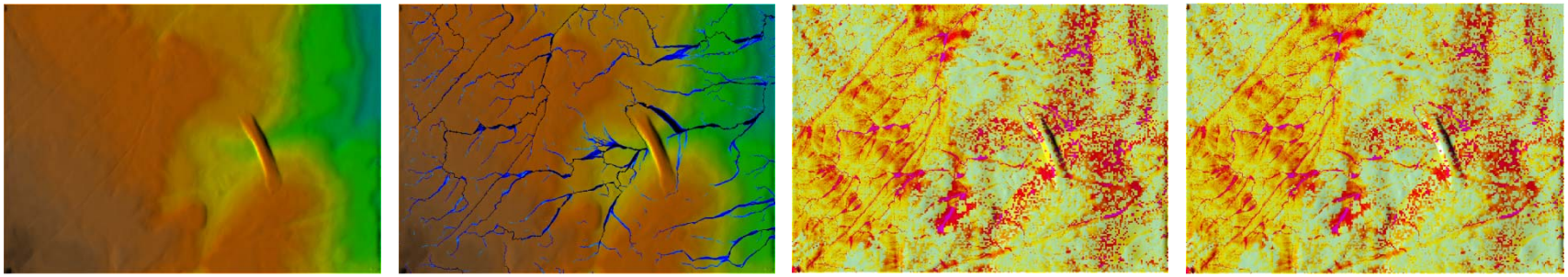
(a) (b) (c) (d)

Figure 5.2: Real world DEM (a), with flow accumulation (b), soil loss potential with standard flow accumulation (c), and soil loss potential with weighted flow accumulation (d).



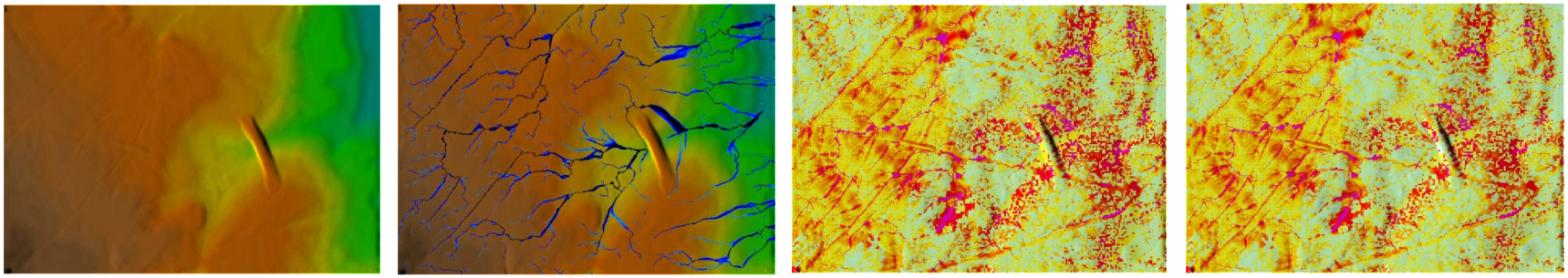
(a) (b) (c) (d)

Figure 5.3: Initial model scan (a), with flow accumulation (b), soil loss potential with standard flow accumulation (c), and soil loss potential with weighted flow accumulation (d).



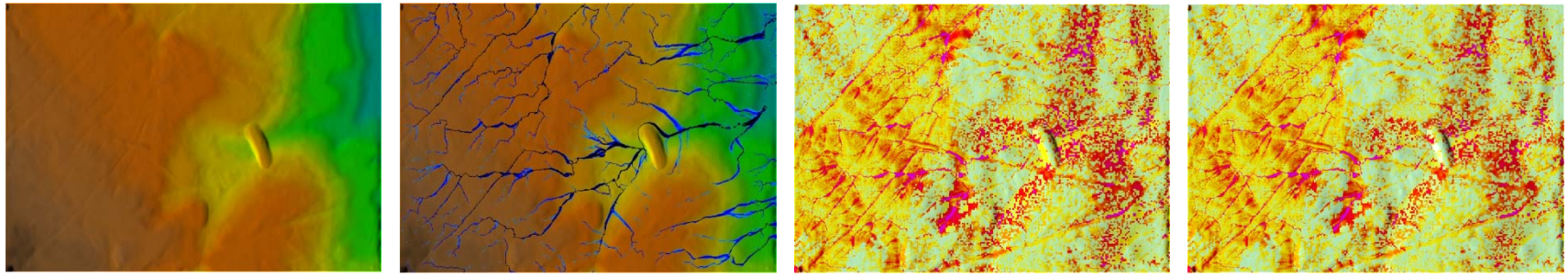
(a) (b) (c) (d)

Figure 5.4: Fill Dam 1 simulates filling in the gully and constructing a large dam (a), with flow accumulation (b), soil loss potential with standard flow accumulation (c), and soil loss potential with weighted flow accumulation (d).



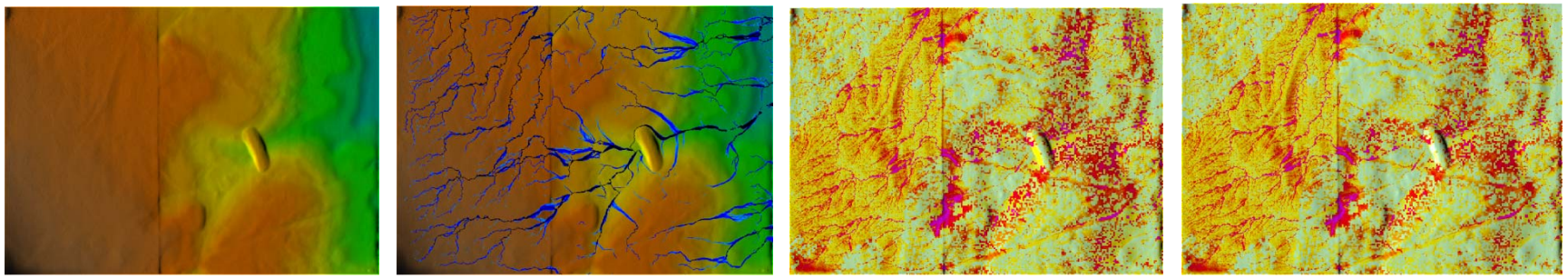
(a) (b) (c) (d)

Figure 5.5: Fill Dam 2 simulates filling in the gully, constructing a large dam, and diverting some flow from the airstrip to the dam (a), with flow accumulation (b), soil loss potential with standard flow accumulation (c), and soil loss potential with weighted flow accumulation (d).



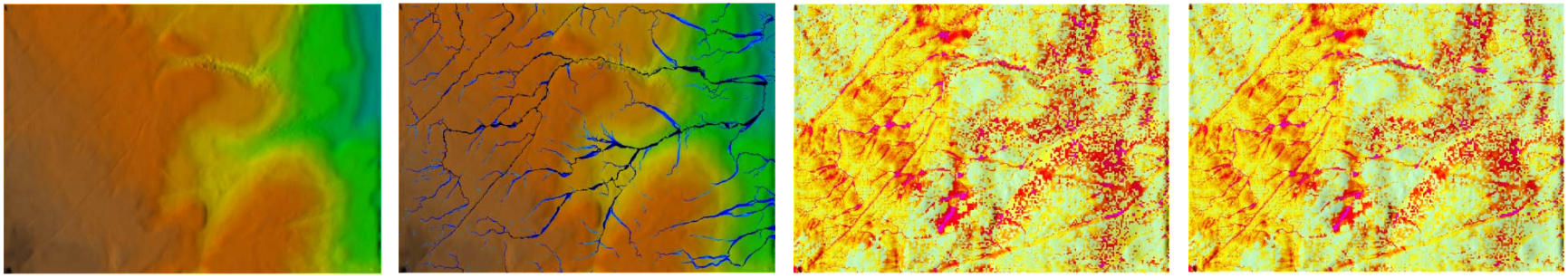
(a) (b) (c) (d)

Figure 5.6: Fill Dam 3 simulates filling in the gully, constructing a small dam, and diverting some flow from the airstrip to the dam (a), with flow accumulation (b), soil loss potential with standard flow accumulation (c), and soil loss potential with weighted flow accumulation (d).



(a) (b) (c) (d)

Figure 5.7: Grade 3 simulates filling in the gully, constructing a small dam, and grading the airstrip(a), with flow accumulation (b), soil loss potential with standard flow accumulation (c), and soil loss potential with weighted flow accumulation (d).



(a) (b) (c) (d)

Figure 5.8: Rip rap simulates placing rip rap in the gully and in the low ground where significant concentrated water flows (a), with flow accumulation (b), soil loss potential with standard flow accumulation (c), and soil loss potential with weighted flow accumulation (d).