Ditches are Critical!

Poor ditch and culvert maintenance increases flooding and storm hazards

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1. Flooding as a Priority

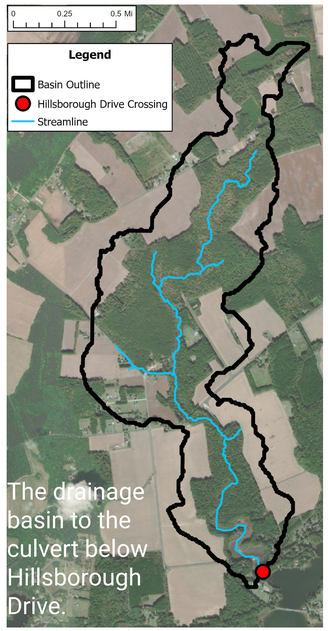
Road Washout in Belle Haven, VA

On the ESVA, we face flooding from high tides and rainfall. Sometimes these two hazards can collide and put our community at risk. For example, in 2018, Hurricane Florence caused Hisllborough Drive in Belle Haven to wash out, cutting off a neighborhood and costing millions (see photo).

Inspired by community accounts of the disaster, UVA scientists explored how rainfall and tides may have interacted to cause the road washout.

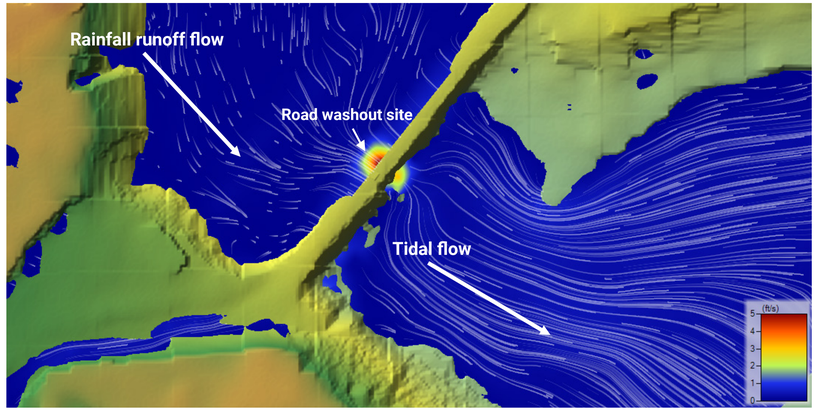
Scientists found that a wave of runoff from the heavy rainfall entered the creek just as the tide was falling - leading to high water on one side of the culvert and low water on the other. These conditions may have contributed to the road washout (red area on map).

A map of the drainage basin to the Hillsborough Drive stream crossing is shown to the right.



The drainage basin to the culvert below Hillsborough Drive.

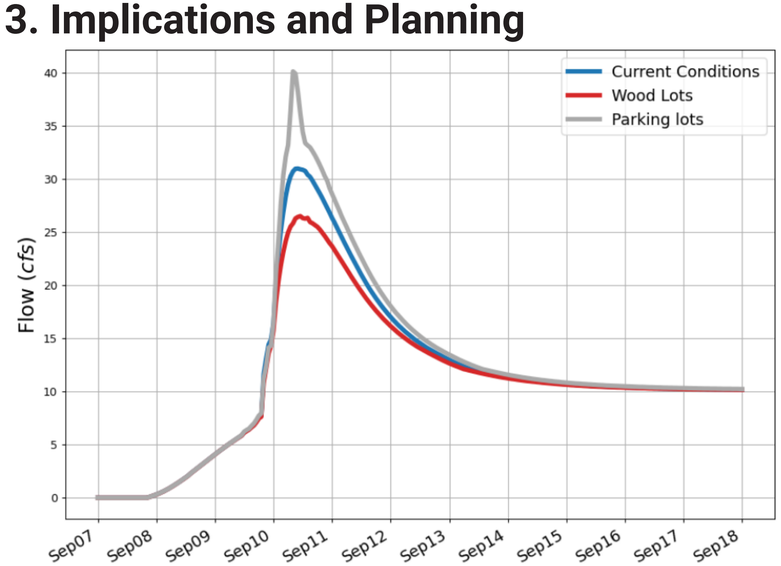
2. Flooding Simulations for Solutions



Flooding models show speed of water flow through the road crossing before the road washout.

Scientists also included potential land conversion scenarios in the model to study the effect of land management decisions on flood events.

3. Implications and Planning

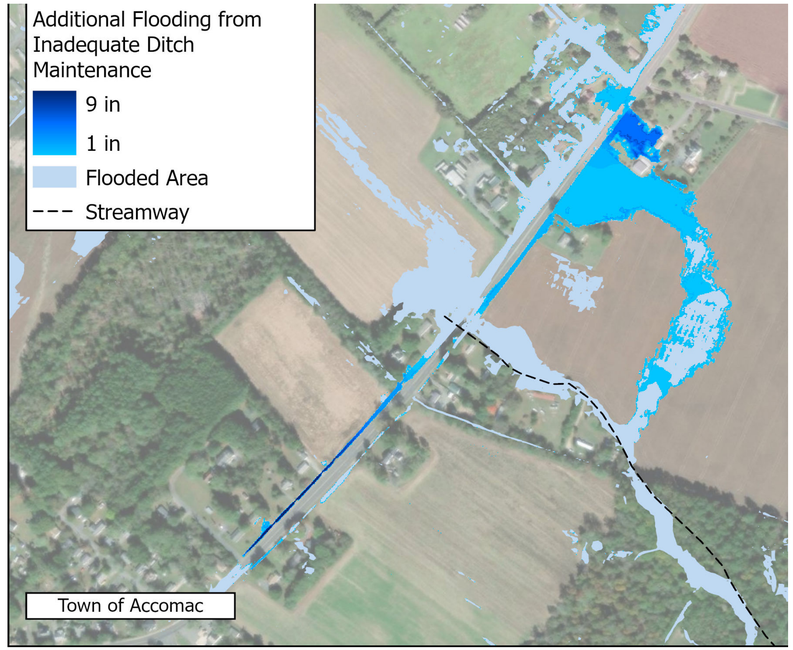


Flow rates through the Hillsborough Drive stream crossing during the simulated 2018 storm event.

3. Implications and Planning (continues)

As land use changes on the ESVA, we must consider the implications for rainfall runoff. Harder, impervious surfaces will contribute to higher flow events. Pervious surfaces can help to capture water in the ground and reduce flooding.

Using lessons learned from the Hillsborough Drive washout, we can identify other vulnerable road crossings on the ESVA. Such crossings should be inspected and maintained regularly to ensure safety.



Scientists also wanted to understand how road ditch maintenance can impact flooding. Here, we see that grassy, over-grown roadway ditches slow down water on its way to the stream, leading to stormwater back ups into roadways and agricultural fields.

Key takeaway

Landuse changes can influence how the ground handles stormwater; increased runoff can cause road washouts; good maintenance of ditches and culverts can help

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