

Lubber Run Watershed

Flood Risk and Potential Solutions

Arlington County has developed an extensive study of flood-vulnerable watersheds. The study includes present impacts and future climate-driven projections of flood risk. The analysis identifies areas at most risk and evaluates the costs and benefits of potential flooding solutions. This fact sheet focuses on the Lubber Run watershed.

Lubber Run Watershed

The Lubber Run watershed covers about 1.61 square miles, including the John M. Langston, GlebeWood, Waycroft-Woodlawn, Bluemont, Ballston-VA Square, Buckingham, and Arlington Forest civic associations. Lubber Run also includes Ballston Quarter Mall, Woodlawn Park and Ballston Wetland Park. The watershed has experienced significant flooding, with 12 reports of flooding during the July 8, 2019 storm.

Lubber Run includes 28 critical facilities (e.g., Glebe and Barrett Elementary Schools), including 8 that are identified as potentially vulnerable to flooding. The Virginia Hospital was identified for more detailed analysis.

Flood modeling and risk assessment:

Flood modeling was conducted for current conditions and 2040 and 2070 projections for climate change impacts. The models estimated the extent and depth of flooding in the watershed and were run for a series of different size storms (2-, 10-, 25-, 100- and 500-year storms). **Figure 3** shows projected “worst case” Lubber Run flooding in 2070 with a very intense storm (12.9 inches of rain in 24 hours) if no stormwater solutions were implemented.

Flood risk was calculated in two different ways:

- Monetary risk was calculated using a FEMA tool that calculates potential damages for a given storm times the probability of that storm, which is then totaled for different size storms.
- Social vulnerability was calculated using federally-established indices, mapped against flood-risk areas. Lubber Run does not demonstrate a confluence of socially-vulnerable populations in areas where flood risk is present.

Economic Risk (millions of \$)

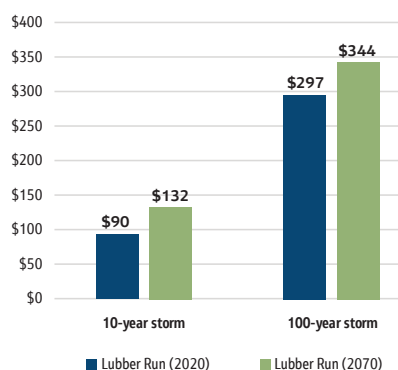
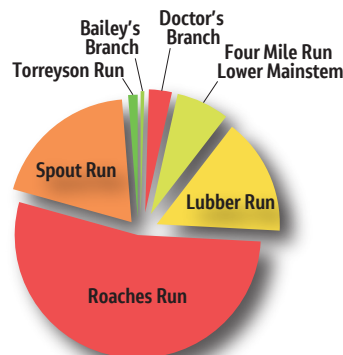


Figure 2 - Economic Impact of Climate Change is shown by comparing two individual floods, now and in 2070 with climate change, if no flood mitigation solutions were implemented.

Economic Risk from Flooding



Socially Vulnerable Area Exposed to Flooding

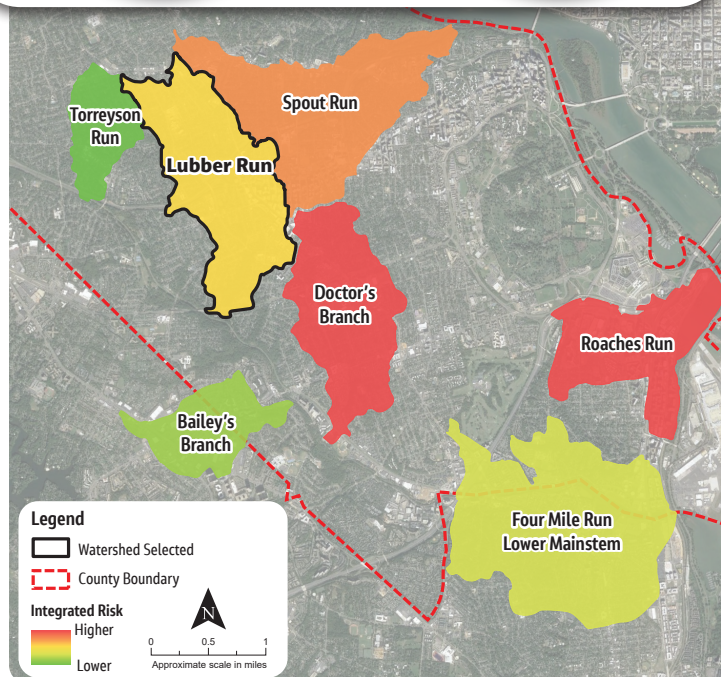
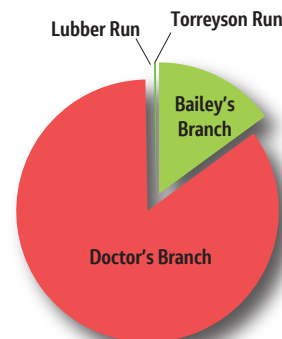


Figure 1 - Watershed Ranking of Overall Risk

The County-wide map shows the **overall “integrated risk” ranking**, which combines economic risk and social vulnerability.

The pie chart on the left shows **economic risk alone**. Lubber Run ranks 3rd highest, at \$32 million. **Social vulnerability** alone is shown in the pie chart on the right, with only Doctor's Branch and Bailey's Branch having significant social vulnerability.

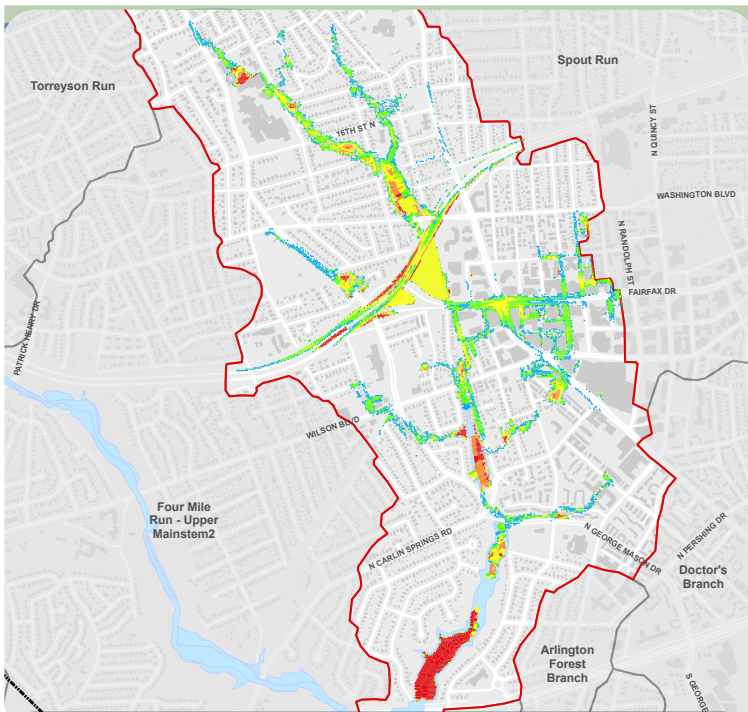


Figure 3 - Worst Case: This map shows the potential flooding in Lubber Run under a “worst case” scenario in 2070 with a very intense storm (12.9 inches of rain in 24 hours) if no conveyance or storage solutions were implemented.

Benefits and Costs of Flood Solutions

The study examined conceptual alternatives for adding storm pipes and inlets (conveyance) or stormwater storage capacity to mitigate flooding associated with the 10-year storm (5.2 inches), the current County drainage design standard. For each of these alternatives, planning level costs were developed and residual risks were determined to quantify benefits of these alternatives.

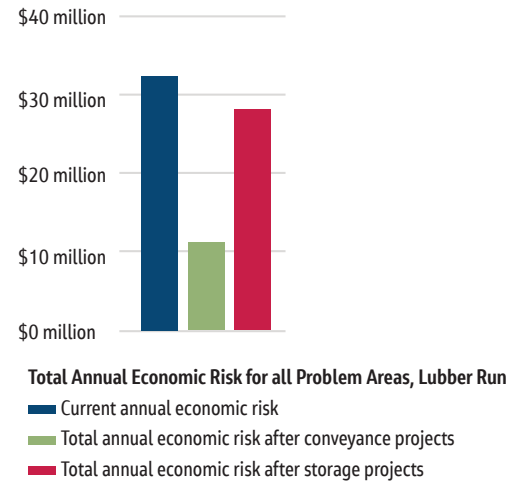


Figure 4 - Total Economic Risk

Shows the total annual economic risk for all storms in the watershed, currently and with conveyance or storage projects.

Benefit cost ratios were calculated for concepts with either increased storm pipe/inlet capacity or with additional storage, where benefits are defined as the reduction in monetary risk. **The benefit cost ratios for Lubber Run indicated that both conveyance and storage projects, if feasible, would be cost effective.**

Flood Mitigation Alternatives

There are four main strategies to address flood risk:

- Increase capacity of storm pipes and inlets (conveyance) or adding stormwater storage for problem areas
- Implement policy and programmatic strategies, including land use planning, risk communication and flood insurance, and enhanced building codes for areas at high risk
- Implement building-level and asset-level concepts to protect critical facilities
- As a last resort, where other solutions prove infeasible, provide overland relief by acquiring and removing structures in flood-prone areas.

The Stormwater Program Risk Assessment and Management Plan (RAMP)

Arlington County’s Stormwater Program Risk Assessment and Management Plan (RAMP) analyzes the risk and uncertainty of flooding due to climate change, and projects future risk and flooding impacts. The County will use the RAMP results to develop a long-term stormwater resiliency strategy.

The RAMP study included:

- Conducting flood modeling and risk assessments that consider current conditions and potential future conditions given climate change
- Determining which areas of the County, critical facilities (e.g., hospitals), vulnerable populations, and environmental resources are most susceptible to flooding
- Completing detailed risk assessments for the watersheds with the highest vulnerability
- Applying Federal Emergency Management Agency (FEMA) tools to assess current and projected future damages at the neighborhood and watershed scale
- Identifying “problem areas” to estimate risk and evaluate the costs and benefits of potential solutions