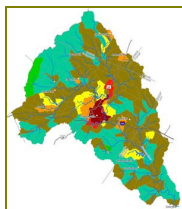


Stream Health Follows Land Use

Key findings from StreamWatch's study of the Rivanna basin

Beginning in spring 2007, StreamWatch set out to study relationships between land use, stream habitat, and stream biology in the Rivanna River basin. For more than two years, we collected stream organisms and habitat data at 51 sites. We then compared these data with land use. Here is what we found:

- Most streams we studied failed Virginia's biological standard. This standard tells us whether streams support a variety of life forms. Streams with more life have better water quality, and can provide better services to humans. Such services include water supply, recreation, and aesthetic enjoyment.
- Stream health is closely related to land use. Rural landscapes with lots of forest have healthy streams. Urban areas with lots of paved surfaces have unhealthy streams. In between, health declines predictably as land use intensifies. The relationship is so strong that we can estimate stream health based on the amount of forest and development in the surrounding area.
- Most of the Rivanna basin is semi-rural (exurban). In this exurban landscape, forest cover averages about 70%, and there are 17 acres for every house. This amount of disturbance may seem mild, yet more than half of exurban streams failed the biological standard.
- Rural and exurban streams decline rapidly with increased development or deforestation. In urban areas, stream health is already poor. Therefore, urban streams do not respond dramatically to additional development.
- Unlike development and deforestation, cattle operations, quantified at the watershed scale, did not have a big impact on stream health. However, we did not study the effects of cattle located close to streams.
- Based on land use, we estimate that 70% of Rivanna streams fail the Virginia standard. Fortunately, only 5% to 10% of streams are severely degraded. Most streams sit near the pass/fail cusp and might meet the standard with better care.
- Within 20 years, increased development in non-urban areas could reduce the number of healthy streams by about a third (see maps on following pages).
- Unstable banks and excess sediment appear to affect the health of many Rivanna streams.
- Forested buffers alongside streams can protect and improve stream health.



See inside for maps
of current and future
watershed conditions

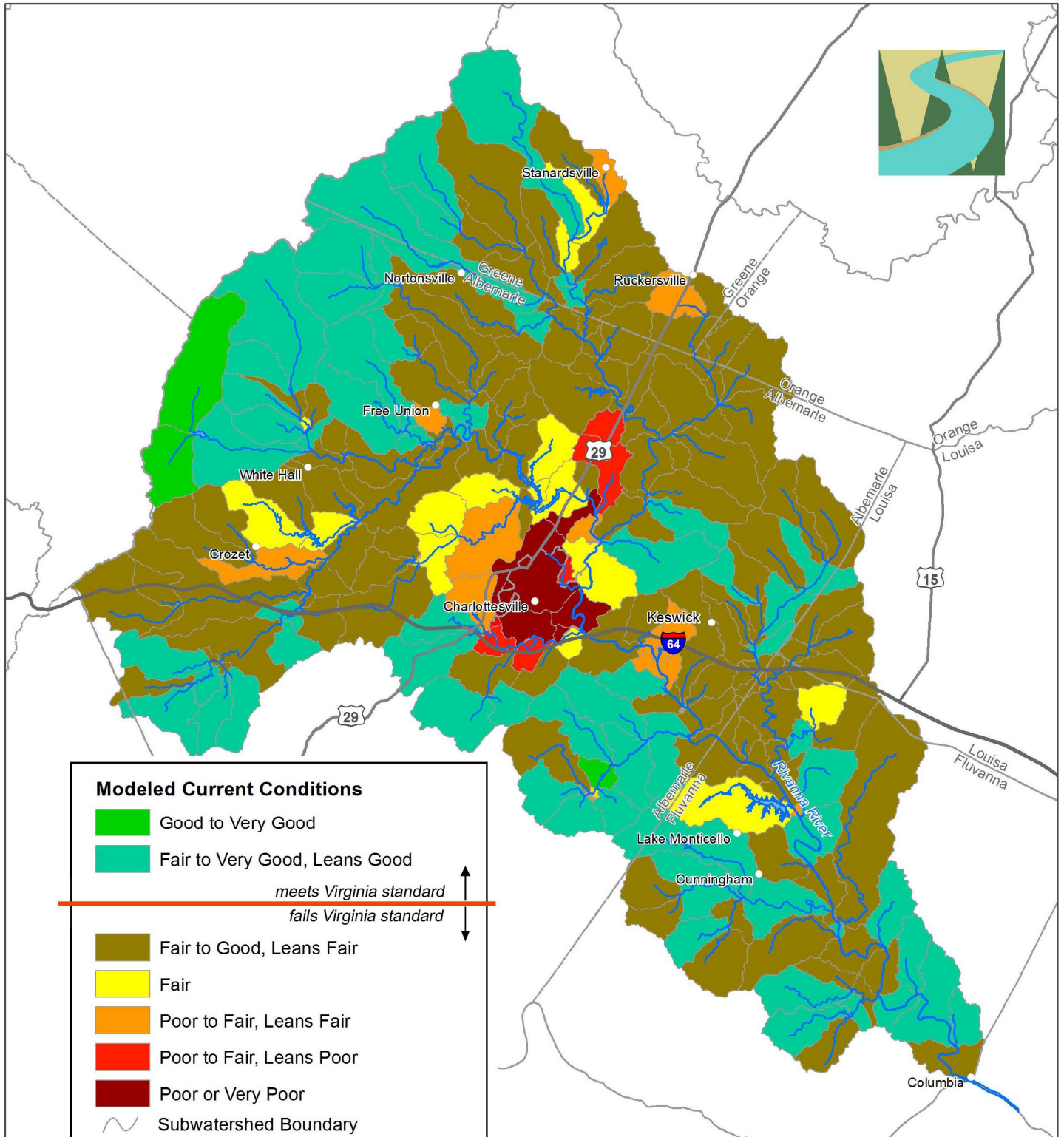
StreamWatch monitors and assesses Rivanna basin streams and rivers to help the community maintain and restore healthy waterways.

*www.streamwatch.org
P.O. Box 681, Charlottesville, VA
434-962-3527*

To learn more about the StreamWatch Land Use Study, visit www.streamwatch.org/lus

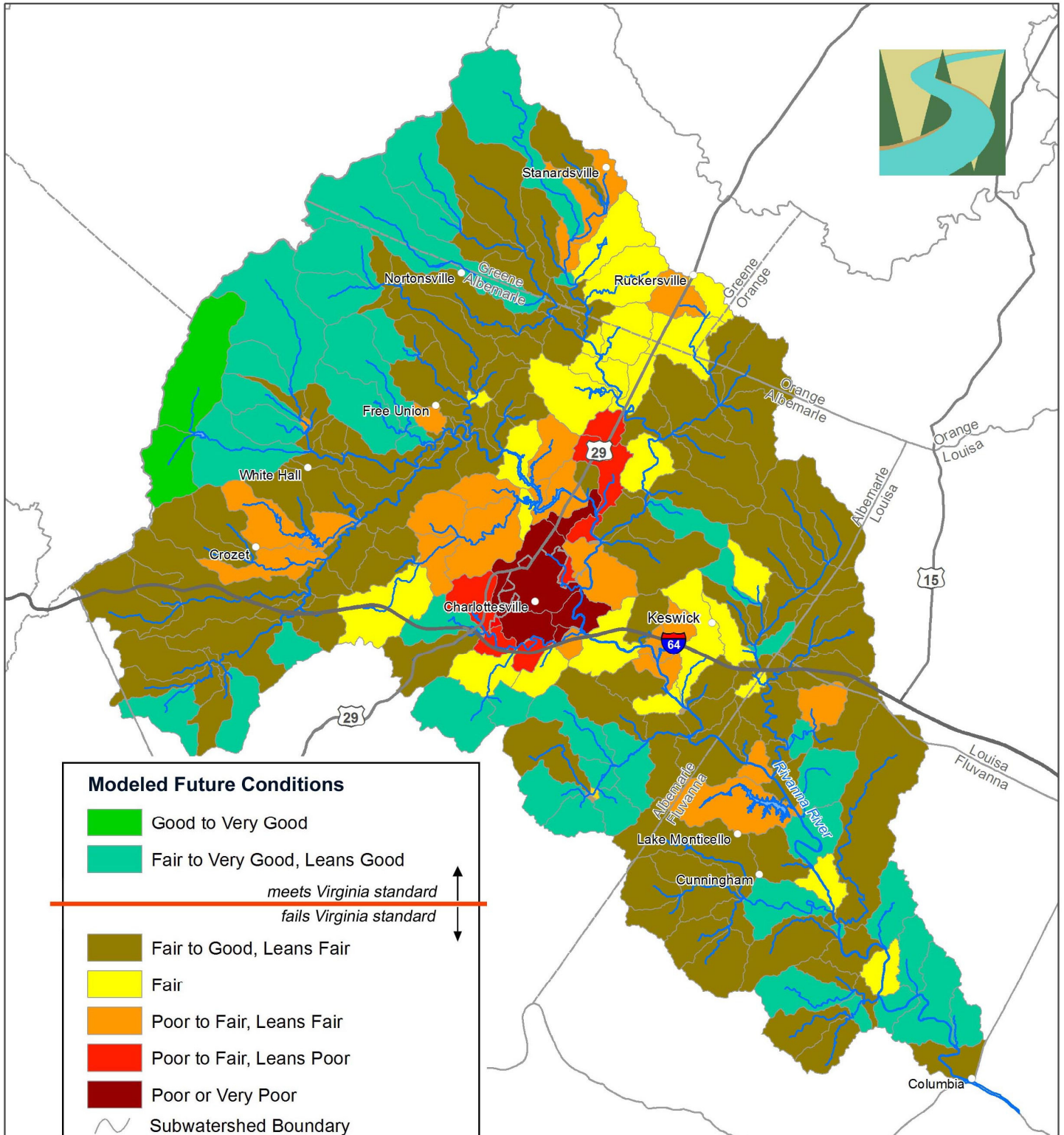
Likely Current Health of Streams in Small Rivanna Watersheds

Colors below indicate modeled stream health in small watersheds throughout the Rivanna, based on land use. Per our model, we estimate that 70% of Rivanna streams fail the Virginia biological standard. Fortunately, only 5% to 10% of streams are likely to be severely degraded. Most streams sit near the pass/fail cusp and might meet the standard with better care.



Possible Health of Rivanna Streams in 20 Years

In 20 years, increased development could reduce the number of healthy streams by about a third. We based this projection on a simple, speculative scenario: We increased impervious cover (roads, parking lots, buildings, etc.) and decreased forest cover to levels that could occur in 20 years, based on current population growth. We distributed growth evenly throughout non-urban areas of the basin, then calculated stream health based on the projected land use conditions.



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StreamWatch Partners

Albemarle County / City of Charlottesville / Fluvanna County / The Nature Conservancy / Rivanna Conservation Society
Rivanna River Basin Commission / Rivanna Water and Sewer Authority / Thomas Jefferson Planning District Commission
Thomas Jefferson Soil and Water Conservation District

Science Collaborators

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Samuel Austin, U.S. Geological Survey / Greg Harper, Albemarle County / David Hirschman, Center for Watershed Protection / John Kauffman, Virginia Department of Game and Inland Fisheries / Karen McGlathery, University of Virginia Rick Odom, Ecologist, GIS specialist / Brian Richter, The Nature Conservancy / Todd Scanlon, University of Virginia William Van Wart, Virginia Department of Environmental Quality

Volunteers and Interns

Our profound and heartfelt gratitude goes out to the many volunteers and interns who assisted with data collection and data management. We could not have completed this study without your hard work. *Thank you!*

Volunteers

Jennifer Alexander / Michael Baker / Dav Banks / Cameron Beers / Calvin Biesecker / Steve Botts / Kelly Bowman / Rachel Bush
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