RISE

Resilience Innovations

2026 BLUE RIDGE REGIONAL RESILIENCE CHALLENGE

APPLICATION DEADLINE: MARCH 20

ALL INQUIRIES SHOULD BE DIRECTED TO INFO@RISERESILIENCE.ORG

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Overview

Building Resilience for the Blue Ridge Region

Communities across Virginia's Blue Ridge region are facing a convergence of accelerating risks. Riverine flooding, extreme rainfall, landslides and debris flows, high winds, and extreme heat increasingly occur in combination, compounding impacts on people, infrastructure, ecosystems, and local economies. Recent events across Southwest Virginia have demonstrated that these hazards are no longer isolated incidents but part of a persistent and interconnected reality that challenges traditional emergency management and recovery models.

At the same time, rural and mountainous communities often operate with limited staff capacity, constrained budgets, and aging infrastructure. While local leaders, emergency managers, and regional partners continue to respond with dedication and ingenuity, they are frequently forced to rely on fragmented tools, disconnected data systems, and short-term recovery mechanisms that do not scale or sustain over time. As a result, communities struggle to move from response to recovery, and from recovery to long-term resilience.

Building on the momentum and lessons learned through the 2024 and 2025 RISE Riverine Community Resilience Challenges, this next phase focuses on advancing integrated, multi-hazard solutions that reflect the real-world conditions facing the Blue Ridge region. These solutions must work across flood, heat, landslide, debris flow, and wind events, supporting preparedness, response, and recovery as part of a connected system rather than isolated interventions.

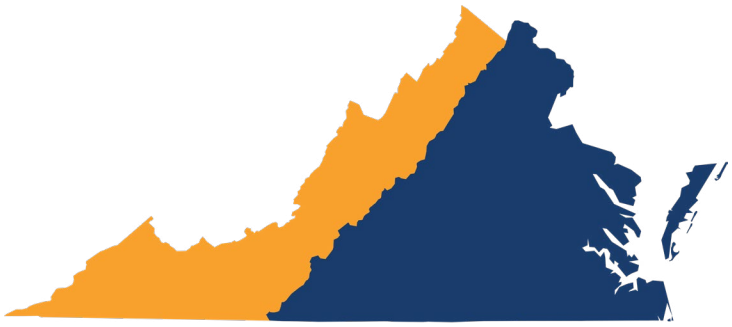
This Challenge is designed to surface innovations that:

- Strengthen coordination across agencies, jurisdictions, and disciplines
- Function under real-world constraints, including limited connectivity and staffing
- Deliver measurable value before, during, and after disasters
- Support both immediate recovery and long-term community resilience

Importantly, this work recognizes that resilience is not only about avoiding losses. It is about enabling communities to recover faster, function more effectively, and build lasting economic and social strength even in the face of ongoing risk.

The following topic areas reflect this integrated approach. Together, they aim to accelerate solutions that are practical, scalable, and grounded in the lived realities of the Blue Ridge, helping communities move from vulnerability toward durable resilience.

This Challenge focuses on communities within Planning District Commissions (PDCs) 1-7 seen in the map below (also found here). These regions sit at the intersection of increasing resilience risk, limited capacity and strong local leadership. These geographies continue to serve as the proving ground for scalable solutions.



Blue Ridge Regional Resilience Challenge 2026

Funding and Award Structure

RISE has $500,000 in available funding, and applicants may address one or more priority areas. The Blue Ridge Regional Resilience Challenge moves solutions from application to action through a three-phase process: applicants advance to semifinalists, and then to three to five funded finalists, each receiving up to $50,000 for the early development of their solutions. One or more winners will ultimately receive a bulk implementation award to complete a pilot project in partnership with Blue Ridge communities.

Topic Area 1

Resilience Recovery After an Event: Debris Removal & Landscape Remediation

The Resilience Recovery Problem(s)

After riverine floods, debris such as forest material, sediment, damaged infrastructure, and household contents, accumulate in channels, culverts, bridges, and floodplains, creating safety hazards, degrading water quality, and increasing the likelihood of secondary flooding during the next storm. In steep, mountainous terrain, intense rainfall can trigger debris flows (fast-moving landslides) and slope failures that deliver large volumes of sediment and debris into streams, roads, and communities, complicating recovery and extending disruptions. Also, storm-driven blowdowns and wind damage can add large volumes of forest debris (tree limbs, trunks, foliage, etc.) and damaged structures, further burdening already limited local response capacity.

Rural communities often face long recovery timelines due to limited contractors and equipment, constrained local budgets, and complex permitting and disposal requirements. In addition, debris, sediment, and contaminated materials can create long-term ecological impacts (stream habitat smothering, riparian loss) and public-health risks if not handled quickly and correctly.

During prolonged outages and cleanup periods, extreme heat or cold increase the risk to vulnerable residents and outdoor workers, raising the stakes for rapid restoration of access, power, and cooling resources.

The goals of this topic are:

- Restore access faster after riverine floods, landslide/debris flow, and wind events.
- Reduce repeated losses by stabilizing banks, slopes, and debris choke points.
- Provide rapid, validated debris and damage intelligence to direct resources.
- Support multi-agency coordination (e.g., public works, emergency management, utilities, contractors).
- Lower recovery cost and time by better planning (e.g., optimizing routing, staging, and disposal logistics).
- Deliver in-place remediation that measurably reduces future risk.

Successful solutions will address at least one of the above.

The Pain Points in Current Solutions

1. ***Limited Situational Awareness:*** currently communities lack rapid, parcel-level predictions and/or observations on where debris is concentrated, what is hazardous, and what should be cleared first.
2. ***Fragmented Responsibilities:*** debris clearance, road repairs, stream work, and environmental remediation are often managed by different (typically government) entities, with limited coordination and dissimilar priorities.
3. ***Permitting and Compliance Friction:*** emergency work must still navigate environmental constraints (e.g., stream disturbance, sediment control, disposal), documentation and compliance detailing, and delaying action and increasing costs.
4. ***Contractor Bottlenecks:*** qualified crews and specialized equipment are scarce, especially for remote hollows and narrow valleys. Also, mobilization times can be long.
5. ***Safety and Liability Challenges:*** unstable slopes, swift water hazards, downed power lines, and contaminated debris increase risks to responders and volunteers.
6. ***Disposal and Reuse Gaps:*** limited local options for sorting, recycling, and beneficial reuse of woody debris and sediment leads to higher landfill costs and missed circular-economy opportunities.
7. ***Weak Recovery-to-Resilience Feedback:*** debris operations often restore to baseline rather than improving stream function, slope stability, and future flood conveyance.

Solutions Being Sought

RISE is seeking solutions to assist regional agencies and departments in providing quick, affordable clean-up after flooding events as well as remediation for protection from future events. Solutions may include:

- **Rapid assessment and prioritization** tools that map debris hotspots, blocked crossings, and high-risk slope/stream segments - optimized for rapid triage and work-order generation.
- **Debris operations integrated workflows** for routing, staging sites, contractor dispatch, chain-of-custody, and reporting (including debris type classification and hazardous material handling).
- **Nature-based and hybrid remediation approaches** that restore floodplains/riparian buffers, stabilize banks, and reduce future debris mobilization.
- **Slope stabilization and debris-flow risk reduction methods** that integrate post-event recovery with landslide mitigation.
- **End-to-end debris logistics innovations** that support sorting, dewatering, treatment, and beneficial reuse pathways (e.g., mulching, timber salvage, biochar/biomass, sediment repurposing for restoration) with clear QA/QC and regulatory compliance.
- **Workforce and community delivery models** that safely scale capacity (credentialing, training, safety tech, micro-contracting platforms, volunteer management) and prioritize local job creation.
- **Financing and procurement approaches** that speed action and reward outcomes (e.g., performance-based contracts, pre-negotiated contracts, collaborative procurements, shared equipment pools).
- **Heat-safe recovery operations** that integrate worker protection and community cooling needs into cleanup scheduling, communications, and continuity planning.

Topic Area 2

Integrated Resilience Solutions to Facilitate Adoption & Enhance Synergies

The Resilience Recovery Problem(s)

Disruptive events are increasingly compound in nature: heavy rain triggers flooding and landslides; storms bring wind damage and prolonged power outages; extreme heat strains public health systems and critical infrastructure. Local leaders need cross-hazard situational awareness and coordinated pathways for action, not siloed responses.

Communities are often left with fragmented tools: warning systems, sensors, maps, guidance, insurance programs, and recovery resources that operate independently rather than as part of a cohesive operational ecosystem. Adoption fails when solutions add administrative burden, require specialized technical capacity, or fail during degraded communications or power outages, precisely when they are needed most.

The greatest value lies in the connections between systems: early warning that enables protective action, faster access to recovery financing, accelerated debris removal, and quicker reopening of businesses and services. Too often, these linkages are neither intentionally designed nor measured as a connected chain, limiting their collective impact when communities need them most.

The Pain Points in Current Solutions

1. ***Interoperability Gaps:*** siloed data across GIS, emergency operations, public works work-orders, utilities, and community reporting; limited APIs/standards and duplicative data entry.
2. ***Connectivity Constraints:*** rural geographies face spotty communications coverage; systems that require always-on connectivity or heavy bandwidth are brittle during disasters.
3. ***No "Day-2" Operating Model:*** pilots often lack sustainment plans (governance, data stewardship, staffing time, cybersecurity expectations, and O&M budgets).
4. ***Weak Synergy Capture:*** integration benefits are rarely measured with credible metrics tied to response speed, staff time saved, uptake rates, and persistence after pilots.
5. ***Trust and Equitable Access Challenges:*** residents may not trust alerts or cannot access them; adoption fails without accessible communications and community legitimacy.
6. ***Security and Privacy Uncertainty:*** small local governments need realistic cybersecurity and privacy practices that do not block adoption.

Solutions Being Sought

RISE is seeking solutions to assist regional and state agencies and departments in providing integrated platforms and data sources that make resilience forewarning, evacuation, and recovery streamlined, affordable, manageable, and sustainable. Solutions may include:

- **Integration layers and connectors:** middleware/API connectors and shared data models that unify event detection (river stage/rainfall, heat indicators, wind impacts, landslide-prone triggers), asset status, work orders, and public communications.
- **Role-based operations dashboards:** single-pane-of-glass views tailored to EOC, public works, utilities, regional coordinators, and community-facing needs - designed for small-staff realities.
- Offline/low-bandwidth capability: degraded-mode operations (store-and-forward reporting, SMS-capable alerts, offline field forms) that remain functional during outages.
- **Adoption packages (not just technology):** training curricula, onboarding playbooks, governance templates, privacy-by-design practices, and costed sustainment plans that local partners can run.
- **Synergy demonstration pilots:** pilots that explicitly show cross-topic outcomes (faster protective actions, reduced downtime, faster debris clearance, improved continuity for clinics/schools/businesses).
- **Heat and health integration:** integrate cooling resources, vulnerable-population outreach, and heat safety protocols into emergency operations and public communications.

Topic Area 3

The Regional Resilience Value Case: Beyond Avoided Losses

The Resilience Recovery Problem(s)

Resilience is underfunded when its value is framed only as avoided losses, especially when events are intermittent and benefits accrue across multiple stakeholders (e.g., residents, businesses, insurers, local and state government). There is a need to frame and quantify how resilience investments create value beyond "avoiding future damage" and highlight what resilience investments can deliver: reduced losses when hazards strike, stronger economic activity from reduced background risk, and social/environmental co-benefits that accrue even in non-disaster years.

Riverine, particularly rural, communities need practical, regionally grounded methods to select, bundle, and finance multi-hazard projects while communicating value clearly to councils, funders, and residents. Without comparable, transparent approaches, projects are evaluated one-by-one, limiting the ability to build portfolios that improve ROI, equity, and implementation efficiency.

The Pain Points in Current Solutions

There are several difficulties regularly found in valuing resilience investments, including:

1. ***Inconsistent valuation methods:*** resilience investment valuation analyses vary in assumptions, and co-benefits (e.g., health, ecosystems, equity) are often omitted or treated qualitatively. Several documented approaches* may be applicable in this topic, for example (but not limited to):
    - Benefit Cost Analysis
    - Triple Dividend of Climate Resilience
    - Triple Bottom Line
    - Total Cost of Risk/Ownership
    - Social Return on Investment

    *References for each of these methods are included at the end of this document.
2. ***Split Incentives:*** the entity that pays is not always the beneficiary (e.g., local government invests while households, businesses, or insurers gain).
3. ***Tooling is Too Complex:*** data needs and analytical burden exceed local capacity; outputs are not packaged in an investment-ready way.
4. ***Portfolio "Blindness":*** communities lack methods to bundle projects across corridors, watersheds, or service areas to improve fundability and delivery.
5. ***Communication Gap:*** technical analysis does not translate into clear, credible narratives and visuals for public decision-making.

Solutions Being Sought

RISE is seeking solutions to develop the framework for investable opportunities in resilience for (but not limited to) private and institutional investors, governments, and philanthropies. Where possible, solutions should consider those benefits of the resilience investments during non-event "sunny day" periods. Solutions may include:

- **A resilience value toolkit:** practical templates and models to quantify and communicate the full value stack (avoided losses, reduced-risk economic benefits, and co-benefits) that integrate traditional and adjacent resilience threats with transparent assumptions and uncertainty ranges. Some documented approaches are listed above (e.g., Benefit Cost Analysis, Triple Dividend of Climate Resilience, etc.). Solutions may select one, combine several, or propose new approaches to fully and completely quantify the benefits of resilience protection investments.
- **Investment-grade business case packages:** fundable briefs that include costs, benefits by stakeholder, implementation pathway, O&M and adoption plan, and a realistic measurement strategy.
- **Portfolio design and prioritization:** methods to bundle projects across communities and corridors to reduce admin burden, strengthen equity outcomes, and build market demand for solution providers.
- **Evidence and metrics that small teams can calculate:** simple measurement plans (e.g., uptake, avoided downtime, clearance time, reduced repeat impacts, heat-health indicators) tied to clear targets.
- **Decision-maker communications assets:** slide-ready visuals and plain-language narratives that explain the triple dividend benefits for the Blue Ridge context and make tradeoffs explicit.
- **Financing and benefit-sharing options:** approaches to align incentives (public, philanthropic, and private) and to sustain solutions beyond pilot funding.

It is anticipated that some solutions to this topic may not be able to be fully completed, implemented, and validated within the allocated budget and timeline of the pilot project. Whereas it is preferable that projects complete this cycle within the allotted period, RISE will give credit to those submissions that may not be able to be completed but that define in as much detail as possible steps required to completion, expected outcomes and metrics to judge performance.

Applicants may look to past RISE Riverine Community Resilience Challenge solutions to evaluate the benefits of the pilot programs in the region for this topic. That would be an acceptable option and yield region-specific data, and demonstrate successful pathways to accomplish the goals.

References Specific to Topic 3

Benefit–Cost Analysis (BCA)

- **U.S. Office of Management and Budget (OMB),** Circular A-94: Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs
- **Boardman, A. et al.** (2018), Cost-Benefit Analysis: Concepts and Practice (5th ed.). Cambridge University Press.
- **Federal Emergency Management Agency (FEMA),** Benefit-Cost Analysis (BCA) Toolkit

Triple Dividend of Climate (or Disaster) Resilience

- **Global Facility for Disaster Reduction and Recovery (GFDRR) / World Bank** (2015). Unlocking the "Triple Dividend" of Resilience.
- **Zurich Flood Resilience Alliance (2018).** The Triple Dividend of Resilience: Realising Development Goals through the Multiple Benefits of Disaster Risk Management.
- **World Resources Institute (WRI) –** Heubaum, H. (2022), The Triple Dividend of Building Climate Resilience: Taking Stock, Moving Forward.
- **World Meteorological Organization (WMO)** (2024), The Triple Dividends of Early Warning Systems.

Triple Bottom Line (People–Planet–Profit)

- **Elkington, J.** (1997), Cannibals with Forks: The Triple Bottom Line of 21st Century Business. (Summary at https://proppg.ufersa.edu.br/wp-content/uploads/sites/11/2016/10/Referencia-de-Lilian-Giesta-Triple-bottom-line-in-21-century-2.pdf)
- **Global Reporting Initiative (GRI),** GRI Sustainability Reporting Standards
- **Harvard Business School,** Measuring the Triple Bottom Line (HBS Working Knowledge)

Total Cost of Ownership (TCO) / Total Cost of Risk (TCOR)

- **ISO 15686-5,** Buildings and Constructed Assets — Life-Cycle Costing
- **U.S. General Services Administration (GSA),** Life-Cycle Cost Analysis (LCCA) Handbook
- **Risk and Insurance Management Society (RIMS),** Total Cost of Risk (TCOR) Framework
- **McKinsey & Company,** Climate risk and response: Physical hazards and socioeconomic impacts

Total Cost of Ownership (TCO) / Total Cost of Risk (TCOR)

- **Social Value International,** A Guide to Social Return on Investment
- **NEF (New Economics Foundation)** (2009), A Guide to Social Return on Investment.
- **OECD,** Social Impact Measurement for Social Enterprises

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- Tanner, T., Surminski, S., Wilkinson, E., Reid, R., Rentschler, J., & Rajput, S. (2015/2018). The Triple Dividend of Resilience: Realising development goals through the multiple benefits of disaster risk management. GFDRR/World Bank and ODI. https://documents1.worldbank.org/curated/en/993161515193991394/pdf/P151463-01-05-2018-1515193988640.pdf
- Zurich Flood Resilience Alliance. (2018). The Triple Dividend of Resilience: Realising development goals through the multiple benefits of disaster risk management. https://zcralliance.org/resources/item/the-triple-dividend-of-resilience-realising-development-goals-through-the-multiple-benefits-of-disaster-risk-management/
- Heubaum, H. (2022). The Triple Dividend of Building Climate Resilience: Taking Stock, Moving Forward. World Resources Institute. https://www.wri.org/research/triple-dividend-building-climate-resilience-taking-stock-moving-forward
- World Meteorological Organization (WMO). (2024, November 5). The Triple Dividends of Early Warning Systems and Climate Services. https://wmo.int/media/magazine-article/triple-dividends-of-early-warning-systems-and-climate-services
- U.S. Global Change Research Program (USGCRP). (2023). Fifth National Climate Assessment (NCA5), Chapter 22: Southeast. https://www.southernclimate.org/wp-content/uploads/NCA5_Ch22_Southeast.pdf
- NOAA National Centers for Environmental Information (NCEI). (2025). U.S. Billion-Dollar Weather and Climate Disasters: Virginia Summary (1980-2024). https://www.ncei.noaa.gov/access/billions/state-summary/VA
- U.S. Geological Survey (USGS). (n.d.). What is a debris flow? https://www.usgs.gov/faqs/what-a-debris-flow
- U.S. Environmental Protection Agency (EPA). (2025). Extreme Heat. https://www.epa.gov/climatechange-science/extreme-heat