

Conserving an Intact and Enduring Appalachian Landscape

*Designing a Corridor in Response to
Climate Change*

Appalachian Landscape Climate Advisory Group

2022

“...A realm and not merely a trail marks the full aim of our efforts.”

— Benton MacKaye, the visionary behind the Appalachian Trail

Executive Summary

The increasingly devastating impacts of climate change are being felt worldwide, including across the entire Appalachian Landscape (also referred to as the Landscape). Recognized as a globally significant region, the Appalachian Landscape contains a wide variety of species and critical natural resources, including a vast canopy of resilient forests and a network of streams and rivers that stretch from southern Canada into Alabama in the southeastern United States (Figure 1). This natural network provides more than 119 million people with critical resources like clean water.¹ More than 38 million people make up the diverse communities and cultures across this urbanized and populous Landscape. No natural region in the U.S. is as integrated into the economies and livelihoods of communities as this region. A large-landscape vision is needed to increase the pace and scale of conservation to tackle the most pressing issues of our time.² An intact and enduring Appalachian Landscape will secure the resources, benefits, and services this Landscape protects for future generations.³

Climate impacts are complex and expected to affect every sector of society. The symptoms of a shifting climate like rising temperatures, in conjunction with the increase in human development due to growing populations, are putting the region's public, economic, and ecological health at risk. Scientists in the U.S. have observed species beginning to shift their geographic ranges.⁴ The rapid loss of biodiversity and species range shifts can have cascading effects that hinder human health and



Figure 1. Artist rendition of the Appalachian Trail with the “Greater Appalachian Realm.” Map courtesy of ATC.

overall well-being.⁵ The increase in the frequency and severity of weather events and natural disasters is expected to continue, impacting the safety and livelihoods of communities.⁶ These impacts will disproportionately affect communities of color and exacerbate inequitable social conditions.⁷ As a result of these extensive impacts, working alongside communities is a priority to achieve durable community resilience across this Landscape.

Currently, just 26% of this globally significant Landscape is protected.⁸ The United States stands to lose one of its most valuable natural networks, which provides generational benefits to millions of people, including safeguarding clean water, air, food sources and systems, and safe living conditions.

In 2021, a Climate Advisory Group (CAG) of experts was convened to evaluate the impacts of climate on the Appalachian Landscape and the importance of this unique region in building resilience to climate change at the national scale. The CAG focused on elevating the collective action already underway and identified the readiness and willingness to work together to combat these threats. The CAG created a vision to bring partners together across disciplines to help safeguard and promote climate, environmental, and community resilience across this Landscape.

Appalachian Climate Corridor:

A connected and conserved landscape that protects the Appalachian Mountains so people and nature can thrive in an era of climate change.

Goal 1. Ecological Integrity: Ensure an intact and enduring landscape.

Goal 2. Human Connection to Nature: Inspire broad community action.

The CAG has identified threats to this Landscape, a vision to address these threats with actionable goals, and suggested actions to protect this region. In addition, the CAG discussed and identified existing policies, programs, and conservation projects to evaluate

immediate opportunities to advance the vision and goals. The results of the CAG discussions are presented in this document to build toward a strategic vision to protect and conserve the Appalachian Landscape. To achieve a connected and conserved Landscape, we recommend stakeholders use this document to collaborate with partners to identify where their personal and organizational expertise can best be combined to accelerate and expand the protection of the Appalachian Landscape. Some initial steps are recommended to catalyze collaboration:

- Identify recommended action(s) of interest.
- Intentionally work with residents and communities with historical ties to the land and additional partners to identify who can help achieve agreed-upon recommended action(s) of interest.
- Integrate existing prioritization tools and build from existing tools to identify areas of priority concern related to climate change.
- Identify and advance opportunities to impact policies and programs to help humans and ecological communities actively become more resilient to the impacts of climate change across the Landscape

This document serves as a call to action for communities, agencies, governments, businesses, foundations, and nonprofit organizations to work together to design a coordinated landscape effort that addresses climate and land-use change to protect one of North America's greatest natural assets.

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Andi Pearl, The Volgenau Foundation

Aaron Troncoso, Next Generation Advisory Council Member, Appalachian Trail Conservancy

Brendan Mysliwicz, Appalachian Trail Conservancy

Christy Plumer, Theodore Roosevelt Conservation Partnership

Claire Jantz Ph.D., Center for Land Use & Sustainability, Shippensburg University

Curtis Bennett, National Aquarium

David Foster Ph.D., Harvard University

Dennis Shaffer, Appalachian Trail Conservancy (Retired)

Fred Tutman, Patuxent River Keeper

Gary Tabor, Center for Large Landscape Conservation

Greg Wathen, Tennessee Wildlife Resources Agency (Retired)

Idalina Walker, Friend of Southwest Virginia

Jay Leutze, Southern Appalachian Highlands Conservancy

Jessie Levine, The Nature Conservancy

Jennifer Melville, Open Space Institute

Katie Allen, Appalachian Trail Conservancy

Laura Belleville, Appalachian Trail Conservancy

Lynn Scarlett, Ph.D., The Nature Conservancy (Retired)

Marian Orlousky, Appalachian Trail Conservancy

Mark Anderson, Ph.D., The Nature Conservancy

Melly Reuling, Center for Large Landscape Conservation

Peter Stein, The Lyme Timber Company

Sacha Spector, Ph.D., Doris Duke Charitable Foundation

Scott Deitchman, MD, MPH, Consultant, National Center for Disaster Medicine and Public Health

Susan Arnold, Appalachian Mountain Club

Thomas Easley, Ed.D., Mind Heart for Diversity, LCC.

Toni Lyn Morelli, Ph.D., Northeast Climate Adaptation Science Center, US Geological Survey

Wendy Janssen, National Park Service

Design: Kendra Hoff, Center for Large Landscape Conservation

Copy Editing: Christine Ganas Weinheimer, Center for Large Landscape Conservation

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Glossary of Key Terms

Adaptation — The process of making adjustments in natural or human systems in anticipation of or in response to a changing environment in a way that effectively uses beneficial opportunities or reduces negative effects.⁹ Examples of climate adaptation include building flood defenses, planning for heatwaves and higher temperatures, and improving water storage and use.¹⁰

Appalachian Climate Corridor — A connected and conserved landscape that protects the Appalachian Mountains so people and nature can thrive in an era of climate change. This Landscape includes the A.T. Corridor, the Appalachian Trail Landscape, and The Nature Conservancy's Appalachian Landscape (in order of smallest to largest by acreage). Please refer to Figure 2 for more details.

Appalachian National Scenic Trail (ANST) — At more than 2,180 miles long, the ANST is a public footpath that traverses the scenic, wooded, pastoral, wild, and culturally resonant lands of the Appalachian Mountains.¹¹

Appalachian Trail (A.T.) Landscape — The watersheds that touch the Appalachian Trail are typically displayed as the HUC-10 watershed boundary.

Appalachian Landscape — This map delineates the Blue Ridge to Boreal Landscape, bounded by The Nature Conservancy.

A.T. Experience — Integral to the A.T. Trail experience are:

- Opportunities for observation, contemplation, enjoyment, and exploration of the natural world
- A sense of remoteness and detachment from civilization
- Opportunities to experience solitude, freedom, personal accomplishment, self-reliance and self-discovery
- A sense of being on the height of the land reliance
- Opportunities to experience the historic and pastoral elements of the surrounding countryside
- A feeling of being part of the natural environment; and
- Opportunities for travel on foot, including opportunities for long-distance hiking.

Other recreational uses of these lands should be considered compatible if they do not require any modification of design and construction standards for the Trail footpath or Trail facilities; cause damage to the treadway or Trail facilities; require an engine or motor; or adversely impact the Trail experience or the cultural, natural, or scenic resources of the Trail.¹²

Carbon Markets — A market where reductions in carbon dioxide or other GHG emissions can be bought and sold.¹³

Carbon Sequestration — The ability of trees, plants, and crops to absorb – or sequester – carbon dioxide emissions from the atmosphere through the natural process of photosynthesis. Sequestration happens naturally as forests, plants, and crops grow. Planting new forests, improving soil health, and implementing best practices for forest management can increase sequestration rates.¹⁴ Using conservation tillage, reducing field pass intensity, improving efficient nutrient management, and diversifying crops through rotation or cover crops can increase sequestration rates.¹⁵

Carbon Storage — Forest ecosystems and agricultural lands store carbon in the roots, trunks, and branches of trees, foliage; soil layers; and forest products and crops. Permanent protection and carbon-friendly management of forestland can avoid the release of carbon stores back into the atmosphere through development and heavy cutting, while sustainable forest management can reduce damage from insects and fire.¹⁶ Improved farming practices such as reducing soil disturbance, enhancing permanent soil cover, and implementing crop rotation can avoid the release of carbon stores while improving farm energy efficiency and boosting air and soil quality.¹⁷

Climate Change Refugia — “Areas that remain relatively buffered from contemporary climate change over time and enable persistence of valued physical, ecological, and socio-cultural resources.”¹⁸

Climate Justice — Term that “acknowledge[s] climate change can have differing social, economic, public health, and other adverse impacts on underprivileged populations.”¹⁹ Climate justice begins with recognizing key groups are affected differently by climate change. Climate impacts can exacerbate inequitable social conditions.²⁰

Climate-smart Conservation Strategies — The intentional and deliberate consideration of climate change in natural resource management, realized through adopting forward-looking goals and explicitly linking strategies to key climate impacts and vulnerabilities.²¹

Connectivity — “Ecological connectivity is the unimpeded movement of species and the flow of natural processes that sustain life on Earth.”²²

Community Resilience — The ability and/or capacity of a community or business to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.²³

Diverse/Diversity — The differences of people found in the advisory group, partners, and the Landscape we work across. Taking into account the demographic mix of peoples, including the dimension of human difference (e.g., racial and ethnic groups, income, rural to urban settings, sexual orientation or gender identity, etc.). Diversity incorporates different perspectives but must be paired with inclusivity for an equitable impact (please see the Equity and Inclusion definition below).²⁴

Equity — Ensuring fair treatment, access, opportunity, and advancement for all people while at the same time striving to identify and eliminate barriers that have prevented the full participation of some groups.

Inclusion — Intentionally building a culture that is flexible, values diverse ideas, and embraces the meaningful participation of all.

Mitigation — Reducing emissions of and stabilizing the levels of heat-trapping greenhouse gases in the atmosphere.²⁵ Climate mitigation examples include enhancing carbon sinks (such as forests, wetlands, and soils) that accumulate and store greenhouse gases.

Carbon Neutral — Balance between the amount of carbon dioxide produced and the amount removed from the atmosphere. We have reached carbon neutrality when we remove as much carbon dioxide from the atmosphere as we put into it.

Natural Climate Solutions — A suite of conservation, restoration, and improved land management interventions — such as natural forest management, cover cropping, regenerative agriculture, and avoided conversion²⁶ — on natural and agricultural lands that increase carbon storage and reduce greenhouse gas emissions.²⁷

Resilience — The ability and/or capacity to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.²⁸

Stewardship — The responsible use and protection of the natural environment through conservation and sustainable practices to enhance ecosystem resilience and human well-being.²⁹

Wildlife Corridors — Swathes of natural land cover that join habitat patches.³⁰

www.ErikBarstow.com / Courtesy of the Appalachian Trail Conservancy



Motivation & Process

“Nature is changing, and we can’t hold it steady, so we have to find a way to protect it while it shifts.”

– Mark Anderson

Dave “Taco” Tachon / Courtesy of the Appalachian Trail Conservancy

For more than 100 years, the Appalachian Trail, lovingly known as the A.T., has existed as the backbone of conservation on the East Coast of the United States. Recognized as one of the most iconic long trails globally, this trail attracts more than three million visitors annually. This protected green ribbon spans 12° of latitude from Georgia to Maine, with elevations ranging from 124 feet to over 6,500 feet above sea level. The trail sits upon one of the world’s most topographically and biologically diverse landscapes. The Appalachian Trail has long served as an important wilderness recreation resource, a refuge from development that preserves ecological diversity, and a primary

north-south migration corridor for native wildlife in the region. This Landscape also provides critical climate change refugia for the future adaptation needs of plants and animals. Experts agree that the Appalachian Landscape must be conserved and connected to maintain its resilience and biodiversity while protecting species’ current and future opportunities to move across eastern North America. There is perhaps no greater opportunity to advance large landscape protection in the United States than by continuing in the incredible effort of land protection and community engagement that began in 1921 with the establishment of the A.T., which continues to this day.

Communities across the Appalachian Landscape must take immediate action to prevent and/or minimize the most significant impacts of climate change³¹, including preparations for long-term drought, extreme weather events, increased forest fires, and an increase in vector-borne diseases such as Lyme disease.³² Climate change will continue to affect individuals, human and ecological communities, and our nation, leading to hundreds of billions of dollars in projected annual losses due to the impacts of climate change. An increase in the destruction of buildings from severe storms, increased invasion of exotic species, the desiccation of water sources due to drought, and changes in the timing of the seasons will threaten the health, sustainability, and composition of the flora and fauna communities. These expected impacts will cause major disruption to the Appalachian Mountain ecosystem.³³ Although a daunting forecast, climate change can motivate and unify local communities to galvanize national and global leadership to affect change. The field and practice of landscape conservation is growing, thriving, and innovating across the globe to address these complex challenges such as climate change. The Appalachian Landscape includes a variety of landscape conservation initiatives at multiple scales and geographies that are already driving conservation success across eastern North America (see Appendix A for some initiative examples). These initiatives contribute to achieving conservation goals at the national scale, including contributing to ambitious goals of conserving 30 percent of U.S. lands and waters by 2030.

Successful landscape-scale collaborative models exist and demonstrate that coordinated, collaborative, scientifically based strategic efforts across partners, programs, and communities are a proven approach to building trust and growing relationships to achieve sustainable conservation outcomes.³⁴ All of these models started with a vision. The collaborative landscape conservation design approach will be needed to maintain a connected and resilient Appalachian Landscape that can mitigate and adapt to climate change.³⁵ Achieving this ambitious goal will require a shared commitment to design the nation's first and largest climate corridor. By building on Benton MacKaye's 20th-century vision for the Appalachian Trail and collaborating with partners across this Landscape, we can optimize our ability to mitigate and adapt to the biodiversity and climate crises while advancing

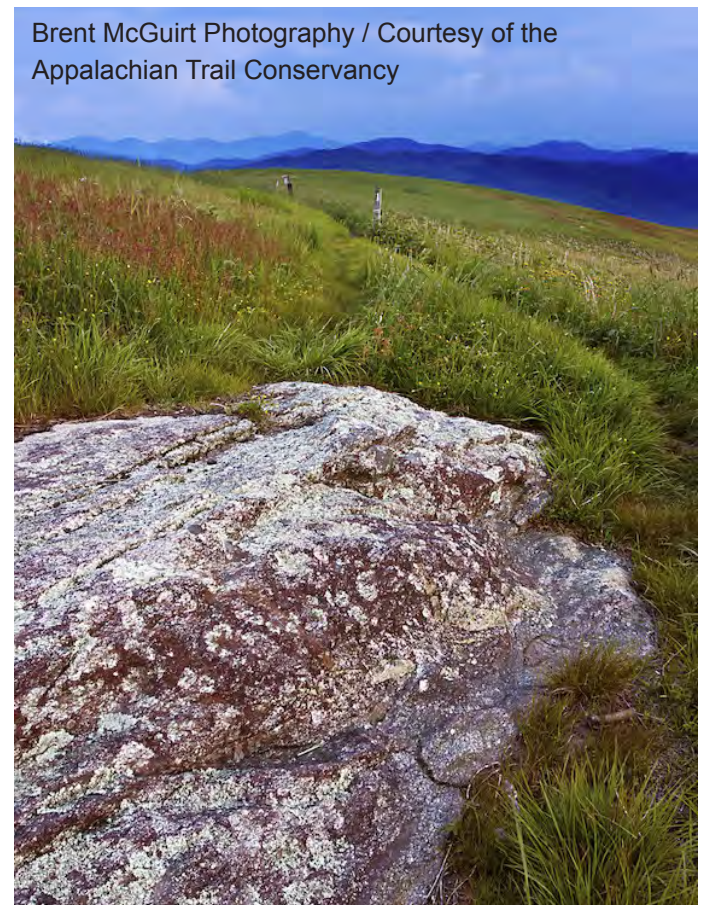


Starting in May 2021, the Appalachian Trail Conservancy, working with the Center for Large Landscape Conservation, developed a Climate Advisory Group (CAG) to identify how to integrate climate-smart conservation strategies across the Appalachian Landscape. CAG members were selected based on their regional affiliation (Northeast, Mid-Atlantic, and Southeast) and expertise in fields ranging from equity and conservation biology to land protection and philanthropy. Over seven months, more than 30 experts from across disciplines came together to discuss the importance of the Appalachian Landscape, the impacts of climate change on the Landscape, and the value of this Landscape in helping to mitigate the effects of a changing climate on surrounding communities.

To ensure that the CAG moved forward in a way that was sensitive to and aware of the needs of communities who have traditionally been marginalized or excluded from conservation action and decision-making spaces, we engaged an expert in equity to help guide the conversation of the CAG meetings and support the development of this document. The Equity Advisor participated in all CAG meetings, made suggestions to improve the CAG process, and developed recommendations on how to better integrate an equity lens and approach into the implementation of this vision moving forward (See Appendix C for recommendations).

The CAG discussions focused on the future of the Appalachian Landscape in a changing climate. Through facilitated, open and participatory conversations, the CAG began to frame a shared vision and values to consider, which would help mitigate and adapt to the expected effects of climate change. Through monthly facilitated discussions and working groups, the CAG worked to:

- Define a vision and shared values, building upon existing science and knowledge
- Understand the Landscape-wide resources and climate mapping available
- Assess existing threats and public policy and program opportunities to address them, and
- Begin to identify existing and potential partners for further collaboration.



These preliminary discussions brought partners together to build a bold vision to move this initiative forward. These discussions were also meant to provide resources to inform and support the work of existing initiatives like the Appalachian Trail Landscape Partnership (ATLP), a coalition of 70+ public and private groups. An inventory of existing information, gaps in our knowledge, and opportunities were identified to build a foundational understanding of current and potential work that could contribute to conservation outcomes across the Appalachian Landscape to mitigate and adapt to the effects of climate change. The CAG developed a list of essential priorities and suggested actions for partners to collectively consider when designing a landscape conservation approach to respond to the effects of climate change. This document summarizes the identified opportunities and threats where long-term, inclusive partnerships with communities and conservation practitioners can accelerate efforts to achieve a resilient Appalachian Landscape.



Brent Farmer / Courtesy of the Appalachian Trail Conservancy

Embracing Complexity

The magnitude and rate of climate change effects on the Appalachian Landscape across more than 14 states, diverse ecosystems, and complex land ownership patterns will make designing a climate-smart strategy challenging. Embracing the unique complexities of the Landscape, the CAG brainstormed some priorities and potential actions to address these challenges across the Landscape. The CAG acknowledged that the process of building this vision is iterative. The CAG explored some solutions but was aware that including all partners in any proposed recommended solutions is critical, especially the perspectives of those not traditionally at the conservation discussion.

The ideas presented in this document are neither original nor exhaustive but do reflect the collective expertise and dedication of a group of individuals whose work in the fields of large-landscape conservation, land use policy, forestry, climate, biodiversity, community engagement, equity, Indigenous rights, and public health spans decades. Still, there is much to learn and to benefit from the input of others. We expect this to serve as a living document. The continued development of ideas is encouraged to expand this initiative and its partnerships to support a shared vision for the future of the Appalachian Landscape.



Justin "2Taps" Helmkamp / Courtesy of the Appalachian Trail Conservancy

Figure 2. Spanning from northern Alabama to the Canadian Maritimes, the Appalachians are a global priority for conservation. The blue line delineates the ANST running along the spine of the Appalachian Landscape. Appalachian Landscape data courtesy of TNC.



Appalachian Landscape Context

The CAG discussed an Appalachian Climate Corridor that encompasses the Appalachian National Scenic Trail, the A.T. Landscape, and the Appalachian Landscape bounded by The Nature Conservancy (see Glossary and Figure 2 for more detail). At its narrowest, the Appalachian Trail forms a path along the spine of the Appalachian Mountains, protected and managed by the National Park Service, USDA Forest Service, Appalachian Trail Conservancy, numerous state agencies, and thousands of volunteers. Conceived as a public footpath through the wilderness more than 100 years ago, the A.T. has now become a cultural resource that connects rural and urban communities throughout this Landscape. In recent years, continued development and increased recreational usage have elevated broader attention to the Landscape beyond the A.T., which is significant to the protection of the Trail, its management, and the A.T. Experience.³⁶ Through that broader lens, the A.T. Landscape became a large-landscape effort for conservation partnerships like the ATLTP to preserve the wild, scenic, and culturally significant landscapes across eastern North America (Figure 2).

Over a century ago, Benton MacKaye inspired a vision to build a trail that traverses 14 states of the eastern U.S. In his original proposal, MacKaye saw this as a greater Appalachian Realm (Figure 1). He envisioned a regional plan where the Appalachian Trail supported local communities designed to protect rather than impede upon the many benefits of land

in its undeveloped state. His vision activated private and public individuals alike to, within 16 years, construct a continent-spanning trail. Designated a National Scenic Trail in 1968, the Appalachian Trail is a nationally recognized cultural and natural resource, permanently protected by Congress and the most successful intentional land protection project in the nation's history. MacKaye's vision inspired a grassroots movement that continues to engage individuals, communities, states, and federal partners today.³⁷

The Appalachian Landscape, the broadest geography to consider (Figure 2), is home to an expansive network of protected and conserved federal, state, tribal and private lands, providing opportunities for millions of individuals to seek their own unique experiences in nature. More than three million people visit the Appalachian National Scenic Trail annually. The ATLTP continues to advance land protection to benefit the Appalachian Trail, its surrounding ecosystems, biodiversity, and nearby communities. ATLTP seeks to connect and conserve the natural, ecological, cultural, historic, scenic, recreational, and community-oriented qualities that make the Appalachian Trail and its surrounding lands so unique.³⁸ The context of this vision is to build from this foundation of collective action to conserve the region's lands and maintain its ecological and cultural values across the local, state, and regional scales to ensure that the Appalachian Landscape becomes a national model for regional resilience in the face of the expected future threats.

The Urgency and Need to Act Now

Globally, the widespread effects of increasing greenhouse gases are causing an increase in temperature extremes and significant variability in precipitation and storm events. As a result, snow cover is shrinking, flooding is becoming more frequent, wildfires are increasing, and invasive plants and animals are spreading and expanding their range, further compromising ecosystems.³⁹ The eastern United States is expected to experience temperature extremes, an increase in flooding, drought, and impacts like wind damage due to extreme weather

events. These factors can contribute to the greater frequency of wildfires and potentially cause a significant change in the distribution and abundance of plants and animals and their habitats.⁴⁰ These compounding factors are expected to degrade the ecological resource, like water and air, that more than 119 million people depend on and affect the world-class outdoor recreation opportunities that will impact the well-being of individuals and livelihoods of local communities (e.g., tourism and economic prosperity) across the eastern United States.⁴¹

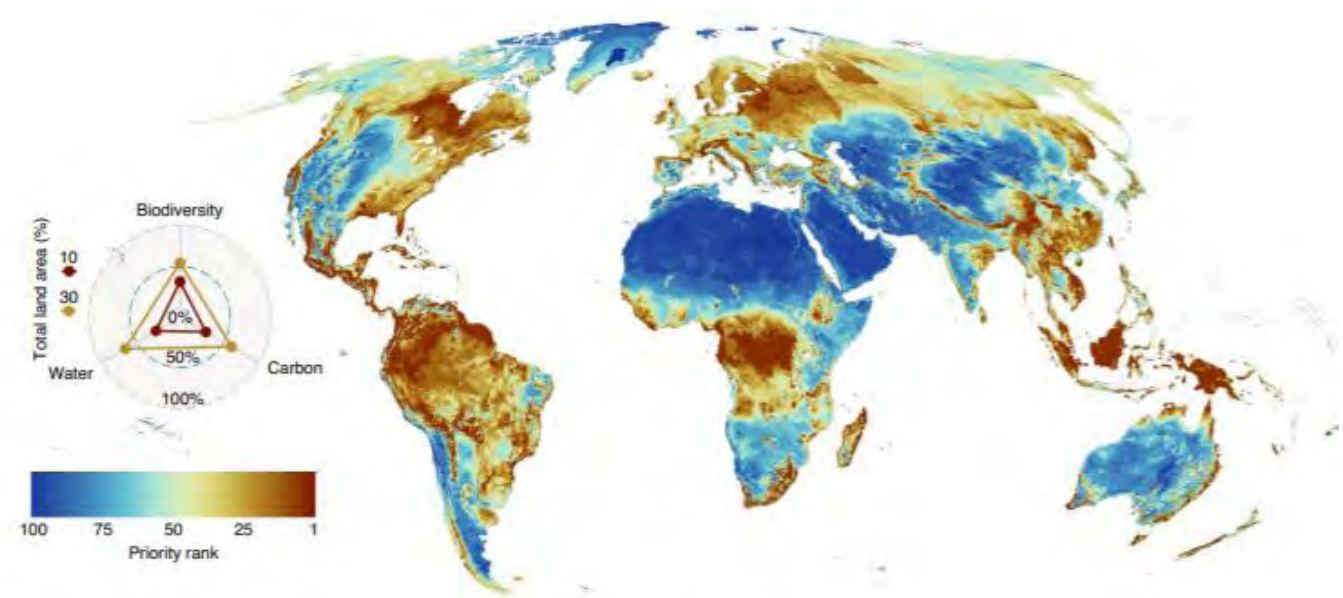


Figure 3. This figure shows the high conservation importance (red) of the Appalachian Landscape. Courtesy of Jung, M., Arnell, A., de Lamo, X. et al. Areas of global importance for conserving terrestrial biodiversity, carbon, and water. *Nat Ecol Evol* 5, 1499–1509 (2021). <https://doi.org/10.1038/s41559-021-01528-7>

“What is suggested, therefore, is a “long trail” over the full length of the Appalachian skyline, from the highest peak in the north to the highest peak in the south.”

– Benton MacKaye

Jim Cotey / Courtesy of the Appalachian Trail Conservancy

The recent adoption of ambitious goals for conservation, environmental justice, and addressing the climate crisis at the federal level presents a unique opportunity to advance this effort at the landscape scale. Executive Order 14007, “Tackling the Climate Crisis at Home and Abroad,” calls for conserving our land, water, and biodiversity, increasing resilience to the impacts of climate change, and delivering environmental justice. The Appalachian Landscape is poised to do all of this. This Landscape is recognized as a globally significant landscape due to its high levels of carbon, biodiversity, and water (Figure 3).⁴² It is also home to the highest concentration of people by population density in the United States.

To increase the pace and scale to protect these values and expand our response to our changing climate across the Appalachian Landscape, proactive, coordinated, and collaborative approaches must be taken with human communities, landowners, and land managers to conserve the habitat and

ecological communities across this Landscape. Experts and partners across the eastern United States have provided tools and resources to help strategically prioritize the work that must be done to achieve a more resilient landscape (see Appendix A for some relevant examples). Given the Appalachian Trail’s history and growing popularity, there are many opportunities to engage communities and partners to work across this Landscape.

Considering the nature and urgency of the threats, there is an immediate need to embrace a landscape-scale vision and actively engage local, state, regional, and federal partners to mitigate and adapt to climate change.⁴³ Along the Appalachian Landscape, existing initiatives need to increase collaboration and build strategies to translate the best available science and resources into climate actions that individuals, organizations, and partners can implement across this Landscape. This document articulates some key priorities to consider when building a strategic landscape-scale vision of an Appalachian Climate Corridor.

Designing a Vision for a Resilient Appalachian Landscape

As partners across the Appalachian Landscape, we must build awareness of the threats of climate change to human and ecological communities while designing and implementing climate-smart conservation strategies. This work requires a holistic conservation approach that actively and strategically works across jurisdictional boundaries and focuses on the larger Landscape to manage for change.⁴⁴ Two overarching goals are defined to begin this work:

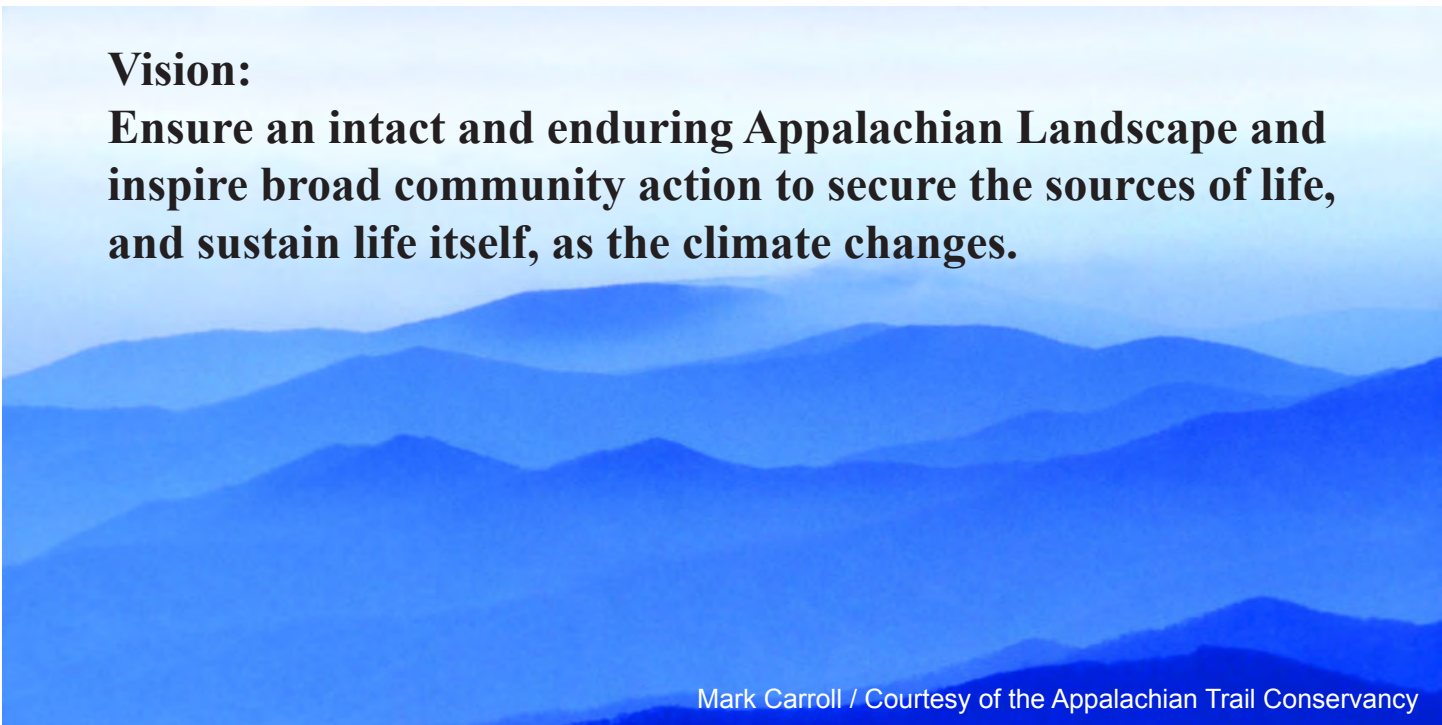
Goal 1. Ecological Integrity: Ensure an intact and enduring landscape

Goal 2. Human Connection to Nature: Inspire broad community action.

We believe that establishing a collaborative Appalachian Landscape vision can become a focal point to foster the next generation of communities and conservation practitioners to mitigate and adapt to climate change. To ensure an intact and enduring Appalachian Landscape, broad community action and more inclusive community engagement are needed. By expanding and building on the network of successful collaborative conservation and climate action efforts underway, partners across the Appalachian Landscape can strengthen engagement with communities to achieve continental-scale conservation to mitigate and adapt to the threat of climate change. The following sections focus on the goals, key values, and actions discussed by the CAG around this vision.

Vision:

Ensure an intact and enduring Appalachian Landscape and inspire broad community action to secure the sources of life, and sustain life itself, as the climate changes.



Mark Carroll / Courtesy of the Appalachian Trail Conservancy

Designing a Climate Corridor



Buddy Johnson / Courtesy of the Appalachian Trail Conservancy

To improve the resilience of ecosystems and biodiversity in a changing climate, we must be strategic about where to implement conservation, what work is needed to sustain ecological function and integrity and acknowledge and incorporate the needs of communities and individuals across this Landscape. A focus on enhancing connectivity while identifying, protecting, restoring, and conserving climate change refugia is needed. This dual approach will ensure that land use planning within the Landscape maintains the ecological benefits such as clean water, erosion control, and fire and flood prevention to surrounding and reliant communities. The Appalachian Landscape mitigates climate impacts through carbon sequestration and storage and offers an opportunity for long-term climate adaptation, if connectivity is maintained.

There is growing international interest and efforts underway to improve connectivity at a continental scale to combat the anticipated impacts of climate change.⁴⁵ The design of an Appalachian Climate Corridor is key to achieving continental-scale connectivity across the Appalachian Landscape. The CAG identified goals to guide this work, threats to achieving these goals, values to prioritize, and actions to initiate this work. This document shares a few existing policies, programs, conservation projects, and initiatives that contribute to the Appalachian Climate Corridor vision.

Goal 1: Ecological Integrity: Ensure an intact and enduring landscape to secure the sources of life

For a landscape to thrive, its ecological integrity must be maintained. Ecological integrity encompasses the health of a landscape in terms of its connectivity, biodiversity, and function.⁴⁶ Ecological integrity gauges the “wholeness” of ecosystems and informs how an ecosystem will face stressors such as habitat fragmentation and climate change. Across this Landscape, increases in stressors, including the destruction and fragmentation of intact forest habitats, alterations in forest regeneration, and establishment of invasive species, will continue to be exacerbated by climate change.⁴⁷ The Appalachian region is projected to experience increases in temperature and water extremes that could impact the ecological balance of this Landscape.⁴⁸ Managing for ecological integrity in a changing climate requires:

1. Maintaining, restoring, and stewarding the connectivity of healthy, functional, and climate-resilient forests and habitats,
2. Protecting species diversity by implementing measures to allow species to adapt to a changing climate,
3. Promoting, expanding, and enhancing natural climate solutions and ecosystem-based approaches.



Value 1: Maintain Landscape Connectivity: Connect healthy functioning forests and habitats.

Terrestrial and freshwater species have already begun to shift their geographic ranges, seasonal activities, and migration patterns in response to the ongoing changes in climate.⁴⁹ Landscape connectivity is a critical conservation tool that can offer resilience and ensure healthy functioning ecosystems. The amount of native biodiversity across the Appalachian Landscape can be maximized by (1) limiting the destruction of intact forest, aquatic, wetland, and riparian habitats, (2) maintaining these quality habitats, and (3) connecting these quality habitats.⁵⁰ The Appalachian Landscape offers a primary migration route for plants, mammals, and amphibians.⁵¹ This “Natural Highway” is bounded between cities, farms, and suburbs, following the Appalachian Mountain range (Figure 4).⁵² Healthy and functional ecosystems have the best chance to thrive if we protect resilient habitat cores and movement corridors across this Landscape.⁵³

To achieve this requires:

- Sustaining and improving terrestrial connectivity
- Sustaining and improving aquatic connectivity
- Conserving a climate change refugia network



Figure 4. “Nature’s Highway” Map courtesy of Dan Majka, TNC. Find out more [here](#).

Sustain and Improve Terrestrial Connectivity

The USDA Forest Service predicted unprecedented forest subdivision and development threats to increase across the eastern forests into 2030.⁵⁴ The impacts of land conversion on forests, agricultural lands, and open space from human development like housing, energy, and road development continue to increase due to pressures across one of the country's most populated regions. Most forests within the Appalachian Landscape are privately owned and are not protected from development.⁵⁵ This development pressure is of particular concern across the mid-Atlantic states. Fragmentation breaks up larger areas of natural land cover into smaller, more isolated

patches. Fragmentation makes it difficult for species to move and can lead to biodiversity loss.⁵⁶ Connectivity of terrestrial habitat occurs when essential habitats and strategic interconnections between these essential habitats are protected.⁵⁷ The Appalachian Landscape encompasses extensive protected areas, including Pisgah National Forest in the south and the Adirondacks in the north. These linkages could significantly improve the functional connectivity of the Appalachian region.⁵⁸ Strategic protection of new and/or enhancement of current protected areas and the corridors that connect them is needed to combat the impacts of fragmentation.



Lori Swartz / Courtesy of the Appalachian Trail Conservancy

Recommended Actions:

- Promote collaboration across States to build a strategic conservation planning framework to guide efforts to address the threat of fragmentation. A conservation planning framework can include:
 - Parcel prioritization models to avoid or minimize fragmentation and other relevant values
 - Analysis of the [Protected Area Database](#) overlaid with core wildlife corridors identified by State Wildlife Action Plans.
 - Assessment or creation of predictive regional growth/development models across the region
 - Integration of State Forest Action Plans into conservation planning to minimize fragmentation of identified priority areas for terrestrial connectivity.
- Incentivize the maintenance and restoration of connected, healthy functioning forests and habitats on private and public lands.
 - Provide a tax deduction or other incentive for landowners to allow their land to be part of a connectivity connector. This would require the landowner to meet specific criteria for land conservation.
 - Work with local and state governments to formalize land-use ordinances that promote maintenance of forest/tree cover and/or encourage clustered, low-impact development.
 - Seek permanent conservation easements for critical private lands identified as essential for connectivity.
- Promote “wildlife-friendly” development across sectors of human enterprise, from energy development to linear infrastructure development (e.g., locating wind turbines and electricity transmission lines away from migratory bird flyways).
 - Engage and participate in road planning at the earliest stages to help promote best practices from road ecology science and the development of functional and economical wildlife highway crossings.

Sustain and Improve Aquatic Connectivity

Riparian habitats, streams, rivers, and wetlands are dynamic and sensitive to changes in the climate. Connected networks of freshwater are essential for fish and other aquatic organisms to disperse and access habitats. Across the eastern United States, a legacy of human use of river networks has left these aquatic systems fragmented by barriers such as dams

and culverts.⁵⁹ Climate change may amplify and exacerbate existing ecosystem challenges impacting aquatic connectivity. Partners should identify dams, culverts, and other man-made aquatic barriers, prioritize addressing these barriers based on their impacts on ecosystem health, and seek ways to remove or modify them to sustain fundamental hydrologic processes.⁶⁰

Recommended Actions:

- Develop or support existing coalitions of watershed stakeholders (e.g., transportation agencies, US Army Corps of Engineers, private landowners, Tennessee Valley Authority, and other utility providers, etc.) to prioritize the removal of barriers, restoration of riparian habitat, and mitigation projects such as the creation of new wetlands.
- Use recently improved inventories and geospatial tools (some examples in Appendix A) to identify aquatic barriers to prioritize removal, restoration, and mitigation.
- Work with partners to identify and review priority Federal Energy Regulatory Commission hydropower relicensing projects for potential impacts on the proposed Appalachian Landscape.

Courtesy of the Appalachian Trail Conservancy



Conserve and Protect the Climate Change Refugia Network

Protecting climate-change-resistant lands across this region is essential for species to have an opportunity to adapt to a changing climate. Led by scientists at The Nature Conservancy (TNC), non-governmental, government, and academic partners have identified and mapped the Resilient and Connected Network across the United States. This tool identifies resilient sites that have confirmed biodiversity and climate flow.⁶¹ Combined, these factors represent climate-resistant lands that have “the capacity to maintain biological diversity, productivity and ecological function as the climate changes.”⁶² TNC has identified these climate-resilient cores and corridors that are essential to maintaining resiliency and biodiversity.

In 2018, the Open Space Institute (OSI) assessed climate-resilient lands and identified “Areas Worth Exploring” to ensure climate resilience across the A.T. Landscape (Figure 5). OSI found that 57% of the study areas scored above average for climate resilience. Of the 57% of climate-resilient lands identified, only 34% of those lands are protected. This analysis also identified the need to protect geophysical settings that are ‘underrepresented,’ such as low elevation fertile sites which can support more than one thousand endemic species. Only 10% of the study area included underrepresented settings that are resilient. Many of these sites are recognized for their current biodiversity values and are considered a top priority for future conservation.

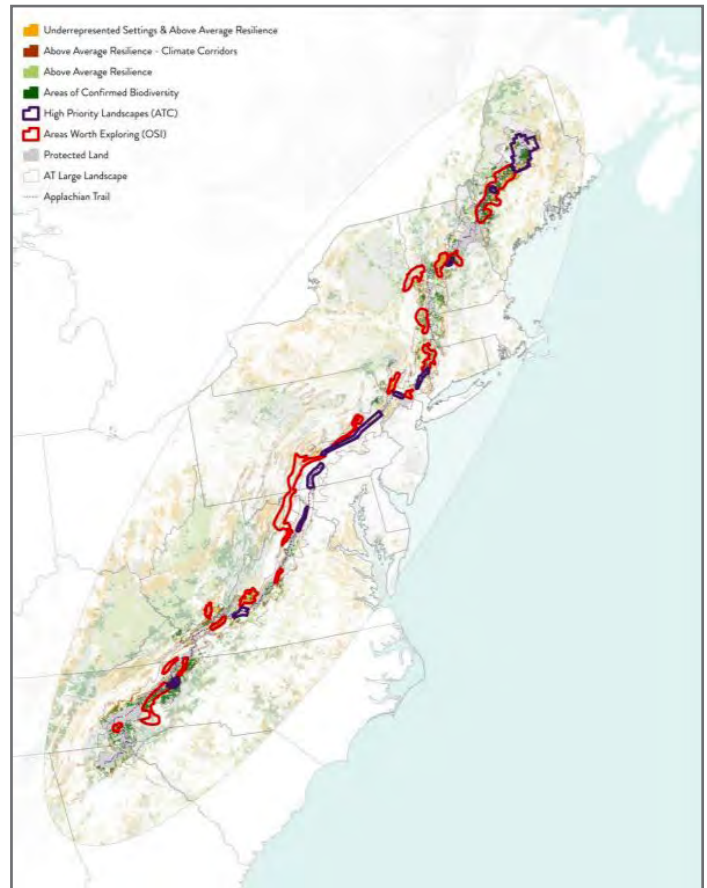


Figure 5. “Areas Worth Exploring” defined by a 2018 climate-resilient land analysis conducted by OSI.

These findings suggest that more work must be done to ensure that climate-resilient sites across this Landscape are permanently protected.

Recommended Actions:

- Work with natural resource agencies, land trusts, Tribes, municipalities, states, and additional partners at appropriate scales to identify priority actions to protect climate change refugia for priority resources.
 - Synthesize and, where necessary, develop climate change refugia maps at relevant scales for species, ecosystems, and socio-cultural resources that incorporate landscape stakeholder priorities.
 - Convene workshops that combine relevant survey data to integrate local knowledge and validate climate change refugia maps at the appropriate scales.
 - Identify and support partners to implement conservation actions on identified climate change refugia sites.
 - When selecting priority conservation projects to permanently protect climate-resistant lands across this landscape, incorporate and iteratively integrate the comprehensive and accessible work completed by TNC's Resilient and Connected Network and the assessment conducted by OSI (See Appendix A).
- Develop a comprehensive land protection plan to identify lands that are critical connectivity links, otherwise known as “pinch points.”
 - Prioritize the conservation of critical corridors/landscape linkages for habitat connectivity and ecological integrity. Identify priority climate refugia that are threatened by land-use change.



U.S. Forest Service Legacy Program

Brief Description

The U.S. Forest Service's Forest Legacy Program (FLP) is administered in partnership with state agencies to encourage the protection of privately owned forest land through conservation easements or land purchases. These grants are awarded competitively annually and can provide up to 75% of the funding for both land and conservation easement purchases. The required 25+% match is often secured through state agency grants, local government grants, landowner donations of fee or easements, bargain sales of fee or easements, and philanthropy.

Opportunity

Some of the earliest FLP funded conservation projects and more recent projects like the [Mahoosuc Gateway Initiative](#) across the New Hampshire-Maine border are [located across the Appalachian Landscape](#). In the past year or so, the program has grown substantially due to the full authorized appropriations of the Land and Water Conservation Fund (LWCF) under the Great American Outdoors Act (GAOA). This program could dramatically increase under the pending Build Back Better legislation (BBB) which includes an additional \$1.25 billion over the next ten years. This program supports many public benefits, including maintaining intact forest habitats to support the network of climate refugia, while encouraging sustainable forest management across private lands.

Challenges

Currently, not all of the Appalachian Landscape geography is included in the required "Assessment of Needs" documents which are submitted to the USFS for approval. This approval is required to secure eligibility for Forest Legacy Program funds. To encourage the use of this program across this geography, two actions are suggested:

- Explore amending or seek approval for Assessments of Needs, where necessary, to ensure the entirety of the spatial areas of the Appalachian Landscape is eligible.
- Expand eligibility to include federally recognized Tribes to receive FLP grants similar to what is currently allowed under the USFS's Community Forest and Open Space grant program.



Jonathan Riley / Courtesy of the Appalachian Trail Conservancy

Reconnecting the Mountains of Maine to the Sea

The A.T. and its surrounding lands are home to a vast variety of native wildlife, including the federally listed endangered Atlantic salmon found in the streams and river of Maine's 100 Mile Wilderness. U.S. populations of Atlantic salmon were reduced to dangerously low levels by overfishing and the construction of dams and other aquatic barriers that limit access to the spawning and foraging waters used by this anadromous species.

Today, Maine is the only state in the continental U.S. that sustains a population of Atlantic salmon, which exists across only a small fraction of its native range. ATC, collaborating with the Appalachian Mountain Club, The Nature Conservancy, USFWS and the NPS are working to restore fish-friendly passage along Henderson Brook by removing an aquatic barrier and restoring natural stream hydrology within the Appalachian Landscape.

Once completed, the Henderson Brook rehabilitation project will restore fish access to 3.4 miles of the brook so that species like Atlantic salmon and wild brook trout can access valuable breeding and foraging habitat that has been blocked for decades.⁶³ This project contributes to an even greater effort, AMC's Maine Woods Initiative, which is focused on reconnecting critical aquatic habitat across the West Branch of the Pleasant River System in Maine. This initiative has raised more than \$1.4 million for fish passage projects, leading to the completion of 70 culvert conversions and the reconnection of more than 76 miles of high-quality stream habitat.⁶⁴



Courtesy of the Appalachian Trail Conservancy

Value 2: Maintain Biodiversity: Protect and expand the species and ecosystem diversity

The average rise in global temperatures and the rapid alteration of the natural landscapes due to increased development has led to as many as 150 to 200 species going extinct every day globally.⁶⁵ The underlying geology, landform, and hydrologic diversity across the Appalachian Landscape, accompanied by the smaller ecological-scale gradients like valley to mountain summits across this region, provide a foundation for ecological diversity. This ecological diversity provides a foundation for protecting and maintaining biodiversity.⁶⁶ The southern Blue Ridge is one of the most biologically diverse regions in the United States, containing species that occur nowhere else in North America.⁶⁷ The Appalachian Landscape will increasingly play a prominent role in the

protection and adaptation of the eastern forest's plants and animals. Higher elevation streams throughout the southern Blue Ridge Mountains will serve as a refuge for brook trout, and the High Peaks of western Maine will serve as a refuge for the endangered Atlantic salmon. High-elevation forests will do the same for cool-temperate species like spruce, yellow birch, and sugar maple; songbirds like the golden-winged warbler; and the American marten in the northern latitudes. These intact forests offer biological diversity that is associated with large-scale connectivity. Continued protection from development, mismanagement, or permanent land conversion is essential to secure the survival and resilience of the eastern forest ecosystems.⁶⁸



“The Appalachian Trail Landscape is a treasure trove of biological diversity.”

– Pete McKinley, Lead Ecologist, The Wilderness Society

David Janes / Courtesy of the Appalachian Trail Conservancy

Reduce Loss of Native Species by Maintaining Essential Habitat

Intact and connected essential habitat is needed to protect native species populations. Habitat fragmentation is a leading driver of the biodiversity crisis. Conservation biologists agree that one of the most effective strategies for protecting biodiversity in a changing climate is to ensure that wildlife habitat is protected and connected at the landscape scale.⁶⁹ TNC's 2016 edition of the Resilient and Connected Landscapes data states that this Landscape contains large and intact interior forest blocks, which have confirmed biodiversity. Limiting the destruction of intact forest blocks and other essential habitats will help maintain critical climate refugia for plants and animals.⁷⁰ Strategically protecting, stewarding, and restoring essential habitat and, where applicable, acquiring and/or managing essential habitat can help mitigate the impacts of climate change on native species across this Landscape.

James Happy / Courtesy of the Appalachian Trail Conservancy



Recommended Actions:

- Identify, synthesize, and integrate existing priority species of Greatest Regional Conservation Need into climate-smart conservation actions across the Appalachian Landscape.
 - Streamline data-sharing agreements to increase the accessibility of data to key management stakeholders.
 - Identify ecologically appropriate habitat restoration, reforestation, and revegetation projects for focal species informed by U.S. Fish & Wildlife Service and State Wildlife Action Plans.
- Identify public funding opportunities to build a comprehensive analysis and inventory of essential habitats and climate refugia for plant and animal species of concern in the Appalachian Landscape. This comprehensive study should be conducted through a collaborative effort among federal, state, and local entities as well as conservation partners.

Proactive Conservation for Vulnerable Plants and Wildlife

Under the projected climate change scenarios for the 21st century and beyond, terrestrial and freshwater species face an increase in extinction risk.⁷¹ To put this in perspective, North America has lost nearly 3 billion birds since 1970.⁷² This rapid extinction risk is of particular concern for species with low mobility and/or those that are non-migratory. The Appalachian Landscape is home to a huge diversity of species, including several federally listed rare, threatened, and endangered (RT&E) species. bog turtle, Carolina northern flying squirrel, long-eared bat, rusty patch bumblebee, small whorled pagonia, and Atlantic salmon are just a few of the federally listed species that partners like ATC staff and volunteers work to protect across this Landscape. Many documents highlight species at risk, including State Wildlife Action Plans and Vulnerability Assessments. Often the challenge is translating these plans and assessments into action. A coordinated effort must be taken to review these assessments and plans for the most “at risk” species to prioritize efforts to conserve at-risk and RT&E species across this Landscape.



Recommended Actions:

- Review and synthesize existing vulnerable species research, such as the Regional Species of Greatest Conservation Need, derived from State Wildlife Action Plans across the Northeast and Southeast to identify species of greatest risk. Prioritize species that are most vulnerable such as species with low mobility. See the Appalachian LCC Species and Habitat Vulnerability Assessment Project for a relevant assessment synthesis (Appendix A).
- Work with federal and state agencies as well as leading nonprofit conservation organizations, such as conservation networks like ATLP, to develop strategies and action plans to encourage more proactive species conservation strategies in the Appalachian Landscape.
- Work with federal and state agencies and identified vulnerable species experts to assess opportunities to adopt climate refugia corridor development for vulnerable species in climate adaptation plans to better service short-term contingency needs.

Encourage Climate-Smart Invasive Species Management

Across the eastern U.S., invasive species distributions and impacts have been well documented, including the effects on native plant communities by Japanese stiltgrass, the most widespread invasive in the U.S. to the woolly adelgid and emerald ash borer, feral hogs, kudzu, and english ivy to name a few.⁷³ Invasive species are expected to be a leading threat to plants and animal species, impacting ecological, economic and human health, and recreation experience.⁷⁴ Prevention is currently considered the best way to reduce the effects of invasives. Policy actions at the state level have been leading the way in limiting the purchase, sale, and transport of invasive species (see Appendix B for a list of examples). Little is known about the long-term trends in invasive

plant communities across a regional scale and over time. Still, climate change is expected to exacerbate issues associated with the impact of invasive species across the Appalachian Landscape.⁷⁵ This can include the emergence of new species of concern as invasives shift their geographic range into new ecosystems and invasives that may emerge earlier and persist longer, or grow more in response to earlier springs, longer growing seasons, increased disturbances, higher concentrations of atmospheric CO₂, and other changes. To incorporate and achieve climate-smart invasive species management, managers need more information about how and when they should act against invasives in a changing climate.⁷⁶

Recommended Actions:

- Support and recruit additional qualified volunteers/landowners to address invasive issues as they arise.
- Educate the Appalachian Trail user community to avoid contributing to the transport of invasives.
- Encourage recreationists and landowners across this Landscape to record invasive species through online community science efforts. Utilize national online platforms like [Early Detection and Distribution Mapping System \(EDDMapS\)](#).
- Incentivize and educate private landowners, especially agricultural communities, to reduce invasive species and promote native plants and regenerative processes. Encourage land management agencies and owners to use approved biocontrol across the Landscape.
- Work with regional invasive plant councils to encourage collaboration, education, and advocacy for strong policy across public sectors on managing invasive species in the face of climate change.

Central Appalachia Habitat Stewardship Program — National Fish and Wildlife Foundation

Brief Description

The Central Appalachia Habitat Stewardship Program works to improve forest and freshwater habitat quality and connectivity and increase the distribution and abundance of native fish, birds, and other wildlife. Administered by the National Fish and Wildlife Foundation (NFWF), these competitive grants are awarded across portions of the Appalachian region of New York, Pennsylvania, Ohio, Maryland, Virginia, and West Virginia.

Opportunity

Partnering with Federal agencies like the U.S. Department of Agriculture’s Natural Resources Conservation Service and foundations like the American Forest Foundation, this program has awarded more than \$9.8 million in grant funding and \$12.5 million in partner match dollars to fund 61 projects to increase the abundance of key species.⁷⁷ The most recent 2020 grant award includes several forest management projects to improve habitat quality for priority birds like the golden-winged warbler and wood thrush in Pennsylvania and aquatic habitat projects to enhance the quality of habitat and/or restore connectivity for imperiled aquatic species like freshwater mussels and eastern brook trout.⁷⁸



Donna Cline / Courtesy of the Appalachian Trail Conservancy

Challenges

Currently, this program is focused on six states of the Appalachian region. These focal areas have been selected based on an analysis of large watersheds for priority forest and freshwater habitat for target species to sustain and improve large, contiguous blocks of the highest quality habitat. Two actions are suggested to capitalize on the benefits of this program:

- Expand this program to include other regions of the Appalachian Landscape that align with the program goals and objectives
- Consider aligning projects to achieve co-benefits of the current Areas Worth Exploring data created by OSI for the ATC, and/or to be determined Appalachian Opportunity Zones.

Restoring a Climate Resilient Forest on Tug Hill

Tug Hill is a 1.2-million-acre mosaic of public and private lands and is the third largest forested area in New York. Tug Hill is a critical link between the Adirondacks to the northeast and the Appalachian Mountains to the south and has been recognized as an important area to support future species movement as the climate changes. The Nature Conservancy (TNC) manages the 15,000-acre Tug Hill Conservation Area. Due to a legacy of poor timber harvest practices, portions of this landscape are predicted to be less resilient to climate change. TNC and partners determined that forest recovery through natural processes would not be sufficient on the time scale needed to bolster ecosystem adaptation to climate change. In 2018, TNC initiated a project to evaluate restoration practices to improve resilience.

In the first phase of the project, the team planted a 50-acre degraded area with 35,000 seedlings of tree species present on Tug Hill today, as well as species expected to thrive in a future climate. In the second phase, TNC has partnered with the University of Vermont to determine whether planting additional trees in gaps in the forest canopy can increase forest health and resilience. TNC is also experimenting with forestry techniques, such as creating small gaps in the tree canopy and leaving snags and large woody debris on the forest floor to create wildlife habitat. The findings will help public and private forest owners in New York and across the region to better manage their forest lands in the face of climate change. [Find out more](#) about this project.

Michael_ 'ShortTerm'_ Crews / Courtesy of the Appalachian Trail Conservancy



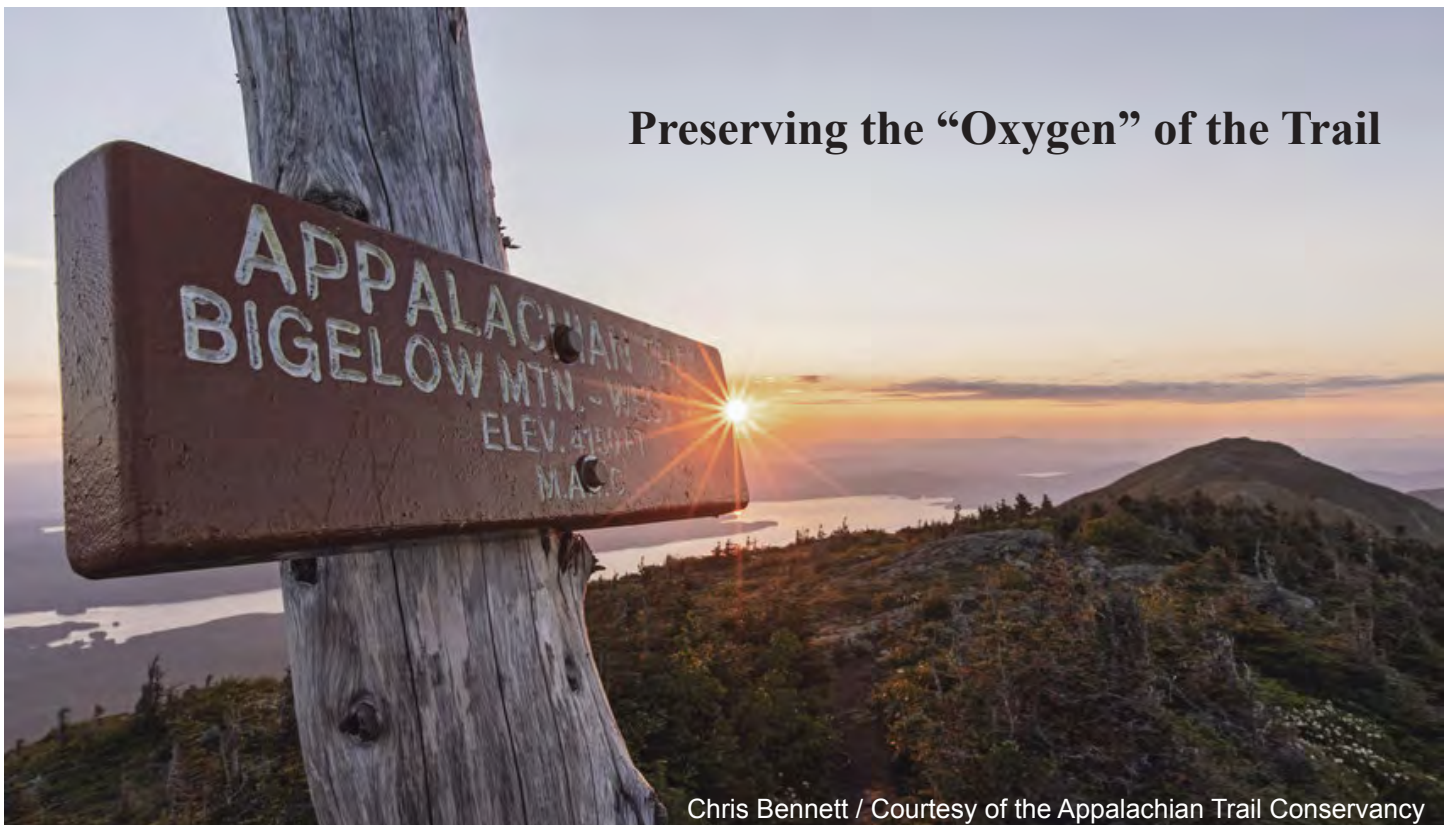
Value 3: Natural Climate Solutions & Ecosystem-Based Approaches: Protect and enhance the benefits that people receive from our ecosystems

To minimize the impacts of climate change, we must reduce fossil fuel emissions and remove greenhouse gases already in the atmosphere. To achieve carbon neutrality by 2050, we must conserve, restore, and improve land management strategies to achieve natural climate solutions.⁷⁹ The Appalachian Landscape protects the world’s largest broadleaf forest and provides benefits (also called “ecosystem services”) like carbon sequestration, clean air, and clean water. Forests and forested wetlands are responsible for storing a majority of the U.S. forest carbon. These lands naturally absorb atmospheric carbon, offsetting an estimated 16%-30% of the emissions created by energy production, transportation, and other greenhouse gas sources.⁸⁰

Research indicates that natural — or land-based — climate solutions can offset an additional 21% of annual greenhouse gas emissions beyond what forests already absorb.⁸¹ Taking steps to protect, sustainably manage, and restore ecosystems can provide natural services that maximize co-benefits like food security, clean air and water, and protection against extreme weather events, all while supporting human health and well-being.⁸²

Across this Landscape, partners can:

1. Improve water security by protecting watersheds,
2. Enhance carbon storage and sequestration.



Preserving the “Oxygen” of the Trail

Chris Bennett / Courtesy of the Appalachian Trail Conservancy

Protect Watersheds to Maintain Drinking Water Resources

The nation relies on forested watersheds for high-quality drinking water. Forests improve water quality by filtering rainfall and removing sediment and pollutants before the water is slowly released as clean water into streams and rivers.⁸³ The abundant forested watersheds across the Appalachian region continue to provide a source of clean and dependable water supply for millions of residents in downstream towns and cities. Compared to other regions of the country, the Southern Appalachian Mountains have some of the most vulnerable forests in the U.S. due to potential loss to development over the next two decades.⁸⁴ Conservation of forests to protect watersheds is essential across the Appalachian Landscape to ensure access to drinking water for millions of people across the East.

Jim Cotey / Courtesy of the Appalachian Trail Conservancy



Recommended Actions:

- Inventory and prioritize drinking water sources and headwaters to help set land conservation and protection priorities.
- Where landscapes are designated as watersheds to store, protect, and provide drinking water for human communities, identify regional, state, and local watershed authorities or organizations/agencies responsible for their protection as potential partners in protecting the Appalachian Landscape.
- Identify related funding sources – e.g., EPA's Safe Drinking Water Program and Clean Water State Revolving Funds – to support additional conservation efforts.
- Work with businesses and corporations to promote watershed protection.

Enhance Carbon Sequestration and Storage

The Appalachian Landscape contains an extensive, intact, and functioning forest ecosystem and network of agricultural lands that can contribute to carbon sequestration and storage. Currently, these forests store an estimated 56% of the eastern region’s above-ground carbon.⁸⁵ The opportunity to support regenerative agriculture practices across this extensive Landscape could substantially increase carbon sequestration and storage opportunities. Studies indicate that this Landscape has the “potential to sequester over 9.3 billion tons of carbon by 2050 if this landscape remains undisturbed over the next 20 years.” (M. Anderson, personal communication, June 23rd, 2021)

Kaleigh Mullins / Courtesy of the Appalachian Trail Conservancy



Recommended Actions:

- Promote forest carbon programs to eligible partners-state and local governments, universities, and private landowners.
- Investigate evolving carbon markets as a potential incentive and funding source for conserving agricultural and forest lands (e.g., regenerative agriculture and improved forest management).
- Encourage state and federal agencies and land trusts to prioritize forests with high forest carbon storage and sequestration potential in their land protection plans.
- Promote changes in the Forest Legacy and other federal and state funding programs to prioritize the protection of carbon-rich forests and wetlands.

Clean Water State Revolving Funds

Brief Description

The Clean Water State Revolving Fund (SRFs) is a federal-state partnership run by the U.S. Environmental Protection Agency. Administered by State agencies, this program provides low-income communities with low-cost financing for a wide range of water quality infrastructure projects. Traditionally used for ‘grey’ infrastructure, this program allows states to have broad discretion to utilize these loans to foster and deliver water quality benefits via land conservation and land restoration actions. In Ohio, Virginia, Tennessee, Kentucky, Oregon, Iowa, Pennsylvania, Connecticut, New York, California, and Vermont, these State Revolving Funds (SRFs) have been used by state and local government agencies and land trusts to acquire lands and conservation easements that deliver credible water quality benefits. EPA’s national office is supportive of using SRFs for these “green” infrastructure projects.

Opportunity

This program was dramatically increased as part of the Infrastructure Investment and Jobs Act of 2021, doubling the loan capacity in every state. To date, individual SRF loans used for “green” infrastructure have ranged from a few hundred thousand dollars, for interim community forest financing projects in Vermont, to a 50-million-dollar loan to catalyze a landscape-scale land conservation investment across 60,000+ acres in north-central Pennsylvania.

Recently, both Virginia and Kentucky utilized their respective SRFs to provide low-cost debt to The Nature Conservancy’s Cumberland Forest Project in the central Appalachians. More states within the Appalachian Landscape could be pursuing similar activities.

Challenges

The broad discretion that states have to use these loans can cause unique administrative barriers in each state that may prevent projects from using these loans for water quality benefits via land conservation and land restoration actions. These issues would need to be resolved within the state agency administering the SRF loans. Other barriers may require action at the state legislative level. The scale of the lending ability within the Appalachian Landscape states also varies greatly based upon population. While typically, these are loans with low interest rates and long terms, they require repayment. Still, several SRFs have found ways to innovate and create criteria for partial loan principal forgiveness. Two actions are suggested to encourage the use of this program:

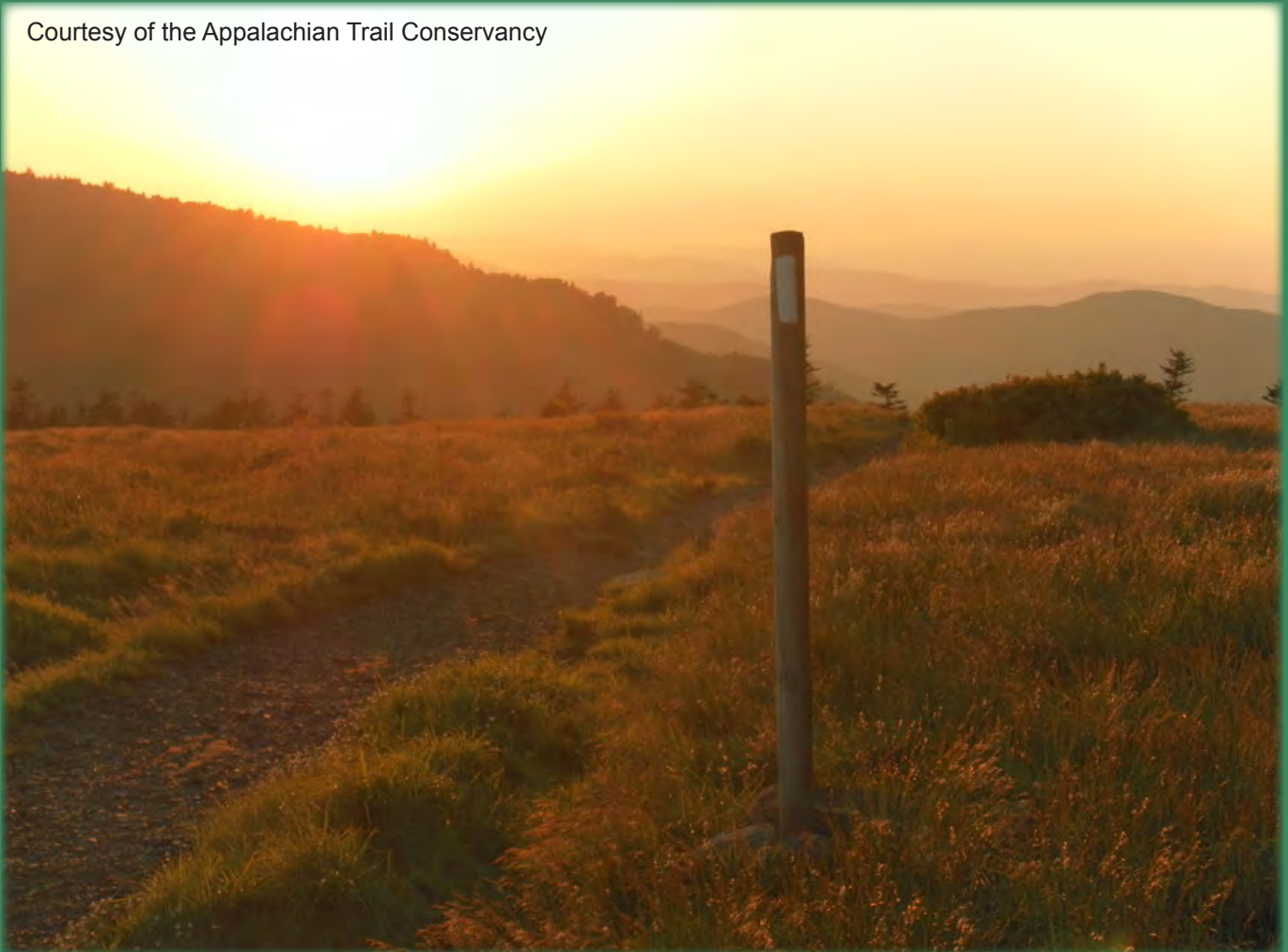
- Identify specific barriers that Appalachian Landscape states face when using this program for land conservation and land restoration for water quality benefits.
- Work and learn from other SRF projects to share success stories and innovations.

Conserving Forests for Clean Water

The 234,000-acre Sebago watershed serves as pristine drinking water for almost 20% of Maine's population. The forests surrounding Sebago Lake are so effective at naturally filtering the water that this lake is one of only 50 surface drinking water supplies in the country that requires no filtration before treatment. Sebago Clean Waters is a coalition of organizations working to protect the water quality, community well-being and vibrant economy, and fish and wildlife habitat across the Sebago watershed through voluntary forestland conservation.

The Sebago watershed is 84% forestland, but only 10% of this region is conserved. The U.S. Forest Service study identified the Sebago watershed at high risk of losing important forestland to development pressure. This collaborative initiative is working across conservation organizations and a regional water utility to engage individuals, communities, and businesses to protect 25% (35,000 more acres) of the watershed in the next 15 years by raising a total of \$15 million from public and private funding sources.⁸⁶

Courtesy of the Appalachian Trail Conservancy

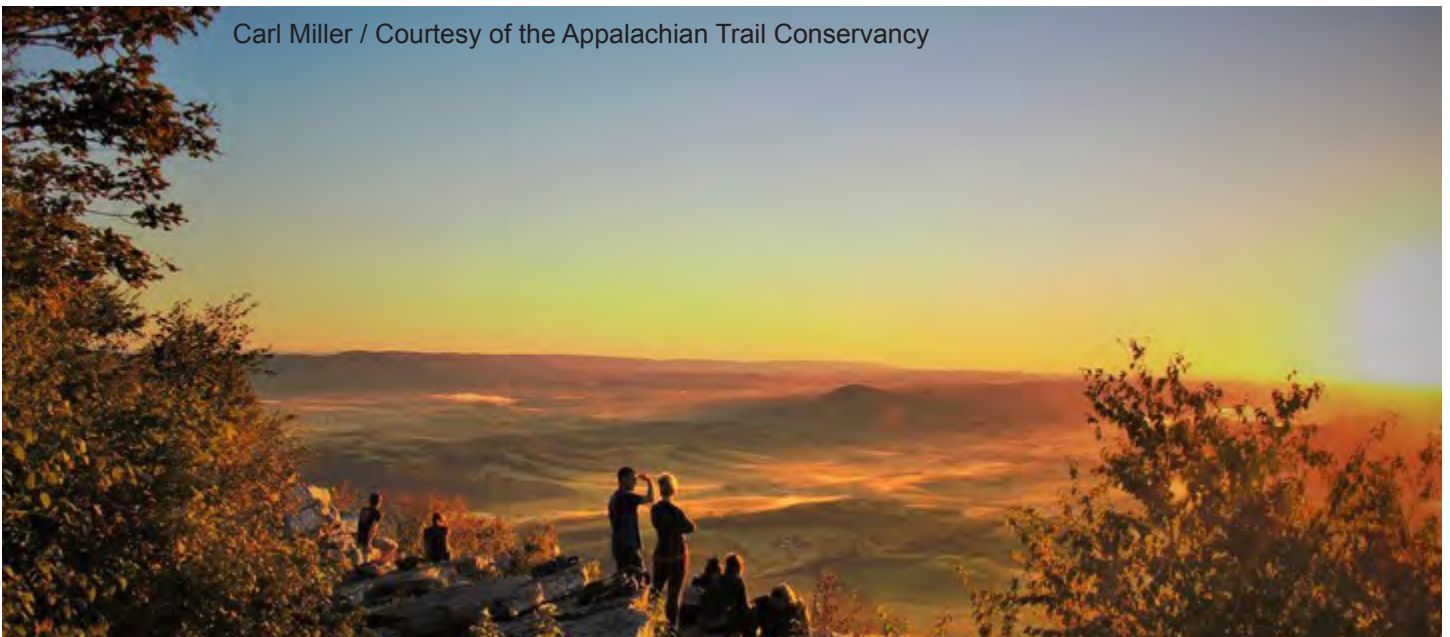


Goal 2: Human Connection to Nature: Inspire broad community action to sustain life

It will take all of us—including rural, suburban, and urban communities across this Landscape—to combat the impacts of climate change and ensure we continue to have intact landscapes and healthy communities. Climate change will directly and universally affect our quality of life, but these impacts will disproportionately affect communities of color and impoverished communities. Solutions will vary significantly in each of the communities across this Landscape. Due to this, new and diverse partnerships must form, potentially not led by a conservation organization, to make a concerted effort to collaborate with all communities to identify connections to the environment and ways to build resilience that serve both the community and the Landscape.

To achieve sustainable and durable conservation outcomes and community resilience, Landscape projects in this region must demonstrate tangible impacts that support public economies and align directly with the goals and values driven by each community. Conservation groups must prioritize projects that are community-led and driven where individuals, conservation organization and other relevant institutions are invited to collaborate with communities to achieve place-based climate action goals and a shared vision toward resiliency. This vision must center on community enhancement to provide individuals with the decision-making support to catalyze climate action to ultimately conserve Appalachia’s culture, biodiversity, wildlife, and connection to nature.

Carl Miller / Courtesy of the Appalachian Trail Conservancy





Advancing landscape-scale conservation and restoring ecological connectivity alongside communities can reestablish connections between communities and nature, increase the sustainability and durability of an initiative, and improve access to the benefits of nature for all communities. To build solutions that connect communities to nature at the Landscape scale, the CAG suggests that partners:

1. Engage with communities to understand the spectrum of involvement and relationships to the Landscape and co-create solutions to build stronger relationships and engagement.
2. Work with communities to understand how the Landscape affects their well-being, economy, quality of life, and traditional culture.
3. Create opportunities for communities to engage in collective action to benefit themselves, their communities, and their environment.

It is understood that recreation opportunities along the Appalachian Trail are primarily utilized by a White, middle-class population.⁸⁷ Acknowledging that, the CAG recognized that communities across the Appalachian Landscape, specifically those most adversely affected by environmental harm and injustice, have not been included in the conservation and resource management decision-making process. The CAG acknowledges the complexity of working with communities across this Landscape and understands that more time and resources are required to build necessary relationships. This work is integral to the success of this vision. The recommendations below are the first step to identifying the work that partners must do to reach out and make connections with communities. Building broader community involvement, action, and inclusion is critical to conserving this landscape. By prioritizing the integration of justice, equity, diversity, and inclusion principles into conservation action, we can work toward advancing climate justice. This work, in turn, will protect our planet, conserve biodiversity, and ultimately sustain human life on Earth for generations to come.

Value 4: Coalition Building

Dedicating the time to collaborate closely with communities is integral to developing foundational and durable relationships. Often monetary, capacity, and time barriers make it difficult for this work to happen. Where appropriate, working with community leaders to identify these impediments and dedicating resources to eliminate or minimize them is an essential first step. As resources and opportunities to collaborate with community leaders and community engagement become more available, learning opportunities and relationships will develop over time. These relationships can be a catalyst for building opportunities for co-creation, ownership, and partnership to work toward sustainable and effective stewardship of this Landscape. To achieve this, the CAG suggests that partners:

1. Identify community leaders and work with those leaders to identify ways to create opportunities to listen to the needs of stakeholders and communities across the Landscape.
2. Reach out to and actively engage existing conservation and outdoor recreation organizations connected to this Landscape and the increasing number of organizations that represent and advocate for diversifying outdoor recreation and climate justice efforts for Black, brown, and Native American communities. Work with these groups to identify new and appropriate ways to build inclusive strategies to sustain and restore the Appalachian Landscape.
3. Identify barriers to building locally led capacity to directly meet the needs identified by stakeholders and communities across this Landscape (See Appendix A for resources).

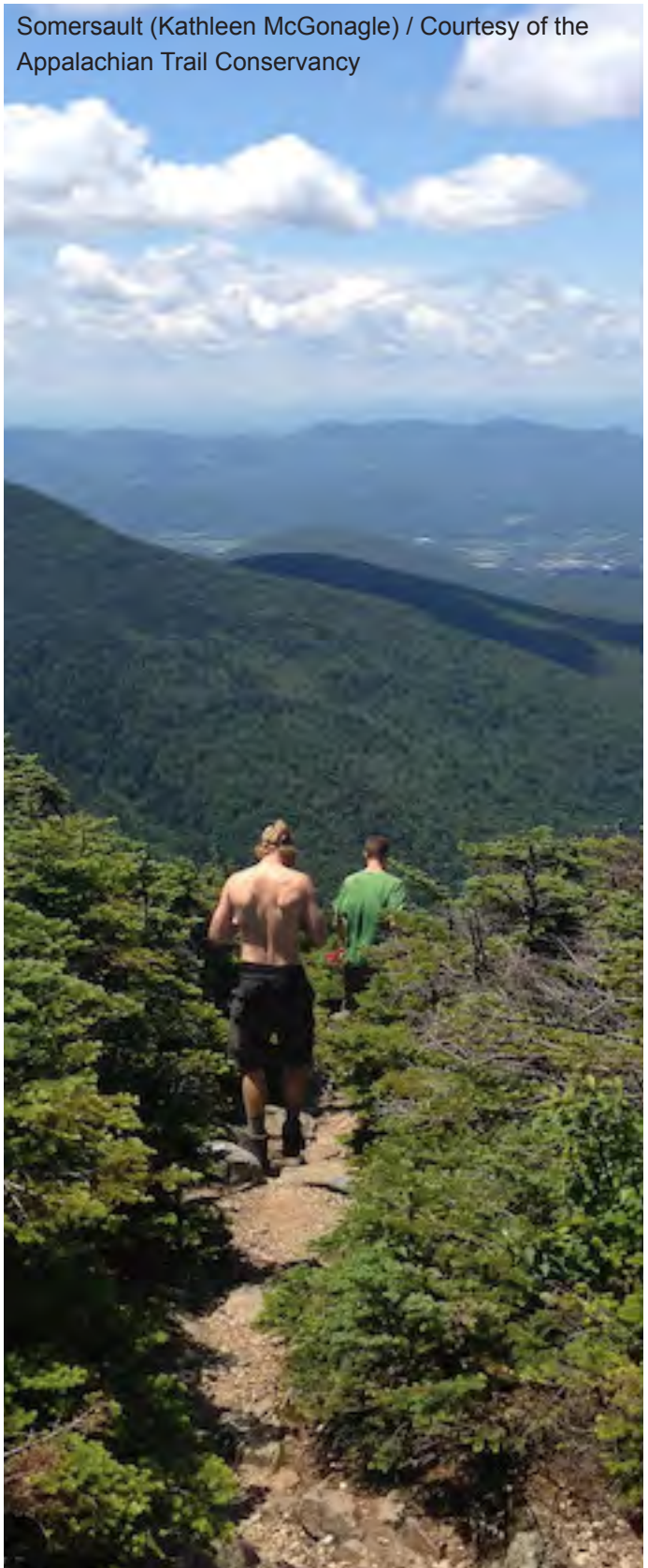


Michael “Marathon” Rosenberg / Courtesy of the Appalachian Trail Conservancy

Understanding Our Audiences

Across the Appalachian Landscape, it will be essential to identify and understand the demographic, economic, and cultural diversity of the rural, suburban, and urban communities, including Tribes currently living in and historically located within this Landscape. Partners must acknowledge, understand, and learn about the nuanced history across this Landscape. A first step could be engaging diversity, equity, and inclusion experts and social scientists collaborating with communities across this Landscape to learn more about how the communities' economies and cultural values intersect with environmental health and ecological integrity.

Additional education and learning resources are needed to prioritize community engagement by those looking to build relationships and trust over time. These learning resources must come directly from the communities if and when there is a readiness to share. Critical to understanding audiences is ensuring that no assumptions are made about how past injustices have impacted a community. The foundation of trust and acknowledgment will allow partners to evaluate the specific risks that climate change poses to a community and lead to greater awareness and action to address relevant risks. The relationships, connections, and experiences of partners across the Appalachian Landscape must be built on and expanded to begin this work.

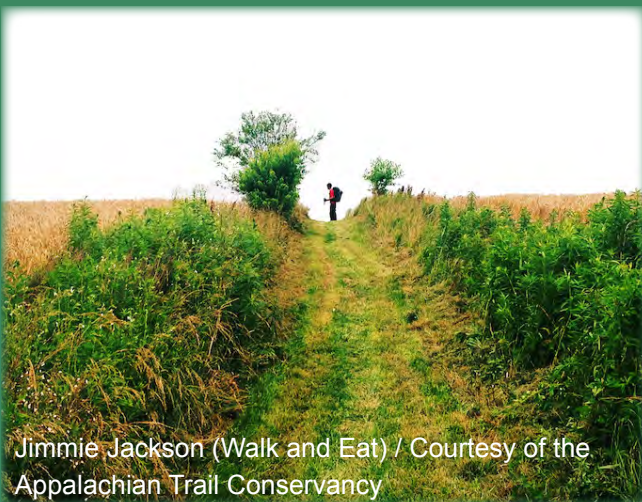


The goal of this work is to build trust and lay the foundation of inclusion and community engagement. Equally, it will be essential to work with the conservation community to help create a welcoming and inclusive environment

through justice, equity, diversity, inclusion, and building awareness. Processes that prioritize co-creation by involving diverse historical and current stakeholders are essential for long-term stewardship of this Landscape.

Recommended Actions:

- Establish and maintain an inventory of partners at varying reach and locations to achieve a shared vision of an Appalachian Landscape to mitigate and adapt to climate change.
 - Engage with Appalachian Trail Clubs and A.T. Communities and identify other organizations that have historically cared for this Landscape.
 - Publicly recognize the ancestral and current connection to the Appalachian Region. Engage with all stakeholders with current and ancestral homelands associated with the Appalachian Landscape.
- Create opportunities for different fora (community gatherings, formal presentations, etc.) and invite individuals and groups who have not previously been engaged in conservation work (e.g., communities of faith, elders, community leaders, etc.). These gatherings can be a place to learn about an individual's connection, experience, perspective, and interest in the Appalachian Landscape. Prioritize integrating this learning into strategies and planning where appropriate.
- Develop strategies for continued engagement. This may include a series of listening sessions, fellowships, or internship programs to engage those who have previously not been included. Provide financial support where appropriate for community leaders and youth to provide an opportunity for individuals to participate in meetings and forums focused on development and implementation.



Jimmie Jackson (Walk and Eat) / Courtesy of the Appalachian Trail Conservancy

Opportunities to Engage

Once communities and organizations are identified, partners must provide inclusive opportunities and events to understand their needs, interests, and values. This outreach and engagement will help partners determine opportunities to collaborate with communities in stewardship projects that meet the needs and interests of the community while mitigating and adapting to the effects of climate change. Identifying the interests of individuals within a community can help us identify relevant skills and integrate and support individual and community growth while creating opportunities to connect with, protect and conserve the Landscape at the community level.



Woody Harrell /
Courtesy of the Appalachian Trail Conservancy

Recommended Actions:

- (Re)build a culture of stewardship
 - Create diverse opportunities for individuals to support local community stewardship projects.
 - Foster engagement with K-12 and higher education students and teachers to incorporate service-learning opportunities.
 - Reconnect communities to nature by providing opportunities for skills development to enhance access to and stewardship of recreation opportunities.

- Build a culture of recreation and enjoyment of nature and its benefits in traditionally underrepresented communities
 - Build relationships with local leaders and partners focused and invested in diversifying the outdoors to listen, learn and identify ways to create more inclusive opportunities in the outdoors across this Landscape.
 - Identify and remove barriers so opportunities are created for individuals and communities to connect to and access the outdoors in ways that are most meaningful to them.

Stories “Behind” the Care

To educate conservation practitioners, partners, and stakeholders about communities across this Landscape, the CAG recommended actively creating opportunities to hear from communities often excluded from conservation efforts. This work can include hearing stories about how individuals live and take care of the land. Through these opportunities, we can learn about the values that we may have in common — though communities may express them differently — or we may learn about different and/or conflicting values. Integrating and prioritizing time with communities before, during, and after planning processes is essential for practitioners, partners, and stakeholders

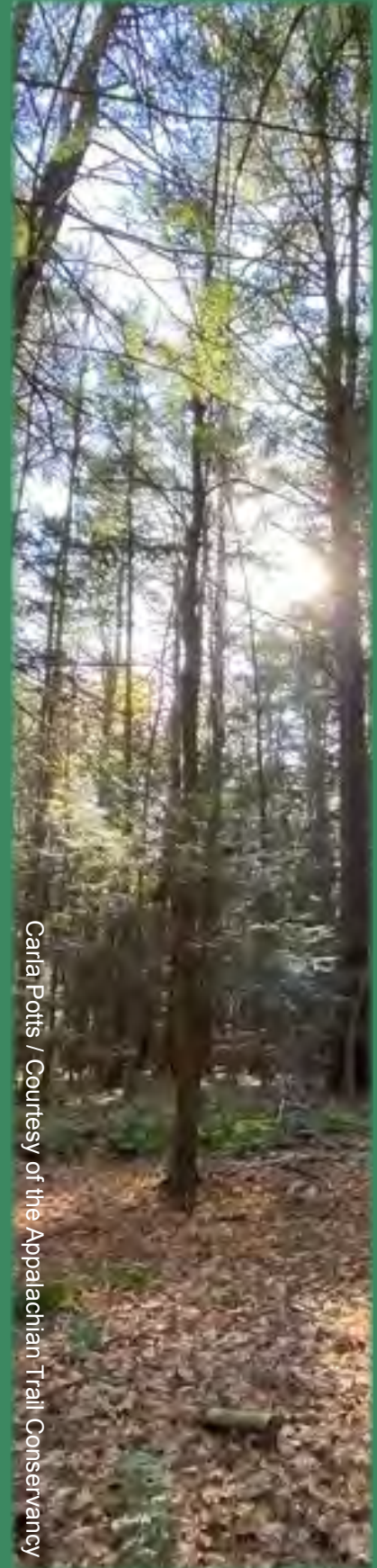
to advance our work with communities across this Landscape. This story exchange could serve to educate conservation practitioners and provide a new layer of understanding for all stakeholders. Coming together through storytelling on this Landscape could help identify potential solutions to combat the effects of climate change and benefit all. Sharing stories about communities who are mitigating or adapting to the impacts of climate change across the Appalachian Landscape will help bring people together to build a coordinated effort to conserve this Landscape that will serve all future generations.



Sarah Vickery / Courtesy of the Appalachian Trail Conservancy

Recommended Actions:

- Learn from communities and integrate their priorities
 - Create listening sessions to learn about the shared history of this Landscape and cultural resources of interest, and broaden understanding and relevance to care for nature.
 - Reach out to community leaders like faith leaders, school officials, elders, etc. to ask them how they would like to engage and their priorities for their communities.
 - Provide leadership opportunities and funding to those often excluded from conservation work so community members can be active participants and help shape the future of the Landscape.
- Share learning and priorities across established channels.
 - Share stories from individuals, communities, or organizations from across the Appalachian region to the broader community to advance our understanding of the collective care happening across the Appalachian Landscape. Integrate historical knowledge and traditional ecological knowledge where possible.
 - Work with Appalachian Trail states and local Appalachian Trail Maintaining Clubs and chapters, affiliated organizations, and others who historically have cared for this Landscape to bring to life stories about their lived experience on these lands and its value to people and their environment.
 - Work with universities building climate communications programs to develop messaging to reach a broader audience. This work can help us create a lexicon of “depoliticized” language/terms around climate change.
 - Develop effective messaging to connect communities to climate change impacts and solutions.



Carla Potts / Courtesy of the Appalachian Trail Conservancy

Regional Conservation Partnership Program (RCP)

Brief Description

Administered by USDA's Natural Resources Conservation Service (NRCS) this program brings together a wide array of local and national partners to further the conservation, restoration, and sustainable use of soil, water, wildlife, and related natural resource on eligible land across a regional or watershed scale. Partners apply to NRCS for annual RCPP project awards. Once selected, producers, landowners, and partners enter into program contracts and supplemental agreements with NRCS to complete the agreed-to conservation activities. RCPP projects can include any combination of authorized, on-the-ground conservation activities implemented by farmers, ranchers, and forest landowners. These activities include land management/land improvement/restoration practices, land rentals, entity-held easements, United States-held easements and/or public works/watersheds.⁸⁸

Opportunity

RCPP projects are currently underway in all 50 states and Puerto Rico, including a variety of natural resource concerns to address water quality and quantity, wildlife habitat, and flood mitigation. Recently, two projects were funded in the Appalachian Landscape, including the Maryland Clean Water Commerce Outcomes Project and the Healing Mine-Scarred Landscapes via Reforestation. Both projects highlight climate co-benefits, including the reduction of greenhouse gas emissions.⁸⁹

Challenges

The RCPP funding is divided evenly among two funding pools: Critical Conservation Areas (CCAs) and State/Multistate. The CCAs are designated by the Secretary of Agriculture and represent an opportunity for partners to come together at a regional scale to address common natural resource goals while maintaining or improving agricultural productivity. Successful projects achieve regional natural resource goals while meeting complementary local conservation priorities. These include relevant priority resource concerns like inadequate habitat, water quality degradation and degraded plant condition. Part of the Appalachian Landscape is covered by portions of four CCAs: the Chesapeake Bay Watershed, the Great Lakes Region, the Longleaf Pine Range and the Northeast Forests and Waters.⁹⁰ Two actions are suggested to encourage the use of this program:

- Learn about the funding process and conservation goals of current active RCPP projects that align with the Appalachian Climate Corridor values.
- Encourage the Secretary of Agriculture to designate a ninth Critical Conservation Area to cover the remainder of the Appalachian Landscape.

Keep Virginia Cozy / Courtesy of the Appalachian Trail Conservancy



Mapping Stewardship Networks

The Stewardship Mapping and Assessment Project (STEW-MAP) was developed by scientists at the USDA Forest Service Northern Research Station to answer the question: Who takes care of the environment? Communities and NGOs contribute to critical stewardship of their local environment. The STEW-MAP builds an inventory of new and existing individuals and groups working across a landscape and depicts strategic networks, stewardship gaps, and overlaps in activity. This information can help to leverage stewardship capacity for governments, non-profits, and other organizations to achieve outcomes that would be impossible with finite resources. Two STEW-MAPs have been created adjacent to the Appalachian Landscape: one in Baltimore, MD, updated in 2018 and another in New York City, updated in 2017.⁹¹ These extremely rich datasets offer an example of how the local volunteer groups and NGOs of the Appalachian Landscape could be identified to create stronger, healthier, and more resilient communities.

Value 5: Support Thriving Communities

A comprehensive approach across sectors is needed to integrate conservation and climate actions to encourage collaboration at the regional and community planning levels. Working with communities across this region, partners can support:

1. Access to information and resources about climate action
2. Securing resources to bolster economic and capacity-building opportunities.

This work will help us identify and break down the barriers that limit communities from integrating conservation actions and learning about climate impacts. This work can provide an opportunity for the Appalachian conservation community to learn more traditional approaches to land management and ecological knowledge. In tandem, the communities not currently engaged in conservation or recreation could learn and be exposed to new opportunities in the outdoors. Ideally, the communities will discover ways to co-create sustainable pathways and approaches for economic development while achieving conservation outcomes.



Bob Maxey / Courtesy of the Appalachian Trail Conservancy

Information and Resources

Working across sectors to achieve a comprehensive approach to address the impacts of climate change will require resources (funding, capacity, and time) for relationship building, information exchange, participation in decision-making, and the development of resources to connect ideas to action.

It is imperative that information exchange be encouraged across partners to engage communities in the decision-making process and create a network of community-level support across this region.

Angela Emans / Courtesy of the Appalachian Trail Conservancy



Recommended Actions:

- Encourage participatory decision-making
 - Work with community leaders and residents to understand their perspectives and share the benefits of nature and natural climate solutions to their communities, economies, and ways of life.
 - Work with Regional Planning Commissions to integrate climate action and stewardship into community priorities like land-use regulation and community development.
 - Engage with communities to develop comprehensive climate adaptation plans with local partners to create shared values for quality of life and economic prosperity while raising awareness and addressing climate impacts. These plans could consider economic development, business, infrastructure, housing, health, tourism, recreation, safety, and conservation.
 - Work with community planners to promote sustainable economic policies and sustainable growth.
 - Assess the Economic Development Administration at the Department of Commerce and USDA Rural Development Office's criteria to evaluate funding for rural communities. Request to add new criteria where appropriate to include the impacts of climate change on rural communities.
- Supply resources
 - Develop action strategies/toolkits around natural resources stewardship and climate adaptation planning for communities, differentiating what stewardship looks like across rural, suburban, and urban communities.
- Improve awareness of funding sources for recreation infrastructure, trails, multi-use paths, and conservation and natural resource management planning to sustain new infrastructure.
- Identify, summarize, and highlight existing and new federal, state, and local funding sources to support conservation, rural development, and climate-related initiatives.

Economic and Capacity Building

This Landscape winds across rural communities and supports natural resources for the most densely populated portions of the United States. In some rural areas across Appalachia, the economic system often fails to allow wealth

to remain in rural areas (e.g., extractive economies). Partners can educate and help provide access to incentives and voluntary programs that support communities across this region.

Recommended Actions:

- Encourage and facilitate the exchange of Ideas
 - Analyze community economics throughout the Appalachian Climate Corridor. Identify unique trends and disparities to facilitate discussion.
 - Promote models and community exchanges where extractive economies have successfully transitioned to outdoor recreation economies.
 - Bring rural economic development expertise into this collaborative effort.
- Establish incentives
 - Develop a recreation fund or tax to transfer money from users to landowners and land conservation.
 - Comprehensively restructure tourism/destination marketing tax to generate resources for stewardship at multiple scales.
 - Incentivize community planning for outdoor recreation businesses and services, including conservation and climate-smart strategies.
- Promote volunteerism
 - Provide information about applicable voluntary conservation/incentive programs assistance to support the use and implementation of these and emerging programs.

Voluntary Carbon Market

Brief Description

Recent USDA Climate-smart agriculture and forestry (CSAF) documents note the need to support new and better markets for agriculture and forestry products to enhance the adaptive capacity of rural communities and carbon sequestration. Voluntary carbon markets for both agriculture and forestry can provide carbon offsets or credits.

These markets provide cost-effective ways to incentivize CSAF practice adoption and further promote voluntary adoption of CSAF conservation practices. USDA wants to support the identification and verification of the Greenhouse Gas benefits associated with CSAF practices and facilitate the participation of farmers, ranchers, and landowners in new markets for CSAF goods and services.⁹²

Neely Lawson / Courtesy of the Appalachian Trail Conservancy



Opportunity

Appalachian forests store very high amounts of carbon, and we can increase carbon sequestration through improved management of these forests. Family forestland owners own the largest portion — 39% — of U.S. forests. This means there are more forestlands managed by families in the U.S. than managed by the federal government. The [Family Forest Carbon Program](#) provides

a mechanism to incentivize improved management and increase sequestration for family forestland owners by providing them a way to participate in carbon markets. Created in partnership between the American Forest Foundation (AFF) and The Nature Conservancy (TNC) this forest carbon program provides land-owning families with expert conservation guidance and resources along with the financial assistance to increase the health and value of their woods.

These practices increase carbon sequestration and storage while delivering important co-benefits like water quality, wildlife habitat and increased long-term forest resiliency. In October 2021, the program expanded from select counties in Pennsylvania to open enrollment to landowners with as few as 30 acres up to 2,400 acres across all of Pennsylvania, all of West Virginia, and five counties in western Maryland. Beyond the Central Appalachian area, the program will expand to two new regions — the Upper Midwest and the Northeast — in 2022. The program is designed to be an all-around resource for small-forest landowners to be able to achieve their financial goals while making a meaningful conservation impact. In 2020, Amazon committed \$10 million to support this program to help family forest owners sequester carbon across the Blue Ridge to Boreal region of the eastern United States.⁹³

Voluntary Carbon Market Continued

Challenges

Agricultural and forest carbon markets have enormous potential to finance large-scale adoption of CSAF practices, but barriers have resulted in limited use of these markets. While families and individuals collectively own the largest portion – 39% – of U.S. forests, less than 1% of the land in existing forest carbon projects are on properties under 1,000 acres in size. This is primarily due to the high transaction costs associated with project development, monitoring, reporting and verification as well as the confusion in the carbon marketplace with the lack of consistency among approaches to protocols for generation GHG offset. To encourage the use of carbon markets, we suggest two actions:

- Expand the Family Forest Carbon Program to include other regions of the Appalachian Climate Corridor. Similar to the Amazon partnership, approach corporations and businesses that have previously supported the Appalachian Landscape as potential investors in forest carbon credits through this program.
- Work with USDA to set standards to reduce transaction costs and bolster market infrastructure.



Griffin Kingsbauer / Courtesy of the Appalachian Trail Conservancy

Anthony Garcia / Courtesy of the
Appalachian Trail Conservancy



Southwest Virginia Recreation Economy

Throughout the 20th century, Southwest Virginia was a cluster of coal power plants and small farms. From 1990 to 2014 this region experienced a 46% decrease in manufacturing and 45% decrease in mining jobs, leading to a substantial disappearance of jobs. Today, recreation, has become a key fixture for repairing the economy of small towns across Southwest Virginia.⁹⁴ The Appalachian Trail and the Virginia Creeper Trail are two trails that are attributed with the repairing the economy of Damascus.

Since 1987, Damascus has organized the annual Trail Day Festival attracting more than 25,000 people and generating approximately \$40,000 in tax receipts.⁹⁵ Since the early 2000s, Southwest Virginia has experienced economic growth and the regional trail economy has played an integral role in supporting this recovery. Nearly, \$1 billion in annual tourist economy is attributed to the recreation economy created by the network of trails across the region.

Moving Forward: Designing an Appalachian Climate Corridor



Anthony Snyder / Courtesy of the Appalachian Trail Conservancy

A large-landscape-scale approach that considers the impacts of climate and land-use change is required to conserve an intact and enduring Appalachian Landscape. This document offers a vision for an Appalachian Climate Corridor. It summarizes ideas and recommendations that stakeholders must consider across this region to act now to protect and preserve the Appalachian Landscape from expected future impacts. The CAG has identified key threats to consider, recommended actions to address these threats, and opportunities to advance this vision through new and existing policies, programs, and ongoing conservation projects. This work is just the beginning of a large-scale, collaborative, and coordinated effort that will require input from scientific experts; conservation partners;

communities; philanthropists; and local, state, and federal governments. Consistent with the vision of Benton MacKaye, creating an Appalachian Climate Corridor will depend on the successful engagement and integration of stakeholders in an iterative planning and prioritization process moving forward.

The extensive and accessible mapping tools across the Appalachian Landscape provide a foundation for connecting and conserving priority landscapes in a changing climate (See Appendix A). Resources are needed to translate this work into strategic, coordinated, and place-based action plans. To continue the work to make this vision a reality, a few immediate next steps are suggested:

This foundational document frames an ambitious vision for the Appalachian Landscape. To continue the work to make this vision a reality, a few immediate next steps are suggested. We invite you to start a broader conversation regarding the actions described in this document and add your voice to help design an Appalachian Climate Corridor.

Implementing a shared vision to mitigate and adapt to climate change is essential to maintain the ecological integrity and human experience that Benton MacKaye began a century ago with his vision of the Appalachian Trail.

1. Collaborative Infrastructure:

- a. Continue a Senior Climate Advisory Work Group of individuals with relevant experience and expertise dedicated to further refining, prioritizing, and advancing elements of this vision. This group could identify upcoming policies and/or program opportunities that align with the values and recommended actions of the Appalachian Climate Corridor.
- b. Create a “Climate Corridor Information Center” as a resource to better consolidate and distribute information on the threats associated with climate change to the Appalachian Landscape. This information center could provide resources on accessing existing and proposed climate mitigation and adaptation programs and funding sources. This would provide a hub for sharing information and ideas regarding climate actions that communities, states, or regions can take to mitigate and adapt to climate change.
- c. Establish a position(s) to manage all aspects of the development and implementation of the Appalachian Climate Corridor with a specific focus on prioritizing and implementing the actions identified in this document. This individual would work with relevant leadership across key federal and state partners responsible for implementing relevant climate programs.
 - Duties can include advocate and help guide the development of state and local Corridor efforts with an emphasis on (1) Appalachian Opportunity Zones; (2) compile and disseminate information to relevant partners regarding relevant federal and state programs that could benefit the Corridor effort; and (3) serve as the principal liaison to the Senior Climate Working Group.

2. Prioritization:

Facilitate collaborative work of practitioners through a multi-scaled prioritization framework.

- a. Identify sub-geographies, such as regions or states, to focus conservation outreach and efforts. Focus on building relationships across sub-geographies with smaller entities to expand inclusion into decision-making as priorities are identified to build this shared vision at multiple scales.
- b. Develop a comprehensive connectivity map of the Appalachian Landscape to identify opportunities to align current climate mapping resources and new information and resources identified through this process (See Appendix A). This would be the foundation for “Appalachian Opportunity Zones.”
- c. Focus on the highest priority connectivity “pinch points” that need immediate attention in the proposed Appalachian Landscape that have already been identified and prioritize the development of place-based action plans with relevant partners to reduce the risk of losing these key connectivity areas.

3. Communications:

Articulate the need for landscape-level conservation planning and community-led climate action.

- a. Broadly and strategically engage partners outside of the current federal, regional, state, and local scales to help encourage, inform, and integrate the Appalachian Climate Corridor concepts. Convene these partners to identify specific climate and land-use threats they are dealing with across the Appalachian Landscape and identify specific actions to address those threats.



Carrie Naber / Courtesy of the Appalachian Trail Conservancy

Appendices

Appendix A. Preliminary list of conservation prioritization tools that exist for this Landscape. *These are spatially explicit resources to consider when prioritizing projects across this Landscape.*

*Suggested Value(s) Key:

Goal 1: Ecological Integrity: LC = Landscape Connectivity, BD = Biodiversity, NE = Natural Climate Solutions & Ecosystem-based Approaches

Goal 2: Human Connection to Nature: CB = Community Building, TC = Support Thriving Communities

Brief Description, Relevance & Links	Suggested Values*
<p>Appalachian LCC ScienceBase web portal — provides access to a broad array of App LCC products, reports, data, etc. See an example of a relevant resource below.</p> <ol style="list-style-type: none"> Appalachian LCC Species and Habitat Vulnerability Assessment Project <ol style="list-style-type: none"> Data Final Report: Climate Change Vulnerability Assessments in the Appalachian LCC 	<p>LC, BD, NB, CR & SS</p>
<p>Appalachian National Scenic Trail Natural Resource Condition Assessment ArcHub Site — This ArcHUB site was created by the Center for Land Use and Sustainability which contains a space to visualize NRCA data through story maps, apps, and web maps. (Expected Completion of Full Report Winter 2022)</p>	<p>LC, BD, NB, CR & SS</p>
<p>Appalachian Trail Values and Conservation Protection V1 Travis Belote Tableau Visualization — Data along the entire length of the Appalachian Trail. McKinley, Belote, and Aplet split the AT into 1-mile segments and evaluated the ecological integrity and species richness of each segment. In addition, they evaluated the degree of conservation protection surrounding the AT using GAP status (GAP 1 is the highest level of protection; GAP 4 is the lower level of protection). This allowed us to find high value, but under-protected regions along the AT. Select segments on the map or plots to view the ecological integrity, species richness, and degree of protection.</p>	<p>LC, BD, NB</p>
<p>A Rural Capacity Map — Headwaters Economics created this map to help identify communities where investments in staffing and expertise are needed to support infrastructure and climate resilience projects.</p>	<p>CB, TC</p>

<p>The Climate Atlas — A new decision-support tool for conservation and land protection agencies and organizations has been released by the Conservation Lands Foundation. The Climate Atlas was developed to support progress toward the Biden Administration’s 30x30 goal. The Climate Atlas assesses the climate and biodiversity benefits that any given landscape in the U.S. provides.</p>	<p>LC, BD</p>
<p>Environmental justice criteria for new land protection can inform efforts to address disparities in access to nearby open space — Develop a screening tool to identify and map communities with high social marginalization and low nearby protected open space. Research shows that areas prioritized according to environmental justice criteria are substantially different from those prioritized according to conventional conservation criteria. This demonstrates how incorporating environmental justice criteria in conservation prioritization may shift patterns of future land protection. This work provides methods that can be used broadly across regions to inform future conservation efforts.</p>	<p>CR & SS</p>
<p>OSI “Areas Worth Exploring” 2018 Analysis (Figure 5) — Conducted for ATC in 2018, this study identified climate-resilient lands across the A.T. Landscape. This report is available upon request from ATC.</p>	<p>LC, BD</p>
<p>Nature’s Network — developed through a partnership of the US Fish & Wildlife Service and 13 northeastern state fish & wildlife agencies, Nature’s Network provides access to a wide variety of products and tools to inform landscape conservation in the northeast, including the northern Appalachians.</p> <ol style="list-style-type: none"> 1. Northeast Conservation Planning Atlas Data Portal — access to geospatial data and products to support Nature’s Network conservation planning efforts. 	<p>LC, BD, NB</p>
<p>NatureScape — developed by the Appalachian Landscape Conservation Cooperative, NatureScape is a landscape conservation design project that identifies priority lands and waters in the Appalachian LCC footprint. The Appalachian LCC web portal was renamed to the Landscape Partnership and provides access to a broad array of products and data sources focused on this region.</p>	<p>LC, BD, CR</p>

<p>Southeast Aquatic Resources Partnership (SARP) Aquatic Barrier Prioritization Tool — a geospatial tool that provides information on aquatic barriers (dams and road-related) in southeastern states. Includes parts of Virginia and West Virginia. This tool helps look at aquatic connectivity and provides a process for prioritizing the removal of barriers based on a number of criteria.</p>	<p>LC, BD</p>
<p>Southeast Conservation Adaptation Strategy — SECAS is a regional conservation initiative that spans the Southeastern United States and the Caribbean. SECAS brings together state and federal agencies, nonprofit organizations, private businesses, Tribes, partnerships, and universities around a shared vision: A connected network of lands and waters that supports thriving fish and wildlife populations and improved quality of life for people.</p> <ol style="list-style-type: none"> 1. Blueprint — A data-driven spatial plan that’s helping more than 250 people from over 100 different organizations bring in new funding and inform their conservation decisions <ol style="list-style-type: none"> 1. Relevant Indicators (Contribution by Emily Granstaff, Southeast Blueprint User Support, USFWS. More justification and details can be found here.) <ol style="list-style-type: none"> 1. Intact Habitat Cores 2. Resilient Sites 3. Permeable Surface 4. Imperiled Aquatic Species 5. Forest Birds 6. Amphibian & Reptile Areas 7. Invasive Species <p>2021 Report Card — This report assesses progress toward the SECAS goal using information from existing monitoring programs. <i>Southeast Conservation Adaptation Strategy. 2021. Recent Trends in Southeastern Ecosystems (2021): Measuring Progress toward the SECAS Goal.</i> Available online: http://secassoutheast.org/pdf/SECAS-goal-report-2021.pdf</p>	<p>LC, BD</p>

<p>THRIVE Regional Partnership — a regional partnership based in Chattanooga, TN. The Natural Treasure Alliance (part of this partnership) provides a regional conservation perspective around metropolitan areas across the tristate region in the southern Appalachians.</p> <ol style="list-style-type: none"> 1. Summary and conservation blueprint of The Cradle of Southern Appalachia Initiative, a collaborative landscape conservation plan <ol style="list-style-type: none"> 1. Progress Dashboard — ArcGIS web portal for this conservation blueprint 	<p>LC, BD, CB & TC</p>
<p>TNC Resilient Land Mapping Tool — a tool developed by The Nature Conservancy and many partners to achieve an ambitious vision for land protection: to conserve a network of resilient sites and connecting corridors that will sustain North America’s natural diversity by allowing species to adapt to climate impacts and thrive</p> <ol style="list-style-type: none"> a. Core Concept Document for the Mapping Tool — describing relevant data including Resilient + Connect Lands, Confirmed Biodiversity & Climate Flow. b. Description of Carbon Offsets Datasets on mapping tool — Forest Carbon + Clark University <ol style="list-style-type: none"> 1. Resilient Sites for Terrestrial Conservation in Eastern North America 2016 Edition Final Report 	<p>LC, BD, NE</p>
<p>USDA Forest Service National Forests to Faucets 2.0 Assessment — The Assessment uses Geographic Information Systems (GIS) to determine the relative importance of small watersheds to surface drinking water. Embedded in the data is the vital role forests play in protecting source water: the extent to which these forests are threatened by development, insects and disease, and wildland fire.</p>	<p>NB</p>
<p>USDA Forest Service Forest Inventory and Analysis (FIA) Forest Carbon Density Dataset — this data product contains the following eight raster maps: total forest carbon in all stocks, live tree above-ground forest carbon, live tree belowground forest carbon, forest down dead carbon, forest litter carbon, forest standing dead carbon, forest soil organic carbon, and forest understory carbon.</p>	<p>NE</p>

Appendix B. Further reading and suggested resources, organized by value.

Goal 1:	Value	Resources
Ecological Integrity	Value 1. Maintain Landscape Connectivity	<ol style="list-style-type: none"> 1. Albright, W., Ament, R., Callahan, R., Frantz, M., Grabau, M., Johnson, M. E., . . . Tenggardjaja, K. (2021). Connectivity & Climate Change Toolkit - Fish & Wildlife. https://largelandscapes.org/wp-content/uploads/2021/06/Connectivity-and-Climate-Change-Toolkit.pdf 2. Hilty, J.*, Worboys, G.L., Keeley, A.*, Woodley, S.*, Lausche, B., Locke, H., Carr, M., Pulsford I., Pittock, J., White, J.W., Theobald, D.M., Levine, J., Reuling, M., Watson, J.E.M., Ament, R., and Tabor, G.M.* (2020). Guidelines for conserving connectivity through ecological networks and corridors. Best Practice Protected Area Guidelines Series No. 30. Gland, Switzerland: IUCN. https://largelandscapes.org/wp-content/uploads/2021/02/IUCN-Guidelines-for-conserving-connectivity-through-ecological-networks-and-corridors-English.pdf 3. SE Climate Adaptation Science Center Urban Growth Models https://www.sciencebase.gov/catalog/item/5438004ce4b08a816ca636fb 4. Southern Forest Future Project https://www.srs.fs.usda.gov/futures/
	Value 2. Maintain Biodiversity	<ol style="list-style-type: none"> 1. Clement, J.P. et al. 2014. A strategy for improving the mitigation policies and practices of the Department of the Interior. A report to the Secretary of the Interior from the Energy and Climate Change Task Force, Washington, DC, 25 p. https://www.doi.gov/sites/doi.gov/files/migrated/news/upload/Mitigation-Report-to-the-Secretary_FINAL_04_08_14.pdf 2. Early Detection and Distribution Mapping System (EDDMapS) https://www.eddmaps.org/ 3. Incentives for Biodiversity Conservation: An Ecological and Economic Assessment https://defenders.org/sites/default/files/publications/incentives_for_biodiversity_conservation.pdf 4. Integrate Climate into State Wildlife Action Plans https://necasc.umass.edu/projects/integrating-climate-change-state-wildlife-action-plans 5. Inventory & Monitoring Networks and Parks https://www.nps.gov/im/networks.htm

Goal 1:	Value	Resources
Ecological Integrity	Value 2. Maintain Biodiversity	<p>6. Leading At-Risk Fish & Wildlife Conservation Wildlife: A Framework to Enhance Landscape-scale and Cross-boundary Conservation through Coordinated State Wildlife Action Plans https://www.fishwildlife.org/download_file/view/3498/273</p> <p>7. Legislative and Regulatory Efforts to Control Invasive Species — The Center for Rural Pennsylvania https://www.rural.pa.gov/download.cfm?file=Resources/PDFs/research-report/Invasive-Species-Report-2019.pdf</p> <p>8. Managing Climate Change Refugia for Climate Adaptation https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4980047/</p> <p>9. NatureServe Habitat Models for Imperiled Species — The Map of Biodiversity Importance https://habitatsuitabilitymodeling-natureserve.hub.arcgis.com/pages/the-map-of-biodiversity-importance</p> <p>10. Northeast Regional Invasive Species and Climate Change (RISCC) Management network riscnetwork.org</p> <p>11. Regional Species of Greatest Conservation Need, derived from State Wildlife Action Plans https://www.nwf.org/Our-Work/Wildlife-Conservation/southeast-regional-priority-species</p> <p>12. Targeting current species ranges and carbon stocks fails to conserve biodiversity in a changing climate: opportunities to support climate adaptation under 30×30 https://www.biorxiv.org/content/10.1101/2021.08.31.458416v2.full</p>
	Value 3. Natural Climate Solutions & Ecosystem-based Approaches	<p>1. American Carbon Registry https://americancarbonregistry.org/Voluntary Carbon Market Project List https://acr2.apx.com/myModule/rpt/myrpt.asp?r=111</p> <p>2. Natural Climate Solutions: A win-win solution for addressing climate change. https://usnature4climate.org/</p> <p>3. Resilience Metrics: Developing targeted adaptation indicators and metrics https://resiliencemetrics.org/*</p> <p>4. The Bipartisan Policy Center’s (BPC) Energy Project: Leveraging Outreach & Technical Assistance to Scale Natural Climate Solutions: https://bipartisanpolicy.org/report/outreach-assistance-climate-solutions/</p> <p>*Note Resource #3 is relevant to multiple Goals/Values.</p>

Goal 2:	Value	Resources
Human Connection to Nature	Value 4. Coalition Building	<ol style="list-style-type: none"> 1. BIPOC Outdoor Resource Guide https://www.melaninbasecamp.com/trip-reports/bipoc-outdoor-resources 2. Diversity, Equity, Inclusion, & Justice (DEIJ) Terminology Communications Guide (September 2021) https://www.allianceforthebay.org/wp-content/uploads/2021/12/DEIJ-Terminology-Guide-September-2021-1.pdf
	Value 5. Support Thriving Communities	<ol style="list-style-type: none"> 1. Changing Landscape Initiative — Northwestern Virginia Project https://storymaps.arcgis.com/stories/08194ec9bf6244cbb82a6a168a2758ed 2. Sentinel Landscape — Landowner Resource Tool https://sentinellandscapes.org/landowner-resources/ 3. The Appalachian Ecosystem Journey https://appalachianinvestmentecosystem.squarespace.com/

Appendix C. Equity Advisor Report

EQUITY ADVISING REPORT

CAG Report 2022

Prepared By

Dr. Thomas R. Easley

In July 2021, the Appalachian Trail Conservancy began an initiative entitled **Conserving an Intact and Enduring Appalachian Landscape: Designing a Corridor in Response to Climate Change**. The context for this initiative is the history of the Landscape, the urgency and need to act now, and the vision for the future. In this vision, the outcome is to ensure an intact & enduring landscape and inspire broad community action to secure the sources of life and sustain life itself, as the climate changes. While this is a valiant effort, any initiative that is new and embarking on new ground, will have some gaps in its outcome because individuals are learning as they are building.

This report is developed to provide suggestions and guidance on steps to be taken in the future that reflect principles of diversity, equity, and inclusion.

THE APPROACH

1. CAG held monthly meetings that would bring 30 professionals together to apply the best available climate science, local and traditional knowledge to develop and implement climate mitigation, adaptation and connectivity recommendations that build resilience across the Appalachian Landscape to establish an Appalachian Climate Corridor. While every meeting did not have full attendance, the attendees were engaged in every meeting.

Problem(s):

- Unclear if the committee members live near the Appalachian Trail.
- Unclear if any of the committee members are part of any communities impacted by the trail
- Unclear of the vetting process of the committee members

Potential Solution Steps:

- Recruit members that live near or on the trail.
- Work with the communities around the trail to understand how they view the trail
 - One idea to achieve this is to connect with community leaders like ministers, alder persons, & organizational representatives, that are based in the areas this work is being accomplished.
- Be more transparent with the committee, about how they were all identified to be on the committee
 - Within the initial meetings, take time to address the process by which the people were recruited. Address expectations, but also understanding of expertise multiple times so that everyone gets more comfortable with the skillsets in the group.
- Prepare guiding principles with participants so you will have a co-created culture around how you will work as a unit
 - Before I start an initiative with a group, we establish working agreements as a guide for our work, and as a reference on ways to behave in case conflict develops.

2. CAG started with defining a climate corridor. The following questions came up during our discussions:

Who is at the center of deciding what is a corridor?

When engaging in work that galvanizes people, increase your awareness to the centers of power, which are the milieus where decisions are made. At times we are unaware that we are acting as gatekeepers, until we think about who is being considered in this initiative and who are the purveyors of the work?

Who is on the margins of this work, meaning they are left out of the discussion?

To be on the margin means, decisions are made for you, and roles are chosen for you. Just as this work is about protecting the trail, think about who deems this as a priority and who may not, because of unknowing. Further, do not assume that the values are the same from the organization to the community. Different foci will inform responses or behavior.⁹⁶

Recognizing that some communities are on the margins, those communities' way of life and ways of understanding may also be on the margins. As a result, we in this group may be unaware of our impacts on others and may not have been inclusive during our goal setting. For example, during the formation of our goals, we identified values like "Maintain Biodiversity" or "Maintain Landscape Connectivity." What are we maintaining if we do not have the input of the inhabitants of the Landscape?

We may have the same values, but we articulate them differently. hand, we may also have different values, which lends itself to why we put this plan together. On the other hand, we may also have different values, which lends itself to why we put this plan together. The communities being impacted by the trail that are being asked to take action have not yet been consulted about what they do on the Landscape.

Problem(s):

- There has not yet been any engagement with the communities impacted by the trail
- The conversations around the trail were inclusive of the committee members, but not the people
- There has not been a conversation around the inhabitants of the trail not complying to participate in future initiatives

Potential Solution Steps:

- Invite committee members to connect with community residence by the trail and have them work to bring people into this work. Use the relationship between individuals to do what initiatives are supposed to be doing, create ways to communicate and work together.
 - Intentionally seek the input of everyone and take your time because trust and relationships take time to develop
 - Consider the consequences of low or no participation from the communities
3. CAG worked to be inclusive by inviting scholars, scientists, administrators, and professionals that care about these issues. However, each one of the people that were on the call, were all formally educated in U.S. Centric programs.

Problem(s):

- While there is diversity of perspective, and academic experience, there was not diversity of types of education on the committee
- All of the committee members were recognized by the academic, political, and scientific communities, but that approach is also exclusive
- The committee met representing others, but without a relationship or personal connection to others, misrepresentation can happen

Potential Solution Steps:

- Seek out expertise from numerous types of institutions (Historical Black Colleges and Universities, Tribal Colleges, Hispanic Association of Colleges and Universities, and Institutions that focus on the inclusion of women)
 - Be willing to recruit people that show up differently on the academic spectrum
 - Do not try to speak up for others, but acknowledge when you do not know something, and do not be afraid to stop the work until you get clarity or more inclusion
4. CAG had meetings online to accommodate for the dangers of COVID 19. The minutes were always informative, and each meeting started with a debrief of progress. However, this method of meeting, while it is safe, may not be inclusive for people that are not technologically savvy or who do not have access to zoom or other modalities. Some can view this action as exclusive.
- A potential solution is to establish two to three ways to meet, and two to three ways to share information that is relevant to those impacted and not condescending. Hence, people feel welcomed in the conversation.
5. CAG launched a laudable initiative that included the entire Appalachian Trail. One problem with that is the CAG may be moving too quickly or thinking so vast, that you miss the intricacies of smaller communities. This method of working can be reflective of supremacy because instead of moving step by step, CAG is moving in a huge way. This can be seen as dominant behavior instead of inclusive work styles.
- A solution can be to break this program into incremental steps that looks more like tackling this threat region by region or state by state. The benefit of this approach is that it will help CAG build relationships with small entities and bring those excluded in decision-making into the discussion.

FOCUS AREAS

The key pieces that need to be focused on are:

- Involve and invite impacted communities (those close to the environment where this work is occurring that are either communal, environmental, or civic) and their perspectives to your work.
- Do not negate exploring the history of the Appalachian Trail and organizations involved in managing and protecting this resource. Be willing to face the gaps in the formation that may contribute to the exclusion of others.
- Work to get all committee members on the same page of understanding the initiative.
- Rethink the following terms and make sure the way you address them is inclusive: *Coalition Building, Thriving Communities, Active Leadership*
- Maintain Congruency - Everything that is being asked of the communities, make sure your organization or entities are doing it as well.
- Consider the barriers that other communities may have, such as financial and time constraints, etc., that may challenge individuals to participate in this initiative.
- Think about how to help struggling communities build their own economy.
- Explore all terms used to see if they are exclusive in nature: *Economic capacity building, Culture, Service, Communities*

CONCLUSION

It is difficult to create inclusive initiatives when operating in exclusive ways unintentionally. Exclusion can happen when we assume that others care about our concerns, and we try to make our concerns others' concerns. We may have the same values, but we may articulate them differently, or we may not have the same values. This is a primary reason we put this plan together to continue to have these conversations across this Landscape. Knowing this issue of climate is existential, the urgency is here, but with communities still struggling because of oppressive policies and oppressive behaviors by leaders, we must take a step back and explore our own methods for including diverse voices. We have a lot of work to do, but we also have a lot of ground that we covered together. The aim is not to be perfect, but to be equitable, relevant, and relational, while also representing multiple communities in our work.

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