

## **Appendix: Environmental Justice and Climate Change Case Studies**

### **Summary of League Positions for Environmental Justice**

#### **Environmental Justice and Climate Change: Case Study Chesterfield Heights, Norfolk**

#### **Gold Mining in Virginia**

#### **Natural Gas Infrastructure, an Environmental Justice Case Study**

#### **Environmental Justice Case Study**

**Topic: Landfills' effects on community health and well-being**

**Case: Bristol, VA**

#### **Nature Deficit Effects**

**Access to Nature Is an Environmental Justice Issue**

#### **Urban Heat Island Effect Case Study**

## Summary of League Positions for Environmental Justice

The order of the positions below is taken from *Impact on Issues*. Specific LWV-VA positions are in bold.

LEAGUE POSITIONS	LWVUS	LWV-VA	REVIEW COMMENTS
Natural Resources	<p>“Promote an environment beneficial to life through the protection and wise management of natural resources in the public interest.” The position includes protecting public health.</p>	<p>No statement, just a title</p>	<p>Public interest and public health can encompass environmental justice but without explicitly naming the issue, it is likely to be neglected.</p>
Resource Management/ <b>Land Use</b>	<p>LWV-US’s land use policy summary is as follows: “Promote policies that manage land as a finite resource and that incorporate principles of stewardship. Promote policies that Federal public lands should remain under the jurisdiction of the federal government.”</p> <p>Resource Management addresses more than land, but it is the position closest to Land Use. It urges, “Consideration of environmental, public-health, social, and economic impacts of proposed plans and actions;” and “Procedures for mitigation of adverse impacts;” and “Special attention to maintaining and improving the environmental quality of urban communities.”</p>	<p>The state’s Position in Brief is as follows: “Support state policies that include creating state long- range comprehensive land use plan coordinated with local and regional plans, protection of critical environmental areas through some land use controls, and assisting to and increasing flexibility for localities in land use planning and control.”</p> <p>The position (which dates to 1975) includes the following note: “Many of the recommendations of this position have been accomplished through legislation, nationally and in Virginia. Also, today’s land use processes have become a function of government comprehensive planning.”</p>	<p>With few exceptions, the state and national positions place land use in the context of conservation, natural resources, and government responsibility/control, rather than the effects of land use decision-making on people and communities. The national policy does support environmental, social and economic impact assessment of “major public and private developments,” as well as “identification and regulation of areas impacted by public or private investment where siting results in secondary environmental, and socioeconomic impacts.”</p> <p>The national policy also supports identification and regulation of “natural hazard lands, where development could endanger life and property.” This seemed useful to flag in light of several group members’ interest in the environmental</p>

			justice implications of climate change/natural hazards
Environmental Protection and Pollution Control	This is the actual position and air, water, solid waste, and nuclear waste are sections in the League History of the position. “The League’s approach to environmental protection and pollution control is one of problem solving.” Another relevant point in the position is, “Consumers, taxpayers and ratepayers must expect to pay some of the costs.”	No overall statement precedes the positions on air, water, land, and extractive industries.	There is no acknowledgment that marginalized populations have shouldered a disproportionate burden of both pollution and costs.
Air Quality/Air Quality	Air Quality does not address environmental justice in any substantive way. The closest it comes is, “In 2012, when the EPA proposed the first-ever standards to control industrial carbon pollution from power plants, which causes global climate change and increases health problems, the League joined with its environmental and social justice allies in collecting the largest number of comments ever submitted in review of an EPA regulation.”	The position document does not address environmental justice in any substantive way. It comes closest by supporting “efficient transportation modes.” In fact, the position is focused on vehicle emissions to the exclusion of other contributors to poor air quality and it notes that “Most of these recommendations have been accomplished (or exceeded).” Of serious concern is this statement, “Develop less polluting alternative fuels, a high priority with preference for compressed natural gas, reformulated gasoline, electricity and hydrogen.”	Neither LWVUS nor LWV-VA addresses environmental justice in any substantive way. The LWV-VA position’s endorsement of specific fossil fuels needs to be updated to reflect current climate science.
Water Resources/ <b>Water Supply and Distribution</b>	The League supports programs and policies that show the interconnectedness of water quality, quantity, groundwater and surface water monitoring potential depletion and pollution. It supports measures to reduce pollution from direct point sources and	<b>The League supports</b> a comprehensive state effort to protect the water supplies by recognizing the connection between ground and surface water and that all decisions are made based on sharing the use of ground water. The state is responsible for the	

	<p>nonpoint sources. The quality of the water must be able to sustain species populations and diversity including lakes, estuaries, wetlands, in-stream flows and coastal waterways.</p> <p>The League supports stringent controls to protect the quality of current and potential water supplies. When Interbasin Transfers are used the league supports close study and efforts to minimize damage to residents and flora and fauna affected by this transfer.</p>	<p>collection of information on water resources and planning for future use, making sure that all land use policies guarantee protection of water resources and that land use and water supply and distribution are indivisible. The state continues to have a moratorium on fracking until proven effective and not harmful to residents and their drinking water. The League also supports a moratorium on uranium mining until modern, enforceable and effective best practices are achieved.</p>	
Solid Waste	<p>The League supports legislation that supports the prohibition of injecting toxic wastes into on or under ground sources of drinking water; set location standards for siting waste treatment storage, and disposal facilities, and permit land disposal of untreated hazardous waste only as a last resort for selected substances. The league also supports pollution prevention and community access to information on emissions, as well as efforts to enable state and EPA regulators to compel federal facilities with RCRA standards. The League supports adequate funding of Superfunds for Toxic Waste Cleanup .</p>	<p>No specific position on solid waste.</p>	
Nuclear Waste	<p>The LWV-US does have a nuclear position under Natural Resources to promote the maximum protection of public health and safety and the environment. Other positions within the LWV-US address</p>	<p>There is not a LWV-VA position per se on nuclear or nuclear waste. However, there is a position for a moratorium on uranium mining in the Water Supply and Distribution position.</p>	<p><b>Analysis:</b> The maximum protection of public health and safety and the environment could be seen within the environmental justice lens. The LWV-US position on public participation should be reviewed to ensure</p>

	<p>nuclear weapons, nuclear power, and public participation.</p>	<p>The League supports the moratorium on uranium mining. The Commonwealth must establish modern, enforceable, and proven effective best practices to protect the health and safety of workers, the public, and the environment before uranium mining, processing, and reclamation occurs. The Commonwealth must ensure that tangible economic benefits exists even if industry can develop modern best practices specific to the unique environment of Virginia. Further, if the Commonwealth adopts best practices approved by an independent assessment team such as the National Academy of Science (NAS) or other independent scientific organization, it must also provide the staff and funds needed by the Department of mines (sic), Minerals, and Energy, the Department of Environmental Quality, the Virginia Department of Health, and other state agencies to thoroughly monitor and regulate uranium mining. According to the December 2012 NAS report “the waste from mining and milling if not adequately controlled repositories to prevent surface and groundwater contamination. Tourism and agriculture, important economic drivers for the Commonwealth, depend on clean water which could be compromised by uranium mining. (2014).</p>	<p>that it addresses equal access to the decision-making process.</p> <p><b>Analysis:</b> Again, the moratorium impacts all Virginians <b>without regard to race, color, national origin, or income</b>. The LWV-VA position does recommend staff and funds to monitor and regulate uranium mining so minimally addresses development, implementation, and enforcement of environmental laws, regulations, and laws.</p>
<p><b>ENERGY and Extractive Industries</b></p>	<p>Energy –The League supports that the US is a responsible member of the world community, reduction of energy growth rates, use of a variety of energy resources</p>	<p>Energy not assigned <b>Extractive Industries: Hydraulic Fracturing (LWV-VA)</b></p>	<p><b>Analysis:</b> Concur that this position includes an environmental justice lens because 1) a moratorium applies to all people regardless of race, color, national origin, or income and</p>

	<p>with emphasis on conserving energy and using energy efficient technologies, and limitations on nuclear fission. The League supports environmentally sound use of energy resources of the entire cycle of energy products with predominant reliance on renewable resources that is encouraged through funding for research development, financial incentives, rate setting policies, and mandatory standards. The League supports mandatory energy conserving measures and thermal standards for building efficiency, new appliance standards and standards for new automobiles. It supports policies to reduce energy demand and minimize the need for new generating capacities, maintain deregulation of oil and natural gas prices, and assist low income individuals with energy policies bear unduly on the poor.</p>	<p>The League of Women Voters of Virginia supports a moratorium on hydraulic fracturing in the Commonwealth of Virginia until there is sufficient evidence from robust studies to show that hydraulic fracturing will not have a negative impact on the health, safety, and well-being of citizens, local jurisdictions, or the natural environment. Absent a moratorium, the League of Women Voters of Virginia believes that the Commonwealth of Virginia, including all relevant state departments and state agencies, and local governments, have a responsibility to safeguard Virginia's critical features and to ensure the public's safety, health, and welfare by 1) adopting strict systems for monitoring, regulation, and oversight of the hydraulic fracturing, including all related facilities, and fracking impacts on critical features (e.g. ground and surface water resources and recharge areas; geologic resources and seismic zones; historic sites and districts), public facilities (e.g. recreation areas, schools, wildlife preserves), local and regional infrastructure, and local and regional economies; 2) developing and implementing systems of financial assurance so all fracking-related expenses incurred by the Commonwealth and the local jurisdictions are borne by the industry; 3) granting localities authority to regulate hydraulic fracturing operations; 4) providing state funding to local governments to offset the costs incurred by local governments; 5)</p>	<p>2) addresses the development, implementation, and enforcement of environmental laws, regulations, and policies.</p> <p>Both LWV-WV and LWV-MD have positions on surface mining and coal, respectively, that LWV-VA does not address.</p>
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		developing a state-level system for long-term monitoring of local impacts and enforcement of regulation throughout the full life cycle of the hydraulic LWV-VA Positioned For Action, Spring, 2021; and 6) creating programs and policies designed to help local jurisdictions address the longterm (sic) economic and social impacts of hydraulic fracturing and its expected “boom and bust” cycles.	
Transfer of Public Lands	Prior to any transfer, a comprehensive assessment that covers the following issues should be performed...Environmental justice.	See <b>Land Use</b> under Resource Management	This position adopted in 2020 is the first to say Environmental Justice. But because it is within a position with narrow application, it does not address the majority of environmental injustices. Nor does it spell out what those might be.
Climate Change	From the Statement of Position on Climate Change Policy, as announced by the LWV National Board, January 2019: “The League believes that climate change is a serious threat facing our nation and our planet. The League believes that an interrelated approach to combating climate change-including through energy conservation, air pollution controls, building resilience, and promotion of renewable resources-is necessary to protect public health and defend the overall integrity of the global ecosystem. The League supports climate goals and policies that are consistent with the best available climate science and that will ensure a stable climate system for future	No position on Climate Change	LWVUS is using this position for action on environmental and climate justice: In the US League of Women Voters Toolkit for Climate Action, under the subsection on Climate Change and Adaptation: “Here in the US, heat waves are becoming more frequent and intense, putting children, the elderly, the sick, and the poor in particular at risk. More frequent severe rainstorms are overwhelming storm sewers and causing flooding. Warmer Temperatures and changing precipitation patterns are affecting water availability in many parts of coastal communities and ecosystems.  Importantly, The LWV US in November, 2020 stated support for “returning the National

	generations. Individuals, communities, and governments must continue to address this issue, while considering the ramifications of their decisions, at all levels - local, state, regional, national, and global.”		Environmental Policy Act (NEPA) to its essential form prior to modification finalized on July 16, 2021. Specifically in the Phase Rulemaking, the League supports: Cumulative and Indirect Effects are one of the primary ways the federal government considers the frequently disproportionate impacts that the siting of large scale projects and facilities may have on people of color, indigenous people, and poor populations. Central to consideration of disproportionate burdens is the consideration of cumulative impacts, which result from past, present, and reasonably foreseeable future actions and effects in a project area, including impacts of climate.
Public Participation	The position states, “The public has a right to know about pollution levels, dangers to health and the environment, and proposed resource management policies and options. The public has a right to participate in decision-making at each phase in the process and at each level of government involvement. Officials should make a special effort to develop readily understandable procedures for public involvement and to ensure that the public has adequate information to participate effectively.”	no equivalent state position.	This position comes the closest to addressing environmental justice in that it echoes the EPA definition’s “meaningful involvement” and “equal access to the decision-making process.” The League position does not, however, describe the public in any detail as the EPA does with, “race, color, national origin, or income.” And the position does not recognize that some groups of people have been historically excluded from public participation or that those same groups have borne a heavier burden of pollution and health impacts as a result.
Agriculture Policies	The League’s Statement of Position on Federal Agriculture Policy, as announced by the National Board, October 1988: LWVUS believes that federal agriculture policies	In the League’s History section on positions "Action has focused on coastal resource preservation and planning, preservation of	



	<p>should promote adequate supplies of food and fiber at reasonable prices to consumers, farms that are economically viable, farm practices that are environmentally sound, and increased reliance on the free market to determine prices.</p> <p>SUSTAINABLE AGRICULTURE. Federal policy should encourage a system of sustainable, regenerative agricultural production that moves toward an environmentally sound agricultural sector. This includes promoting stewardship to preserve and protect the country's human and natural agricultural resources.</p> <p>RESEARCH AND DEVELOPMENT. Agricultural research, development, and technical assistance should continue to be a major federal function. Resources should be targeted to developing sustainable agricultural practices and addressing the needs of mid-size farms.</p> <p>FARM CREDIT. Farmers should have access to credit with reasonable terms and conditions. Federally provided farm credit is essential to maintaining the viability of farm operations when the private sector is unable or unwilling to provide the credit farmers need. Of these policies, the League believes the most essential for the future of agriculture are: encouraging sustainable agriculture; providing research, information, and technical assistance to agricultural producers; and increasing</p>	<p>prime agricultural land and strip mining legislation".</p> <p>Only other mention of Agriculture is under Section titled <b>Land Use</b></p> <p><b>subsection State Control of Land Use:</b> Increased state control is needed for certain land areas of statewide concern such as...productive agricultural and forest lands." and,</p> <p>"The League believes that the state should give assistance to localities for land use planning and control by...collecting, analyzing and disseminating economic, environmental and social data."</p>	
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	<p>reliance on the free market to determine prices.</p> <p>In the 115th Congress (2017-2019), the League worked with partners to urge conferees on the Farm Bill in Congress to include provisions that protected and strengthened the Supplemental Nutrition Assistance Program (SNAP). The joint advocacy of the League and others pushed for policies that addressed the complex realities of the lives of women with low incomes, and their families, who seek to meet basic human needs—including the health, well-being, economic security—of their families.</p>		

## **Environmental Justice and Climate Change: Case Study Chesterfield Heights, Norfolk**

Flooding from sea level rise and more frequent intense rainstorms from climate change is the existential threat that parts of Virginia have been experiencing for the past decade and longer. The land bordering the coast and tributaries of the Chesapeake have faced increased flooding with shorelines eroded and neighborhoods, yards, roads, septic tanks, and storm water systems inundated. For instance, since 1927, the sea level has risen by about 1 1/2 feet in Sewells Point at the Naval Station Norfolk in the Hampton Roads area (and an additional foot is predicted by 2050). Research shows that sea level rise driven by climate change is set to accelerate in the coming decades. "Between 2020 and 2080, the number of residents living in homes exposed to extreme coastal flooding will triple to about a million; roadways flooded will increase from 55 to 340 miles and 170,000 acres of tidal wetlands will be permanently inundated." as reported in the Virginia Mercury (12-8-21). In addition, the Hampton Roads area, the Middle Peninsula, the Northern Neck, the Eastern Shore and cities such as Alexandria will experience more frequent flooding due to high tide events.

The Elizabeth River is a 6 mile long tidal estuary forming an arm of Hampton Roads harbor at the southern side of the mouth of the James R, between the cities of Portsmouth, Norfolk and Chesapeake. Hampton Roads includes the harbor and bordering communities.<sup>1/</sup> Watershed of the Elizabeth River is roughly 250 square miles within the cities of Chesapeake, Norfolk, Virginia Beach, and Portsmouth and reaches as far as the Great Dismal Swamp, the only source of fresh water. The mission of the Elizabeth River Project (ERP) is to restore it to the highest practical level of environmental quality through government, business and community partnerships. In addition, the ERP's focus on environmental justice builds on a 2020 commitment by its Board of Directors to more proactively address racial disparities, and found a springboard with the group's recent decision to update their community-based urban tree canopy, potential wetland restoration opportunities and industrial storm water. An example is ERP's pilot effort to help Norfolk's historically African American Chesterfield Heights neighborhood gain greater resiliency to coastal flooding.

<sup>1/</sup> Hampton Roads – Name of both the body of water wide channel for the James, Nansemond and Elizabeth Rivers. It is comprised of the VA Beach – Norfolk-Newport News, VA-NC, and metropolitan area. (Roads - roadstead- means safety of a port "partly sheltered area of water near a shore where vessels may ride at anchor".

The Elizabeth River Project (ERP) teamed with researchers from the Virginia Institute of Marine Science (VIMS) and William and Mary to build an online mapping tool that can help the non-profit and other community partners better incorporate environmental justice issues into planning and restoration efforts. Joe Rieger, ERP's Deputy Director for Restoration, defers to the US EPA's definition of environmental justice or "EJ" as the fair treatment and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. He states that the Elizabeth River Environmental Justice Tool "provides a great additional way for us to more deliberately focus our planning efforts in historically under resourced communities of color. In addition to income level, flooding and redlining, other components include the level of tree canopy and wetlands, vulnerability under various storm surge scenarios, the % of people of color, and the presence of Superfund sites". Dr. Molly Mitchell, head of the partnership at VIMS, explains that there had never been a focus so much on social vulnerabilities to determine how best to position resources on the ground to have a larger societal impact. She adds that "our online tool leverages national EJ data from EPA's existing EJ screen as well as other social and environmental data sets developed for Virginia to allow for holistic consideration of the socio-environmental setting in the Elizabeth River." Garry Harris, chair of the Equity, Inclusivity, and EJ Task Force of the ERP board, says, "It's going to be great to share this new tool with regulators, planners, and city councils. It really helps put us in a leadership position in terms of regional EJ and equity focus."

Within this context and following an award from the Virginia Sea Grant in 2014, Wetlands Watch started work on a community-scale, street level design work for sea level rise adaptation. The overall goal of the work was to conduct a flooding/sea level rise adaptation design process in a shoreline community at the street/parcel level with full community involvement focusing on adaptation before significant storm and flooding damage occurred with a central goal to maintain or expand ecosystem services in any designed developed. A secondary goal was to involve academic institutions with relevant departments of design, architecture, engineering, and policy in order to develop tomorrow's expertise. A broader objective was to inform a range of challenges and expose needed work in legal, policy, economic, social and other fields and encourage area of inquiry from VIMS (Virginia Institute of Marine Science's Center for Coastal Resources management) and William & Mary School's Coastal Policy Clinic. In January 2016, Wetlands Watch along with Hampton University and Old Dominion University produced a report titled "Tidewater Rising Resiliency Design Challenge".

Chesterfield Heights in Norfolk was one of 4 neighborhoods chosen as a candidate site for adaptation design. In the end, the study selected Chesterfield Heights because of the active involvement of the Elizabeth River Project in the neighborhood, the presence of a vibrant civic league, the mix of homes (both historic and later in-fill), and the mix of tidal and rainfall flooding.

Chesterfield Heights is an historic community of middle/lower income single family residences on the Eastern Branch of the Elizabeth River, built starting in 1915. The western end of the community is built on old filled in creek (Ohio Creek) which complicates flooding. Eastern end of the neighborhood is Grandy Village, a Norfolk public housing community. Chesterfield Heights is a community of nearly 900 people living in 500 structures and it is predominantly African-American and has a median household income of about \$32,000. It has approximately a 2,200 foot long riverfront shoreline experiencing increasing erosion from barge wakes. It has two creeks/inlets that convey water deep into the neighborhood and are a source of storm surge flooding. The community has an active civic league and the neighborhood exhibits a strong sense of place. There were a number of solutions , high and low impact, that were explored and ultimately presented to the city of Norfolk. The region began to assemble a grant proposal under the US Dept of Housing and Urban Development (HUD) National Disaster Resilience Competition (NDRC). In January, 2016, Virginia was awarded \$120 million, most of which was to implement the designs on the Ohio Creek Watershed/Chesterfield Heights.

The project began in 2017, after completion of an Environmental Impact Statement (EIS) evaluation, with a design team that included the City of Norfolk, the ERP, the Virginia DHCD aside from engineering and construction companies. The first step was to ensure extensive community involvement in the process so that residents from both the Chesterfield Heights Historic District and Gandy Village neighborhoods were heard and involved in the project progress moving forward. A layered, localized approach was employed including the relocation and transformation of roadways, new pump station additions, leveraging prior investments to catalyze transit-oriented development. To alleviate flooding, a layered approach to resiliency was utilized that incorporated a berm, living shoreline, and oyster reefs as part of the coastal defense strategies. By raising roadways and implementing drainage improvement, the two primary access routes remain passable during major flooding events to allow a continuation of access for residents, industrial uses, and emergency vehicles. The project incorporated public spaces, landscape, and streetscape features

throughout. The Grandy Village Stormwater Park includes a large, open playing field engineered with underdrains and more permeable soils that will serve as a shallow stormwater retention area following a flood event. The Ohio Creek waterfront edge after the completion of construction that includes earth berm, rock revetment, and 4,200 linear feet of living shoreline. More than 2,000 linear feet of the living shoreline stabilization were constructed and completed in 2021 along with a tide gate and 1,020 linear feet of floodwall. Infrastructure improvements, including new pump stations, roadways, stormwater, sidewalks, and park enhancements are currently under construction with an anticipated completion date of late 2022. Hopefully, the lessons from the pilot project in Chesterfield Heights to create a resilient shoreline against sea level rise with engineering solutions and community involvement has the potential for application to other tidal communities in Virginia.



Flood Zone map of Chesterfield Heights (blue=100-year flood plain)  
Maps courtesy of Wetlands Watch: Tidewater Rising Resiliency Design Challenge: Chesterfield Heights Neighborhood, Norfolk Virginia. Prepared by William A. Stiles, Jr., Wetlands Watch, Mason Andrews, Hampton University and Mujde Erten-Unal, Old Dominion University; January, 2016.

Given the magnitude of the monies needed for project design and implementation for coastal resiliency, the Virginia Legislature passed a measure to have the state join the Regional Greenhouse Gas Initiative (RGGI) in 2020 as a way to raise funds for flood preparedness. The RGGI is a carbon cap and trade market involving 10 other New England and Mid-Atlantic states. Under the RGGI, any power plant that produces 25 or more megawatts of electricity must buy carbon allowances in quarterly auctions. In Virginia, the costs Dominion Electric incurs for its carbon-emitting plants are passed onto customers. The law authorizing Virginia's participation in the RGGI requires 45% of all proceeds from the auctions go toward the Community Flood Preparedness Fund (CFPF) . Further provisions require that at least 25% of flood preparedness funds go to projects in low income areas. As of end 2021, the RGGI had raised 228 million with allocations going to the CFPF of 103 million. Consequently, a total of 32 million has been awarded in project funding across the state. A third grant round with 40 million is open for applications through April of 2022. With the current administration, Virginia stands to lose its membership in the RGGI and its goal of reducing Green House Gas (GHG) emissions and a built in funding mechanism for the CFPF that benefits many parts of the state. According to Grace Tucker of the Environmental Defense Fund (EDF), "Pulling Virginia out of RGGI would strip away critical funding that local governments need and disproportionately harm under-resourced, small and rural communities who do not have the capacity to address flood risk on their own." Other sources of funding would need to be found to help Virginia mitigate the severe displacement and losses due to man-made climate change and the inevitable rise of sea levels.

## References and Resources:

- 1) A Riverfront Neighborhood at Risk: Fortifying Chesterfield Heights (American Institute of Architects) by Savannah Tarpey, January 2016.
- 2) A Quick Guide to Resilience produced by the William & Mary Law School/Virginia Coastal Policy Center with contributions from Ryan Franklin and Sarah Henshaw in 2020.
- 3) ADAPTVA: a portal for evidence based planning tools and resources to respond to changing climate conditions by providing forecasts, adaptation case studies, risk assessment and guidance tools, maps and data, and access to comprehensive planning information. ADAPTVA is a collaboration of the Center for coastal Resources Management (CCRM) at VIMS, the Virginia Coastal Policy Center and Thomas Jefferson Public Policy Program at William and Mary, and Wetlands Watch.
- 4) The College of William and Mary (W&M) and the Virginia Institute of Marine Sciences (VIMS) Team with Elizabeth River Project (ERP) to create Interactive Planning Map by David Malmquist (W&M), July 19, 2021.
- 5) Community Flood Preparedness Fund Projects, VA Conservation Network (VCN) by Nicole Duimstra, January 10, 2022.
- 6) Ensuring the Resilience of Virginia's Flood Prone Communities with Policy Recommendations (VCN) from the 2022 Common Agenda in collaboration with Jay Ford of the Chesapeake Bay Foundation, Kim Jemaine of the Chesapeake Climate Action Network, Emily Steinhilber of the Environmental Defense Fund and Skip Stiles of Wetlands Watch.
- 7) Governor Declares Emergency After Southwest Virginia Flooding by Mike Still of the TimesNews, July 6, 2020.
- 8) Helping Cities Stay Dry When Sea Levels Rise part of Space for US Collection series from Applied Sciences Program of the Earth Science Division of the National Aeronautics and Space Administration (NASA). See also, EEJ@NASAEarth which pairs sea surface height information derived from satellites with demographic data, for example Norfolk, VA, to understand disparities seen by communities of color and lower economic status in negative impacts of sea level rise.
- 9) Interview with Skip Stiles of Wetlands Watch, March 11, 2022.



10) Mapping Tool helps Elizabeth River Project Factor Income, Redlining and More into Decision-making by Katherine Hafner of the Virginian- Pilot, August 14, 2021.

11) Ohio Creek Watershed Project: Draft Environmental Impact Statement from the Virginia Department of Housing and Community Development (DHCD) with the City of Norfolk Office of Resilience. Prepared by Vanasse Hangen Brustlin (vhb) Civil Engineering Co. in September, 2018.

12) Protecting Coastlines and Transforming Communities: Ohio Creek Watershed Project produced by vhb, November 11, 2021.

13) Virginia Coastal Resilience Master Plan 2021 by the VA Department of Conservation and Recreation (DCR).

14 ) Virginia Must Stay in the RGGI to Successfully Address its Flood Crisis by Grace Tucker of the Environmental Defense Fund (EDF), January 13, 2022.

15) The Virginia Mercury various articles by Sarah Vogelsong:  
Resilience Planning – and a few innovative ideas – top state's first Flood Fund grants, 10/14/21;  
Why some lawmakers push for Virginia Flood Board, 11/29/21;  
Virginia reaps \$228 million in first year of carbon market participation, 12/6/21;  
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Hampton takes home biggest slice of latest round of flood fund awards, 1/7/22  
Dominion asks permission to withdraw proposed increase in carbon market costs, 1/11/22;  
\$320 million headed to Norfolk Harbor flood protection projects, 1/20/22;  
Four ways Republicans want to pull Virginia out of RGGI, 1/27/22;  
As Virginia nets another 74 million, RGGI uncertainty lingers, 3/14/22;  
Younkin says RGGI won't cut emissions, critics say his own report shows he's wrong, 3/18/22.

# **GOLD MINING IN VIRGINIA**

FEBRUARY 28, 2022

**LWV-VA Environmental Justice Issue  
Group Authored by: I. I. Cole, P.E.**

# Gold Mining

Gold is a finite resource.

All the gold on Earth was formed during the beginnings of our universe. Gold occurs naturally in elemental form and is found as ore in rocks. What properties of gold make it valuable? Gold conducts electricity but doesn't tarnish. Gold is malleable and can be melted and cast into beautiful *object d'art*. Gold alloys with other metals, such as, silver, copper, zinc and nickel, to make it stronger and less malleable.

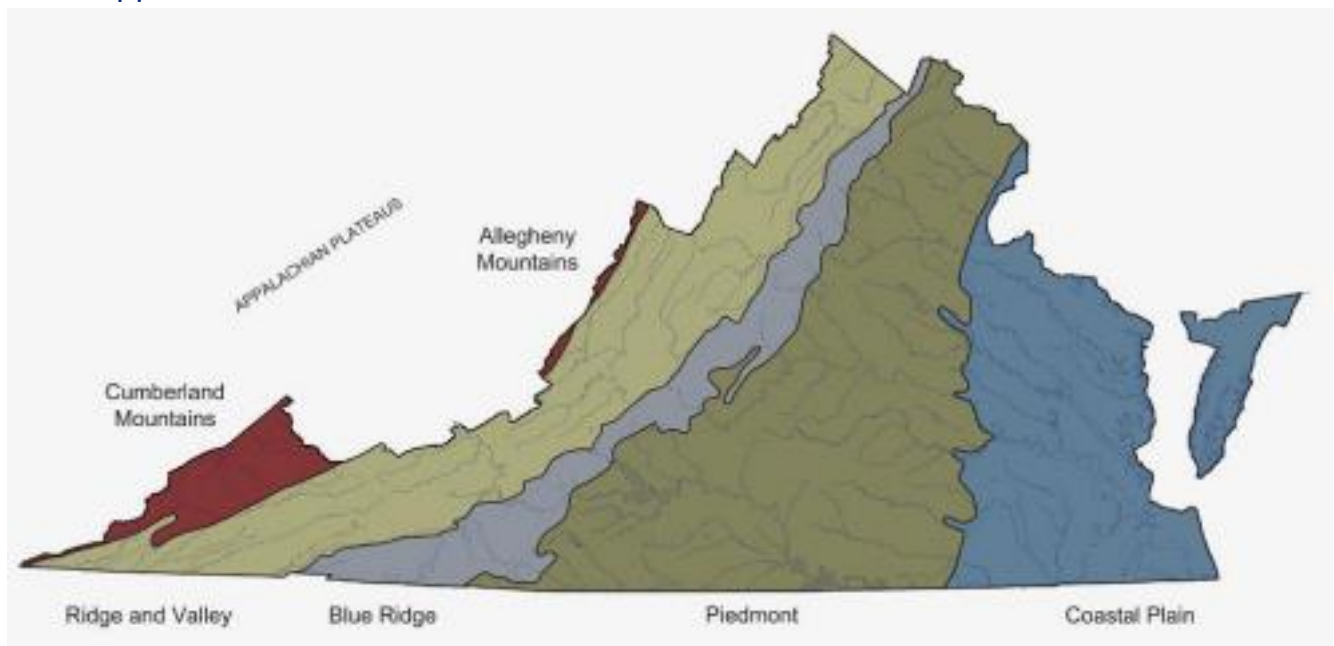
Gold is used in most modern electronic devices, such as, mobile phones, calculators, laptops and computers, global positioning system (GPS) units, and televisions; but also, dentistry; cancer treatments; electric vehicles (EV), currency; jewelry, and even space flight to shield vehicles and astronauts from radiation.

***The many uses of gold and the limited supply make it a valuable commodity.***

Where is gold found in Virginia?

Virginia is located on the East Coast approximately halfway between Maine and Florida. From the Atlantic Ocean westward, Virginia spans five of the 20 major physiographic provinces defined for North America:

1. Coast Plain,
2. Piedmont,
3. Blue Ridge,
4. Ridge and Valley, and
5. Appalachian Plateaus.



*Figure 1 Physiographic Provinces of Virginia (VADCR, March 2021)*

The Piedmont Province is locally hilly with a generally rolling landscape with an underlying geology of mainly metamorphic and igneous rock that has undergone a long history of deposition, uplift, deformation, and erosion. The eastern edge is known as the Fall Zone where the geology changes from crystalline bedrock to unconsolidated sediments.

Virginia's gold is found primarily in the Piedmont Province along what is known as the gold-pyrite belt, which runs from Fairfax County in Northern Virginia to Buckingham County in the southwest. Historically the largest concentrations of gold mines are in Buckingham, Fluvanna, Louisa, Goochland, and Spotsylvania counties.

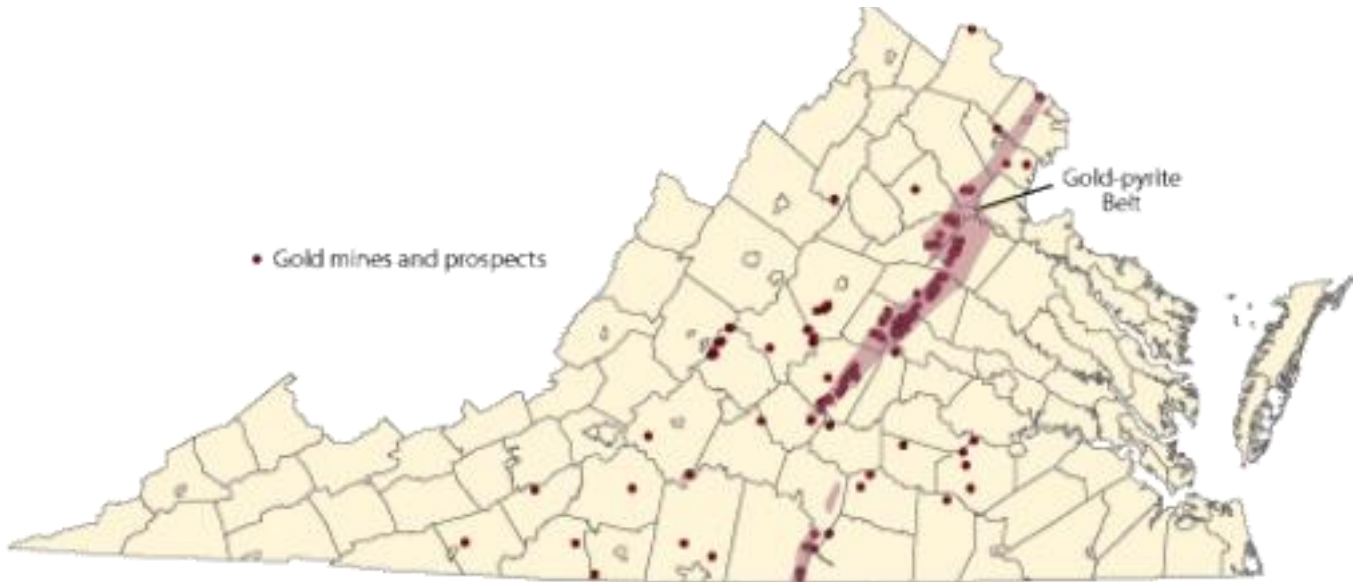


Figure 2 Gold-Pyrite Belt (VA Energy, 2007)

## The history of gold mining in Virginia.

Gold has been mined commercially in Virginia from the early 19<sup>th</sup> century until 1947. The California Gold Rush in the mid-1800's had a negative impact on industrial gold mining in Virginia. Due to the current cost of gold, a renewed interest in gold mining in Virginia is happening

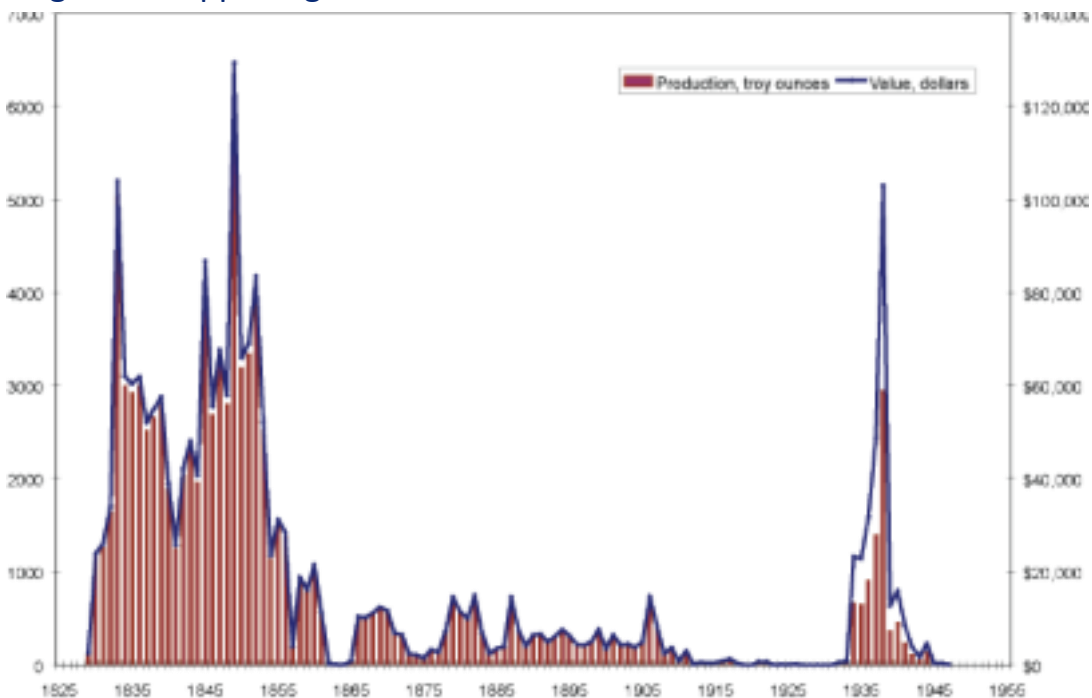


Figure 3 Historical Gold Production In Virginia

(<https://energy.virginia.gov/geology/Gold.shtml#:~:text=Most%20of%20Virginia%E2%80%99s%20gold%20mining%20was%20in%20the,extends%20from%20Fairfax%20County%20to%20southwestern%20Buckingham%20County>).

## How is gold mined?

There are two principal mining methods:

1. Placer Mining and
2. Load (Vein) Mining.

Placer mining occurs when gold is found in deposits of sand and gravel, usually in stream or river beds. The gold can be separated by panning methods. Load or load mining is a more complicated process. Once mined (deep or shallow), the ore is crushed into a powder in mills where the gold is extracted by gravity separation. The gold dust is then processed in a cyanidation mill (pioneered by MacArthur and Forrest) where a solution of cyanide dissolves the gold while the remaining rock dust is filtered off. Fine specks of gold can be precipitated out of the cyanide solution with the addition of zinc dust or by the carbon-in-pulp process. In this recovery process, gold ore, carbon, and cyanide are mixed together to form a slurry. The solution is passed through a series of tanks containing activated carbon where the carbon adsorbs the gold as it passes. The gold is stripped from the carbon in a caustic cyanide solution under heat and pressure. The gold is recovered by electrolysis or by zinc precipitation. The carbon then can be re-used.

The gold is then smelted in a furnace with silica, bora, and soda ash to absorb most of the impurities that rises to the top of the furnace as a slag. The gold, which settled on the bottom, is poured into bars that are shipped from the mine to be refined. ([UCSB Science Line](#))

## Current state of gold exploration in Virginia.

In March 2019 the wholly owned subsidiary of Aston Bay Holdings Ltd, Blue Ridge Mining, Inc., signed an 80-acre Exploration and Option Lease Agreement with an independent land and timber company in Buckingham County, Virginia based on drilling on the property in 2016 that demonstrated significant gold from quartz-veined meta-volcanic rocks.

In April 2019, the initial drill program of six drill holes was completed. Based on this drilling, an exclusive option to lease the mineral rights to 10,985 acres of land was signed with North American Timber Company. These lands are located within the

same region of Virginia as Aston Bay's recently acquired Blue Ridge Project, which is located within a copper-lead-zinc-gold-silver mineralized belt. In May 2021, Blue Ridge Mining, Inc. entered into a Letter Agreement with a private landowner for access to 1,982 acres located within an underexplored base metals belt in Campbell and Pittsylvania Counties.



Figure 4 Aston Bay Exploration Sites (<https://astonbayholdings.com/projects/virginia-usa/virginia-overview>).

Virginia General Assembly responds to this sudden interest. The Division of Mineral Mining, part of the Department of Mines, Minerals and Energy, was established April 20, 1987, by merging the safety and reclamation inspection and enforcement responsibilities for non-fuel mineral mining operations (non-coal) into one division. On October 1, 2021 the Department of Mines, Minerals and Energy was rebranded as the Virginia Department of Energy also known as Virginia Energy. Mineral Mining is responsible for the safe and environmentally sound production of Virginia's non-fuel minerals and for surface mining reclamation.

Code of Virginia – Title 45.2 – Subtitle III addresses the regulation of mineral mines, including permitting.

In the 2021 Special Session I of the Virginia General Assembly, HB2213 – Gold; Secretary of Natural Resources, et al., to study mining and processing, passed into law. HB2213 required the Secretary of Natural Resources, the Secretary of Health and

Human Resources, and the Secretary of Commerce and Trade to establish a work group to study the mining and processing of gold in Virginia. In addition, the bill required that the work group include:

- **Representatives from The Virginia Council on Environmental Justice;**
- Experts in mining, hydrology, toxicology, geology, and public health; • Environmental organizations;
- **Potentially affected communities;** and
- **Native American communities.**

The work group is tasked to present its finding to the Department of Mines, Minerals and Energy no later than December 1, 2022. The study is required to

- Evaluate the impacts of the mining and processing of gold on public health, safety, and welfare;
- Evaluate whether existing air and water quality regulations are sufficient to protect air and water quality;
- Evaluate the impacts of different leaching and tailing management techniques on downstream communities; and
- Evaluate whether existing bonding, reclamation, closure, and long-term monitoring of sites is sufficient.

The state agency component of the Gold Mine Study contracted with the National Academy of Sciences, Engineering, and Medicine (NASEM) to provide peer-reviewed science for the study, which will:

1. Briefly describe the geologic and mineralogical characteristics of the main gold deposits in Virginia, and the types of modern gold mining operations used with comparable deposits in other domestic or international locations.
2. Summarize the Commonwealth of Virginia's existing regulatory framework for gold mining and processing sites (for example, bonding, reclamation, closure, and long-term monitoring) and compare to other states with current or recently closed gold mining operations. This summary will include a discussion of relevant air and water quality regulations, as well as Chesapeake Bay watershed protections.
3. Evaluate the impacts of potential gold mining and processing operations on public health, safety, and welfare in the Commonwealth of Virginia. This evaluation will include:



## 7

- A. Discussion of current gold mining operations at sites with comparable geologic, mineralogical, hydrologic, and climatic characteristics to those found in the Commonwealth,
- B. Potential impacts of different leaching and tailings management techniques on downstream communities in the Commonwealth, and
- C. Whether existing air and water quality regulations in the Commonwealth are sufficient to protect air and water quality.
- D. Whether existing bonding, reclamation, closure, and long-term monitoring of sites for potential gold mining are sufficient to protect air and water quality. The NASEM study will be completed and released to the Virginia Department of Energy by November 1, 2022.

The NASEM met initially on December 15, 2021. The State Agency Work Group met initially on February 25, 2022. The NASEM report was released on November 1, 2022, and can be accessed at

<https://nap.nationalacademies.org/catalog/26643/the-potential-impacts-of-gold-mining-in-virginia>

## **Natural Gas Infrastructure, an Environmental Justice Case Study**

Virginia is in a strategic location between the Marcellus Shale and the cities and ports along the Atlantic coast. Two major pipeline projects were planned to carry natural gas from the fracked shale deposits across the Commonwealth. The distance meant that compressor stations would be necessary along the pipeline route. Compressor stations are large and very loud, emit air pollutants, and can explode. As is all too common with facilities no one wants to be near, the sites selected in Virginia were adjacent to minority communities.

### **Atlantic Coast Pipeline (ACP)**

The Atlantic Coast Pipeline project was finally abandoned for financial reasons. It became an environmental justice issue when the project proposed to build a compressor station in Union Hill, Buckingham County, Virginia. Union Hill is a community settled by formerly enslaved people after the Civil War on farm land where they had been forced to labor. Buckingham county residents fought against the planned compressor station, arguing that because Union Hill is a historic Black community, the resulting air pollution would be an environmental injustice. Nevertheless, the State Air Pollution Control Board and the Department of Environmental Quality approved the permit.

In the court case that ensued, the Fourth Circuit Court vacated the air quality permit for the Atlantic Coast Pipeline and set an important precedent that environmental justice concerns could not be ignored by the permitting authority. “Even if all pollutants within the county remain below state and national air quality standards, the Board failed to grapple with the likelihood that those living closest to the Compressor Station – an overwhelmingly minority population according to the Friends of Buckingham Survey -- will be affected more than those living in other parts of the same county. The Board rejected the idea of disproportionate impact on the basis that air quality standards were met. But environmental justice is not merely a box to be checked, and the Board’s failure to consider the disproportionate impact on those closest to the Compressor Station resulted in a flawed analysis.”

While the ACP was supposed to terminate in North Carolina, a spur pipeline called the Southside Connector was planned to cross several heavily populated, predominately minority communities. The buried 24-inch steel pipe would have run for nine miles in existing utility right-of-way in South Hampton Roads. It would have been a high pressure transmission line operating at as much as 1,250 pounds per square inch, not a distribution line as had been implied. This project too ran into heavy opposition and but the fate of the ACP may have had more to do with halting this pipeline.

### **Mountain Valley Pipeline (MVP)**

The demise of the ACP left the Mountain Valley Pipeline without competition but with similar issues. The pipeline would pass through Giles, Craig, Montgomery, Roanoke, Franklin, and Pittsylvania counties on the way to North Carolina. Opponents of the MVP project argued that the pipeline negatively impacts the water quality of the streams it crosses.

The MVP Southgate project submitted a draft air permit for the proposed construction of the Lambert Compressor Station, to be located near Chatham, in Pittsylvania County. The

Lambert compressor station, if approved, would enable the extension of the 303-mile Mountain Valley pipeline project by 75 miles into North Carolina. Opponents argued that the proposed compressor station would adversely impact the health of low-income and majority African-American residents of Banister District in Pittsylvania County. These arguments were made in front of the Virginia Air Pollution Control Board (VAPCB) in an effort to obtain a denial of a key approval sought by the developers of the project.

In December, 2021, the VAPCB denied the air permit, finding that the proposed project would impact an environmental justice community. The board also found that the project application did not comply with Virginia's air pollution and environmental justice laws, nor with legal precedent established under *Friends of Buckingham v. State Air Pollution Control Board* (4th Cir. 2020), the decision that ended the ACP.

The 4th Circuit Court of Appeals, in March, dismissed MVP's appeal of the Air Pollution Control Board's decision. However, in response to the Air Board's decision, the Virginia General Assembly passed and the Governor signed legislation that removed permitting authority from the Air Pollution Control Board and the State Water Control Board.

By June, the MVP was encountering regulatory problems with the Federal Energy Regulatory Commission (FERC), U.S. Forest Service and U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers over water quality in stream crossings. But in August, the MVP negotiated with the federal government a four year extension for completing work. The *Virginia Mercury* reported, "FERC's decision Tuesday sets October 13, 2026, as the new deadline. The commission said that should Mountain Valley receive required permits, it is "likely" the permits will undergo judicial review and take time to resolve."

That was followed by news that U.S. Senator Joe Manchin of West Virginia had secured a commitment from President Joe Biden, Senate Majority Leader Chuck Schumer and House of Representatives Speaker Nancy Pelosi to allow the long-delayed Mountain Valley Pipeline to be completed. This commitment was not specific to MVP, but rather imposed limits on permitting processes that could affect many other projects. Then in September, Sen. Manchin abandoned his effort to use a government funding package to speed up the permitting process for energy projects, because it had complicated passage of that bill before the end of the fiscal year.

Despite that decision, MVP backers are still counting on federal legislation to reform permitting for energy infrastructure and the November election changed the makeup of the House of Representatives. But with all these twists and turns, who can say when or if the MVP will be completed.

## **Header Improvement Project**

Meanwhile, under the name Header Improvement Project, a set of short pipelines were proposed to connect with the main Transco pipeline that crosses Virginia on a north-south line. These pipelines would affect Hanover, New Kent, Charles City, Fauquier and Prince William counties and would necessitate new or expanded compressor stations in Prince William and Caroline counties and the city of Chesapeake as well as a C4GTpower plant in Charles City County.

*Bay Journal* [reported](#), “The \$346 million Header Improvement Project (HIP) proposed by Virginia Natural Gas would impact neighborhoods in the city of Chesapeake and several counties — Fauquier, Prince William, Hanover, New Kent, Caroline and Charles City — as well as about 68 streams and rivers, 150 acres of wetlands and 313 acres of forest. It would particularly impact majority-minority communities where residents claim they’re sidelined in the decision-making. They want to know why the infrastructure is being foisted on them and what health and environmental repercussions would be visited on their families because of it.”

Charles City County was a textbook example of cumulative impacts from industrial projects. But the [decision to abandon](#) the C4GT project seems to have had more to do with financial problems than the community protests. Other parts of the Header Improvement Project encountered legal and financial problems in addition to questions of environmental justice.

*Bay Journal* [summarizes](#) the difficulties natural gas pipeline infrastructure has encountered in Virginia. Grassroots opposition has coalesced around climate change and environmental justice. Public protests have forced delays that allowed financial and other problems to become apparent. But this struggle is ongoing and strong advocacy continues to be needed.

## Environmental Justice Case Study

### Topic: Landfills' effects on community health and well-being

Case: Bristol, VA

#### *Background*

Landfills used to manage solid waste can have many negative effects on human health. People living near landfills can be exposed to hazards including pathogens, endotoxins (toxins produced by bacteria), gasses, and aerosols.<sup>1</sup> Microorganisms in landfills create gas as they break down waste, generating methane, carbon dioxide, sulfides, and ammonia, which pose serious health and safety threats along with unpleasant odors.<sup>2</sup>

Like many environmental hazards, this burden is not borne equally, and landfill siting is an important environmental justice concern. In fact, the term “environmental racism” springs from the fight against a Warren County, NC, hazardous waste landfill in the 1980s.<sup>3</sup> For decades, environmental justice activists, researchers, and community members have been calling attention to the disproportionate impact of landfills on low-income communities and communities of color, particularly Black and Indigenous communities. As described by public health and waste management expert Denise Patel:<sup>4</sup>

*The end result is that low-income and Black, Indigenous, and people of color (BIPOC) communities are most impacted by waste policies and are often targeted by the waste industry and others as potential sites for building incinerators and landfills. These industries know that these communities lack the ability and capacity to fight back to protect themselves. Policies like redlining have further concentrated polluting facilities, including waste facilities, in EJ and BIPOC communities.*

#### *Landfill Odors in Bristol, VA*

An example of landfills' effects on community health and well-being is unfolding today in Bristol, VA. Bristol, VA, is an independent city in southwestern Virginia on the Tennessee border. As of the 2020 Census, Bristol has approximately 17,000 residents, with another 27,000 living across the state line in the “sister city” of Bristol, TN.<sup>5</sup>

<sup>1</sup> K. Huun and L. Jones (2020). “Who Bears the Cost of Your Waste?” University of Colorado Boulder Environment Center. <https://www.colorado.edu/center/2021/04/15/hidden-damage-landfills>.

<sup>2</sup> New York State Department of Health (2010). “Important Things to Know About Landfill Gas.” [https://www.health.ny.gov/environmental/outdoors/air/landfill\\_gas.htm](https://www.health.ny.gov/environmental/outdoors/air/landfill_gas.htm).

<sup>3</sup> D. Fears and B. Dennis (2021). “‘This is environmental racism’: How a protest in a North Carolina farming town sparked a national movement.” *Washington Post*, April 6, 2021. <https://www.washingtonpost.com/climate-environment/interactive/2021/environmental-justice-race/>

<sup>4</sup> C. Yang (2021). “Q&A: Addressing the Environmental Justice Implications of Waste.” Environmental and Energy Study Institute. <https://www.eesi.org/articles/view/qa-addressing-the-environmental-justice-implications-of-waste>.

<sup>5</sup> U.S. Census Bureau (2022). “QuickFacts: Bristol city, Tennessee; Bristol city, Virginia; Virginia.”

The Bristol Integrated Solid Waste Facility, located in an old limestone quarry, opened in 1998. Starting in late 2020, thousands of residents began submitting odor complaints to the City and to the Virginia Department of Environmental Quality (DEQ). Far from just experiencing an unpleasant smell, community members reported experiencing a range of symptoms, leading to lost sleep, visits to urgent care, and severe disruption to everyday life. A 2021 article in the nonprofit media outlet *Southerly* summarized residents' experiences as follows:<sup>6</sup>

*Residents have reported intense headaches, nausea, burning eyes and throats, nosebleeds, and other symptoms. A local Facebook group with over 3,000 members is overflowing with stories: One resident reported chest pain and difficulty breathing. A U.S. Army veteran wears a gas mask to sleep. A mother watches her newborn "[wake] up all [through] the night gagging and coughing." People regularly leave their homes in the middle of the night to escape or end up calling in sick to work.*

The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index, which identifies communities where economic and social factors increase vulnerability to natural hazards, ranks the Bristol census tract with the landfill as among the most vulnerable tracts in the nation, with only about 15% of the country's census tracts receiving a higher social vulnerability score.<sup>7</sup> According to the Census Bureau's American Community Survey, 22% of Bristol residents live in poverty, compared to 9% in Virginia as a whole.<sup>8</sup>

### *Actions and Investigations*

In March 2022, DEQ convened an expert panel to review the history of the landfill and the ongoing issues. The panel's report, published in April 2022, identified elevated temperatures in the landfill; the panel stated that the landfill's "condition has the potential to worsen unless prompt (immediate) action is taken" and "strongly recommended" closure of the facility in addition to a suite of actions to mitigate the odors and address the underlying conditions creating them.<sup>9</sup>

<https://www.census.gov/quickfacts/fact/table/bristolcityvirginia,bristolcitytennessee,VA/PST045221>. Accessed June 8, 2022.

<sup>6</sup> S. Wade (2021). "Air pollution from a Virginia landfill is making residents sick. Officials won't call it an emergency." *Southerly*, December 1, 2021. <https://southerlymag.org/2021/12/01/air-pollution-from-a-virginia-landfill-is-making-residents-sick-officials-wont-call-it-an-emergency/>.

<sup>7</sup> Centers for Disease Control and Prevention, Agency for Toxic Substances and Disease Registry (2018). "CDC/ATSDR Social Vulnerability Index." <https://www.atsdr.cdc.gov/placeandhealth/svi/index.html>. Accessed on June 8, 2022.

<sup>8</sup> U.S. Census Bureau (2022). "QuickFacts: Bristol city, Tennessee; Bristol city, Virginia; Virginia." <https://www.census.gov/quickfacts/fact/table/bristolcityvirginia,bristolcitytennessee,VA/PST045221>. Accessed June 8, 2022.

<sup>9</sup> C.H. Benson et al. (2022). "Expert Panel Report: Bristol Integrated Solid Waste Management Facility, Bristol, Virginia." Virginia Tech College of Engineering, April 25, 2022. [https://www.bristolva.org/DocumentCenter/View/3634/Bristol-Landfill-Expert-Panel-Report\\_25April2022](https://www.bristolva.org/DocumentCenter/View/3634/Bristol-Landfill-Expert-Panel-Report_25April2022).

In June 2022, the city entered a consent agreement with DEQ and began the process to cease accepting waste.<sup>10</sup> Meanwhile, in the Commonwealth's Fiscal Year 2023 budget, the General Assembly allocated funding to DEQ to "provide technical assistance to the City of Bristol regarding ongoing health, environmental, and quality of life issues stemming from the operations of the City's landfill" and to support the City in beginning to resolve those issues.<sup>11</sup> However, while the landfill stopped accepting waste in September 2022, residents still reported odors a month later.<sup>12</sup> As of late October 2022, the city estimates that fully remediating the landfill will cost \$30 million.<sup>13</sup>

Accessed November 13, 2022.

<sup>10</sup> D. McGee (2022). "Bristol, Va., to stop accepting trash; enters into agreement with DEQ." *Bristol Herald Courier*, June 8, 2022. [https://heraldcourier.com/news/local/bristol-va-to-stop-accepting-trash-enters-into-agreement-with-deq/article\\_96fd4bd6-c5c0-5c10-bd41-574aeb4bfcce.html](https://heraldcourier.com/news/local/bristol-va-to-stop-accepting-trash-enters-into-agreement-with-deq/article_96fd4bd6-c5c0-5c10-bd41-574aeb4bfcce.html).

<sup>11</sup> Virginia Legislative Information System (2022). "2022 Special Session I Budget Bill - HB30 (Reenrolled)." Virginia General Assembly, <https://budget.lis.virginia.gov/item/2022/2/HB30/Reenrolled/1/380/>. Accessed November 13,, 2022.

<sup>12</sup> J. Jenco (2022). "Post-closure, Bristol residents still suffer from landfill smell." WHJL.com, October 10, 2022. <https://www.wjhl.com/bristol-va-landfill/post-closure-bristol-residents-still-suffer-from-landfill-smell/>.

<sup>13</sup> C. Scheele (2022). "Bristol, Va. Landfill cleanup expected to cost \$30 million." WHJL.com, October 26, 2022. <https://www.wjhl.com/bristol-va-landfill/bristol-va-landfill-cleanup-expected-to-cost-30-million/>.

# Nature Deficit Effects

## Access to Nature Is an Environmental Justice Issue

Carolyn Caywood

### Summary

To be nature-deprived is an environmental and climate injustice. Green spaces must not be treated as amenities for the affluent, but public health necessities for all neighborhoods. Small local parks, community gardens, welcoming landscapes around public buildings, and tree-canopied streets can begin to address the legacy effects of under-investment in low-income neighborhoods. Green spaces can mitigate heat-related health conditions, buffer boundaries between a residential neighborhood and incompatible land uses, provide needed stimulation for balanced child-development, and even encourage more civic-minded behavior.

### Background

*Advancing Sustainability through Urban Green Space* reports that “Urban green spaces provide an array of benefits, or ecosystem services, that support our physical, psychological, and social health.” There are direct physical effects on communities and neighborhoods that lack green spaces. And there are psychological harms to people who are deprived of contact with nature, especially during the formative years of childhood. These are less visible and obvious injustices than the exposure to pollution that initiated the environmental justice movement, but they are nevertheless an injustice with lasting consequences.

A view that cities are unhealthy and country life is more wholesome dates back to a time before modern sanitation. One civic response was the development of city parks and park-like cemeteries. Another was programs that sent urban children to the country for a summer, or for life. But as cities ceased to be plagued with disease, these efforts came to be seen more as amenities than needs.

Meanwhile, the city dwellers least likely to be able to afford leisure time in the country or to feel welcome in a park were often immigrants, either from abroad or from the American South. For many of them, memories of rural life involved forced labor and abuse. Even today, “African Americans, Latinos, women, and members of the LGBTQ community often report feeling unwelcome or unsafe in outdoor spaces.” reports *Five Ways to Make the Outdoors More Inclusive*.

A [report](#) commissioned for *The Nature Gap*, “Finds that the United States has fewer forests, streams, wetlands, and other natural places near where Black, Latino, and Asian American people live. Notably, families with children—especially



families of color with children—have less access to nature nearby than the rest of the country. In other words, these communities are nature deprived. These disparities are particularly concerning because nature is not an amenity but a necessity for everyone’s health and well-being.”

## **Physical effects**

The official government policy of redlining neighborhoods that were low income or largely populated by people of color has left a legacy of little green space, fewer tree-lined streets, more impervious surfaces, and a lack of vegetative buffers between residential and incompatible uses. Impervious surfaces and a lack of vegetation increase rainfall ponding and risk of flooding. Climate change in [Virginia](#) is exacerbating both heat and rainfall, as *States at Risk* shows.

Hard, flat surfaces amplify noise, and [National Park Service measurements](#) indicate “that noise may well be the most pervasive pollutant in America.” Angela J. Hanscom adds, “In fact, being exposed to loud noises or noise pollution on a frequent basis may actually harm children and their ability to interpret sound over time.” on page 52 of *Balanced and Barefoot*.

Lack of vegetation combined with paved surfaces increases heat, and the National Weather Service [says](#) “extreme heat is the number one weather-related killer.” The temperature difference between a neighborhood with a tree canopy and one without can be as much as 20 degrees. Homes in these treeless neighborhoods are likely to lack built-in air conditioning because redlining made it difficult to get bank loans for home improvement.

“More than 80 percent of the U.S. population lives in urban areas, where development and transportation patterns often limit the quantity and accessibility of natural features.,” according to [Cities Connecting Children to Nature](#). Families dependent on public transit may have no practical way to reach parks. Even where green spaces aren’t physically distant, barriers like limited access highways often cut off access from low income neighborhoods. Fees for entry can be another barrier, especially for people with disabilities because, as reported by the [National Council on Disability](#), they live in poverty at more than twice the rate of those without disabilities. Park design can be an additional barrier for people with disabilities.

Unfortunately, parks, green spaces, and undeveloped pockets of land can become a refuge of last resort for people experiencing chronic homelessness. Homeless encampments can create litter and public health problems and discourage other people from enjoying a natural area. Park managers typically respond by enforcing no overnight camping rules while providing some extra services and

connection with social services agencies. Other land managers may bar all use of a green space. The National Recreation and Park Association [says](#) that, "Matters surrounding homelessness are complex, with solutions that necessitate a holistic approach and collaboration between federal, state, and city agencies and nonprofit organizations." Nevertheless, this should not justify refusing to expand green spaces in underserved communities.

## **Health effects**

"People from low-income communities or communities of color often experience worse health and educational outcomes than other groups. Access to quality natural spaces and nature-based experiences can mitigate poorer outcomes typically associated with disadvantage. Inequitable access to such spaces and experiences can contribute to widening disparities," according to the [Children and Nature Network](#).

"In fact, a growing body of evidence shows that access to green space in urban areas can bring considerable benefits to the health and well-being of city residents. These benefits may include [improved cognitive development and functioning](#), [reduced symptom severity of attention deficit hyperactivity disorder](#), [reduced obesity](#), and [positive impacts on mental health](#). Looking forward, the University of British Columbia researchers write, the "impact of urban vegetation exposure on the health and well-being of marginalized communities may become even more critical as climate change worsens," writes Ambika Chawla in [Green Space in Cities Can Bring Considerable Health Benefits for Communities, but Access is Unequal](#).

## **Psychological effects**

Heat tends to make people irritable in contrast to green spaces which tend to be soothing. Vegetated surroundings can help people manage anger, while noisy, walled and paved spaces can inflame aggravations. Because easy access to green spaces invites people to mingle outside, neighborhoods with small local parks, community gardens, public buildings set in welcoming landscapes, and tree-canopied streets build a stronger sense of community. "Nature in our daily lives enhances the strength of social ties among neighbors by encouraging use of common spaces." states [Outside Our Doors](#). Green surroundings have also been shown to make people more productive. [Urban Green Space and Its Impact on Human Health](#) reports, "We found consistent negative association between urban green space exposure and mortality, heart rate, and violence, and positive association with attention, mood, and physical activity."

If people feel unwelcome, however, they lose these benefits. One remedy is to make green spaces more culturally relevant. The Wilderness Society [observes](#) that, "In recent years, the Antiquities Act has been used to great effect to tell the stories of traditionally underrepresented groups and reckon with painful episodes in our nation's history." Localities in Virginia can draw on their own history to make even small neighborhood parks reflect the diversity of the community and reshape public understanding of that history. Moreover, organizations that have been created within many minorities to rebuild a connection with nature are potential partners. See the Resources at the end of this paper.

## **Child Development**

The effect on a child of having, or not having, easy access to a natural area for unstructured play can be profound. Unstructured play in natural areas benefits children in physical, mental, emotional, and social areas of development. [The Nature Gap](#) explains that, "Studies consistently find that children who spend time outdoors in natural environments experience improved health and cognitive functions, strong motor coordination, reduced stress, and enhanced social skills."

Physical benefits include whole body activity that's purposeful but not prescribed, collaborative more than competitive, self-initiated and thus not repetitive, boring, or discouraging. Children playing in natural areas can benefit from increased vitamin D and exposure to probiotics according to Ariane de Bonvoisin in [Psychology Today](#).

Unstructured outdoor play encourages imagination and creativity, reasoning and memory, resourceful problem-solving, and self-directed learning and experimentation. Such imaginative play is often collaborative with other children. Through such play, children develop self-reliance, mindfulness, respect for all life, and an intuitive awareness of ecological relationships. Angela Hanscom says, "In nature, children learn to take risks, overcome fears, make new friends, regulate emotions, and create imaginary worlds," in *Balanced and Barefoot*, page 3.

"Since 2005, the number of studies of the impact of nature experience on human development has grown from a handful to nearly one thousand. This expanding body of scientific evidence suggests that nature-deficit disorder contributes to a diminished use of the senses, attention difficulties, conditions of obesity, and higher rates of emotional and physical illnesses. Research also suggests that the nature-deficit weakens ecological literacy and stewardship of the natural world. These problems are linked more broadly to what health care experts call the 'epidemic of inactivity,' and to a devaluing of independent play," explains [Richard](#)

[Louv](#). Lack of outdoor play in natural surroundings may be implicated in asthma, allergies, and auto-immune diseases.

Clearly, children need convenient access to natural areas where self-initiated play is welcomed and adults are present only for safety. No elaborate equipment is required, in fact, it's better without. And yet, in 2012 the CDC found that only one in five children lived within walking distance of a park or playground. In 2018, *Literature Review | Equitable Access to Nature's Benefits* found that, "People from low-income communities or communities of color often experience worse health and educational outcomes than other groups. Access to quality natural spaces and nature-based experiences can mitigate poorer outcomes typically associated with disadvantage. Inequitable access to such spaces and experiences can contribute to widening disparities."

A recent development is purposely created nature playscapes such as Angela Hanscom's [Timbernook](#) and, outside Charlottesville, Carolyn Schuyler's [Wildrock](#). As a nonprofit, Wildrock has worked to keep fees from being a barrier and partnered with organizations for outreach to nature-deprived children. However, visiting is a planned event, not an everyday part of a child's life.

## Virginia

According to a table in [The Nature Gap](#), US census tract demographics in 2017 indicated that in Virginia 20% of white people and 76% of people of color live a nature-deprived area. Lest it be assumed that this is only an urban problem, *The Nature Gap* highlights, "Energy extraction as a driver of nature deprivation." The article continues, "For example, in the parts of Appalachia where coal mining has been most concentrated—including Kentucky, West Virginia, and southwestern Virginia—low-income communities are located in areas with higher-than-average levels of nature loss due to energy development."

The Trust for Public Land "ranked the 100 most-populated U. S. cities by comparing five park categories: equity, access, investment, amenities, and acreage." Arlington was ranked third in the nation. Virginia Beach came in at 41, Richmond at 45, Norfolk at 50, and Chesapeake at 62. Localities with smaller populations were assessed on what percentage of residents live within a 10-minute walk of a park. The national average is 55% according to <https://www.tpl.org/parkscore>

Local League municipalities (counties were not evaluated except Arlington)

- Alexandria 96, Arlington 99%
- Charlottesville 85, Waynesboro 26%

- Centreville 63, McLean 65, Reston 88%
- Falls Church 99%
- Fredericksburg 41%
- Ashburn 31, Leesburg 52, South Riding 33, Sterling 38%
- Lynchburg 35%
- Blacksburg 71, Christiansburg 31, Radford 33%
- Dale City 27, Lake Ridge 6, Manassas 61, Warrenton 54, Woodbridge 30%
- Mechanicsville 4, Richmond 80, Short Pump 29, Tuckahoe 19%
- Cave Spring 16, Hollins 21, Roanoke 65, Salem 52%
- Chesapeake 46, Norfolk 75, Portsmouth 51, Suffolk 8, Virginia Beach 68%
- Abingdon 27, Bristol 36%
- Williamsburg 73%

Other Virginia cities: Bedford 30, Danville 35, Galax 34, Hampton 23, Harrisonburg 34, Martinsville 15, Newport News 28, Petersburg 56, Staunton 37, Winchester 69%

Recommendations in [\*Identifying and Addressing the Vestiges of Inequity and Inequality in Virginia's Laws\*](#) to address environmental justice include: "Direct the Department of Conservation and Recreation to adopt a Statewide Park Equity Mapper to include demographic and health data necessary to inform equitable decision making and Amend Code § 10.1-200.1 to include access for environmental justice communities as a required consideration in state park master planning."

## **Solutions**

"The research is clear: quality, close-to-home parks are essential to communities. Everyone deserves a great park within a 10-minute walk of home," said Diane Regas, President and CEO of [The Trust for Public Land](#).

- Engage residents in decision-making about solutions. Let their knowledge of local needs, psychological barriers, and safety concerns guide choices. Partner with neighborhood and grassroots organizations. Learn what history and culture connections will make green spaces more welcoming.
- Fund parks in safe walking distance of neighborhoods that lack access. Support public transit for older children and young teens to increase the natural areas they can access. Create green spaces with landscaping

around public buildings like schools, libraries, and community centers. These can be resources for STEM education. Provide incentives for early childhood centers to include nature play options. Encourage faith communities that have landscaped property to create areas for quiet contemplation.

- Support tree planting as a neighborhood civic activity involving residents in decisions as well as action. Monitor to ensure that neighborhood improvements don't result in rent raises that price residents out -- [environmental gentrification](#). Remove any legal barriers to setting up community gardens. It's not uncommon for a formerly redlined neighborhood to be a food desert and gardening offers many opportunities for casual STEM learning. Encourage the rediscovery of each culture's heritage of knowledge about nature.
- Encourage unstructured play, letting nature and imagination supply most of the equipment. Arrange outdoor spaces to provide unobtrusive supervision. More directed outdoor activity like story walks, building fairy houses, guided nature observation, also can be beneficial but should not replace unstructured play.
- Rethink zoning requirements for paved surfaces. Support green roofs and vegetated breaks in parking lots that can reduce runoff. Plan green buffers between residential areas and incompatible land uses like traffic, industrial processes, and waste management.

### **Proposed consensus questions:**

- Should the Commonwealth dedicate funding to ensure that all Virginians are within a ten minute walk of a green space?
- Should the Commonwealth remove legal barriers and offer incentives to replace impervious hardscape with vegetation?

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**Resources:**

*America Outdoors With Baratunde Thurston* PBS video. Episode 5 "Tidewater: Homecoming" 2022, features Black history in coastal Virginia and North Carolina.

*Children & Nature Network* <https://www.childrenandnature.org/> lists of research and resources.

*Diversify Outdoors* <https://www.diversifyoutdoors.com/> lists outdoor organizations for a wide range of minority groups including people with disabilities.

*Green Muslims* <https://www.greenmuslims.org/> has Virginia connections.

*Outdoor Afro* <https://outdoorafro.org/> celebrates and inspires Black connections and leadership in nature.

*Naturally Latinos* and *Taking Nature Black* are annual conferences, <https://anshome.org/conferences/> There's an *LGBTQ Outdoor Summit* <https://www.lgbtqoutdoorsummit.com/>

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**Urban Heat Island Effect Case Study**  
**League of Women Voters United States**  
**Climate Justice**

**Topic:** Urban Heat Island Effect and impact on socioeconomically disadvantaged communities

**Case:** Richmond, VA

**Overview**

As the earth warms because of increased CO2 emissions, data collected in 50 metropolitan areas from the 1960s until 2010s reveals the future trends of extreme heat that we will face. [Heat waves](#) have steadily increased from an average of two per year to six; the duration has increased by one day from four to five; the heat wave season is now on average 47 days longer now than in the 1960s and finally the intensity has increased from 2.0 degrees F to 2.5 degrees F above the local threshold.

Extreme Heat is the leading cause of weather-related deaths; it affects different populations in the same urban area unequally because of the different distribution of heat absorbing materials and green areas. This has come to be known as the Urban Heat Island (UHI) effect. There is one more sobering fact that researchers have been aware of for a while--that during a heat wave, socioeconomically disadvantaged black and brown communities are disproportionately affected.

**The Issue**

A major project underway at the University of Richmond and Virginia Tech led to the digitizing of all the Home Owners Lending Corp (HOLC) maps, available for all cities over 40,000 people, that were used in the 30s and 40s by banks to decide to whom to offer home mortgages. The "A" or green

lined blocks had white residents with good housing stock and the "D" or redlined blocks had black residents and lower grade housing stock. By digitizing these historical maps and overlaying current satellite readings of Land Surface Temperature, impervious structures, and leaf canopy, the climate change inequity we are experiencing today can be traced back to the decisions made by the federal government, banks, and local land use groups nearly a century ago. Communities of color suffer more from heat because of [historical racist housing policies](#).

These findings are being used by community organizations like Groundwork USA's Climate Safe Neighborhoods to develop solutions for formerly redlined neighborhoods amid today's climate crisis. Climate Safe Neighborhoods organizes a neighborhood in three phases.

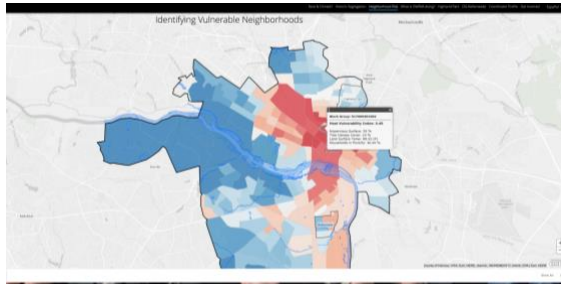
First, the maps become a tool the residents use to ask their local government why the maps haven't changed in 90 years. The maps are convincing in conversations with people who have not identified climate change as an issue that might affect them personally. Climate change is bringing heat waves and more extreme weather events like torrential rains that overwhelm a city's storm drains. So education is going on about impervious surfaces and the effects of greening areas to mitigate both these problems.

Second, the Climate Safe Neighborhoods initiate short-term measures like getting trees planted, getting air conditioning to residents who need it, and leading residents to set their priorities on these questions,

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rather than simply accepting a local planning agency's solution.

Finally, the long term-long goal is nurturing resident civic capacity, including educating residents on their community governance structure and encouraging citizen participation in city planning committees.



**Background**

On July 13, 2017, researchers spearheaded a heat watch campaign during a heat wave in Richmond. Teams of volunteers of students from local universities, the city of Richmond and a non-profit organization Groundwork Richmond Virginia (RVA) rode in cars and on bikes with hand-made sensors to collect hundreds of thousands of air temperature and humidity measurements. This is an example of a citizen-science project. The data was fed into an open source software package developed by Portland State researchers. The historical Grade A neighborhoods averaged four degrees cooler than the Grade D neighborhoods. [U.S. Climate Resilience Toolkit](#)

Groundwork RVA developed a heat vulnerability index (HVI). Their HVI included land surface temperature, tree canopy cover and impervious surface, and adaptive capacity (percentage of households in poverty). They then selected census block

groups in the top 25% HVI and intersected those blocks with FEMA Flood Hazard Zones to select two neighborhoods to work with residents on climate issues of heat and flooding.

Groundwork RVA has developed three programs to operate in these two neighborhoods. There is a Green Team, a group of young people who have been educated to explain the UHI effect and flooding to their neighbors, a Green workforce that trains and employs recent high school graduates and at-risk youth in urban gardening and landscaping skills, and thirdly, the BelleMeade Community Bike shop.

The Highland Park neighborhood was originally settled by white immigrants from southern and eastern Europe. Black ownership was restricted in the 30s. The area experienced white flight in the 50s-60s and disrepair in the 80s-90s, leading to a decline in property values and significant disinvestment. In the last few years there has been significant investment in this neighborhood, leading to rapid gentrification. Since this did not always benefit longtime residents, Groundwork RVA is working to prevent displacement of seniors and other longtime residents.

The Oak Grove-Belle Meade neighborhood has small bungalow-style houses, mostly rentals, that were built in the 40s for returning soldiers. There is also a large 446-unit public housing project, Hillside Court. Oak Grove-Belle Meade was impacted by industrial operations such as waste treatment plants, power generation, trucking and fuel terminals, and product

**Urban Heat Island Effect Case Study**  
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manufacturing. While other parts of Richmond are gentrifying, this neighborhood experiences continued disinvestment.

Groundwork RVA was successful in getting the City of Richmond to include language in its Master Plan [Richmond 300: A guide For growth](#) “prioritizing areas with a high heat vulnerability score” on several of the objectives that would increase green stormwater infrastructure, ensure a 10-minute walking distance to a park for every resident and tree canopy increases so every neighborhood would have 30% coverage.

After decades of neglect and financial discrimination, nonprofit organizations are stepping in to empower Richmond's marginalized communities so they can influence government action on unhealthy neighborhood conditions that will only get worse with climate change. However, the strength of the communities' influence will be tested when they seek major modifications or wholesale change. Also in question is whether the residents will benefit from improvements or will find themselves squeezed out by gentrification. There is a role for researchers who have adopted the citizen science model, realizing their specialized knowledge can lead to confrontation without stakeholder support. With community engagement, there is an opening for consensus on goals and effective implementation of solutions.

### Discussion Questions

1. The EPA defines heat equity as the development of policies and practices that moderate heat islands

and help people adapt to extreme heat in ways that reduce inequitable distribution of risks across different populations within the same urban area. How can this be implemented?

2. What would help a community move from the Groundwork model second phase, localized modest adjustments, to the third, local control and voice in governance for future decisions?
3. When improvements are made, how can neighborhoods protect themselves from being gentrified and forcing out the original residents?
4. What metrics would help to gauge progress in empowering a community to address the UHI effect?
5. Is there a citizen science project in your area? If not, what climate problems do you think your community would like to address in a citizen science model?

### Resources

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