The Climate Benefits of Degraded Lands Reclamation and Restoration

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Cover image: The Kennecott Mines National Historic Landmark is an abandoned copper mine in south-central Alaska. The National Park Service has identified buildings that need rehabilitation, stabilization, and potential cleanup actions. Photo: Melinda Podor/Getty Images

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Homes surround an oil well pad pump jack in Frederick, Colorado. Photo: Milehightraveler/Getty Images

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A restored Superfund site along the Sheboygan River in Wisconsin. Photo: Cavan Images/Getty Images

Introduction

Climate change is the most urgent and intersectional challenge facing global society today. It has impacted the lives of billions of people and will continue to alter our physical[1] and psychological[2] health for decades to come. Our fossil fuel dependency, which drives climate change, has also left its physical mark on the landscape. Extractive activities like oil and gas production and hardrock mining tend to be destructive processes that leave land degraded and wildlife at risk. For example, one study found that coal bed methane production was directly linked to an 82 percent decline in Wyoming's Powder River Basin sage grouse population between 2001 and 2005.[3] These degraded lands come with a cost that falls heavily on frontline communities and wildlife. Clean air and water are compromised, and the carbon sequestration potential of these degraded lands is often rendered obsolete. Reclaiming and restoring degraded lands is crucial to improve human and ecological health and help tackle climate change. Reducing dependence on fossil fuels while enhancing carbon storage in forests, wetlands, grasslands, and other nature-based solutions is essential to effectively address the climate crisis and increase climate stability across the globe.

The National Wildlife Federation acknowledges the myriad of environmental and health issues associated with degraded lands. This report highlights current information about the climate benefits of reclamation[4] and related investments and makes policy suggestions based on that knowledge.

Degraded Lands Defined

Degraded land is a broad term used to describe land that has lost some measure of its natural productivity due to human activities. Under this definition, many types of land could be described as degraded: agricultural lands, clear-cut forests, dredged or filled wetlands, landfills, mine lands, and more. Almost all human development and infrastructure inevitably changes the natural productivity of the land. This report focuses on lands that have supported extractive industry such as abandoned mine lands and orphaned oil and gas wells, and lands that pose hazards to people and wildlife due to contamination, such as brownfields and Superfund sites. Below is a brief discussion of each type of degraded land.

Abandoned Mine Lands

Abandoned mine lands (AMLs) are lands that once supported coal mines and hardrock mines—mines that extract metals and ores such as gold and copper—that are no longer operational and in varying degrees of abandonment and reclamation. This makes documentation quite difficult. One source[5] holds that as of 2015, there were about 48,529 abandoned coal mines in the U.S., but this number may be inaccurate due to inconsistencies in data reporting. As for hardrock mines, there were approximately 500,000 in 2016, according to the House Committee on Natural Resources.[6] Most authorized coal and hardrock mine operations use up to 1,000 acres[7] per operation.

Oil and Gas Wells

Abandoned oil and gas wells are extraction sites that have been improperly plugged or not plugged at all. With an estimated 3.4 million abandoned wells in the U.S.,[8] these sites pose severe environmental and public health risks. Orphaned

The Carrie Furnace steel mill in Pittsburgh Pennsylvania is now a National Historic Landmark and has been undergoing redevelopment. Photo: catnap72/Getty Images

oil and gas wells are a subset of this category, in which the wells have unknown or negligent owners and operators. Similar to abandoned mine lands, orphaned oil and gas wells exist in varying stages of abandonment and reclamation. Bankrupt owners often leave an extraction site unsealed with no plans of properly closing operations and restoring the land. A geospatial analysis from the Environmental Defense Fund in partnership with McGill University documents the location of 81,000 documented orphaned wells across just 28 states, showing heavy well concentration in Appalachia, the Midwest, Oklahoma, the Gulf Coast, and southern California.[9] The research also shows that many Americans live in close proximity to these documented wells—around 9 million live within a mile of one.

Brownfield and Superfund Sites

A brownfield is a piece of land compromised by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Redevelopment of contaminated lands is typically a challenge and often requires an injection of funding to clean the land up to standards for reuse. Brownfields that are most commonly eligible for federal funding fall under three categories: sites contaminated by petroleum or a petroleum product, sites contaminated by controlled substances, and mine-scarred lands. The Environmental Protection Agency (EPA) estimates that there are over 450,000 brownfield sites in the United States.[10]

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), established in 1980, is commonly known as Superfund. This act allocates funds for the EPA to clean up contaminated sites when there is no apparent responsible party. The National Priorities List (NPL) documents the nation's worst contaminated sites that have known or threatened releases of hazardous substances and serves as a guide to the EPA on which sites need investigation or cleaning. As of July 2022, the EPA identified 1,333 NPL sites and 43 proposed sites. The NPL fluctuates as site conditions improve to established standards.[11] Superfund sites tend to have worse contamination than brownfields, and will involve the EPA for cleanup, whereas brownfields are typically abandoned commercial and industrial lots that are intended for reuse.

A Great Blue Heron crosses the pond at Atlas Tack Superfund site in Fairhaven, Massachusetts. Photo: Danlogan/Getty Images

Degraded Lands and the Climate

The Working Group II contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change released in February 2022 affirms that the window of opportunity to make climate-adaptive changes is quickly closing.[12] It states with high confidence that "the resilience of species, biological communities, and ecosystem processes increases with the size of natural areas, by restoration of degraded areas, and by reducing non-climatic stressors."

The National Wildlife Federation considers investments in degraded lands reclamation an integral part of the climate solution and one with many co-benefits in addition to carbon sequestration. Degraded lands are more vulnerable to erosion, weathering, leaching, decomposition, and dangerous combustion, and therefore release carbon dioxide, methane, and other hazardous gasses. With proper management, these lands have the potential to sequester millions of tons of carbon dioxide annually as new and restored forests, grasslands, shrublands, and soils.[13] One report finds that for every $1 invested in land restoration, anywhere from $7 to $30 dollars can be returned in the form of improved food production, water quality, and carbon sequestration.[14]

Family planting a tree together. Photo: Jose Luis Please Inc/Getty Images

Climate Benefits

Key Principles for Climate-Informed Degraded Lands Reclamation

Degraded land reclamation can look different depending on the area and the goal for the reclaimed land. The net benefits of restoration vary by ecoregion and the status of restorable sites, and taking these ecological and environmental factors into account when developing restoration and reclamation plans is crucial. The following principles can help policymakers, community leaders, and local and state government and natural resource technicians strategize the best process and use of their project sites.

- Prioritize restoration of ecologically appropriate habitat types, which will create favorable plant and wildlife habitats that can also sequester carbon and increase climate resilience.

- Prioritize sufficient pollution assessment and cleanup activities before establishing new wildlife habitat or community use of formerly contaminated sites. This will protect the health and safety of people and wildlife.

- Afforestation efforts (i.e., planting trees in areas not historically in forest cover) should focus on severely degraded lands that do not border remaining naturally treeless systems such as native grasslands and shrublands, which also sequester carbon and support a range of important social and ecological values. Afforestation can contribute to meeting climate goals when implemented properly and with caution.

- Plant native grasses in areas where growing trees is difficult. Native grasses can stabilize soils, store carbon, and begin to rebuild organic matter in the soil, which supports more diverse plant communities in the future.

- Consider prioritizing phytoremediation techniques wherever possible. Phytoremediation is a process in which carefully selected plant species are planted on degraded lands to remove harmful soil contaminants. These techniques are often cost-effective and can sequester carbon. It can help cleanse potentially toxic elements from contaminated soil and water caused by legacy hardrock mining. In brownfields, phytoremediation using trees can reduce stormwater runoff and local flooding, and act as a living barrier to noise and air pollution.

- Reclamation priorities and plans should be created with the input of local communities, especially frontline and fenceline communities already coping with high pollution burden and increased climate vulnerability. Robust and meaningful community engagement will help ensure reclamation efforts deliver longer-term economic development in some of the most climate-, energy-, and economically-distressed regions.

Following these principles can help ensure degraded lands are reclaimed in a way that benefits the environment and communities long-term. However, every degraded land site has a different set of challenges and environmental and social impacts and requires individual assessment and monitoring as detailed below.

Reclaimed Mine Lands

Responsible land use and land management practices play a significant role in enhancing soil organic carbon (SOC) sequestration in reclaimed mined lands.[15] Carbon sequestration in soils happens when biomass decomposes and soil organic carbon pools gradually accumulate. If these soils are properly reclaimed and managed, carbon storage can be enhanced. Since the distribution of organic carbon in coal-contaminated mine lands can vary greatly, thorough sampling must be done to obtain an adequate measure of SOC before and after restoration.

As carbon dioxide assimilates into both aboveground biomass and soil organic matter, reclaimed lands can be a significant sink for atmospheric CO2.[16] A 2012 study that analyzed how time affected carbon sequestration in three West Virginia minesoils found that reclamation can have near-term benefits.[17] While SOC stocks were highest in the oldest minesoils, the study estimated that 75 percent of that SOC storage was achieved in the first decade after reclamation.[18]

Carbon sequestration in soils happens when biomass decomposes and soil organic carbon pools gradually accumulate. If these soils are properly reclaimed and managed, carbon storage can be enhanced.

In general, higher rates of SOC sequestration are observed for minesoils under pasture and grassland management than under forest land use.[19] One study in southeast Ohio evaluated the impact of native prairie restoration on a prior mine land and found evidence that this method could be more beneficial than planting shallow-rooting cool-season grasses, which are typically used in reclamation.[20] Native prairie vegetation has deeper roots, and thus may improve soil health at greater depths. Warm-season prairies can also provide habitat and high-quality nectar for endemic wildlife and pollinators, and be used as grazing land. Typically, the older a prairie is, the more abundant its vegetation and robust its ecosystem benefits.

Reforestation or afforestation on reclaimed mined land has major carbon sequestration potential. If 25 percent of unreclaimed AML acreage were reforested, these lands could potentially sequester 232,000 metric tons of CO2 annually—about as much as is emitted from powering 40,000 homes for a year.[21] The Forest Resources Association further estimates that an acre of young forest in Appalachia can sequester 1.6 metric tons of carbon per year.[22]

The New Cornelia mine is a currently inactive open-pit copper mine in Pima County, Arizona. Photo: Steve Proehl/Getty Images

Reclaimed abandoned mine lands can also provide essential services to people and wildlife. Native forests can increase soil water retention, reduce flooding, and minimize pollution and sediment runoff. Reclaiming these lands can also help increase climate resilience, of crucial importance in Appalachia, which is expected to see increased flooding due to climate change. The poor soils and loss of vegetation on former mine lands likely makes the impacts of flooding worse;[23] one 2019 analysis found that heavily strip-mined areas of the Ohio River Basin were also the most threatened by extreme weather due to climate change.[24] The 2022 flooding in eastern Kentucky, and parts of Virginia and West Virginia, underscores the potentially devastating intersections between climate-induced flooding and disturbed mineland. More research is needed to better understand this intersection.[25]

Orphaned Oil & Gas Wells

The EPA estimates that there are around 3.4 million abandoned wells, including orphaned wells and other non-producing wells.[26] These wells emit roughly 280,000 metric tons of methane annually, according to the EPA. Methane is a super-pollutant capable of trapping more planet-altering heat than carbon dioxide. Per ton, methane can have 81-83 times the global warming potential (GWP) of carbon dioxide over the first 20 years after emitted.[27] Methane is also emitted alongside volatile organic compounds and hazardous air pollutants like benzene.[28]

An old, orphaned oil well pump in a farm field. Photo: JJ Gouin/Getty Images

Plugging abandoned and orphaned wells would have significant impacts on reducing carbon dioxide, methane, and other harmful gasses that leak unnecessarily into the atmosphere and environment. This would provide immediate climate and community benefits by mitigating emissions, reducing air and water pollution, protecting biodiversity, and creating jobs.

One study estimated that the value of carbon sequestration and agricultural benefits combined from restoring eligible abandoned and orphaned oil and gas wells over 50 years to be $21.3 billion, with the cost of restoration around $6.9 billion – a 3:1 benefit-cost ratio.[29] Agricultural techniques such as sustainable farming, agroforestry, and responsible grazing help prevent further soil and land degradation; they can also provide additional economic and food security benefits to impacted communities. Even on its own, carbon sequestration at these restored sites over a 50-year period is valued at $7.3 billion, in addition to unquantifiable benefits to improving air and water quality, public health, and slowing climate change.

Brownfields

The expansion, redevelopment, or reuse of a brownfield may be difficult due to the presence of hazardous contaminants and pollutants. While redevelopment is often the goal of brownfield remediation, there is evidence to show that managed brownfield soils can also sequester carbon and provide other environmental and social benefits.

A study done on 20 brownfield sites in England found that the fine material in soils occurring after concrete demolition can aid in atmospheric carbon sequestration, with uptake rates highest in the first 15 years after demolition and with a removal rate of 4–59 tons of CO2 per hectare per year.[30] The study mentions the lack of information and research on this process and stresses the need for its consideration in carbon mitigation policies. Considering the U.S. has more than 450,000 brownfields—ranging in size from less than an acre to several thousand acres—carbon removal by urban soils should be examined as a natural

Manhattan's High Line Park was once an elevated railway and was redeveloped for open public space. Photo: Aretem Vorobiev/Getty Images

carbon management strategy. Trees planted on brownfield land, as part of a phytoremediation strategy, can also aid in carbon sequestration, and possibly help cool urban heat islands.[31]

Brownfield cleanup comes with other indirect climate benefits too. By cleaning up and redeveloping these sites instead of developing green spaces or other productive lands, communities avoid an increase in impervious surfaces, which can lead to runoff, waterway pollution, and hotter temperatures. In cities, impervious surfaces such as pavement and buildings create what is known as the urban heat island effect, making urban areas anywhere from 1 to 7 degrees Fahrenheit warmer than outlying areas in the daytime. Areas with an abundance of impervious surfaces absorb and retain greater amounts of heat, and exhibit decreased cooling effects that might otherwise come from evaporation and plant transpiration in a more vegetated area, in addition to providing shading from trees. These concrete- and asphalt-laden areas typically have increased energy costs, air pollution levels, and heat-related illness and mortality.

The EPA found that brownfield redevelopment can reduce the amount of impervious surface expansion associated with urban sprawl by 73-80 percent, which can help preserve existing green spaces.[32] One example of how brownfield redevelopment can be an economic and environmental boon is in the city of Atlanta, Georgia. A contaminated steel mill sat abandoned in midtown Atlanta. Facing rapid sprawl and disinvestment, the city cleaned up and redeveloped this brownfield, turning it into a mixed-use development now known as Atlantic Station. The redevelopment created affordable and upscale housing, new jobs, and entertainment and retail businesses.

The Atlantic Station site employed smart growth strategies that avoided new development and urban sprawl and its associated environmental and climate impacts. The site used less land than a conventional development but still provided the same amount of housing and commercial space. This land efficiency technique reduced annual stormwater runoff by almost 20 million cubic feet a year.[33] It also upgraded to a separated sewer system with modified catch basins for stormwater control, reducing the flow of pollutants from stormwater runoff into nearby water sources.

Superfund Sites

Improperly managed industrial and hazardous waste has left thousands of sites contaminated across the United States, including former landfills, toxic waste dumps, manufacturing facilities, processing plants, mining sites, and more. Similar to other degraded lands, these Superfund sites can be rehabilitated and restored into public parks, forests, grasslands, and other natural ecosystems that absorb and store atmospheric carbon.

For example, a seven-acre wetland was developed following the EPA's cleanup of the Bowers Landfill in Pickaway County, Ohio. Cleanup of the 12-acre site included removing contaminated waste, capping and venting the landfill, and re-vegetating the area.[34] The seven-acre wetland in the Scioto River floodplain has become a safe habitat for plants, birds, fish, and other wildlife and offers new recreational opportunities for the community. The restored land helps protect the landfill cap from flooding, reduces runoff, and traps carbon dioxide and other harmful greenhouse gasses. Wetlands have the ability to store a total of 11.5 gigatonnes of carbon, roughly equivalent to four years of annual U.S. carbon emissions.[35]

At another project site in East Helena, Montana, a 700-acre site with a former lead smelter was revitalized and prepared for redevelopment. This site is now home to a new elementary school and future high school, a 300-home subdivision, and a County Search and Rescue facility. Additionally, over 180 acres of the Prickly Pear Creek floodplain and 80 acres of migratory bird habitat were restored, offering carbon sequestration and flood mitigation properties.

The EPA determines which sites should undergo investigation and cleanup by identifying contaminated sites on its National Priorities List. With 73 million people living within 3 miles of a Superfund site, and 1,333 sites identified across the U.S. and its territories, these contaminated areas are also a public health and economic issue and disproportionately affect fenceline communities. In addition to natural restoration and carbon sequestration opportunities, these sites have the potential to become sites for renewable energy, housing, or recreational projects that can positively impact communities. Sufficient cleanup can result in improved air and water quality, lower blood-lead levels and birth defects in children, increased property values, job creation, recreational opportunities, and revenue to local businesses.[36]

Much of the documented benefits of Superfund site reclamation are focused on public health and local economy, which make communities more resilient. However, a lack of sufficient documentation of the carbon storage potential of Superfund reclamation is apparent and requires attention.

The East Helena smelter, a Superfund site, in Montana before scheduled demolition. Photo: Ron Armstrong/Getty Images

A woman fly-fishing in the Arkansas River near Leadville, Colorado. Thirty years after being placed on the EPA's NPL, a 102-mile portion of this river was designated a gold medal trout stream, increasing recreational and guided tourism in the area. Skibreck/Getty Images

Economic Opportunities

Investments in degraded land reclamation can help mitigate serious environmental damage, remove costly threats to public health, and sequester carbon. They also have clear economic benefits.

An analysis from the Ohio River Valley Institute found that cleaning up half of remaining AML damage in 10 years (a $1.3 billion per year investment) would support more than 17,000 jobs, both direct (jobs to reclaim the minelands) and indirect (such as administration jobs).[37]

Opportunities for economic and job growth are similar in the oil and gas industry. Skills attained in oil and gas industry jobs are transferable to reclamation jobs such as plugging abandoned wells. For example, the Ohio River Valley is a region highly affected by the decline of the oil and gas industry. Yet, well-plugging and remediation jobs would provide opportunities originating in the most distressed, low-income communities where there is high unemployment. It is important to note that ensuring any new reclamation and remediation jobs created are family-sustaining jobs, and accessible to those most in need, requires additional policy support.[38]

The economic benefits of brownfield and Superfund site remediation mainly lie in increased property value, local tax revenue, and job growth—especially if local workers are hired in association with site cleanup. A 2017 study found that cleaning up brownfield properties led to residential property value increases of 5-15.2 percent within 1.29 miles of the sites.[39] If land cleanup and redevelopment increase property values, they can also increase the local property tax revenues. This can help yield additional funds for municipalities to provide better public services and education, yet it can also displace legacy residents by raising taxes and increasing green gentrification.[40] Policy tools and interventions to prevent the displacement of, and maximize the benefits for, legacy residents should be employed proactively, prioritizing the community's needs.

Superfund revitalization can also reduce storm management and recovery costs and attract tourism revenue.[41] One example: the California Gulch Superfund site in Colorado boasts the attraction of over 100,000 anglers to its Gold Medal Trout Waters designated as part of cleanup efforts. Overnight travel spending generated $30.5 million in revenue in 2021, just one year after a large portion of the site was removed from the National Priorities List of Superfund sites.

Renewable Energy on Degraded Lands

Developing renewable energy projects on degraded lands is another way these lands can be a climate solution. In a recent report, the EPA found that up to 774,000 megawatts of power could be generated on degraded lands using renewable technologies.[42] Reusing these lands for renewable energy can help address the cleanup of contaminated sites as well as the necessary transition to clean energy.

There are environmental, regulatory, and technical barriers to overcome in building renewable energy on degraded lands, but also major synergies that can be exploited. For example, closed landfills may be a fitting location for new solar resources given their typical proximity to other infrastructure like roads, transmission lines, and population centers. Additionally, solar energy development at abandoned mines or Superfund sites has been found to help power groundwater remediation. Additional benefits include revenue growth and job creation for local communities and providing disenfranchised and rural communities better access to clean energy and corresponding air quality improvements. The EPA has mapped locations and renewable energy potential for contaminated lands, landfills, and mine sites through its RE-Powering America's Land Initiative.[43] The Department of Energy, meanwhile, is building out a new program[44] that will place clean energy demonstration projects on current or former mine lands.

The southern edge of a wetland created on the Atlas Track Superfund site in Fairhaven, Massachusetts. Photo: Danlogan/Getty Images

Community Benefits

Thanks to the economic and climate benefits discussed above, investments in land reclamation can help support the overall revitalization of communities, particularly fossil fuel dependent communities. Oil, gas, and coal workers across Appalachia, the Rust Belt, and throughout the western U.S. have provided the electricity and materials that powered the American economy since the Industrial Revolution. We have a responsibility to ensure those communities are not left behind as our nation increasingly transitions to clean energy. Today, many of those communities and workers face poor health from pollution, structural barriers to economic opportunity, increasingly severe climate impacts, and more. Degraded land reclamation cannot solve all of these problems, but it is part of the overall solution and should be part of any suite of "energy transition" or "just transition" policies.

Investments in land reclamation can provide good, family-sustaining jobs—particularly for people in fossil fuel dependent communities, offering a chance to stay and work, instead of being forced to abandon the communities where their families have lived for generations. And these investments can help build local wealth in communities while addressing legacy pollution and improving public health. These benefits are only possible, however, if the investments are designed and implemented thoughtfully, with communities—especially frontline and fenceline communities—in the driver's seat. Additional resources and guidance here can be found in the National Economic Transition platform[45] and the BlueGreen Alliance National Energy Transition Policy Framework,[46] which articulate comprehensive policy needs to help support communities impacted by the transition away from fossil fuels.

Policy Recommendations

Reclaiming degraded lands is often one of the most overlooked climate solutions. The National Wildlife Federation offers the following federal policy recommendations, which are focused on ensuring climate benefits of degraded lands reclamation. We acknowledge there are additional federal steps that can and should be taken to ensure land reclamation policies and investments are equitable, community-led, and economically beneficial to local communities. We also encourage policies that recognize the contributions to our national prosperity of the people most affected by the boom and bust cycle of extractive industries, to help ensure they have family-sustaining jobs and can continue to live and thrive in those communities, as we transition to a new clean-energy economy.

Abandoned Mine & Orphaned Well Clean-up

- Expand the goal of AML reclamation to include specific climate and environmental benefits. Recent Office of Surface Mining Reclamation and Enforcement (OSMRE) guidance on the Bipartisan Infrastructure Law's AML grant implementation[47] specifies that states and Tribes should prioritize projects that deliver benefits to disadvantaged communities, and those that eliminate methane emissions to the greatest extent possible. This is a welcome step; strengthening the definition of reclamation would help ensure these investments are also working as a climate solution. For additional details, see "Repairing the Damage" by the Ohio River Valley Institute.[48]

- Monitor abandoned mine land reclamation projects funded by the Bipartisan Infrastructure Law to ensure robust climate benefits of reclamation projects wherever possible. Building off of existing methane emissions reporting requirements, OSMRE could encourage collection of additional climate-related metrics, including estimates of carbon sequestration, in AML reporting from States and Tribes.

- Enact supplemental appropriations for remediation of contaminated areas including those on the National Priority List and abandoned mine sites, and restrict permitting for new projects that increase pollution in already overburdened communities.

- Support additional research and analysis on carbon sequestration and climate resilience potential on degraded lands. This could include providing funding to OSMRE for an assessment of the ability to use federally owned land and AMLs for carbon dioxide removal benefits and practices, including ecologically appropriate revegetation, reforestation, and restoration to natural landscapes, including grasslands. Additional funding should also support research on how former mine operations impact climate-induced flooding.

- Congress should appropriate funding for the Appalachian Region Reforestation Initiative (ARRI), a cooperative effort among OSMRE, state agencies, industry, environmental organizations, academia, and landowners. ARRI is a longstanding successful program dedicated to restoring forests on coal-mined lands in the Eastern United States, and currently is funded via a patchwork of cost-share and private dollars.

- Congress should pass the Orphaned Well Cleanup and Jobs Act, which authorizes $8 billion to plug and clean up orphaned wells while putting thousands of people to work.

- Congress should pass the Safeguarding Treatment for the Restoration of Ecosystems from Abandoned Mines (STREAM) Act, which authorizes states to set aside up to 30 percent of their annual Bipartisan Infrastructure Law abandoned mine land grant into an account for the treatment and abatement of acid mine drainage. The House passed the STREAM Act in August 2022, but the bill has yet to have a hearing in the Senate.

- Pass the Revitalize, Enhance, and Nurture in Expanded Ways Our Abandoned Mine Lands (RENEW) Act, which would provide backup funding to communities to create jobs by reclaiming abandoned mines and restoring water quality.

Pollution Remediation

- Congress should increase annual funding for Superfund clean-up to $20 billion, for Superfund Emergency Response and Removal to $840 million, and for Brownfield Redevelopment to $3 billion.

- Pass and fully fund at $56 billion over 10 years the Environmental Cleanup Infrastructure Act to devote an additional $30 billion to Superfund sites.

- Include local impacts of climate change in Superfund site planning and remediation.

- Through 1872 Mining Law reform legislation, establish a national abandoned hardrock mine clean-up program funded by industry fees. Supporting agency regulations and policies for such legislation must require reclamation and revegetation standards or directives to optimize carbon sequestration and climate resiliency outcomes.

Conclusion

Significant funding for degraded land reclamation is already underway through the Bipartisan Infrastructure Law, passed in November 2021. This law allocates $21 billion to reclamation efforts with funding falling into four major programs: $11.3 billion for abandoned mine land reclamation; $4.7 billion for orphaned oil and gas well plugging, remediation, and restoration; $3.5 billion for Superfund site cleanup; and $1.5 billion for brownfield remediation and revitalization. And the Inflation Reduction Act, signed into law in August 2022, reinstates the Superfund tax on oil and petroleum companies, which will provide additional funding to the EPA for Superfund cleanup. This historic funding will help improve the health, environment, and economy of communities. It is also an opportunity to make progress on climate.

The scope of America's degraded lands problem is vast, but so is the opportunity—to create new and restored forests and grasslands to sequester carbon, revitalize local economies, and remove ongoing threats to people and wildlife.

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