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## Climate Change Adaptation Resource Center (ARC-X)

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# Pennsylvania Protects Coldwater Fisheries and Water Quality from Climate Change

In 2009, pursuant to the Pennsylvania Climate Change Act, the Pennsylvania Department of Environmental Protection developed a “Pennsylvania Climate Impact Assessment.” This report identified the climate risks to maintaining the health of freshwater ecosystems among several other climate vulnerabilities.

The report identified warmer air temperatures, and the associated increase of stream waters, may reduce the ability for certain aquatic species to survive. This is supported by the EPA National Water Program's Climate and Water Strategy which identifies cold water fisheries as particularly susceptible to climate change and associated changes in water temperature.



Allegheny National Forest

The Climate Impact Assessment specifically suggested that: “Pennsylvania may see a decline in some of our most valued coldwater communities... Of special concern is the impact of higher temperatures and altered flow regimes on Eastern Brook Trout, not only because of its status as a recreationally and culturally important species, but because it is an indicator of high water quality and may be an early victim of deleterious impacts of climate change.”

Pennsylvania, in recognition of the cultural, environmental, and economic importance of cold-water fisheries to the state, and the vulnerability of possible transformation of cold water fisheries to warm water fisheries, identified the need to cover freshwater stream health within their Climate Change Adaptation Report. Pennsylvania, in recognition of the need to adapt to the changing climate and protect cold-water fisheries and freshwater ecosystems, outlined specific adaptation strategies for state agencies within their Climate Adaptation Planning Report.

These strategies, if implemented, can help Pennsylvania adapt to future climate changes for freshwater ecosystems, and will provide benefits to coldwater fisheries and stream health regardless of whether future climate impacts meet or exceed current projections.

How Did They Do It?	Applicable EPA Tools
<p><b>Pennsylvania conducted a Vulnerability Assessment for their natural lands</b></p> <ul style="list-style-type: none"><li>• Pennsylvania conducted a risk analysis and vulnerability assessment of their natural lands using global climate models from the IPCC AR4 and utilizing two different emissions scenarios and averaging the results over three separate 20 year periods. The Pennsylvania Climate Impact Assessment states that the “average of the projections from a suite of GCMs is most often used because model-average backcasts [running the model for previous decades using known data to determine accuracy] are found to more closely replicate the historical climate record in Pennsylvania in the 20th Century than the backcasts for any individual model, thus indicating greater reliability for the model average than for individual models or subsets.”</li></ul>	<p>Hydrologic and Water Quality System models seven categories of pollutants to estimate future impacts of climate change on water quality and inform vulnerability assessments.</p> <p>Hydrologic and Water Quality System &lt;<a href="https://epa.gov/waterdata/hawqs-hydrologic-and-water-quality-system">https://epa.gov/waterdata/hawqs-hydrologic-and-water-quality-system</a>&gt;</p>

How Did They Do It?	Applicable EPA Tools
<p><b>Developed a Climate Adaptation Report</b></p> <ul style="list-style-type: none"><li>Developed an adaptation report that identified the key issues affecting freshwater streams and the potential consequences of climate change, including impacts to water quality and extent of native fish species. This report identified adverse impacts to specific fish species as well as recommendations for adaptation actions and corresponding research needs to determine effective adaptation strategies.</li></ul>	<p>Adaptation to Attain Clean Water Goals can inform an adaptation report by discussing how climate change may affect the ability to meet future goals of the Clean Water Act.</p> <p>Adaptation to Attain Clean Water Goals</p> <p>&lt;<a href="https://epa.gov/cre/climate-change-and-coastal-watersheds-adaptation-attain-clean-water-goals-and-sustainable-coasts">https://epa.gov/cre/climate-change-and-coastal-watersheds-adaptation-attain-clean-water-goals-and-sustainable-coasts</a>&gt;</p>

How Did They Do It?	Applicable EPA Tools
<p><b>Identified specific recommendations</b></p> <ul style="list-style-type: none"><li>• Identified how different environmental conditions would lead to differing resilience levels with implications for the targeting of adaptation efforts. For example, the Pennsylvania Climate Adaptation Planning Report specifically highlighted variable levels of resiliency against climate risk as “Limestone spring streams with abundant, deep cold springs will be more resilient in the face of hot weather extremes than freestone streams that rely on surface and shallow groundwater sources. Trout conservation efforts are likely to be more successful in the limestone streams compared to other coldwater streams.”</li><li>• Recommended adaptation actions including, identifying and protecting critical habitat and, where applicable, removing small dams to conserve habitat and mitigate temperature increases.</li></ul>	<p>Synthesis of Adaptation Strategies Guidebook &lt;<a href="https://epa.gov/cre/synthesis-adaptation-options-coastal-areas">https://epa.gov/cre/synthesis-adaptation-options-coastal-areas</a>&gt;</p> <p>Wildlife Adaptation Strategy (PDF) <a href="#">↗</a> &lt;<a href="https://www.st.nmfs.noaa.gov/assets/ecosystems/documents/nfwpcas-final.pdf">https://www.st.nmfs.noaa.gov/assets/ecosystems/documents/nfwpcas-final.pdf</a>&gt;(120 pp, 3.8 MB, About PDF &lt;<a href="https://epa.gov/home/pdf-files">https://epa.gov/home/pdf-files</a>&gt;)</p>

## Similar Cases and More Information

To view another case(s) that works to protect water quality and fish habitat, view the Piscataqua National Estuary Program or Minnehaha River case. For more information on communities that have adapted to maintain healthy streams for aquatic organisms under changing climate conditions view Vermont Culvert Rebuild Policy, or the Maine Culvert Analysis Case.

- Minnehaha, MN Creek Watershed District Assesses Stormwater Management Climate Vulnerability  
<<https://epa.gov/arc-x/minnehaha-mn-creek-watershed-district-assesses-stormwater-management-climate-vulnerability>>

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## References

- Pennsylvania Climate Impact Assessment Reports to the Department of Environmental Protection [↗](https://www.dep.pa.gov/citizens/climate/pages/impacts.aspx)  
<<https://www.dep.pa.gov/citizens/climate/pages/impacts.aspx>>
- Pennsylvania Climate Action Plan [↗](https://www.dep.pa.gov/citizens/climate/pages/pa-climate-action-plan.aspx) <<https://www.dep.pa.gov/citizens/climate/pages/pa-climate-action-plan.aspx>>
- Planning and Management: Programmatic Response to Climate Change and Water  
<<https://epa.gov/climate-change-water-sector/other-climate-planning-documents>>

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[Climate Change Adaptation Resource Center \(ARC-X\) Home](https://epa.gov/arc-x) <<https://epa.gov/arc-x>>

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[Your Climate Adaptation Search](https://climateadaptation.epa.gov/) <<https://climateadaptation.epa.gov/>>

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[Implications of Climate Change](https://epa.gov/arc-x/implications-climate-change) <<https://epa.gov/arc-x/implications-climate-change>>

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[Adaptation Planning](https://epa.gov/arc-x/planning-climate-change-adaptation) <<https://epa.gov/arc-x/planning-climate-change-adaptation>>

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[Adaptation Strategies](https://epa.gov/arc-x/strategies-climate-change-adaptation) <<https://epa.gov/arc-x/strategies-climate-change-adaptation>>

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[Case Studies](https://epa.gov/arc-x/searchable-case-studies-climate-change-adaptation) <<https://epa.gov/arc-x/searchable-case-studies-climate-change-adaptation>>

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[EPA Contacts & State Websites](https://epa.gov/arc-x/epa-regional-climate-adaptation-contacts-state-websites) <<https://epa.gov/arc-x/epa-regional-climate-adaptation-contacts-state-websites>>

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