

# Contamination and Climate Change: Examining the Relationship between Virginia's Hazardous Waste Sites and Public Health

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## Abstract

The loss of coastal and inland wetlands, an increased frequency of extreme weather events and precipitation, and a rise in sea level are all anticipated to impact Virginia in the next 100 years. However, neither the Governor's *Climate Change Action Plan* nor the federal report, *Global Climate Change Impacts on the United States* mention hazardous waste sites in connection to climate change. We focused specifically on the future of Virginia's public health vis-a-vie increased mobility of hazardous waste through our water systems with the onset of climate change.

In Virginia, 21 sites on the National Priorities List, those which are recognized by the federal government as uncontrolled hazardous waste sites, lie near or immediately on bodies of water. In the event of predicted extreme weather and sea level rise, this proximity translates into the likely spread of chemicals into surface and ground waters, leading to long-term economic and environmental damage. Heavy rainfall can compromise the efficiency and efficacy of treatment plants, meaning that contamination is likely to spread to drinking water. Communities near military bases, such as Hampton Roads, with groundwater contamination have been shown in studies to have a greater frequency of negative health effects such as cancer and developmental problems.

The solution to these threats lies in prioritizing the remediation of hazardous waste sites. Preparation for severe storm events is also key, including anticipating storm surges and how a site may be secured to prevent off-site transport of chemicals through our water bodies. By doing so, we can prevent the uncontrolled spread of hazardous waste throughout Virginia's ecosystems and communities, thereby protecting human health in the face of drastic environmental change.

## The Numbers on Virginia

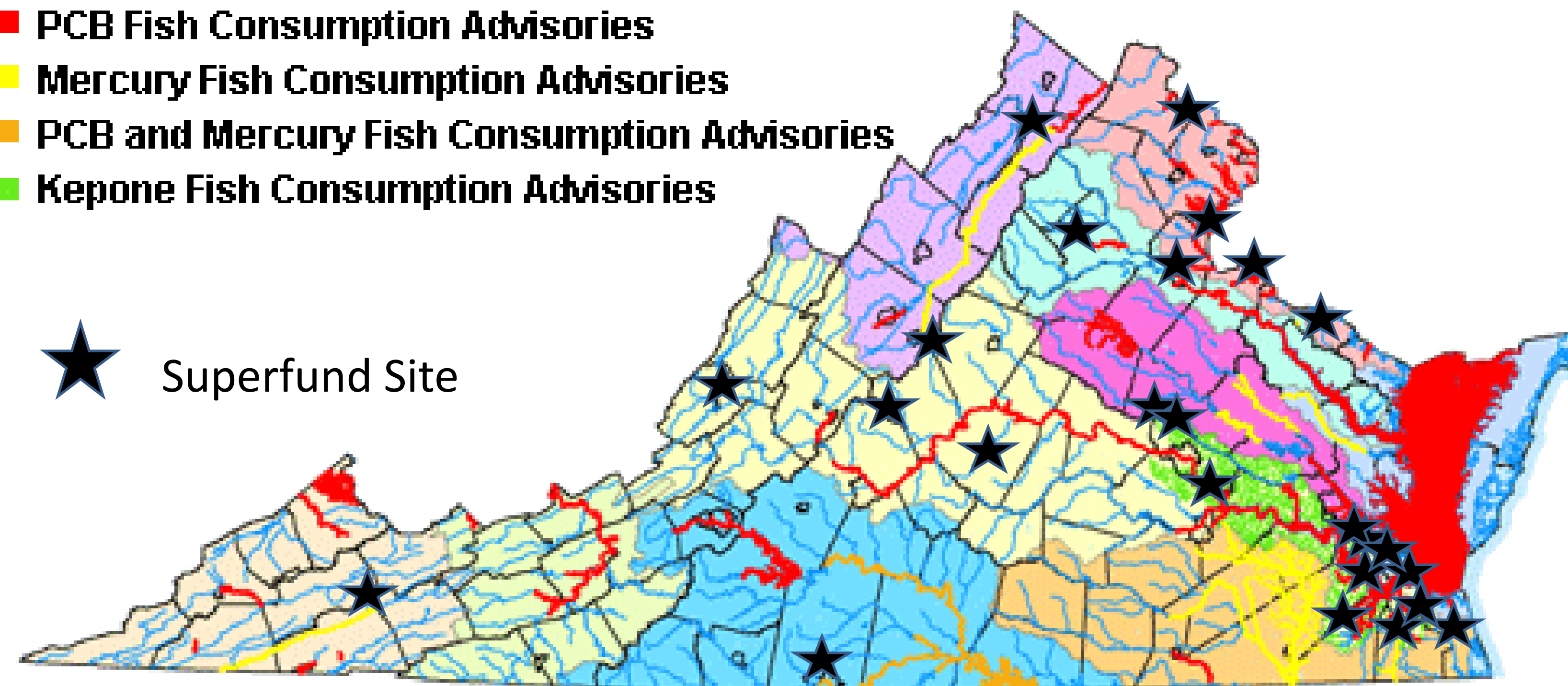
<b>30 sites</b> on the National Priority List	<b>38 out of 95 counties</b> completely dependent upon well water (and therefore groundwater)
<b>21 sites</b> near or on waterways	<b>50 billion gallons</b> of groundwater used each year
<b>19 sites</b> currently undergoing remediation	<b>7, 769, 089 residents</b> with the potential to be harmed by contaminants if extreme weather carries them into our waterways
<b>7, 769, 089 Virginia residents</b>	
<b>239, 300 residents</b> within 1 mile of a site	
<b>2, 472, 523 residents</b> in counties with NPL sites	

## Virginia's Common Contaminants, Listed by Health Effect

Damage to Vital Organs	Damage to Nervous System	Carcinogenic Benzene	Damage to Reproductive System
Thallium	Carbon Tetrachloride	Carbon Tetrachloride	Benzene
Toluene	Manganese	Vinyl Chloride	Toluene
Carbon Tetrachloride	Thallium	Arsenic	Vinyl Chloride
Vinyl Chloride	Chloroform	Chloroform	Manganese
Chloroform	Lead	DDT	PCBs
Antimony	DDT	PCBs/Dioxins	
Cadmium	PCBs/Dioxins	Dieldrin	
Lead		PAHs	

- PCB Fish Consumption Advisories
- Mercury Fish Consumption Advisories
- PCB and Mercury Fish Consumption Advisories
- Kepone Fish Consumption Advisories

★ Superfund Site



Many sites in Virginia lie on or near bodies of water, many of which are already subject to public health advisories.

## Impacts of Climate Change on Water Resources

A. Higher temperatures → Drought → Less recharge and less groundwater → Less dilution of pollutants in water bodies (i.e. higher concentrations)

B. Extreme precipitation events → Inundation of sewage systems and greater runoff rates → Exponential increases in sediment and pollution loadings to water bodies

## How these Impacts May Spread Contaminants

Urban Storm Water Runoff  
Flooding  
Agriculture & Irrigation  
Fluctuating Water Table

## Effects on Human Health

Prevalent food & water borne diseases  
Increased cancer rates  
Impacts on reproductive health & fetus development  
Impaired development in early childhood  
Elevated blood pressure  
Increased heart disease

## Results of widespread Contamination

Increased levels of contaminants in groundwater & water bodies  
More fish, benthic invertebrates, birds, and mammals with impaired health  
Greater number of impaired waterways and aquifers used for drinking water

**The average time to clean up a Superfund site is 13 to 15 years, within which time we will already be seeing effects of climate change. Studies have linked autism, birth defects, and cancer to living in proximity to a hazardous waste site. Virginia should prioritize the cleanup of hazardous waste sites to prevent the spread of contamination throughout the state.**

Number of Virginia NPL Sites with Common Contaminants

