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# Global Climate Change in Maryland: Loss at the Margins of Place

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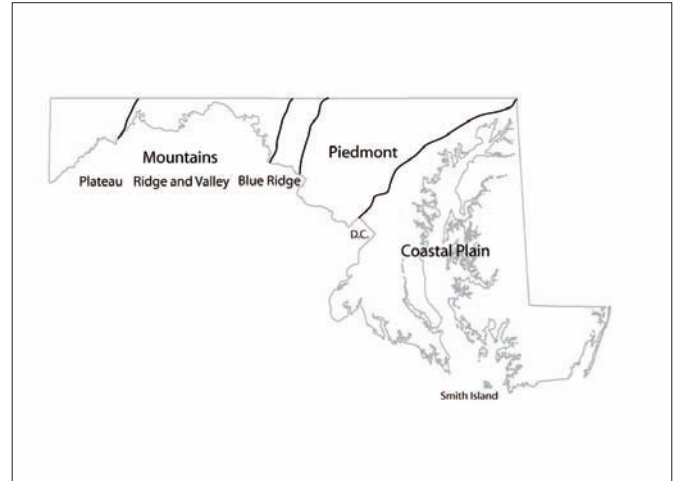
The impacts of global climate change will certainly be greater in some environments than in others. Temperatures will rise more in the polar regions than in the tropics, and ecotones will face changing moisture and temperature gradients before interior habitats. In North America, we typically think first about edge locales such as coastal Florida and Baffin Island when we visualize the impacts of warming and sea level rise. But more familiar places, such as Maryland, will also be affected.

In the complexity of its physiographic edges, Maryland is a microcosm of North America, its margins defined by two elevation extremes, mountain and bay. To the east, inundated coastal plains meet the Atlantic to help form the largest and the most researched estuary in the United States, the Chesapeake Bay. To the west rises one of the continent's oldest mountain chains—the Appalachians—creating a topography of ridges and valleys.

Above: Forest and fields of Maryland from the edge of the Interstate.

Maryland's boundary landscapes are not "Edge of Forever" landscapes.<sup>1</sup> They do not offer vantages toward wilderness. From bay to ridge, human settlements have ebbed and flowed across this terrain, and people have both altered its coast and deforested its mountains. More recently, people have polluted its bays to record levels. Today we recognize that these boundary areas are not pristine, yet we can imagine that they have become wild again as the result of nonhuman processes. Efforts are growing to conserve them as areas that define the state in the face of rapid suburbanization.

In contrast to its margins, the majority of Maryland's built environment occupies a rolling middle landscape of piedmont and gently sloping coastal plains.<sup>2</sup> This is a day-to-day world of commuters, soccer games, and mowed lawns. But it is the edges of mountains and bay that define our sense of place. We brag that we can get to the mountains or the coast in a couple of hours: to our landscape of play, the one that relieves us of the sense of *nowhereness*. We live in the middle, but we dream of the marshes and ridges; and some of us live our dreams.



### At the Edge of the Bay

Climate change means that much of Maryland's productive estuarine and palustrine wetlands along the Chesapeake Bay will eventually be lost. Baltimore has seen seven inches of sea level rise in the last century, and another nineteen inches is expected by 2100.<sup>3</sup> At the Blackwater Wildlife Refuge, on the Delmarva Peninsula, the "Everglades of the North," more than one-third of the marshland has already vanished because of sea level rise, human alteration, and subsidence—a mix of impacts that is hard to untangle. Home of the bald eagle, the migrant peregrine falcon, and the endangered Delmarva Peninsula fox squirrel, the Blackwater also hosts more than 165 species of threatened or endangered plants. Will the \$700 million saltwater recreational fishing industry in Maryland and Virginia be jeopardized? Will the Delmarva Peninsula fox squirrel become extinct?

Losses caused by sea level rise have already forever changed the historic coastal culture. Saltwater intrusion has forced miles of former farmland to become idle.<sup>4</sup> Poplar, Barren, Hambleton, Royston, Cows, Punch, Herring, Powell, Swan, and Turtle Egg are the names of islands that have disappeared.<sup>5</sup> The largest of the Poplar Islands, the result of the split of the original Poplar Island in the late 1800s, was inhabited by a small community around 1900 and was a hunting site used by Presidents Franklin Roosevelt and Harry Truman.<sup>6</sup> By the 1960s the main island was only eighty acres; over the next thirty years it lost an additional thirty acres.<sup>7</sup>

The last inhabited island in the Chesapeake Bay is Smith Island, the subject of the film *We Are All Smith Islanders*.<sup>8</sup> One-third of its land area has already been lost to sea level rise. The thirty to fifty thousand tourists who

visit Smith Island annually seek to capture a sense of its fated way of life and sense of place. But it is predicted that Smith Island will go the way of the Chesapeake's other islands by the end of the century.

At the same time that these older economies decline, commuters, second-homers, and escapees from the middle landscape continue to arrive at Maryland's coastal margins. A million new residents are expected in the state by 2030, and new and old are attracted to views of the water. But the steady accumulation of homes along the coastal margin is threatening death by a thousand cuts.

Unilateral and multistate efforts to protect the Chesapeake have led to such tools as the Critical Area Law—intended to protect one thousand feet of bay edge. But such regulations are irregularly applied, poorly enforced, and underfunded. They seem unable to stem the tide of individual desire to love the bay to death.

Meanwhile, Maryland is acting on global warming.<sup>9</sup> There are successes in the Chesapeake Bay that consider future change.<sup>10</sup> But even well-intentioned shore dwellers think most about breathtaking views and the whoosh of herons. Far less consideration is given to the reality that their great grandchildren will have to deal with higher water levels and more frequent flooding.

**Left:** Blackwater Wildlife Refuge. Small changes in hydrology have significant impacts to the distribution of vegetation communities.

**Right:** The State of Maryland. The five physiographic provinces are the coastal plain (surrounding the Chesapeake Bay), the piedmont, the Blue Ridge, ridge and valley, and the Appalachian plateau. The Appalachian Trail and South Mountain are located in the Blue Ridge.



### Along the Appalachia Ridges

In the next century the average temperature in Maryland could increase by three degrees Fahrenheit. If the rate of temperature change is slow enough, organisms will be able to migrate north, as some have already. In 1928, maple syrup production was centered in Garret County, Maryland. It is now centered in New England, and with development and warming, it is expected to move to Quebec's Gaspé Peninsula.<sup>11</sup>

Rare species may have less chance to migrate, and may face extinction. Predicting species extinction in response to global warming is a daunting task.<sup>12</sup> But some principles are known. For example, certain organisms endemic to mountaintops may be particularly susceptible because they have nowhere to go. This is the escalator effect, noted most famously in the cloud forests of Monteverde in Costa Rica, where rising temperatures and other changes have led to species extinction.

In the mountain counties of Maryland, tourism and development are today replacing forestry and farming. Like the Chesapeake shoreline, these areas provide an attractive alternative to the suburban middle. However, developments such as the controversial 4,300-unit Terrapin Run in Allegany County have been opposed by proponents of smart growth because they would bring too many people to the mountains. Garret County is another place where models predict that ecologically important landscapes are likely to be degraded by additional development.<sup>13</sup>

The Appalachian Trail runs along one ridge in western Maryland. The state has only forty miles of this footpath, which, from Maine to Florida, receives between three and four million visitors a year. The trail is central to the vision of one user community, which is seeking to monitor changing biological conditions along it. Composed largely of day and weekend hikers, this community is seeking to understand changes via citizen science, as reflected in the establishment of the A.T. MEGA-Transect and the NBII-SAIN Appalachian Trail Environmental Monitoring Portal Community.

Above: The Appalachian Trail and South Mountain.

The Appalachian regions of Maryland have long been affected by acid rain and atmospheric deposition. They now face additional environmental stress from changes in temperature. Inaccessibility, conservation, and regulatory activities typically afford mountain landscapes greater protection than other landscapes. Yet it is unclear what regulatory protections will defend these mountain crests from the expected effects of global climate change.

### Margins and Sense of Place

If the margins help us define a sense of place, what happens when those boundaries change? What happens when the causal forces that define those borders are more the result of human action than the wild forces we used to count on to shape the wonderful and seemingly untamed landscapes that frame us in the middle? Wendell Berry and others have noted the importance of the physical environment in the formation of identity.<sup>14</sup> Individually, the boundaries that we establish with others help to establish our own identities. Collectively, the protection of edge cultures—minorities, the disadvantaged, the indigenous—and of other species and landscapes helps define the status of our social evolution and provide a hopeful view of our humanness. Is this a way we can define our response to global warming and its impact on sense of place? Can we address the boundaries—the mountains and coasts that help frame the middle landscapes in which we live day to day?

I have a corner office in a building on the boundary of the coastal plain and the piedmont. At this moment, I look east toward a blue sky over a flat plain of buildings intermingled within expectant early March forests. In that direction lies the bay, with warmth ahead and the continuation of an endless cycle. I see in my mind marshes and crabs and fisherman toiling at their nets and traps. Out the other window to the north is the Piedmont, and in the distance are the forests of the Appalachians. There hiking trails beckon me to once again, if time permits, take in the view from a ridge of a landscape unchanged from my last visit.

I know this will not be. I know that both landscapes will change. But I don't want to relinquish this captured sense of place in which it seems the richness of my life is threaded in a million ways, and the hopes for my children are founded. Humans will survive the end of this nature—a nature that is untouched by us—but a sense of place imagined as untouched by humans draws to a close.<sup>15</sup>

### Notes

1. See John Mitchell's description of the Utah wilderness in "To the Edge of Forever," in T. H. Watkins and Patricia Byrnes, eds., *The World of Wilderness: Essays*

*on the Power and Purpose of Wild Country* (Niwot, CO: Roberts Rinehart Publishers in cooperation with the Wilderness Society, 1995).

2. In "Climate Change Impacts: Maryland Resources at Risk," a 2002 report of the Joint Global Change Research Institute, Moss et al. report that the "midsection of Maryland is the largest area in population, geography, and economic importance."

3. U.S. Environmental Protection Agency. 1998. *Climate Change and Maryland*, 1998. Report no. EPA 236-F-98-0071. Washington, DC.

4. Mike Tidwell, *The Ravaging Tide: Strange Weather, Future Katrinas, and the Coming Death of America's Coastal Cities* (New York: Free Press, 2006).

5. For more on the loss of Maryland's islands, see Donald Smith, "The Case of the Vanishing Islands," *National Geographic News*, April 28, 2000.

6. B. C. Douglas, M. S. Kearney, and S. P. Leatherman, *Sea Level Rise: History and Consequences* (San Diego: Academic Press, 2001).

7. The re-creation and fate of Poplar Island rests with us. Today the U.S. Army Corps of Engineers is restoring Poplar Island as a national model of the beneficial use of dredge materials. See U.S. Army Corps of Engineers. [www.nab.usace.army.mil/projects/Maryland/PoplarIsland/index.html](http://www.nab.usace.army.mil/projects/Maryland/PoplarIsland/index.html).

8. *We Are All Smith Islanders*, the 2004 award-winning film produced by Mark Cohen and Mike Tidwell, illustrates how global warming is changing the Chesapeake Bay region. The film was made for the Chesapeake Climate Action Network.

9. The State of Maryland established the Maryland Climate Change Commission (MCCC) in April 2007 to develop an action plan to address climate change. The action plan "Interim Report," released January 14, 2008, outlines policy options. See [www.mdclimatechange.us/](http://www.mdclimatechange.us/).

10. Mary H. Cooper Ellis presents a case study of accommodation for rising sea levels in the planning of a local Virginia community in "Managed Retreat: Coastal Development in an Era of Climate Change," *LAM*, March 2008.

11. Mark Schwartz et al., "Predicting Extinction as a Result of Climate Change," *Ecology*, Vol. 87, No. 7 (2006), pp. 1611-15.

12. National Assessment Synthesis Team, U.S. Global Change Research Program, "U.S. National Assessment of the Potential Consequences of Climate Variability and Change Educational Resources Regional Paper: The Northeast," in *Climate Change Impacts on the United States: The Potential Consequences of Climate Variability and Change*, 2000. See [www.usgcrp.gov/usgcrp/nacc/education/northeast/default.html](http://www.usgcrp.gov/usgcrp/nacc/education/northeast/default.html).

13. T. Weber and R. Aviram, "Forest and Green Infrastructure Loss in Maryland, 1997-2000, and Implications for the Future," Maryland Department of Natural Resources, Annapolis, MD, 2002. The authors documented that Garret County, among all Maryland's counties, had the largest number of acres of green infrastructure, the most ecologically significant lands in the state, converted from forest to development from 1997 to 2000.

14. Richard Stedman explores the symbolism of place and its behavioral implications in "Toward a Social Psychology of Place: Predicting Behavior from Place-Based Cognitions, Attitude, and Identity," *Environment and Behavior*, Vol. 34, No. 5 (2002), pp. 405-25.

15. The reference is to Bill McKibben, *The End of Nature* (New York: Random House, 1989).

All photos are by the author.