

Drought, Flooding and Coastal Storms: Creating Landscapes and Communities Resilient to Weather Extremes

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Thank you for inviting me to speak here today. It is a privilege to share this part of the program with Jason Weller. Congratulations on his formal appointment last week as Chief of NRCS. NRCS does a terrific job in working on the ground with private landowners to conserve land and water. In the last several years they have increased their effectiveness by better focusing limited resources to achieve even more effective results

For much of its 60 year history The Nature Conservancy was known not for restoration but for the protection of reasonably intact natural areas as habitat for the whole range of plant and animal species. Land acquisition was our most frequently used tool for advancing conservation. This sometimes led us to protect the pieces of places that we could purchase. We did not always see the whole picture, the whole ecosystem.

But over the last 15 years, the Conservancy has moved toward working cooperatively with others on the conservation of whole landscapes and watersheds for their multiple benefits. Last year we revised our mission statement to reflect that evolution. It now reads “to conserve the lands and waters upon which all life depends”. All life includes people.

Almost no ecosystems in the U.S. and around the world are un-affected by human impacts, and so, while acquisition of critical areas remains an important conservation tool for TNC, we often use that tool as a component of working with others to restore the features and attributes of watersheds, landscapes and ecosystems so that they can maintain some part of their original function, are durable over time, and provide services to people and habitat for the diversity of species. One of the services to people that we’ve specifically identified as a global priority of ours is disaster risk reduction.

Here are four examples of recent restoration projects in which the Conservancy is involved that both provide exceptional habitat and mitigate the impacts of extreme weather:

- *South Cape May Meadows Ecological Restoration, New Jersey*
Beginning around 1953, the area that is now South Cape May Meadows began to experience significant erosion and wetland loss. Storms breached and overtopped the dune system and began to flood neighboring communities. Those communities approached the Army Corps, the New Jersey Department of Environmental Protection and TNC to find solutions. A plan was devised to replenish the beach, reconstruct the dunes, restore freshwater flow through the wetlands, create new wetland habitat, and build small levees and water control structures. Completed in 2006, the project withstood Hurricanes Irene and Sandy, protecting the adjacent communities while providing improved wildlife habitat and public access to the shore.
- *Disney Wilderness Preserve, Florida*
In the headwaters of the Everglades in the Kissimmee River Basin, more than 400,000 acres of wetlands have been ditched and drained for agricultural purposes. The

Kissimmee River was channelized to speed water downstream into Lake Okeechobee. This resulted in too much water flooding the Lake in wet periods causing massive and un-natural releases into estuaries on Florida's east and west coasts. (A problem being experienced right now) And in dry periods insufficient water is held in the system intensifying the impacts of droughts. Walt Disney World is at the upper end of the Kissimmee Basin, and 20 years ago regulatory agencies issued overall permits for construction of the Animal Kingdom and other Disney developments that required a single, large scale mitigation project to restore wetlands and uplands on a degraded cattle ranch at a strategic location in the ecosystem. Today all the restoration has been successfully completed and lots more water is held on the land in seasonal wetlands. The ranch (now called the Disney Wilderness Preserve) is playing a pivotal role in creating a much larger conservation area in the northern Everglades. The Everglades Headwaters Project is bringing together federal, state and regional agencies and non-profit organizations to restore and conserve wetlands on private cattle ranches. Support from NRCS's Wetlands Reserve Program has been central to this effort.

- *Oyster Reef Restoration in Mobile Bay, Alabama*
Over the last several decades, Mobile Bay has experienced significant loss of oyster reefs, seagrass beds and coastal marsh habitats. This has accelerated coastal erosion, exposed more areas to storm hazards, and decreased fish and shellfish stocks. A coalition of organizations has now set out the goal of building 100 miles of oyster reef breakwater around the bay that will reduce shoreline erosion, provide habitat for additional oyster colonization, provide nursery habitat for finfish and shellfish, and remove nutrients from the bay. It is estimated that the reefs will promote the growth of 1000 acres of seagrasses hence the title of the project 100/1000. The project is supported by a 100/1000 Restore Coastal Alabama Partnership that includes non-profit organizations, federal and state agencies, local governments, and private citizens who have volunteered in large numbers to do part of the restoration. Conservation science is being used to evaluate the impacts of different oyster reef and living shoreline building techniques and strategies to develop models for taking this project to scale.
- *Mollicy Farms, Louisiana*
In the Mississippi Delta region, millions of acres of floodplain forest have been converted to intensive agriculture and an extensive system of levees was constructed to protect cropland and communities from seasonal flooding. As you know, some of this bottomland is really too wet to farm reliably, and levees everywhere can concentrate river flows in a way that increases the risk of catastrophic levee failures in times of exceptionally high flows. At the Upper Ouachita National Wildlife Refuge in Louisiana, the Conservancy partnered with the U.S. Fish and Wildlife Service to breach a private levee and allow flooding of a 20,000 acre tract of former farmland that had been purchased by the Service and replanted in bottomland hardwoods. The levee breaches were carefully engineered although a flood carried a portion of the levee away before the bulldozers arrived. The Mollicy Farms project demonstrates what could be done with the application of the Wetlands Reserve Program in other parts of the Delta to restore enough additional bottomland hardwoods to reduce downstream flooding, remove nutrients, store carbon and improve opportunities for hunting and fishing while leaving the great majority of the Delta's land in agricultural production.

I find these projects and others like them exciting but unsettling. Unsettling because they are certainly not preservation, and they are not exactly restoration of what once was. Some use hybrids of gray and green infrastructure. In projects like these the partners and participants are really creating an alternative future that, while it is based on our understanding of natural function and process, is something new. If we are not to rely entirely on traditional engineered infrastructure which can be both expensive and destructive of natural systems, this sort of creative conservation is in much of America how we should cope with risks to people, plants and animals in a changing world.

The creative restoration process is, in my view, scarier than simply trying to keep things the way they were. There are more opportunities for mistakes, for criticism, for disputes between those with longstanding differing points of view about the relationship of people and nature.

So how can we make this approach work? There are lessons from the projects that I have described and from many other such projects in which TNC was not involved that suggest how we might move forward with more confidence in shaping the American landscape in the 21st Century:

- First, a preamble to the list. It is not sensible, in my view, to think about new approaches to restoration without a commitment to reducing carbon emissions. Unless we do this, there is simply too high a risk of sea level rise, and extreme weather events that will overwhelm whatever else we attempt to do.
- Second, we should think at the scale of whole sections of coastline or whole watersheds in the planning and execution of restoration projects. This does not mean that each project should be big, but each project should be informed by a large scale perspective. Only at this larger scale will it be possible to make the inevitable tradeoffs needed for restoration to be durable. In the face of powerful forces of change the conservation and restoration of bits and pieces of systems will not result in lasting protection that benefits the most people.
- Third we must be far more effective at working across organizational and inter-governmental boundaries particularly in a continuing era of limited resources. This is the only way to accomplish restoration and effective natural hazard mitigation at a watershed or coastal scale and the only way to step up community scale projects to fit into a regional framework. As the theme of this meeting suggests, cooperative conservation is the future.
- Fourth, there can be an increasing role for the non-governmental sector. Non-profit organizations have shown that they can be effective not just at advocating that things be done, but also by sponsoring and implementing restoration projects. And private corporations have long been key to designing and implementing restoration, but now an increasing number of companies understand the value of nature to their operations and to reducing overall weather and other risks to their investments and profitability.
- Fifth, we should better recognize, respect, employ science to design, evaluate, and quantify the hazard reduction benefits of natural systems. Natural features like barrier beaches and floodplains can provide cost-effective protection where hard-edged infrastructure is not feasible or desirable. We must better assign economic values to the benefits of nature and use science to better understand where natural features work and where they are not effective. The Natural Capital Project, a partnership of TNC and the World Wildlife Fund with Stanford University is an example of how such research can be done.

- Sixth, we should take the long view. It will take decades to restore watersheds or execute coastal restoration plans. Our institutions must last long enough to carry out those plans, and, most importantly, there must be reliable dedicated sources of funding to pay for construction and adaptation to change that will continue far into the future. Unreliable annual or emergency appropriations will not be sufficient. The Dutch set the example for methodical multi-year financing, planning and constructive of infrastructure.
- Seventh, we must learn more about how to assess and convey the idea of risk to allow better collective decision-making about where to invest in restoration, and we must find new ways to mitigate the risk of creative and innovative hazard reduction design. For example we could develop insurance to cover the risks of innovative restoration projects, particularly those that use natural features, to foster experimentation while sharing the liabilities of repair and reconstruction if such natural solutions prove not to be initially effective.
- Eighth, we should see and administer environmental laws not as barriers to restoration, but rather as a sensible framework of safeguards within which we can pursue inventive approaches to making communities more resilient to the impacts of storms and floods. It is entirely possible within the statutory framework of NEPA to place more emphasis on enabling agencies to do good things rather than focusing on defense, on preventing bad things from happening.
- And, finally, we must really learn to listen to people and communities. Residents of coastal and watershed communities should be involved in every aspect of planning. If we are not simply rebuilding or restoring things the way they were, but actually creating an alternative future for coastal and riverside communities, then everyone has an even greater right to be part of the decision-making.

This last point is particularly important. Many Americans today feel that they have lost control of their lives. The impacts of storms and floods, the questions about rebuilding, and the uncertain and uneven responses of Congress to the mounting damage all contribute to that feeling.

The public processes to determine the course of restoration, adaptation and relocation in a changing world will inevitably be painful and difficult, but if conservation science, engineering, economics, planning and architecture are brought together with real consideration of the feelings and aspirations of the families so affected by storms, floods and droughts, then the restoration process can help create communities designed to better withstand future change. It can also give the residents of those places a lasting sense of self-worth and satisfaction in shaping the course of their own lives and those of their children.

Both the social and physical fabrics of coastal areas and those subject to flooding, drought and fires can be prepared and strengthened to better withstand the challenging times to come. Communities can restructure themselves in ways that respect—but do not cling to—the past but continue to maintain the important and comforting bonds between people and place.

And for those of us who have devoted our lives to the planning and practice of restoration, creative conservation, restoration, and hazard mitigation can be a once-in-a-lifetime opportunity to be guides on this journey to help America and Americans find a path forward in a changing and sometimes frightening world.