

## **Keynote Address**

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Thank you for inviting me to talk to you in this lovely spot overlooking the Hudson River. The last time I was here it was for a workshop with senior military officers who were discussing the ways that climate change will affect their missions. They were concerned about how the melting polar ice cap will lead to more shipping, and possibly more conflict, in the arctic; about how drought and starvation in Africa and the Middle East can increase conflict there; and about how they might be called upon to evacuate the residents of small island nations that are going under the waves.

Today I will be addressing other aspects of climate change.

Land trusts are noted for three characteristics that are very relevant to my talk:

1. They think globally and act locally
2. They think about the long term, not just the short term
3. They take science seriously

In that spirit, I'm going to talk about what the latest science says about long term global climate trends, and how that global thinking should affect what land trusts do locally. And, just to warn you, it's not going to be pleasant.

I'd like to start with a few words about the international law background.

In 1997 the nations of the world negotiated the Kyoto Protocol, which aimed to reduce global greenhouse gas emissions by 2012 to well below 1990 levels. The Kyoto Protocol has failed. Instead global emissions are now about 40% higher than they were in 1990.

The UN climate conference in Copenhagen in 2009 was convened to find a successor to the Kyoto Protocol. It was seen as our last chance to avert the worst effects of climate change. It too failed.

The current schedule for the UN climate negotiations is to reach an agreement in 2015 that will take effect in 2020. There is little optimism that we will in fact reach a satisfactory agreement in 2015, especially since the body that makes these decisions for the world's historically largest

emitter – the United States Congress – is in the grip of forces that deny the reality of climate science.

At the Copenhagen conference, the participating nations set a target of allowing global average temperatures to rise no more than 2 degrees Celsius above pre-industrial levels. The small island nations wanted a 1.5 degree target, because at that level they could survive but at 2 degrees they would probably drown. But 2 degrees became the target in order to avoid the worst effects of climate change.

Since Copenhagen, emissions have soared. The odds of staying within 2 degrees have become very small.

The World Bank issued a report in November 2012 entitled “Turn Down the Heat: Why a 4 Degree Centigrade World Must be Avoided.” The President of the World Bank wrote in releasing the report, “The four degree scenarios are devastating: the inundation of coastal cities; increasing risks for food production potentially leading to higher malnutrition rates; many dry regions becoming dryer, wet regions wetter; unprecedented heat waves in many regions, especially in the tropics; increased frequency of high-intensity tropical cyclones; and irreversible loss of biodiversity, including coral reef systems.”

But according to the Intergovernmental Panel on Climate Change report released last month, a continuation of current trends would take us to 4 degrees, and conceivably even to 6 degrees by the end of the century, and above that in the next century.

In view of all this, going forward I believe that human planning activities today should include a process to think systematically about likely climate conditions that will prevail not only when the proposed building or equipment is first open for operation – but also at the *end* of its useful life.

If a building is being planned now that will be finished in 2020 and that we hope will last for 80 years, we should not only make sure that it will be fine in 2020 but also that it will survive the conditions of 2100.

For land trusts, whose essence is to care for future generations, this means looking as far into the future as science has something to say. There are projections going out to 2100, and they should be examined closely. Obviously the further out we look, the greater the uncertainty. But at least we have a range of possibilities.

Some of this is already happening. Some land trusts are wisely undertaking vulnerability assessments; but so far as I am aware this has not yet become standard procedure. These assessments will also need periodic reviews – to reflect what is actually happening, and also to reflect the latest science

We need to anticipate and plan for:

- Sea level rise
- Warmer air temperatures

- Changes in precipitation
- Migration of animals and of plant species
- Less snowfall and earlier snowmelt
- More intense storms
- More wildfires
- Loss of coastal wetlands, and the conversion of some of them to open water
- Conversion of some uplands into wetlands
- Increased beach erosion
- Increased erosion of bluffs and landslide hazards (something we saw with horror in Washington State a few weeks ago)

I was pleased to learn at this morning's workshops that Scenic Hudson has prepared, and posted on-line, a tool that shows how sea level rise will affect the height of the Hudson River (which is influenced by the tides and by sea level up to the Troy Dam) in the decades to come; and that the Nature Conservancy has done similar work for the coastlines of Long Island. These are important tools for planning and analysis.

Just to give one example of the latest projections – from the IPCC's March 2014 report: "Within this century, magnitudes and rates of climate change associated with medium- to high-emission scenarios ... pose high risk of abrupt and irreversible regional-scale change in the composition, structure, and function of terrestrial and freshwater ecosystems, including wetlands."

We are already seeing saltwater intrusion into forested areas; rising waters that threaten ecologically important salt marshes; degradation of some forests; intrusion by invasive species of insects, fish, and plants

The information developed in these planning exercises that I urge will affect:

- Decisions on what land to acquire – it may not make sense to spend a lot of money acquiring lands whose essential character will be lost as a result of climate change
- Decisions on how to act as stewards of the land that is already held
- Selection of species for planting
- Decisions on building trails, shelters and other items

Climate change will be continuous; just because a projection ends in 2100, or whenever, doesn't mean that the change ends there. Perpetual easements need to reflect that; we may need to make greater use of easements that have a limited duration to reflect the temporary nature of certain natural environments, or that can be completely rewritten as physical conditions demand, or that otherwise have built-in flexibility. I am aware that some such easements are already being drafted.

In view of all of this there are two things in particular that I think land trusts need to do with their land: allow adaptation to climate change (that is, find ways to cope with the climate change that is happening and coming); and allow mitigation of climate change (that is, help reduce greenhouse gas concentrations).

First, as to adaptation: Land trust stewardship needs to have the flexibility to deal with continually changing conditions. The loss or migration of species, the change of land from dry to wet or from wet to dry, and many other changes will require the stewards of the land to work with new and unfamiliar conditions.

Some coastal land uses will be abandoned, and stewards will be sought for that land, while new land is sought for the uses that had to move.

One especially important role will be in preserving conservation corridors – areas where animals can escape from land that has become too inundated or too warm or otherwise unsuitable as their habitat, and travel to more hospitable places.

Second, as to mitigation: Preservation of natural areas, which is central to the work of most land trusts, is certainly an important component of fighting climate change. Forests and some wetlands are important sinks for large quantities of carbon dioxide and methane, and have the ability to absorb these gases.

But this preservation mission is sometimes in tension with an even more important part of the global response to climate change -- a massive overhaul of world's energy system away from the fossil fuels that are the most important source of greenhouse gas emissions.

The good news is that there is a pathway – a scenario that would allow us to keep down the temperatures. It was prepared by the International Energy Agency and it spells out everything we need to build into order to carry out this overhaul. It includes very ambitious energy efficiency measures, and also energy from wind, solar, hydro, nuclear, and many other sources. It requires enormous and rapid growth in *all* of these measures.

One of the items in this package is roughly 1.4 million large wind turbines.

Some of them would be on land and some would be offshore. So far the United States has zero offshore wind farms operating at a commercial scale. The most prominent proposed offshore wind farm is the Cape Wind project in Nantucket Sound. It was first proposed in 2001. Today, thirteen years later, it is still not yet under construction. It has withstood a series of lawsuits, but more have been brought.

If building large renewable projects like that one requires more than a decade of litigation before the first shovel is put in the ground, we'll never get anywhere close to what we need. We need a fundamental change in the process by which we site and permit these facilities, and the relevant factors that are considered in whether to approve them. The current procedures and criteria are no longer workable.

So I'm going to say two things that no one in this room will want to hear, but that I think are compelled by the gravity of the current situation

**First**, visual impacts can no longer be allowed to stand in the way of renewable energy.

Wind is strongest on top of ridgelines. Those are by definition the most visible places. There is no escaping this physical reality that in order to achieve the dramatic expansion we need in renewable energy, we are going to need to see a lot of wind turbines on top of a lot of mountains.

**Second**, the impacts on individual species can no longer be allowed to stand in the way of renewable energy.

We are facing an era of mass extinction. Many of you are familiar with the book *Field Notes From a Catastrophe* by the journalist Elizabeth Kolbert. She has just written a new book, *The Sixth Extinction*.

More authoritatively, the IPCC report of March 2014 stated, “A large fraction of both terrestrial and freshwater species faces increased extinction risk under projected climate change during and beyond the 21st century, especially as climate change interacts with other stressors, such as habitat modification, over-exploitation, pollution, and invasive species (high confidence).”

We have had the luxury of declining wind projects because they will harm individual species, such as the Indiana bat. We no longer have that luxury. Entire ecosystems are threatened. Not only is the Indiana bat in bad shape because of these ecosystem-wide effects, but so are countless thousands of other species.

If we are to avoid these problems, we need a massive construction program for renewable energy facilities. If we do that all over the world – at least in those countries with high energy demand – we may be able to pull out of this steep environmental dive that our civilization is now in. But if we keep blocking needed projects because of local impacts, the planet’s ecosystem will crash. That would be the epitome of thinking locally, not thinking globally.

There is certainly room for more cooperation between renewable energy developers and the conservation community in locating the best, or the least bad, sites for new facilities. There are a few extraordinary vistas that would warrant protection. But site-by-site battles and wholesale restrictions on visual impacts or on individual species impacts will keep us from getting to where we absolutely need to go in terms of a transition away from a fossil fuel based economy.

It is true that no one wind farm will save the planet, or even perceptibly lower the temperature. But that can’t be the test.

Imagine if in 1943 a young man had told his draft board, “Please don’t send me overseas to fight. I might get killed, and whether I go or not will not make any difference at all in whether we win the war.” Such a plea would not have been well received. Every man of draft age and sound enough body needed to do his part. Almost all did, and so did many women who volunteered. The combined efforts of millions of men and women were needed, and were successful.

Today again we need the combined efforts of millions of men and women, though the sacrifices we are asking for are nowhere close those asked of these young men and women during the Second World War. Seeing a windmill out your window or hearing its hum is hardly life

threatening. If the scientists are at all close to being right, our civilization today faces a threat of the magnitude it faced – and overcame – in that war.

We are going to see the migration of animal populations, and we will need to engage in heartbreaking triage to see which species we can help save and which are beyond help given the limited resources we have for this purpose.

I said at the beginning of this talk that I was going to say some very unpleasant things. I teach a course on Climate Change Law at Columbia; at the end of the semester last year, a student raised her hand and said, “Professor, this course has been something of a downer.” That’s certainly true. But the sooner we face up to the terrible situation that the scientists tell us now exists, the better will we be able to make difficult but rational decisions going forward.