



to a Future Climate

It's mid afternoon in late May, crazy hot for this time of year (upper 80s), and we are sloshing our way through Spring Pond Bog, the largest open bog in the Adirondacks. The weather has brought the black flies out in full force, loving the heat and humidity, and loving us even more. I'm with a colleague of mine from Cornell, plant ecologist Jonathan Comstock, and we are being led by the legendary Adirondack naturalist, Jerry Jenkins. Jerry knows this state park—from its soaring peaks to bog wilderness areas—probably better than anyone else alive, and he's taking us to see some of the areas that are most vulnerable to climate change.

Swatting at flies, I stare down at my feet to keep my balance as we make our way through the wet, soft, and uneven terrain of hummocks and swales. Suddenly the “slurp-slurp” of Jerry trudging just ahead of me stops and I almost bump into him. The three of us emerge from our hiking trance to take our first good look at the vast expanse of sphagnum carpet interspersed with clusters of dark green spruce trees. We are sweaty, breathing heavy, and our faces and necks are covered with tiny bloody splotches where the black flies have been feasting. Smiling, we laugh at ourselves because crazy as it seems, we love this! We have two whole days away from e-mails, phone calls and report-writing to

enjoy the Adirondacks and talk ecology. What could be better? Black flies come with the territory, and one could argue they keep the crowds down. Besides, later I can show off the dozens of welts as evidence of the “mountain man” in me.

While we are enjoying this, we remain aware of why we have come. After spending so much time going over data about the projected effects of climate change, we feel we could all benefit from a firsthand visit to some of the Adirondack's identified hot spots. And who better to guide us than Jerry, “expert panel reviewer” for our climate change project funded by the New York State Energy Research and Development Authority (NYSERDA)



The author's companions check out several habitats along their trip.

Exploring climate change in the Adirondacks

By David W. Wolfe, PhD

to identify major vulnerabilities of New York ecosystems (see sidebar), and author of a newly published book about the potential impacts of climate change on the Adirondacks. Jonathan and I are also involved with the “Climate Action Plan” currently being developed by the state. The aim of the plan is to find ways to cope with climate change and meet greenhouse gas emission reduction targets. This trip into the Adirondacks will give the three of us a chance to exchange ideas and discuss what, if anything, we can do about the inevitable changes ahead.

For bogs like the one we are in, their fate will largely depend on future rainfall patterns, as it is rain, rather than

inflowing creeks or groundwater, which keeps them wet. Although most climate models indicate that annual rainfall might not change much in our region, there is much less certainty about this than there is about future warming. We do know that more of our rain is coming in heavy downpours, and some models suggest we will have more rain in winter and less in summer. As we walk around the bog we discuss how this summer (2010) seems to be an example of what could become the norm for this region—the growing season started almost three weeks earlier than the historical average, and temperatures have remained above normal. If rainfall is not sufficient to compensate

for greater water use by vegetation, the bog could easily suffer from late-summer drought. Jerry explains that researchers in Alaska and Canada, where the effects of climate change are more apparent, have found that warmer soil temperatures in bogs like this make soil nitrogen more available to plants. This favors shrubs and trees, and can lead to less open bogs.

On our way to our lodging for the night we stop for a quick hike into one of the treasures of the Adirondacks—an old-growth forest near Ampersand Mountain. There are more than 300,000 acres like this within the park where you can find “grand” trees, including 350-year-old hemlocks, red spruces up

to three feet in diameter, and wonderful untouched stands of beech, yellow birch and sugar maple. We talk about how recent analyses suggest that by mid to late century, the New York climate will no longer be suitable for these species, and oak, hickory and pine may replace them. Of course, this is assuming the new seeds can make it north and establish themselves because oak seedlings are a favorite food of white-tailed deer, whose populations are increasing, in part due to less snow cover in winter, which exposes more vegetation for browsing. The conversation then turns to pests and invasives—another issue these areas face. Hemlocks, for example, are threatened by the hemlock woolly adelgid, a tiny insect pest that is moving northward with climate change and has already wreaked havoc on hemlocks south of New York. With so many

discussing the natural history of this area and identifying birds and their calls, I am a student again. At one point we go ashore to explore an area rich with bog laurels, cotton grass, shrubs, trees and thick sphagnum undergrowth. A palm warbler, its yellow-orange and brown colors brilliant in the morning sun, chirps and hops from branch to branch. There are many bird songs in the air and I see Michaele turning and tilting her head to listen. Later, while having lunch, I sum up the birds I saw on the trip: palm warbler, gray jay and belted kingfisher. I ask Michaele what she heard, and she rattles off the names of 13 different species—a reminder I need to work on my bird song recognition.

I think about how climate change is already affecting bird populations with earlier spring arrivals of migrants, and shifts northward in species ranges.

High-elevation plant and animal species are particularly vulnerable to climate change...

variables, we conclude, it's very difficult to predict exactly when and how our natural landscapes will change into new configurations as the climate warms.

Next day we get up early and launch canoes at Osgood Pond for a trip up the river channel and through bogs. We are joined by Michaele Glennon, a bird expert who, like Jerry, works for the Wildlife Conservation Society. It's a little breezy, making canoeing a bit challenging, but there are no black flies! Between Jerry identifying tree species, and Michaele

“Specialists” with very narrow preferences for food or nesting habitat will be most at risk from climate change. Mountain breeding populations of Bicknell's thrush, gray jay and blackpoll warbler are considered vulnerable.

Our last mini-adventure involves an afternoon hike up Whiteface Mountain, the fifth highest peak in the Adirondacks. High-elevation plant and animal species are particularly vulnerable to climate change because once they've reached the mountaintop, they can't move higher to escape rising temperatures. Survival requires a “jump” to a higher peak nearby. In this way, mountain peaks are like islands in their isolation from each other. Recent findings suggest that by the end of this century the climate in the Adirondacks will no longer be suitable for spruce, fir, and alpine tundra plant communities. We wonder what will replace them and how the replacement species will get here. We admit among ourselves that we don't have the answers, but that we must do all we can



Appalachian fir moss

As temperatures warm, alpine tundra plants, like Appalachian fir moss pictured here, may disappear from the Adirondacks.



palm warbler

Jeff Nadler

ClimAid

As part of a multi-disciplinary project called ClimAID, a team of scientists is assessing possible effects of climate change on issues important to New York State, including agriculture, ocean coastal zones, communications infrastructure, ecosystems, energy, public health, transportation, and water resources. Supported by NYSERDA, the project will present a number of options for adapting to a changing climate and identify areas where more research is needed. A final report is scheduled for later this year.

For more information on ClimAID, contact Amanda Stevens at ads@nyserda.org. If you'd like to be informed when the report is released, sign up for the listserv at www.nyserda.org/programs/Environment/EMEP/listserv.asp.



raven

to keep the avenues for species dispersal open to facilitate nature's adaptation to rapid climate change. This means minimizing fragmentation of habitats by roads and other developments where possible, and protecting and expanding streambed zones, which are corridors for species movement.

Despite the heat and our concerns about the future of this area, our spirits are lifted by the panoramic views of verdant rolling mountains below and the

brilliant azure sky above. The higher we go, the more dwarfed the spruce trees become, until they are only knee-high and look like bonsai plants. We take lots of photos and get down on our hands and knees as Jerry shows us some of the small wonderful alpine and sub-alpine plants native to this habitat.

Approaching the summit, we decide to avoid the tourist crowd and turn back for our descent. The others are a bit ahead when a raven glides majestically and

silently by me, just beyond the cliff edge where I am standing. It comes remarkably close, and I catch an ephemeral flash of sword-blade blues reflecting off its jet-black wings. Having talked earlier about birds as seed dispersers to these mountains, I shout to Jerry who is clambering down the trail, "Maybe the ravens will save the mountaintops, if we can't do it." At first he does not respond and I think he has not heard me, but then, without turning he calls back, "They know... they know what their job is." If resting the fate of this national treasure on the wings of birds sounds a bit desperate, it is. We can hope climate change occurs at a pace we can manage, but if it does not, the integrity and function of places like the Adirondacks may not be up to us, but to other species.

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View of Lake Placid from Whiteface Mountain