

Taking the Measure of Snowfalls, or the Lack of Them

CORNWALL, N.Y.

There are many places where one can ponder this strange brown winter: the ponds that should be frozen, the ski areas that should be open or operating close to capacity, the yards with birds that should be else-

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TOWNS** where, the stores full of marked-down winter coats that should have been sold, the streets and trails populated by runners who shouldn't be dashing about in shorts and T-shirts in balmy January air.

But as good a place as any is the Snow Research Station at Black Rock Forest near West Point, where, of course, there is not a single flake of snow to research. It opened a year ago as a rather timely place to study snowfall and snowpack thermodynamics and the like, and now sits dormant among the muddy trails like a forlorn high-tech tribute to a winter that may get here eventually but is certainly taking its time.

"Everything that brings the data into the computer is here," said William Schuster, executive director of

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the 3,785-acre preserve and research site north of West Point. We're in a fenced-in area used for growing experimental breeds of corn, gazing at something that looks like a cross between a sickly robot and one of those machines that shoots out tennis balls.

Mr. Schuster points out moisture sensors, devices that measure the temperature of soil and snow, acoustic snow depth sensors, and the net radiometer that measures net energy, from the earth up and from the sun down. Nearby is a snow pillow used to measure changes in the snowpack — when there is a snowpack. As the world knows, it has never taken snow so long to make its first arrival in Central Park, though he says there was one year, 1965, when it didn't arrive here until Jan. 19.

Snow is hard to measure. It gets blown around and piles up at different depths. It can begin melting as soon as it arrives. But for a multitude of reasons it has dawned on many people that we need to know more about it. Hence the project put together by Jessie Cherry, who recently earned a doctorate in earth sciences at Columbia.

Snowfall depths have been measured at Black Rock Forest since 1961. The goal was to study the role of snow in the regional water supply as well as basic relationships among climate, hydrology and the environment.

Specifically, that includes the changing role of snow in the regional water supply, the cycle of mercury emissions from snow and soil, and the way in which snowpack affects soil temperatures. It sounds abstract, yet it is anything but. If, let's say, there is more rain and less snow



Phil Mansfield for The New York Times

William Schuster, executive director of the Black Rock Forest Consortium, north of West Point, N.Y.

over a long period of time, that means less water running into rivers, because the evaporation rate of rain exceeds that of snow. If there is less snow to reflect light away from the ground, there is a warming of the earth's surface and higher temperatures. Yet at the same time, snow manages to insulate the ground from ice and frigid temperatures, so less snow can mean colder ground temperatures that affect the growth cycle of roots, plants and insects.

Still, the most striking thing about Black Rock Forest turns out to be not what it has to say about snow. It turns out to be what it has to say about everything else. So Dr. Schuster notes that while we think of global

warming as a relatively new phenomenon, man-made emissions have been affecting the environment in lesser ways for more than a century.

So the forest now is not the forest it used to be. Over the decades some of the trees natural to Northern climates, like the black spruce and paper birch, have disappeared. And at least seven kinds of trees unknown in the past, like catalpa, red mulberry and white poplar, have migrated from the South and established themselves there.

No one, as we are often reminded, can look at any one winter and deduce much about climate. Perhaps before this one is over we'll be cursing the snow and cold and looking forward to spring as usual. But as Allan Freil, a professor of geography at Hunter College who is part of the research team, points out, current projections say it is likely the temperatures in the Middle Atlantic states could rise by 5.5 to 9 degrees by 2080 or so. That would make the climate at the Snow Research Station similar to that of North Carolina, and winters like this perhaps the norm.

As for Dr. Cherry, she helps monitor the project from afar, which now means the University of Alaska at Fairbanks. They've had an alarmingly snow-deprived winter as well, but even a snow researcher has limits on how much winter she'd like to see.

"It was 30 below this morning," she said on Friday. "I don't mind winter weather, but when it's this cold it wreaks havoc with everything. The pipes freeze, the car won't start. There are aspects of your life in New York that sound pretty good right now."