The Seattle Times
seattletimes.com

Wednesday, June 1, 2005 - 12:00 AM

Guest columnist

Keeping alert to the threats of environmental changes

By Denis Hayes
Special to The Times

On March 20, 1980, a seismometer on Mount St. Helens' western flank recorded a magnitude 4.1 earthquake. This device, the only instrument directly monitoring the dormant volcano, was linked by radio to the University of Washington. Scientists there recognized the quake as an early warning that Mount St. Helens might be rumbling toward its first eruption since 1857. By May 18, when the mountain finally blew its top, residents had had ample time to make evacuation plans.

Americans first became familiar with the concept of "distant early warning" with the so-called DEW Line during the Cold War. That collection of Arctic radar stations and other information-gathering facilities was designed to alert authorities if Soviet missiles or bombers were heading toward America.

The greatest threats facing the world today are not Soviet bombers but major environmental changes. The earlier we learn of such threats, the better our chances of mitigating their damage.

In Seattle, we are privileged to have world-class scientists at the University of Washington studying myriad distant threats while they are still dots on the horizon. Examples include:

• **Drought.** Earlier this year, UW researchers were able to forecast lower-than-normal stream flows in the Puget Sound region based on snowpack measurements. These forecasts led to major media coverage and then to political actions that reduced water consumption this spring.

• **El Niño.** The largest El Niño in the 20th century, in the winter of 1982, caused more than $19 billion in damages. Since then, federal grants have allowed scientists at UW and other institutions to begin to monitor and better understand the El Niño phenomenon. We now can accurately forecast El Niño weather disruptions six to nine months in advance, allowing farmers, forest rangers and others to plan for the season ahead.

• **Air pollution.** Wind-borne pollution from Asia — the result of surging economic activity, spreading deserts and forest fires — is reaching the west coast of the United States, half a world away. The UW measures mercury, persistent organic pollutants, particulates, ozone and other forms of air pollution at a ground station on the coast of the Olympic Peninsula. These measurements, combined with sampling by aircraft, satellite imagery and computer simulations, allow us to determine where the pollution originated and where it will end up.

• **Invasive species.** Disruptive, non-native species (zebra mussels, English ivy and kudzu are

examples) can cause devastating ecological impacts and destroy local farming, fishing and forestry economies. UW professor of forestry Jerry Franklin, in accepting this year's national Heinz Award for the Environment on May 24, characterized invasive species and invasive pathogens as the greatest threat to the forests of North America.

The UW Center for Urban Horticulture can identify virtually any non-native weed anyone brings to it, assess its capacity to wreak havoc, and help state officials eradicate it before it spreads. The School of Forestry monitors insect infestations, and is helping safeguard the region against an invasion of the virulent new plague, Sudden Oak Death. The College of Ocean and Fishery Sciences is helping the government control invasive pests that arrive in ballast water. It is also working with Puget Sound high-school students to document the spread of Ciona savignyi, an invasive tunicate.

• **Tsunamis.** Three hundred years ago, a gigantic, magnitude 9 earthquake rocked the coast of Washington, triggering a tsunami that surged across the Pacific at a speed of 500 mph and crashed against the Japanese coastline. It was as powerful as the tsunami that killed 220,000 people in the Indian Ocean last December. Another major earthquake, capable of unleashing a 30-foot tsunami, is inevitable and perhaps overdue. Very rapid warnings might save thousands of lives.

Project Neptune, a stunning new endeavor, will be a 2,000-mile-long network of fiber-optic cables off the coast of Washington, Oregon and British Columbia. Chaired by UW professor John Delaney, Neptune will link at least 25 mini-observatories equipped with thousands of instruments and hundreds of robots collecting real-time data from the tops of the waves to deep below the ocean floor. Canada has already begun building its part of the system; the United States has not yet funded its portion.

Information produced by such research is, by its very nature, a "public good." It benefits everyone, and it is most valuable when it is universally distributed. Hence, little, if any, distant early warning research will ever be conducted and disseminated by the private sector.

Yet, in an era of huge tax cuts, some of these vitally important functions are falling into disrepair. President Bush has recommended, and Congress has passed, significant reductions in key budgets for basic environmental research and monitoring at NASA, NOAA and the National Science Foundation. American scientists hope our government will follow Canada's example and begin its funding of Neptune in 2007, though NSF's monitoring budget has not grown as originally planned.

Although distant early warning will not always automatically elicit an effective response, the alternative — ignorance — guarantees a catastrophe. From climate disruption to invasive species, from earthquakes to international air pollution, the U.S. needs to keep its environmental DEW lines well-funded and on high alert.

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