



EarthWatch and Northrop Grumman Foundation

Creating Educational Experiences for Teachers

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Introduction

Northrop Grumman Foundation announced the scholarship recipients of its Earthwatch Educator Program, an innovative environmental education program for teachers across the country.

Eighteen educators from 10 states have been selected to participate in an Earthwatch expedition focused on climate change or oceans preservation. The teachers will transfer their experiences to their classrooms and share them with students, year after year.

The Northrop Grumman Foundation partnered with Earthwatch Institute to develop two expeditions that will provide educators with a hands-on, immersive professional development opportunity. The teachers then share their experience with their students--yielding a positive impact on the students' understanding of math and science, and helping to inspire the next generation of environmental ambassadors.

THE RESEARCH

Climate Change at the Arctic's Edge

Over the next few decades the effects of global warming are expected to be greatest at high latitudes. Estimates for warming go as high as 6°C, and at Churchill there has been approximately 2 C warming since the record began in the 1880s. Warming is not the only climate change parameter; snowfall amount and distribution, and evaporation and snowmelt runoff, are expected to be significantly affected. Climate drives many physical and biological processes at high latitudes, and several of these will be under study with this project. Specifically permafrost, microclimate and snowpack, wetland animals, and tree-line characteristics will be intensively measured. The data accumulated by research on these topics will be used to monitor responses in these environmental components to changes in climate. Atmospheric changes driven by accelerated production of greenhouse gasses at mid-latitudes is causing many environmental responses at high latitudes. The global nature of climate, however, means that the new environmental conditions at high latitudes have the potential to begin to affect the low latitudes where human activities triggered global warming. There are several mechanisms and pathways through which this is occurring but the two under study in this research project are permafrost degradation and tree-line shift.

About the Research Area



Churchill is located at the northern edge of the forest-tundra near the geographical center of the North American continent. It's on the coast and within the Hudson Bay Lowlands, the largest peatlands in North America, situated at the mouth of the Churchill River. Many different biomes can be found in the vicinity, including forest, forest-tundra, tundra, wetland/peatland, estuarine, and marine.

The land around Churchill is emerging from Hudson Bay as the earth's crust rebounds from the weight of the last ice age's glaciers at the rate of 80-100 centimeters a century. As land rises, raised beach ridges are formed and stand out in relief against the lowlands. Plant diversity is high for this latitude because Arctic, sub-Arctic, and Boreal species all meet in the region. Accordingly, Churchill is a favored area for the study of primary plant community succession.



The Teacher Experience



Churchill Northern Studies Centre

Our Professor was Dr. Peter Kershaw from the University of Alberta. Dr. Kershaw has studied the sub arctic for most of his career, both at the Churchill Northern Studies Center and the McKenzie Range. A typical day consisted of a hearty breakfast at 7 am followed by a briefing and being taken out to the field to collect data. Teachers were instructed how to core trees and record data on seedlings and saplings in random quadrats. Data was recorded on I pads. We would then return to the Center for a hot lunch then return to the field for more data collection. Dinner was at 5:30 followed by a lecture from 7 to 9 every night. After the lecture teachers entered data or prepared samples. After this we were treated to guided trips through the area, often staying out past 11:30. Which coincided with the sunset.



Conclusions

Teachers were required to journal as well as doing field work. The journaling provided a reflection on the day as we learned about the geology, weather, climate, the ecology and flora and fauna of the area. Teachers learned first hand, teamwork, scientific principals and the connectedness of the biome we were working in. Teachers are required to integrate lesson plans and reach out to community stressing the importance the environment and our stewardship, the work we did in the permafrost of the Hudson Bay area was only the beginning of a project that will extend years and help hundreds of students develop a new appreciation for science and climate change.



The stories, photographs and samples brought back will translate from first hand experiences to real world understanding of how science is performed. On the local level I will be taking students to the Sandia Nature Center for a field experience where we will teach the students how to collect data in a fashion similar to what the teacher's did at the Churchill Northern Studies Center. My particular area of research will be using Dendrochronology to compare the affect of climate change on tree growth in our own area. This experiential activity will provide an opportunity for students to draw their own conclusions and take the lead in their own education. Samples will be compared to data bases and trends in climate shift will be hypothesized and supported with evidence.

I would like to thank EarthWatch and the Northrop Grumman foundation for giving me the experience that will make a new generation of young scientists aware of the amazing and fragile world we share.

"Education is learning what you didn't even know you didn't know."

Daniel J. Boorstin