2006 Canon Theme

"Water Stewardship in a Changing Climate"

Water is a fundamental element of all life on earth, and the availability of clean and abundant freshwater is essential for both human health and the continued existence of a wide range of economic activities. Climate and water are inextricably linked in local, regional and global hydrological cycles with time scales that vary from minutes to millennia. Changes in climate, whether part of a natural cycle or exacerbated by global warming can be expected to have a significant impact on both the availability and quality of water resources in North America.

Climate models predict that most regions of Canada and the U.S. Midwest will experience warmer conditions, longer frost-free seasons and decreased stream flows over the next few decades and beyond. Even in cases where local precipitation levels increase, these may be more than offset by increased temperatures and evapo-transpiration – leading to reduced water supply and quality, reduced soil moisture content and the potential for increased concentrations of water borne pollutants and disease vectors.

Higher water temperatures can be expected to cause changes in physical and biological processes in waterbodies leading to fish kills and domestic water quality concerns. An increase of water use for crop irrigation is expected to diminish water supply for urban, and other uses. Regional projections include declining Great Lakes water levels, decreasing soil moisture in south central Canada and north central U.S., water storage reservoir shortfalls in the U.S. southwest and a reduction of prairie wetland areas. Declining water levels in the Great Lakes alone will have significant and far-ranging effects on municipal water supplies, navigation, hydroelectric power generation, recreation, and natural ecosystems in both Canada and the U.S.

Climate change could have both beneficial (e.g. longer growing seasons), and adverse (e.g. increased frequency of extreme weather conditions) effects on the Canadian and American agricultural industries. The actual impacts on agriculture will vary widely depending upon local variations in precipitation, soil conditions and land use practices – with some areas experiencing gains while adjacent areas suffer losses. Similarly changes in climate are expected to cause fundamental changes in forest and forest ecosystem dynamics. For example, higher temperatures and enhanced CO_2 concentrations may increase forest productivity and carbon sequestration. On the other hand, the increased frequency of forest fires and insect disturbance (including that caused by invasive and exotic species) may result in significant tree mortality and loss of biodiversity.

The 2006 Envirothon theme "Water Stewardship in a Changing Climate" will not only bring a focus to water issues, but also will provide for examination of the broader global issues, and familiarize students with the United Nations Intergovernmental Panel on Climate Change (IPCC). It will expose students to the concept of climate change modeling, and will cause them to examine aspects of water stewardship in their own

jurisdictions. Students will be encouraged to identify possible positive and negative impacts of climate change, to explore adaptation or mitigation options and to consider the implications of cross boundary (municipal, state, provincial and international) jurisdictional issues.