EDUCATION

ESRI Canada

Case Study

Students Develop Environmental Research Skills through ArcGIS.com

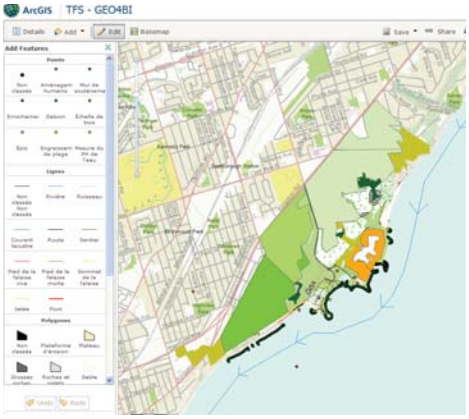
Toronto French School Leverages GIS in the Cloud to Study Local Geological Wonder

At the Toronto French School, students undertake studies of a local environmental issue – the fast-encroaching erosion of the Scarborough Bluffs. They are tasked with analyzing the escalating effects of the erosion and predicting future outcomes. By leveraging ArcGIS Server through the Amazon Cloud along with authoritative data on ArcGIS.com, students are able to overlay diverse datasets, effectively map the results of their research and take advantage of limitless analysis capabilities.

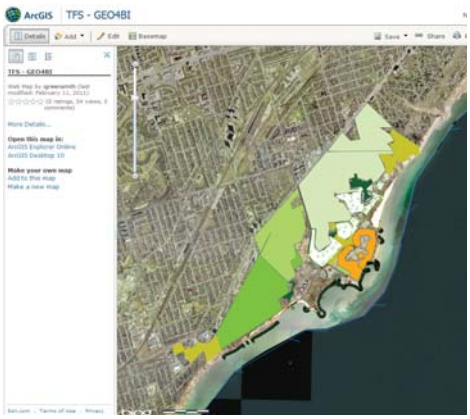
Challenge

Known as the 'Bluffs', this escarpment located in Scarborough, Ontario has been coined a geological wonder and a unique feature of North America. The 14 kilometre coastline has been rapidly eroding since the 1940s, creating a hazard for local homeowners and a decline in property values. Students of the Toronto French School were tasked with analyzing the escalating effects of this erosion on the local population and the environment, to predict future outcomes. They were also tasked with determining whether the City's erosion-control measures were effectively mitigating this environmental threat.

To achieve this objective, students would need to plot and intersect a variety of datasets that would enable them to analyze relationships between the environment, settlement in the area, access to the escarpment through the existing road network and property values. This level of analysis would require the use of a topographical map, aerial photography, vegetation and street map data. Lacking the infrastructure to host this data internally, students leveraged a Web service so that they could utilize ArcGIS Server directly from the Amazon Cloud, while accessing data and basemaps through ESRI Canada's Community Maps Program.



Students built a comprehensive legend of points, lines and polygons that represent roads, rivers and other environmental features.



Students access topographical maps, aerial photography, a shaded relief map and a street map to conduct analysis on the effects of erosion.

"Access to data on ArcGIS.com enabled students to uncover important connections between the environment, the population and property values. The ability to plot findings on a map promoted collaboration while honing student's research and analysis skills."

Josette Bouchard
Toronto French School

Solution

ESRI Canada's Community Maps program makes Canadian geographic data from authoritative sources available as part of a World Topographic Map on ArcGIS.com. By leveraging this freely available data, students pulled together intersecting datasets and collaborated in the creation of a map that visually displayed their research findings. They built a comprehensive legend of points, lines and polygons that represent roads, rivers and environmental features including vegetation, sediments and water PH levels. Through aerial imagery, they were also able to demarcate surrounding neighbourhoods by property value.

Students enhanced the map by attaching pictures, graphs and Word documents to various polygons. For example, they marked locations where water toxicity levels were tested and uploaded the test results to each individual location. They were also able to access topographical maps, aerial photography, a shaded relief map and a street map to conduct a variety of analysis on the effects of the erosion.

As a result, students were able to predict how the value of surrounding properties could potentially be impacted by the erosion. They could also assess whether the existing road network provides adequate access to the area to implement the City's planned erosion-control programs.

Benefits

By utilizing ArcGIS Server on the Amazon Cloud while leveraging basemaps through ArcGIS.com, cost and infrastructure restrictions were eliminated so that students could fully engage in geomorphology – the scientific study of landforms and their changes over time. They were also able to visualize connections between environmental changes, living standards and property values to conduct meaningful analysis of this naturally occurring phenomenon.

Representing environmental features as polygons on the map enabled students to assess the impact of erosion-control measures such as tree planting, the placement of large armour stones and the installation of water drainage systems in the area. The opportunity to map their research fostered collaboration among students while encouraging discussion and analysis.

Access to a variety of maps also allowed students to conduct in-depth analysis right from their own desktops without having to venture back and forth from the field. The Toronto French School will next be leveraging ArcGIS.com to research endangered ecosystems in a ravine located near the school.

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