2017 BIOLOGY FIELD CAMP: THE NIAGARA ESCARPMENT TRIP

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Rivier University's 2017 Biology Field Camp was a 12-day study of the Niagara Escarpment located in the province of Ontario, Canada. The trip was first conceived around a campfire on the bank of one of Ontario's beautiful lakes, so it made perfect sense to organize a teaching trip that would include hiking, camping and engaging students with and in nature. The escarpment's environmental beauty and rich geological history, as well as its friendly access along the Bruce Trail, provided a wealth of learning experiences in a natural classroom. The Biology Field Camp was orchestrated by Dr. Susan Barbaro, Associate Professor of Biology at Rivier University.

The Participants

Twelve Rivier University biology students, three science professors (biology, geology, and chemistry), one education/mathematics professor, and a naturalist (expert guide, outdoorsman, educator, administrator, and chef) participated in a 12-day trip across the Bruce Peninsula, which separates Lake Huron, Georgian Bay, and Lake Ontario. The trip was partially funded by a National Science Grant awarded to the Rivier University Biology Department in the fall of 2016 and was intended to foster peer mentor/mentee relationships as part of a program to **A**ttract, **R**etain, and **G**raduate **Y**oung **L**if**e** **S**cientists (ARGYLES). Student participants included four freshmen (ARGYLES scholars), six juniors, and two seniors all majoring in Biology or Biotechnology. Dr. Susan Barbaro, Associate Professor of Biology at Rivier University, headed an international team of adult leaders/supervisors, adventurists, outdoor enthusiasts, and life-long learners.

The 2017 Biology Field Camp Study

The Niagara Escarpment is located in a region that was once an ancient shallow sea (approximately 450 million years ago). The sea eventually dried up leaving a plain, comprised of compressed layers of sediment and remains of living organisms, that was and continues to be subject to the erosive forces of water and wind. The escarpment itself is comprised of a dolomitic limestone upper cap which is more resistant to erosion and has protected the more easily eroded softer rock formations that exist below the cap. As a result, the escarpment is a vertical face of rock that extends northwest from Watertown New York to the northern and western shores of Lake Michigan. Our journey began at Niagara Falls, Ontario where the waters of Lake Erie drain into Lake Ontario. Following the Bruce Peninsula Trail, located along the Niagara Escarpment, we made our way up from Niagara Falls to Manitoulin Island located in the Northern Channel that separates Georgian Bay from Lake Huron. Geologist Laura Scaife, B.Sc., former curator of the Earth Sciences Museum at the University of Waterloo (Waterloo, Ontario), lead our discovery rich in geologic history during field trips along ravines, into aggregate mines, and hikes up and along the Escarpment.

In addition to learning about the formation of the falls, we hiked along the Niagara River exploring the plant and wildlife that make the river banks their home. We observed first-hand the power of water as class VI rapids at the base of the falls and as a source of electricity for much of the residents living in Ontario. We visited the Butterfly and Nature Conservatory before heading out to our first camping destination Elora Gorge. The Elora Gorge, carved out of the Niagara Escarpment, is one of the most beautiful and spectacular

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natural areas of the Grand River Valley. Equipped with their geology loop, the students scoured the banks of the Grand River for the fossilized remains of pre-historic sea creatures 300-500 million years old. It is here that the students began their water quality study meant to compare the waters along the Escarpment by testing for and measuring the amount of dissolved oxygen, pH, conductivity, nitrates, sulfates, and chlorine. It was not all academics for the students, some braved the chilly air and took a trip down the Grand River in tubes. For some students, this was a first.

Our journey continued northward along the Bruce Peninsula to Cape Croker Park located on the shore of Great Lake Huron's Georgian Bay with beautiful views of the limestone bluffs. Owned and operated by the Chippewas of Nawash First Nation, our visit to Cape Croker would be our first introduction to the Aboriginal People of Canada and rugged camping. After two days of exploring the caves of Cape Croker, continued water testing, and plant diversity explorations, our lessons of geology, biology, and cultural diversity continued on Manitoulin Island. In addition to being the world's largest freshwater island, Manitoulin Island is considered sacred by the Anishinaabe People and whose ancestors continue to make this island their home. Getting to the island itself was an adventure. It included a visit to Tobermory, located at the tip of the peninsula and from where we boarded the Chi-Cheemaun Ferry that took us through the Northern Channel to the port town of South Baymouth. While on the island we visited the La Cloche Peninsula where the Canadian Shield meets the Niagara Escarpment and where the Roosevelt Memorial is located. We hiked the Cup and Saucer Trial, viewed panoramic sites of the Strawberry Channel and Nipissing shore cliff, and fossil hunted at the Shadow Lake, Gull River, and Bobcaygeon formations.

Our trip wrapped up with visits to Lion's Head, located at the base of the escarpment on the shore of Georgian Bay and that boasts of clear blue water that rivals that of the Caribbean, and Crowe Lake located outside of Marmara, Ontario.

The Experience

The learning experiences of the 2017 Biology Field Camp were as unique as each participant. For many students, this educational adventure marked their first visit to another country, as well as intensive hiking and camping in natural environments. The beautiful scenery of Northern New York State gave way to the breathtaking, natural beauty of Ontario, Canada's Bruce Peninsula and the awe-inspiring panoramas of the surrounding Georgian Bay of Great Lake Huron.

In their journal entries, the students captured the raw beauty of the landscapes, the value of the natural educational setting, as well as the interpersonal experiences and collaborative nature of the Biology Field Camp. Dr. Spadano noted, "This journey's blisters will heal, and its dust shaken from my sandals, but its memories will remain in my soul forever." Dr. Barbaro's feelings now that time has allowed her to reflect, "I can't wait for what next year's adventure will offer."

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** **JOSEPH W. SPADANO**, Ed.D., received a Bachelor of Science degree from Fitchburg State University and a Master's degree and Doctorate from the University of Massachusetts Lowell. Dr. Spadano was a 2001 recipient of the Presidential Award for Excellence in Mathematics and Science Teaching, a 2002 recipient of the Distinguished Alumni Award from the University of Massachusetts Lowell and is a National Board Certified Teacher. Dr. Spadano has taught mathematics at Westford Academy and is presently an Associate Professor in the Division of Education and Department of Mathematics and Computer Science at Rivier University. He is also a proud member of Pi Sigma Upsilon.