MS Project
Department of Environmental Science and Policy
College of Science
George Mason University

Candidate: Meaghan K. Caruso
Presentation Date and Time: April 19, 2024 at 3:00pm
Presentation Location: Virtual
Title: A comparative review of lithium-ion battery cathode materials: *Environmental impacts of mining critical minerals and potential solutions*

Project Director: Dr. K. L. Akerlof
Committee: Dr. Jennifer Sklarew and Dr. Linda Hinnov

ABSTRACT

The current surge in demand for electric vehicles, and therefore lithium-ion batteries, has created a concurrent demand for the minerals used to manufacture them. Although demand is skyrocketing, these minerals are finite resources, and the mining of them has its own environmental concerns. The goal of this analysis is to detail the environmental and community impacts of critical mineral mining. The report focuses on three cathode materials that are commonly found in lithium-ion batteries: lithium, nickel, and cobalt. A comprehensive review of solutions is also included to provide evidence-based technological and policy options with potential to mitigate the identified impacts.