ABSTRACT

TITLE:	T lin (Water is Life): The Environmental and Social Impacts of Groundwater Mining from the Navajo-Aquifer in Black Mesa, Arizona
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ABSTRACT: The Navajo Aquifer (N-Aquifer) is an important groundwater source that provides drinking water for the Navajo and Hopi tribes in Black Mesa, Arizona. In 1968, Peabody Western Coal Company, a private sector coal company, began coal strip mining operations using the N-Aquifer. Each year Peabody withdraws 1,200 acre-feet of water from the N-Aquifer and extracts 8 million tons of bituminous coal to fuel the Navajo Generating Station (NGS) in Page, Arizona. Electricity generated from NGS is then used to pump 1.6 million acre-feet of Colorado River water through a 333-mile canal system to Phoenix and Tucson. In result to Peabody's industrial withdrawals, the N-Aquifer has dropped 200 to 400 feet.

This research is to assess the usage of the N-Aquifer in comparing withdrawal rates between Peabody mine and Navajo-Hopi communities. The study demonstrates that Peabody's industrial withdrawal rates of the N-Aquifer has far exceeded municipal withdrawal rates of the Kayenta Well System and has caused spring discharge rates to decline among natural springs near Hopi villages. In addition, Peabody mine's industrial withdrawal rates surpassed groundwater model predictions used in the mine's impact assessments. Although the depletion of the N-Aquifer is evident through USGS monitoring data and residential observations, the Cumulative Hydrologic Impact Assessment (CHIA) criteria, which is assessed by the Office of Surface Mining (OSM) - fails to resolve, identify, and evaluate current and prospective impacts of material damage among the N-Aquifer because it is dependent on hypothetical computer groundwater model results rather than physical data from groundwater monitoring wells. While 62 percent of the total groundwater withdrawals continue to be used for coal mining activity, it is critical that OSM revises the CHIA criteria that will provide an informative baseline data model and resolution to vertical leakage, spring discharge, and base flow in washes on the Black Mesa basin.