Oil sands mining activities in the Fort McMurray region of Alberta, Canada, have led to increased atmospherically deposited nitrogen (N) and sulfur (S), with N steadily increasing over time and S peaking in 2009, then decreasing with the installation of scrubbers on upgrader stacks. Ecosystems (such as ombrotrophic bogs) near these mining activities see an increase to their depositional load. These peatlands are isolated from groundwater and receive inputs only from precipitation, making them uniquely susceptible to changing depositional scenarios. To evaluate the effect of oil sands development on bogs in this area, since 2009, we have collected and analyzed porewater (pH, conductivity, NH4+-N, NO3--N, SO42--S, and total dissolved N), N and S as represented in extractions of ion exchange resin precipitation collectors (NH4+-N, NO3--N, SO42--S), samples of new growth from the most dominant plant species (C, N, and S), and have recorded annual growth of vegetation. For a majority of the years, we have sampled at least 3 times (June, July, and August). Some sites have burned and have been replaced by others, however, collections are on-going and data from these collections are uploaded as they are published.