

Nutrient Dynamics in Peatlands of Northern Alberta

Prior to disturbance by the oil and gas industries, 30 to 50% of the Athabasca Oil Sands region of northern Alberta was covered in peatland. These systems are to be reclaimed to an equivalent ecological capacity, requiring knowledge of their hydrological and biological function prior to mining. Nutrient dynamics are critical for the establishment and persistence of appropriate vegetation, but are complex due to the wide variation in hydro-geochemical characteristics.

In a study published in [Ecohydrology in 2015](#), researchers from the University of Waterloo characterized spatial variability in N and P dynamics in July (peak of the growing season) in five peatland types: two bogs (one natural and one drained), a rich fen and two poor fens. Both hollows and hummocks were sampled within each peatland for initial extractable nutrients and three-week nutrient supply using PRS probes and buried bag incubations. Measurements were related to water table position, peat moisture content and temperature.



PRS probes and buried bag incubation
(photo courtesy of M. E. Wood)

The researchers found that a disturbed fen with semi-permanent road and decommissioned well pads had anomalously high N and P levels due to external inputs of N and P. At the remaining peatlands, N supply rates and extractable levels were generally elevated under wetter conditions while net N and P mineralization were elevated at the drier sites. Phosphorus supply rates and pools were highest in hollows at very wet sites due to low redox potential, as indicated by elevated Fe and Mn on PRS probes.

The authors conclude that reclamation practices should focus on regulating hydrologic conditions to provide optimum nutrient levels for vegetation growth.

Adapted from [Wood, M. E., Macrae, M. L., Strack, M., Price, J. S., Osko, T. J., and Petrone, R. M. 2015. Spatial variation in nutrient dynamics among five different peatland types in the Alberta oil sands region. *Ecohydrology* doi: 10.1002/eco.1667.](#)