

**EFFECT OF LATERAL SUBSURFACE MOVEMENT OF BRINE FROM AN
HISTORIC BRINE SCAR ON SURROUNDING VEGETATION**

Ean Garvin*
Cas Bridge
Carla Landrum
Kerry Sublette
Bryan Tapp

Center for Applied Biogeosciences
The University of Tulsa
800 South Tucker Drive
Tulsa, OK 74104
Voice: 918-631-2517
Fax: 918-631-2091
ean-garvin@utulsa.edu

Historic brine scars are characterized by severe erosion often to bedrock or impermeable subsoil. In Osage County, Oklahoma erosion is typically stopped by an impermeable clay layer at depths of 1-2 m. Characterization of several Osage County brine scars has revealed a halo of salt contamination around the scar at depths of about 1-1.5 m where clay content is high. However, even in areas where the EC and SAR are elevated at these depths dense vegetation exists on the surface. Apparently surface vegetation is protected from the worse effects of the brine by a natural capillary break. The brine appears to have migrated away from the floor of the scars by horizontal capillary suction.

Although surface vegetation exists above the deep brine contamination an investigation has shown that this vegetation exhibits lesser above ground biomass, root biomass, species diversity, and species richness than nearby areas without subsurface impact.. Conventional remediation of historic brine scars typically encompasses surface re-contouring as a major component of the remediation protocol. However, reducing the depth of the brine components within the halo could have the effect of removing the protective capillary break. Thus these salts could be vertically mobilized by capillary suction and present problems in revegetation of the site. Given the observed effects on surface vegetation, remediation of the brine scar should encompass the entire halo area as well as the obviously impacted scar.

###