USING A HELICOPTER ELECTRO-MAGNETIC SURVEY TO LOCATE SALINITY SOURCES AFFECTING STREAMS IN SOUTHERN OKLAHOMA OILFIELDS

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By sampling over 150 different streams and tributaries at more than 300 locations in a 33X34 mile (1,000 square mile) four county project area in Southern Oklahoma with extensive old oilfield production, we were able to define areas in which salinity sources were adversely affecting streams. However, this still left about 400 square miles that had to be searched for the direct or indirect sources (no permitted discharge of saline produced water to streams is allowed), many of which are not apparent at the surface.

Possible sources include:

- Discharges directly to streams due to accidents, poor maintenance, well-related seeps, and (rare) illegal actions
- Eroding saline soil from historic to recent spills and mud pits
- Groundwater plumes from old mud and pre-1970 “evaporation” pits
- Groundwater plumes from producing wells, unloading improperly plugged old wells, and/or injection wells that leaked into shallow aquifers

To speed up source location, I found grant money to fund a test of the USGS developed Helicopter Electro-Magnetic Survey on about 25 square miles within a portion of the project area in which there are high numbers of impaired tributaries. This presentation will outline the HEM methods used and show what the HEM survey results can show.

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