

**STREAM-AXIS EM FROM A HELICOPTER:
IDENTIFYING SALINITY SOURCES IN A LARGE RIVER BASIN**

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We combined multifrequency airborne EM measurements of apparent ground conductivity with chemical analyses of surface water to delineate natural and oil-field salinity sources that degrade water quality in the upper Colorado River (western Texas). To reduce the cost of high-resolution airborne surveying over such large areas, we used a helicopter to tow a multifrequency EM instrument at low altitude along the stream axis, examined preliminary results in the field to identify likely salinized stream segments, and then flew more detailed surveys over these limited areas rather than over the entire basin. Even minimally processed stream-axis EM data (including apparent conductivities measured at single frequencies and multifrequency "spectrograms" along the stream axis) can help identify salinized streambed segments, discriminate between surface and subsurface sources of salinity, and determine water-sampling locations upstream and downstream from each segment. We integrated EM, streamflow, and hydrochemical data to calculate salinity loads, identify specific natural and oil-field salinity sources, and more effectively guide and implement remediation efforts.

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