Relations between Specific Conductance and Sodium-Adsorption Ratio

The combination of specific conductance and SAR is used to determine the suitability of water for irrigation. The suitability is not a single number but rather a dynamic relation. For general reference, a specific conductance near 2,000 microsiemens per centimeter at 25 degrees Celsius, and an SAR greater than 10 would represent a high sodium hazard (Hem, 1985). Graphs shown in figure 6 depict the relations between specific conductance and SAR at the eight selected monitoring sites. Sites potentially affected by oil-field brine discharged into Salt Creek are plotted with two time periods: pre- and post-February, 1990. The linear patterns in the data indicate that regression equations can be established for specific conductance and SAR. A regression equation is a mathematical relation between two constituents where one measured constituent is used to predict another unmeasured constituent. This relation generally is site specific and can change over time if stream chemistry changes. Because specific conductance can be monitored remotely and instantaneously, regulators looking for changes in stream SAR values have the option of monitoring specific conductance as a surrogate for SAR and having nearly instantaneous, continuous records of this calculated SAR approximation.

SAR values measured in Clear Creek are generally less than 2 and correlate well with specific conductance.

SAR values are all less than 1 on the Middle Fork Powder River. A good mathematical relationship between SAR and specific conductance is apparent.

SAR values for water from the Little Powder River site range from about 2 to 13. A strong specific conductance-SAR relation is apparent at this site.

SAR values are all less than 1 on the Middle Fork Powder River. A good mathematical relationship between SAR and specific conductance is apparent.

EXPLANATION
- 1981 – 2000
- Pre—February 1990
- Post—February 1990

Figure 6. Specific conductance and sodium-adsorption ratio (SAR) for selected sites in the Powder River Basin, Wyoming and Montana, 1981-2000 (SC = specific conductance in microsiemens per centimeter at 25 degrees Celsius).