The Cheyenne River drains approximately 24,500 square miles of eastern Wyoming and western South Dakota. Tributaries to the Cheyenne River include both perennial and intermittent streams with considerable variation in drainage area and response to climatic changes. Segments of the Cheyenne River currently exceed South Dakota Beneficial Use Standard and a Total Maximum Daily Load study was initiated in the Spring of 2007. As part of the study, six gaging stations along the Cheyenne River and three major tributaries have been equipped with a continuous water-quality sonde to collect conductivity, dissolved oxygen, pH, turbidity, and water temperature in addition to the measurement of river stage. The data from April to October of 2007 provide some interesting insights into how the Cheyenne River responds to the ongoing drought, storm events, and wide variety of tributary inflows. The geology of western South Dakota also influences the type of response these tributaries produce from precipitation events. Prairie streams with Badland influence (White River Group sediments) can respond quickly to precipitation events with highly turbid flows resulting in large increases of sediment load and in changes to dissolved oxygen and sometimes pH within the Cheyenne River. Tributaries from the Black Hills areas are often less turbid but at times produce enough additional discharge to influence field conditions.