REPUBLICAN RIVER BASIN MODELING AND WATER-QUALITY PROJECT
January 22, 1998

Ground-Water Quality

All inventory information for wells sampled last summer has been entered into our database. All water-quality analyses from the USGS and Olsen's laboratories also have been added to our database. Analytical results have been sent to the NRD managers, well owners, and Ed Harvey at the Conservation and Survey Division (CSD). Preliminary quality assurance has been completed on these data.

Nitrate analyses for the samples collected by the Nebraska Department of Environmental Quality (NDEQ) last summer will be added to our results. A few wells were sampled by both NDEQ and USGS; the results are being compared for quality assurance.

Planning for 1998 sampling will begin in February. Wells to sample will be selected and well owners will be contacted by phone to obtain permission in February and March. Well selection will be a stratified random approach based on areal distribution, well depth, and availability for sampling. Next summer's sampling is scheduled for July and August.

Preparations for the first collection of water-quality samples from the transect wells used for investigating surface-water/ ground-water (SW/GW) interaction will begin in March. About 27 ground water and 3 surface water samples will be collected in April to be analyzed for nitrate and dissolved oxygen concentrations, specific conductance, pH, and temperature. The results from this sampling event will be used to help determine which wells will be sampled to determine ground-water age later in the year. Ground-water age will be determined in about 30 wells using a technique based upon concentrations of chlorofluorocarbons (CFC's). Under ideal circumstances the CFC-technique allows the year of recharge of ground water to be determined to within 1 to 2 years. The ground water age dating will be used to better understand SW/GW interaction and to compare ground-water quality and age.

SW/GW Interaction

Preparations for drilling and well installation at the three sites of the paired observation well transects for investigating SW/GW interactions are proceeding. Burton Well Drilling, Bartley, Nebraska, has been awarded the drilling contract. Drilling is tentatively scheduled to begin the week of February 9, although the driller may want to postpone the start to February 16. A geophysical logger borrowed from CSD will be used to measure vertical variations in electrical properties of the geologic materials in all boreholes. The geophysical logs will be used along with drilling descriptions to interpret the stratigraphy at the drill sites. All sites have been selected and the drilling schedule has been discussed with NRD managers. Pressure transducers with built in data loggers for automatically recording water levels have been received. The pressure transducers will be installed in selected wells along the transects and in the tributary streams. Water levels will be measured at least monthly during the irrigation season in other wells along the transects.

Model Preparation and Data Acquisition

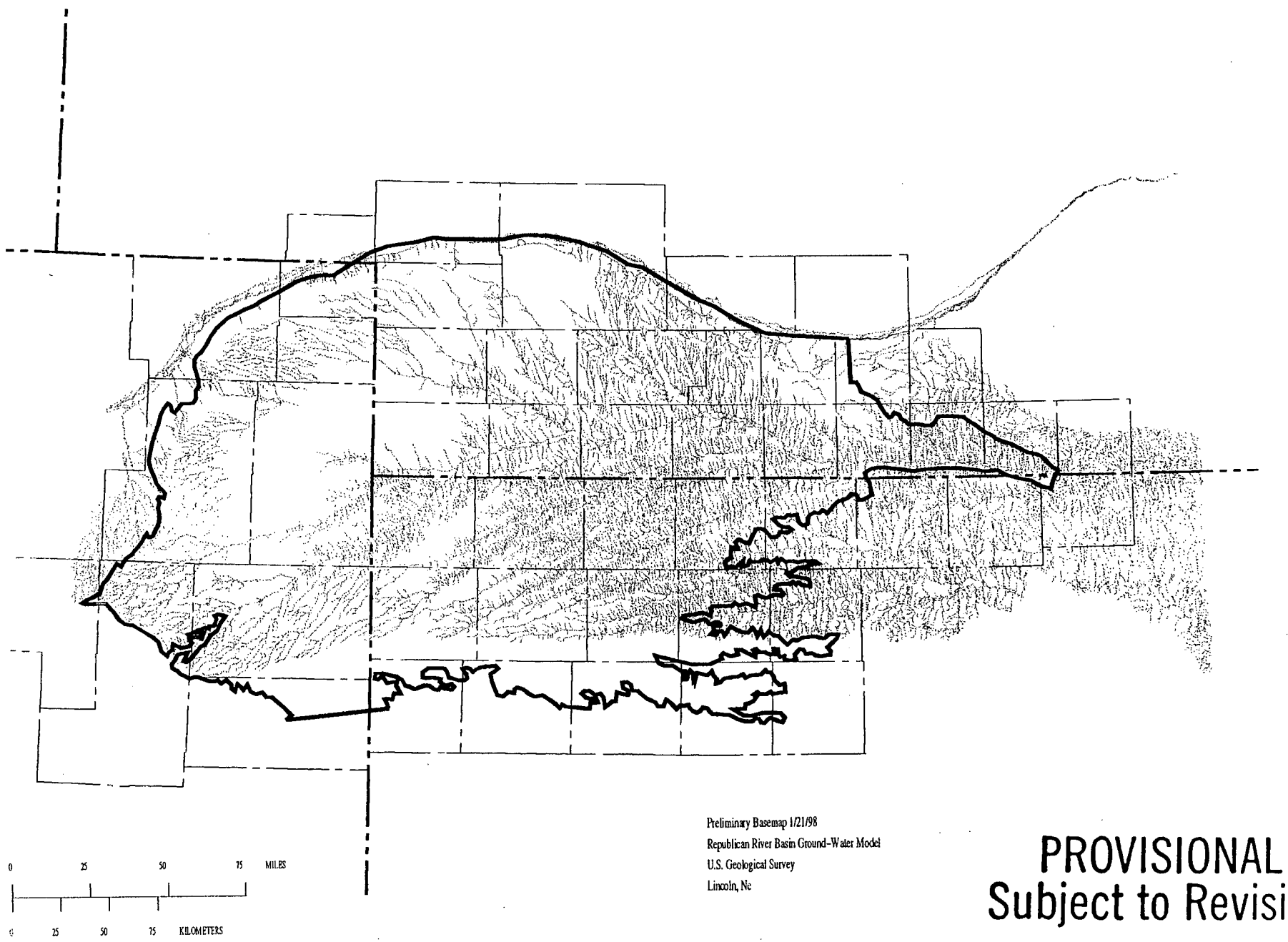
Intensive data collection and compilation to assemble input into the model continued. The basemap and model boundaries were refined (see attached copy of preliminary working basemap). The basemap was loaded into the model and a preliminary model grid created. The preliminary model grid has about 60,000 active grid cells with variable grid sizes. Grid sizes are largest along the outer boundaries of the model area, with grid cells of about 2 X 2 miles, and are smallest in the middle of the study area along the main stem of the Republican River, with grid cells of about ½ X ½ miles. The grid system is a preliminary estimate; the grid will be refined as needed as the model construction and simulations proceed.

Sources of data were inventoried and evaluated and construction of digital GIS coverages continued for the model input parameters land-surface elevation, base of aquifer, hydraulic conductivity, and specific yield. Selected maps for which digital coverages do not exist are being digitized. USGS personnel in Kansas, Colorado, and Oklahoma were consulted and are assisting in assembling data and GIS coverages for the Kansas and Colorado parts of the study area. Ground-water level data was retrieved from the USGS database and is being checked to eliminate any erroneous values. Planning for calculation of consistent estimates of water use across the multi-state study area has begun. A preliminary bibliography for the study area was compiled. A preliminary inventory of existing hydrogeologic cross-sections in the Republican River basin was completed. The effort to inventory cross-sections is being coordinated with state investigators and a master inventory of cross-sections will be compiled at an interagency meeting on Jan. 29.

General

A liaison meeting was held on December 18 to coordinate Republican Basin activities in Nebraska among investigators from the USGS, CSD, Department of Water Resources, and NDEQ. The next meeting is scheduled for March 2.

A short presentation on the Republican River water-quality, SW/GW interaction, and modeling study will be made at the Middle Republican NRD annual water conference on March 4.



Preliminary Basemap 1/21/98
Republican River Basin Ground-Water Model
U.S. Geological Survey
Lincoln, Ne

PROVISIONAL
Subject to Revision