
Kansas Geological Survey

Set of (water availability) maps for Southwest Kansas Groundwater Management District

By

Woods, J.J., and Sophocleous, M.A.

2001-45I. Summary of improvements made in the GMD3 map set of KGS Open-file Report 2001-45 as outlined in a letter to Mr. Hank Hansen, GMD3 manager, with additional explanations as outlined in an e-mail letter to then GMD3 Hydrogeologist Diane Coe.

By Marios Sophocleous

Kansas Geological Survey Open File Report 2001-45



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November 15, 2001

Mr. Hank Hansen, Manager
Southwest Kansas GMD3
409 Campus Drive
Garden City, KS 67846

RE: "Maps depicting groundwater availability in the High Plains Aquifer in Southwest Kansas Groundwater Management District No. 3" Contract

Dear Hank:

As per the above-referenced contract, I am enclosing the seven required groundwater availability maps in preliminary draft form (please refer to the above-referenced contract for enumeration of those maps), plus two additional, related maps (one bedrock map—see item 3 below, and one depth-to-water-table map depicting the triangular tin and hull employed with all data points—see item 5 below), also in draft form, for your review and discussion. Please note that the deadline for this project is the near end of December 2001, so we would appreciate your comments at your earliest convenience.

The new 2000 (1999-2001) maps have a number of improved features (compared to the maps produced in previous years), the most important of which are as follows:

1. We employed the Public Land Survey System (PLSS) to provide the latest high-quality digital representation of basic Kansas land divisions, such as section point and polygon coverages, based on USGS 7.5 minute quadrangles.
2. We implemented the latest version of the digital map of the extent of the High Plains aquifer in Kansas to form a new base map, which includes areas where the High Plains aquifer has little or no saturated thickness.
3. We updated the bedrock values at section centers to make them compatible with the PLSS system mentioned above. We also extended the bedrock map surface to include the areas where the aquifer is not saturated (see supplemental map 1).

4. We assembled, compiled, and added all existing 2001 High Plains water level data for the counties in Oklahoma and Colorado bordering Kansas to better represent and interpolate water level data at the Kansas borders.
5. To avoid interpolating beyond the areas where data are available, we implemented a TIN HULL GIS-procedure to outline areas with no data. In addition to data at section centers, we also posted measured points to see the density of data coverage (see supplemental map 2).
6. Finally, we visually surveyed the flowing segments of the Cimarron River during June and September 2001, and took this information into account in plotting our data in the Cimarron River area.

Hope you find these map products satisfactory. Please feel free to contact me for any questions or comments you may have. Thank you.

Best regards,

Marios Sophocleous
Senior Scientist

Map Enclosures

cc: Don Whittemore, Bill Harrison, Barb McClain, John Woods

Subject: 2000 Groundwater Availability Maps for GMD3

Date: Mon, 28 Jan 2002 15:33:02 -0600

From: Marios Sophocleous <marios@kgs.ukans.edu>

Organization: KGS

To: Diane Coe <dcoe@gmd3.org>

CC: Hank Hansen <hhansen@gmd3.org> ,
Don Whittemore <donwhitt@kgs.ukans.edu> ,
Brownie Wilson <bwilson@kwo.state.ks.us> ,
John Woods <jwoods@kgs.ukans.edu>

Dear Diane,

Following our meeting earlier this month during which we reviewed your comments and our initial responses to them, we thoroughly examined all the data points that indicated a water-level rise from averaged 1997 year (1996-1998) to averaged 2000 year (1999-2001). We wrote a special program which retrieved all water-level rise data points and their measurement dates. That examination indicated that some water-level rise data were highly questionable either because one measurement was obviously highly anomalous compared to either a repeat measurement or yearly measurements before and after, or because that well was abandoned after the 1999 measurement (removed from the network thereafter; observer's comments indicate heavy oily measurement, or other malfunction). In such cases we either took a new average of the measurements excluding the obviously anomalous point, or omitted the already abandoned measurement point altogether. (The latter action involved only two wells that are dropped from the network after the 1999 measurement.)

We also used the updated PLSS section-center coverage for the 1997 data (so that the section centers are identical as the ones used in the improved 2000 surface, as mentioned in my November 15, 2001 correspondence to Hank Hansen), and also took a measurement difference only if a measurement existed at the same well for both the 1997 and 2000 periods. With these changes, some previously water-level rise areas now disappeared; however, a number of areas still do show water-level rises from 1997 to 2000, but now we are more confident that these areas truly exhibited rises.

Another change we did to the 2000 depth to water-level map, was to reduce the blank (no data) aquifer areas by interpolating values there based on the surrounding wells where we felt we could safely (i.e. confidently) do so. Although we could do so for the 2000 depth-to water and probably saturated thickness data, we feel that trying to do a similar thing to other years (past or projected future) might take us a rather long time to complete, and we recommend to leave those blank areas as they are for those time periods so that we can complete this project in a timely manner. We will also be

improving on the coloring of some patterns. Other small changes/corrections have already been implemented.

So we will be finalizing these maps to send to you in the near future. In the meantime, please let me know if you have any further comments or suggestions. Thank you.

Best regards,

Marios Sophocleous
Senior Scientist

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