

Memorandum

To: Programs Projects and Operations Subcommittee
Date: March 9, 2010
From: Brian L. Henkel, Groundwater Management Engineer
Re: Farm Process Pilot Groundwater Flow Model

District staff has been developing a plan with the U.S. Geologic Survey (USGS) to cooperatively create a pilot model study utilizing MODFLOW and the Farm Process Package (FMP). MODFLOW was developed by the USGS and is the industry standard for the creation of groundwater flow models. FMP, also developed by USGS, is a state of the art extension to MODFLOW that assesses all of the components of water use, surface water and groundwater, through a complete water budget analysis. The pilot model would cover a portion of the Platte River valley near Ashland, Nebraska (Attachment 1). The application of the Farm Process Package (FMP) for MODFLOW to the Lower Platte River alluvial aquifer system would be the first application of this advanced tool in Eastern Nebraska.

The study area was selected based on the availability of highly detailed topographic and geologic data collected through other cooperative efforts of the District. The Eastern Nebraska Water Resources Assessment (ENWRA) completed a pilot study in the same area which resulted in the collection and processing of highly detailed, three dimensional hydrogeologic information. Additionally, the area is included in the planned LiDAR collection area scheduled for this spring through the Nebraska-Iowa Regional Orthophoto Consortium. The LiDAR collection will provide highly accurate and detailed topographic information for inclusion in the pilot model. These two detailed datasets, combined with the other existing information, will improve the pilot models ability to effectively assess the benefits of using FMP in the Platte River system.

The completed pilot model could be utilized to assess current and proposed District programs related to water conservation measures, on farm conservation practices or controls on invasive species. The level of detail of the model and the advanced tools of FMP would offer a level of assessment greater than that available with more standard approaches. This would give the District the opportunity to better understand the benefits of ongoing and proposed programs as they relate to the overall water budget in a representative area of the Lower Platte River Basin.

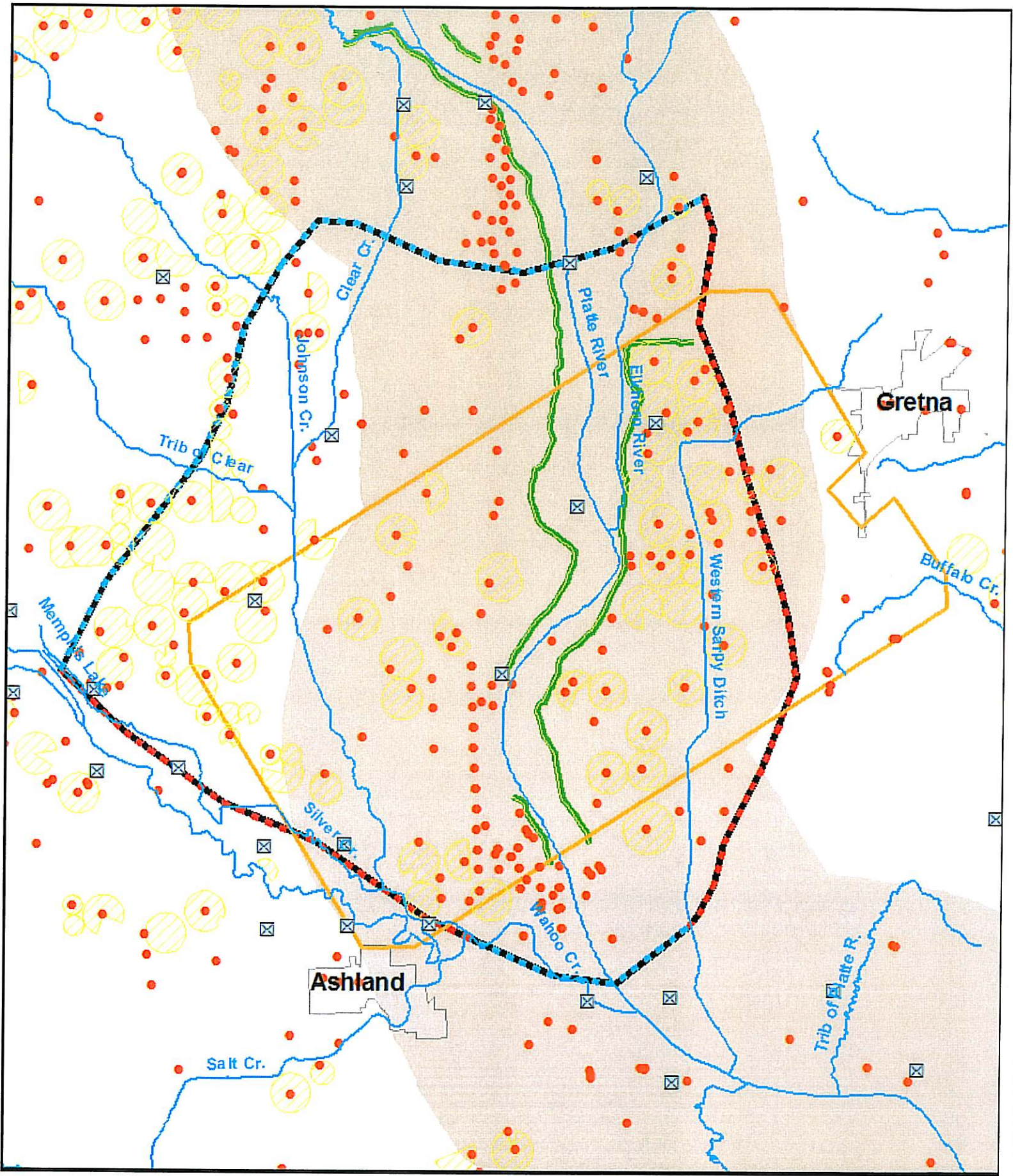
A pilot scale model can also guide the Districts continued data collection and future river and basin analyses. The Annual Evaluation of Availability of Hydrologically Connected Water Supplies, completed by the Nebraska Department of Natural Resources (Department), is an assessment of available supplies. The compiled report is the basis for the Departments determination of 'fully appropriated' and is comprised of water budget analysis, extrapolations of current levels of development and comparisons to historic conditions. A more complete understanding of the interactions of the various components of the water budget in the Lower Platte can assist the District with the additional steps needed in assisting the Department's evaluation.

The proposed pilot model would be a cooperative effort involving the District, the USGS Nebraska and California Water Science Centers and ENWRA. It was originally anticipated that ENWRA would be the primary funding source for the project with the USGS providing approximately the same cost share as the current level and the District contributing an equivalent amount. Through refinement of the scope and continued planning with ENRWA, the availability of funds was revised.

The ENRWA grant application and award was based on characterizing the geologic framework of Eastern Nebraska and not on studying specific water budgets. The portion of the ENWRA grant award, specific to water budgets, has been allocated toward this project. A potential source of funds for this project would be from an unutilized budget category. The District originally anticipated sharing the cost of levee evaluation for the City of Omaha's Missouri River Levee. The City has decided to pursue other maintenance and evaluation options and the budgeted amount is no longer needed in this budget cycle. The total project cost and the agency contributions are listed in the following table:

Agency	Cost
USGS	\$25,000
ENWRA	\$10,000
P-MRNRD	\$83,000
Total	\$118,000

- **Staff recommends that the subcommittee recommend to the Board of Directors that the General Manager be authorized to execute a Joint Funding Agreement with the USGS for the development of a pilot model for a maximum fee of \$83,000, subject to changes deemed necessary by the General Manager and approved as to form by District Legal Counsel.**



- Draft Model Boundary ———— Ashland HEM Area
- constant head ———— CIS Coverage Area
- no flow ———— Streams (DNR)
- Registered Wells ●
- Surface Water Appropriations ☒
- 1996 Levees ————

