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GROUNDWATER OBSERVATION NETWORK DESIGN FOR KANSAS

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Kansas Geological Survey
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Abstract

Concerns about the efficiency and economic soundness of the Kansas groundwater monitoring program led to a systematic redesign of this network, a tentative phase of which is presented in this study. The objectives of this paper include monitoring of major aquifers within each Groundwater Management District at a spatially more uniform level of accuracy, elimination of redundant measurements and optimization of the information gained from each observation well. The theory of regionalized variables is employed to estimate the amount of spatial variability of the water table, on which the network design is based. This study shows that it is not practical to attempt to reduce the already existing level of uncertainty uniformly throughout the various districts; to do so would tremendously increase the cost of well monitoring, which is already very high. Assuming that the currently existing network is satisfactory for the State's objectives, a reduced network consisting of one well every four miles is equally satisfactory. The reduced network yields district-wide maps that do not differ significantly from those produced using the present network and at the same time it reduces the already-existing network by 18 to 47 percent (Table 1). We therefore recommend adoption of a rearranged, square well network that is reduced to a four-mile spacing to achieve both a uniform level of information about the water table and a minimum required accuracy.

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by

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Introduction

During the last several decades development of groundwater-based irrigation in western and south-central Kansas has increased dramatically, resulting in severe groundwater-level declines. In western Kansas, where mining of groundwater supplies is actually taking place, county-wide levels have declined at an average rate of one to five feet per year in the last 20 years (Kansas Groundwater Management Districts Association, 1980). To find solutions to the problem of dwindling groundwater supplies in western Kansas and to help control and direct the development and use of groundwater resources, five groundwater management districts (GWMDs) have been formed in Kansas (Fig. 1). A network of groundwater observation wells has also been developed in Kansas and has been expanded through the years to monitor groundwater-level changes and to evaluate groundwater reserves. Funds allocated each year by the Kansas Geological Survey and other state agencies for collection and analysis of an expanding water-level data network increased to such an extent that concerns about the efficiency and economic soundness of the network program have been expressed. However, no systematic attempts have yet been made to determine the number and location of observation wells, the adequacy of the network for any specified purposes or its cost effectiveness.

In order to deal with some of these issues, the Kansas Geological Survey has proposed that a systematic redesign of the groundwater network in Kansas might result in some significant improvements, such as monitoring of major aquifers at a spatially more uniform level of accuracy, eliminating redundant measurements, optimizing the information gained from each observation well, and possibly decreasing the number of observation wells without significantly affecting the accuracy of the estimates.

Geohydrologic Setting of GWMDs

GWMDs 1, 3, 4 and 5 (Fig. 1) are studied in this report. GWMD 2 (Fig. 1), the smallest in areal extent of all GWMDs (approximately 781 square miles), is the subject of a separate study by Olea and Brentano (1982) and, therefore, it will not be dealt with in this report. All the studied areas belong to the High Plains region of Kansas, which is characterized by flat to gently rolling terrain consisting of fluvial and eolian sediments. The Ogallala Formation of late Tertiary age is the principal aquifer unit in western Kansas (Gutentag and Weeks, 1980; Gutentag, et al., 1980) underlying all three western GWMDs 1, 3, and 4. It consists of poorly sorted layers of silt, clay, sand and gravel. Caliche and caliche-cemented sand and gravel zones ("mortar beds") occur at several horizons throughout the formation. In most instances, the Ogallala can be differentiated from the underlying Permian, Jurassic and Cretaceous bedrock by its heterogeneous alluvial nature (Fader, et al., 1964). Unconsolidated fluvial and eolian deposits of Quaternary age that are in hydraulic connection with the Tertiary deposits (which is the case with GWMD 5) are considered to be part of the High Plains aquifer. Much of the sediments in the more recent alluvial deposits are reworked from the Ogallala Formation. Saturated thickness of the deposits ranges up to more than 600 feet in southwestern Seward County, while yields to wells range up to more than 3,000 gallons per minute.

Precipitation is the principal source of recharge to the groundwater system in the High Plains. It ranges from less than 16 inches to about 30 inches, increasing eastwards across the Plains. Persistent winds and high summer temperatures cause high rates of evaporation in the High Plains. Except in sand-dune areas, where the water can readily percolate down to the water table, most of the water that enters the soil is returned to the atmosphere by evapotranspiration. Recharge to the groundwater system may be several inches per year in sand-dune areas; but, over the much larger part of the High Plains, recharge may average less than 0.5 inch per year (Gutentag and Weeks, 1980). Groundwater from the High Plains aquifer discharges naturally to streams, although there are areas where even major streams, such as the Arkansas River, are now influent because of severe water-level declines observed during the last decades.

The water-table configuration in the region shows a generally eastward slope of the water table across the High Plains. Typically, the slope of the water table is between 10 and 15 feet per mile. Based on average values of hydraulic gradient and aquifer parameters, the velocity of water moving through the aquifer is about one foot per day (Gutentag and Weeks, 1980), which is typical of sand and gravel aquifers.

Data on water levels employed in this study were obtained during January of 1979 or 1980, when the effects of seasonal pumping for irrigation were near minimum.

Methodology

The previously mentioned goals were achieved in part by geostatistical structural analysis, a statistical approach that investigates the amount of spatial variability in any surface, in this case the water table. The basic tool used in assessing this variability is the semivariogram, which is a plot of semivariance that characterizes the rate of change of a mapped variable (water-table elevation) with respect to distance. The semivariance, $\gamma(h)$, is defined as one half of the variance of the increment $[Z(x+h)-Z(x)]$, representing in this case the differences between values of the water-table elevation, Z_i, separated by a vector of distances, h, which has a specific orientation. If a total of N(h) pairs of observations separated by a vector h is considered, then the semivariance is estimated, most conveniently along a line (traverse), as

$$\gamma(h) = \frac{1}{2N(h)} \sum_{i=1}^{N(h)} [Z(x_i)-Z(x_i+h)]^2$$

In general, the semivariance increases with increasing distance, ranging from zero when the distance h is equal to zero, to a value equal to the a priori variance of the observations (sill) at some large value of h. For a detailed exposition on such geostatistical concepts, see Matheron (1971), David (1977), Journel and Huijbregts (1978), and Delhomme (1978).

The concept of semivariogram takes into account those geological parameters that cause the estimation variance, i.e., the uncertainties in estimating water levels between wells. Such geological parameters include, among others, the continuity of the water table, the zone of influence of the water-level measurement, and the homogeneity of the deposits. The continuity is reflected by the rate of growth of semivariance with respect to distance (see section on semivariogram analysis). In a water table, changes usually occur slowly; such continuity, however, may be nonexistant in cases of perched water tables, or when different aquifers are tapped by an observation-well network. The concept of zone of influence of the water-level measurement means that any such measurement is autocorrelated with the water table up to a certain distance from the point of measurement, beyond which any prediction is completely uncertain, as such measurements are statistically independent. This distance, which corresponds to the range of the semivariogram, may vary according to the direction in which the prediction is made (anisotropy). The concept of homogeneity of the deposits means that the error associated with one estimation procedure will vary if geological conditions vary. All these geological characteristics appear quantitatively in the semivariogram, and therefore one can expect that an estimation procedure based on it can be geologically reliable.

The estimation procedure to obtain both the uncertainties in estimated water-table elevations as depicted by the standard deviation of estimation and the map of the water-table elevations is called universal kriging. In order to carry out the universal kriging procedure, the semivariogram(s) of an area must be known from a structural analysis of the data. Kriging techniques for computer contouring developed at the Kansas Geological Survey (Sampson, 1978) are used to contour the water table and to map the likely error at every estimated point in the map grid. The statistical theory from which kriging techniques are derived is known as the theory of regionalized variables.

Semivariogram Analysis

Semivariograms taken along the main trend of the water-table configuration--which generally trends from west to east--show that the water table is extremely continuous with no abrupt discontinuities or changes in slope; they exhibit a parabolic shape, which reflects the pronounced eastward dip of the water table, and indicate that there is no distinguishable limit to the zone of influence about an observation well along this general direction. Examples of average semivariograms (at least three traverses) along a general east-west direction are shown in Figure 2.

Semivariograms taken along a direction perpendicular to the main trend of the water table (generally trending north to south) have goood continuity at their origin but, in general, exhibit an apparent "semi-sill" or interval of almost constant semivariance. This feature, in general, results from small localized differences in water levels. Such semivariograms are "transitive"; that is, they exhibit moderate continuity within a local neighborhood and a random behavior over large distances. Examples of semivariograms along a generally north-south direction are shown in Figure 3.

In geostatistics, a neighborhood or zone of influence indicates a zone beyond which the influence of a water-level measurement disappears, that is, a zone beyond which the measurements are statistically independent. Although from the east-west-trending semivariograms a neighborhood of almost any size could be specified, most of the characteristics of the east-west semivariograms result from a pronounced dip of the water table; therefore when that trend is removed the resulting semivariance of the residuals will have a limited range depending on the size of structures present in the water-table configuration. Thus, a limited neighborhood associated with the semi-sill of the north-south semivariograms was selected for each GWMD. In order to confirm that a limited neighborhood is appropriate, semivariograms were computed for all profiles based on the estimated neighborhood for each GWMD and the fitted polynomial drift. The drift (or trend) describes the regular manner in which the variable under study (water table) behaves over the neighborhood region. Polynomials up to a degree of two were fitted, and the best-fitting polynomial was thus selected. It should be noted, however, that the estimation of the semivariogram of the residuals (i.e., the differences between the water-table elevation and the drift) is not straightforward. Before obtaining the residuals that are necessary to estimate the semivariogram, the drift must be known; but estimation of the drift requires knowledge of the semivariogram. This problem is solved recursively (Olea, 1975) by assuming a semivariogram; computing the drift and the residuals and comparing the resulting semivariogram to the one assumed; and, if necessary, adjusting the drift and/or neighborhood size. Figure 4 represents semivariograms of the residuals from the drift for specified neighborhoods and degrees of polynomial drift. This figure shows both the experimental values calculated from the residuals themselves and the expected values calculated from the fitted polynomial model. The almost exact correspondence between the two suggests that the selection of neighborhood size and order of drift are appropriate.

Finally, before the results of the semivariogram analysis are presented, it should be noted that semivariograms are most accurate near their origin, where the estimates are based upon the maximum number of measurements. Therefore, the interpretation of the semivariograms in this study is based on the analysis of the rate of change of the semivariance near the origin. Finding the slope of the semivariogram at the origin establishes the rate of increase of the semivariance, and is a convenient means of comparing variability of phenomena. Thus, a steep slope near the origin signifies a distribution that changes rapidly with respect to distance, indicating irregular, erratic, or discontinuous surfaces; a more gentle slope signifies a relatively slow change in semivariance, indicating a relatively smooth and regular surface.

Therefore, since attention is restricted to measurements within the neighborhood (near the origin of the semivariogram), the semivariance $\gamma(h)$ will not be needed for distance, h, larger than the range. For such cases, a linear semivariogram of the form

$$\gamma(h) = \omega \cdot h \qquad \text{for } h \leq 2r$$

which is a straight line through the origin with a slope of ω and a neighborhood of radius r, is a good approximation. Thus, to determine the semivariogram in this simplified form, all that is needed is to determine the slope ω and the boundary r. Because the drift should represent only the main features of the water table and not the details, the simple analytical expression mentioned previously is usually enough. These features are incorporated in a computer program, published in Olea (1977), which was used to calculate all semivariograms in this study.

Table 1 summarizes the results of such semivariogram analyses for all western GWMDs. From that table, one could group the four western GWMDs into two groups, based on the complexity of the water-table configuration as indicated by the slope of the semivariograms. The slopes and ranges indicated in that table are averages of several calculated semivariograms from each district. One group includes GWMDs 3 and 4, which possess more complex water-table configurations than the other GWMDs as indicated by the relatively high average slopes of 113 and 109 square feet per mile, respectively, of the semivariograms at their origin. (In Sophocleous et al. (1982) the average slope for GWMD 4 is an unweighted average (115 ft^2/mi) as opposed to the present weighted average value of 109 ft^2/mi). The second group includes GWMDs 1 and 5, which possess a regular, relatively smooth water table as indicated by the smaller average semivariogram slopes of 58 and 68 square feet per mile respectively.

Another important piece of information one can extract from semivariogram analysis is the range, which for all western GWMDs is approximately the same, 18 to 20 miles, indicating that any water-level measurements taken within such neighborhood are correlated to each other. This information, as will be shown in the next section, is of paramount importance in network design, because it defines the maximum allowable sampling interval in the kriging procedure.

Network Design and Error Estimation

The most rational approach to a groundwater network design would satisfy the following conditions: a) it exhibits a uniform square grid that is easy to fit into the already existing land-classification system of township and range, and also insures uniform coverage and uniform level of information about the water table; b) it is dense enough to provide the best answers at an affordable cost, while providing the required accuracy.

The most efficient space-covering pattern that can be devised is, for practical reasons, a regular square grid of observation wells, provided the variable of interest is isotropic in the sense that it does not change at different rates in different directions. The water table is regarded to be an isotropic surface based on the results of the average semivariograms of the residuals, which show no significant differences between the north-south and east-west semivariograms, and on a careful study of water-table maps in all GWMDs where no closed contours of preferred orientation or structure appear.

It will be shown here that reducing the already-existing average uncertainty would require a great increase in wells at a great cost. However, significant savings can be made without significantly increasing the uncertainty by reducing the number of monitoring wells. Therefore, since it is wasteful to collect more data than necessary, especially when these data make only an insignificant contribution to our understanding of the water table, the approach to observation-well-network design should be one that minimizes the number of observation wells in the network under the constraint of a minimum required accuracy.

In selecting the optimal number of observations to be used to krige a point, the screen effect (David, 1977) may be employed. Tests (Olea, 1975) indicate that a limit of 16 observations nearest the point to be estimated are sufficient to krige that point, as they account for more than 97 percent of the total weights assigned to observations within the zone of influence. A square pattern (equivalent to a circular neighborhood) of four by four wells, yielding 16 wells inside the zone of influence, was thus selected to take advantage of the autocorrelation between water-level observations and between each observation and the estimated values. This advantage is assured when the diagonal of the square pattern is equal to the range. Therefore, the spacing between wells in such a pattern, and consequently the well density, can be easily computed. For the western GWMDs of Kansas this spacing is conservatively calculated to be four miles, which means that for a square pattern, nine wells are required for every four townships, that is 2.25 wells for each township (Table 1). The expected errors in estimates made of the water table--estimation errors--can be calculated using the universal kriging procedure. Figure 5 shows contour maps of the standard deviation of estimation (estimation error) within an area defined by four wells, which are part of an infinite regular network where wells are spaced four miles apart. The standard deviation rises sharply away from the wells, reaching a maximum at the center of the square pattern, which is the most distant location from the control points (Fig. 5).

Converting such standard errors into a confidence interval, however, requires the assumption of some probability distribution for these errors. For example, if the central-limit theorem holds, a 95 percent confidence interval for the actual values at the center of the four-well patterns, where the water level will be estimated least reliably, will be given by $Z^{*} \pm 1.96\sigma_E$ where Z^{*} is the estimated value of the water table, and σ_E is the standard deviation of estimation or standard error. This value also represents the minimum accuracy that will be obtained if the study areas are sampled on a four-mile grid.

Theoretical networks of observation wells may be similarly constructed using different well spacings. A sensitivity analysis can thus be conducted to test other alternative networks. The theory of regionalized variables predicts that in a contour map generated by universal kriging the estimation variance is a linear function of the distance between wells, provided the semivariance is linear, a condition held in this study. Taking these conditions into consideration, we designed Figure 6 to calculate the spacing and relative well density that would be required to reduce to any desired level the estimated standard deviation of the water-table elevation for the four-mile well spacing shown in Figure 5. For example, to reduce the maximum standard deviation at the center of a four-well pattern in a regular grid with a four-mile well spacing by 50 percent, a well spacing of one mile and a relative well density of 16 times more wells relative to the four-mile square grid is required (Fig. 6). Even with significant increases in the number of wells, no appreciable changes in the error map will be observed. For example, doubling the number of wells in a regular network will only reduce the standard deviation of estimation by a factor of 1.2. It is thus inferred that the minimum network, consisting of wells every four miles, is optimal when compared to any practically achievable sampling density, as this spacing meets the required level of accuracy with the minimum number of wells. A sparser network will result in a deterioration of the standard deviation of estimation beyond acceptable values, while a denser network will produce minor improvements in accuracy with substantial increases in the number of monitoring wells and in associated costs. For example, in GWMD 3, a well spacing of five miles resulted in significant differences between the existing network and the reduced network of one well for every five miles. Such differences ranged up to about twice the values obtained using the four-mile spacing.

Mapping Results

Figure 7 shows water-table contour maps, based on the existing pattern of wells for various GWMDs, produced by universal kriging using the SURFACE II graphics system (Sampson, 1978); (for a listing of the wells used to contour these maps, refer to Appendix A). Areas with data densities below a specified minimum (for this study, nine data points within a circular neighborhood for interior regions; three octant sectors of a circular neighborhood with at least one data point for boundary regions) are not contoured by the kriging technique. These maps represent the closest approximation to reality because all information available is used. Figure 8 indicates the estimation errors given as standard deviations of estimation for the same GWMDs. Using the existing well network, such maps show the uncertainty already present in the water-level estimation process.

Figure 9 shows water-table contour maps produced by selecting from the existing network wells that are closest to those in a regular network with wells every four miles. The well-network reduction was obtained by superimposing a square four by four mile pattern over the area and selecting one well per square block. The selection procedure retains nine wells for every four townships. The final pattern contains 18 to 47 percent fewer wells than the already existing network. It should be kept in mind, however, that a number of square blocks in all GWMDs have no observation wells. Figure 10 presents contour maps of the standard deviation of estimation for the reduced network of wells. Comparison of these maps with the corresponding ones for the full network (Fig. 8) indicates that the estimation errors for both maps are very similar despite the 18 to 47 percent difference in the number of wells. It should also be noted that in both sets of maps the calculated maximum standard deviations are greater than those estimated for the ideal network (Fig. 5) because of non-regular spacing, boundary effects, and missing data for a number of blocks in the maps. We therefore recommend establishing additional monitoring wells in the areas of high standard deviations in the reduced network maps (Fig. 10). Figure 11 shows the differences in water-table elevations between the full and reduced networks. As can be readily recognized, these differences are generally small and consistent with the standard deviation maps. In a study by Sophocleous, et al. (1982) the significance of the standard deviation maps is evaluated; critical areas where a certain error of estimation would have a significant impact on groundwater-reserve estimations are thus outlined.

Table 1 lists the total number of wells employed for each GWMD, the reduced number of wells resulting from the recommended well spacing and the density of wells for all GWMDs studied. It should be noted that in all GWMDs additional monitoring wells exist that were not measured during the month of January of the year adopted for network analysis (1979 or 1980). It should also be noted that only those wells that penetrate the alluvium, Quaternary undifferentiated deposits, and Ogallala Formation exclusively were considered for analysis. No wells penetrating deeper into pre-Ogallala units, even if they were also screened at the shallower units, were considered in this study.

Conclusions and Recommendations

The results and essence of this study are summarized in Table 1 and Figure 6. This study shows that it is not practical to attempt to reduce the present average level of uncertainty or estimation error uniformly throughout the region, because to do so would increase the cost of well-monitoring tremendously. For example, to attempt to reduce the presently existing error by 50 percent throughout the GWMDs would require at least 16 times more wells than what the currently existing network has. On the other hand, decreasing the existing well density to nine wells for four townships does not significantly increase the uncertainty already present in the estimation process.

Therefore, this study leads to the following conclusion. Assuming that the currently existing network is satisfactory for the purpose of predicting water-level changes related to various pumping and/or recharge mechanisms or groundwater-reserve estimations, a reduced network consisting of one well every four miles is equally satisfactory since it yields district-wide maps of no significant difference from those produced using the present network. This statement implies both a significant reduction in the number of monitoring wells (Table 1) and the establishment of additional observation wells in areas where the recommended spacing requirement for the reduced network is not currently satisfied. These areas are indicated by the mapped areas of maximum standard deviation (Fig. 10). Therefore, we recommend adoption of a rearranged, square well network that is reduced to a four-mile spacing in order to achieve both a uniform level of information about the water table and the minimum accuracy required to supply scientifically valid answers to questions about groundwater resources.

However, in particularly important areas, where reduced networks that are denser than recommended exist and where the estimated uncertainties are unacceptably high for their specific objectives, a separate network may be designed. It should be kept in mind that the objectives of various groundwater programs differ; therefore, the precision and quantity of data required for water-resource evaluation, for example, is different from that required for water resource management and allocation, or for particular research programs. Therefore, the key problem in network design is the definition of program objective; once this is done, the procedures for attaining these objectives can be developed.

Finally, the methodology used in this study is very general and can thus be applied to any type of network analysis. The uncertainty or error maps can be used, in any network, to determine where more information is necessary and to estimate the number of additional measurements that will be needed. Thus, regionalized variable theory provides criteria by which future measurements can be planned in order to achieve specified levels of reliability.

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Illustrations

Tables

Table 1 -- Summary of semivariogram and network design analyses.

TABLE 1

Summary of Semivariogram and Network Design Analyses

	Approx. Area	Semivariogram Characteristics		Degree of Polynomial	Number of Obs. Wells*		Percen
GWMD	(mi^2)	Slope (ft^2/mi)	Range (mi)	Drift	Existing Net	Reduced Net	Reducti
1	1875	58	20	1	247	132	47
3	8938	113	18	2	490	347	29
4	4938	109	20	1	327	241	26
5	3938	68	18	1	305	241	18

Recommended well spacing (wells/mi) in a square network: 0.25

Recommended well density (wells/twp): 2.25

*All wells not measured during January or which, in addition to the High Plains aquifer, penetrate into pre-Ogallala formations are excluded from this compilation.

Figure 1 Groundwater Management Districts in Kansas.

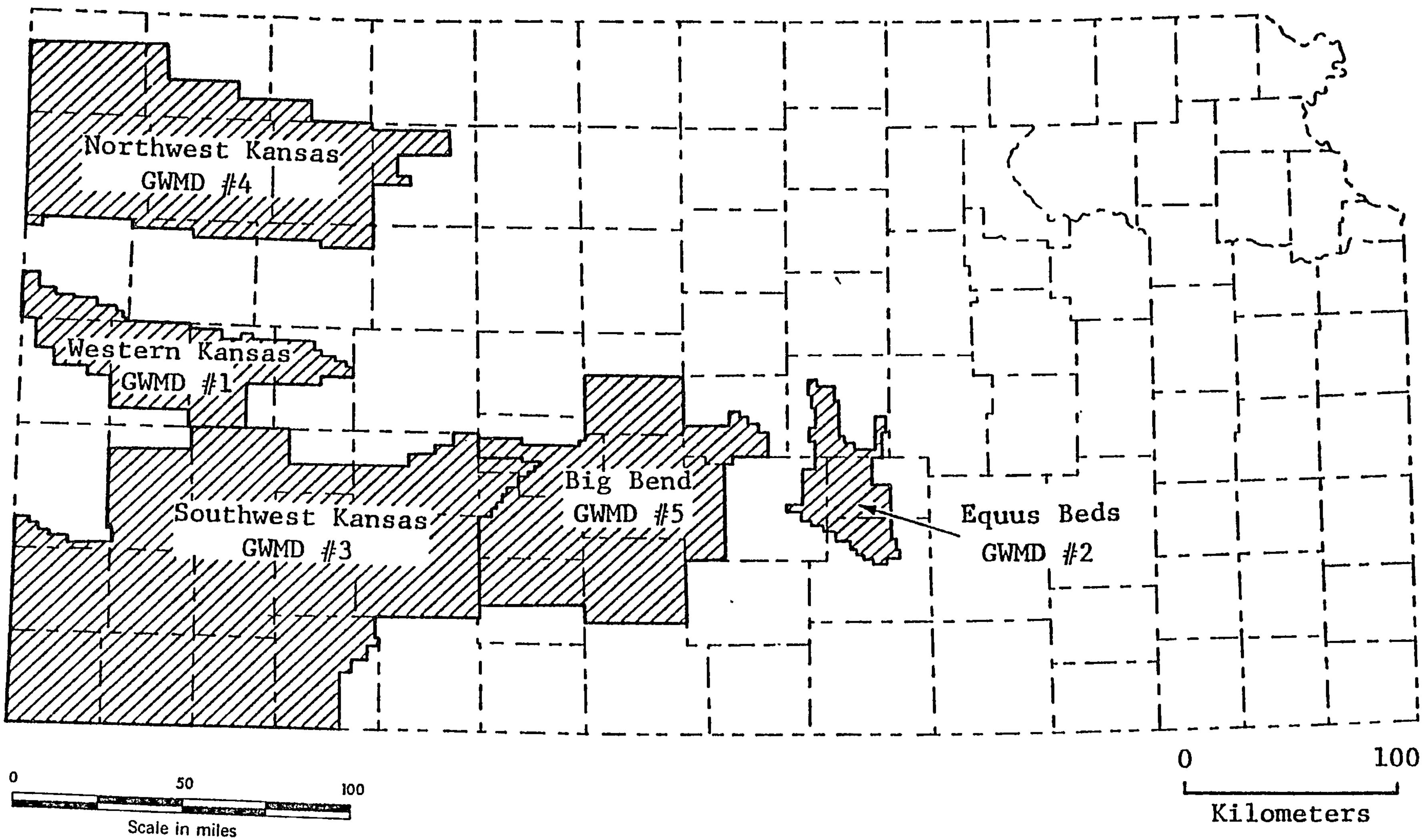
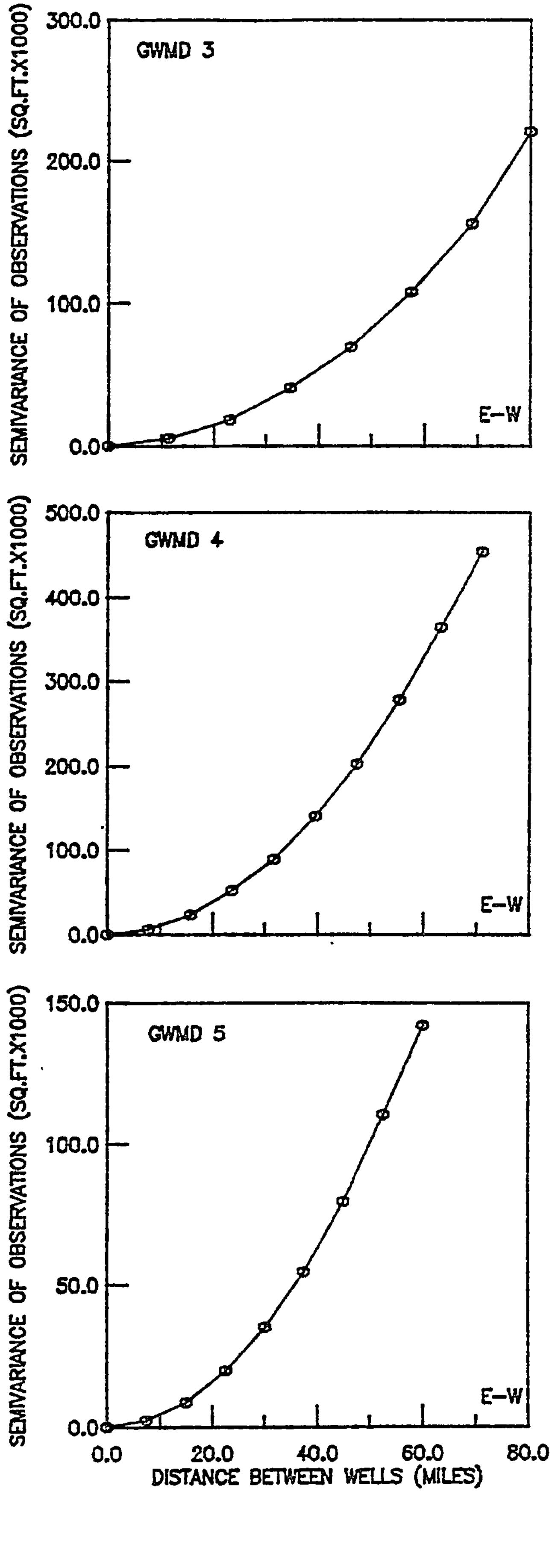

Northwest Kansas
GWMD #4
Western Kansas
GWMD #1
Southwest Kansas
GWMD #3
Big Bend
GWMD #5
Equus Beds
GWMD #2
0
50
100
Scale in miles
0
100
Kilometers

Figure 2 Average semivariograms of water-table elevations along a general east-west direction for various GWMDs.



GWMD 3
E–W
GWMD 4
E–W
GWMD 5
E–W
SEMIVARIANCE OF OBSERVATIONS (SQ.FT.X1000)
300.0
200.0
100.0
0.0
500.0
400.0
300.0
200.0
100.0
0.0
150.0
100.0
50.0
0.0
0.0
20.0
40.0
60.0
80.0
DISTANCE BETWEEN WELLS (MILES)

Figure 3 Semivariograms of water-table elevations along a general north-south direction for various GWMDs. The range of the data, taken as the intersection of the semivariance and the sill, is approximately equal to 20 miles for GWMD 1 and 18 miles for GWMD 3.

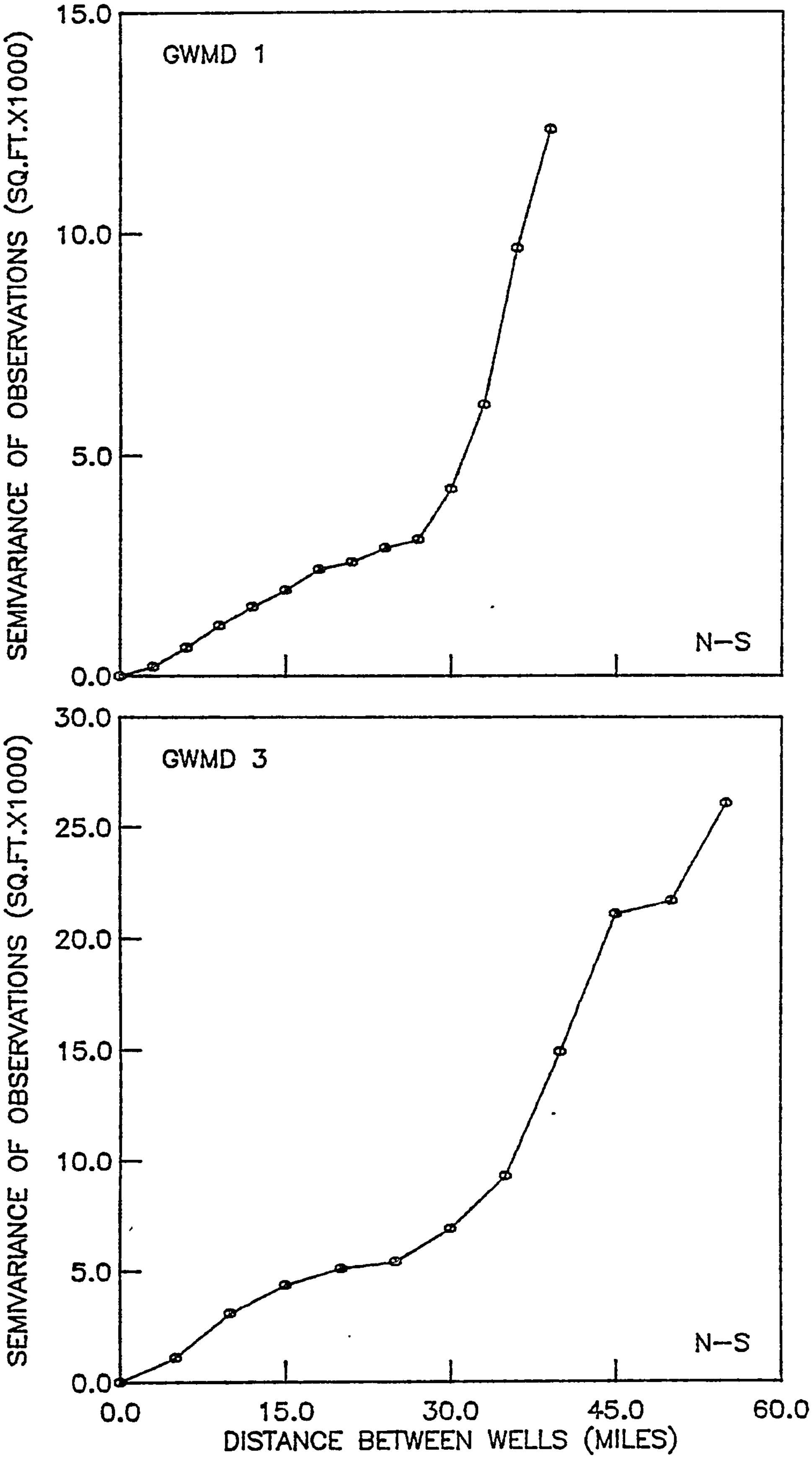

GWMD 1
N–S
SEMIVARIANCE OF OBSERVATIONS (SQ.FT.X1000)
0.0
5.0
10.0
15.0
GWMD 3
N–S
SEMIVARIANCE OF OBSERVATIONS (SQ.FT.X1000)
0.0
5.0
10.0
15.0
20.0
25.0
30.0
0.0
15.0
30.0
45.0
60.0
DISTANCE BETWEEN WELLS (MILES)

Figure 4 Comparison between the semivariogram of the residuals from the drift (o) and the assumed linear semivariogram (x) for the average east-west semivariograms for various GWMDs. The neighborhood size contains four observations in these examples.

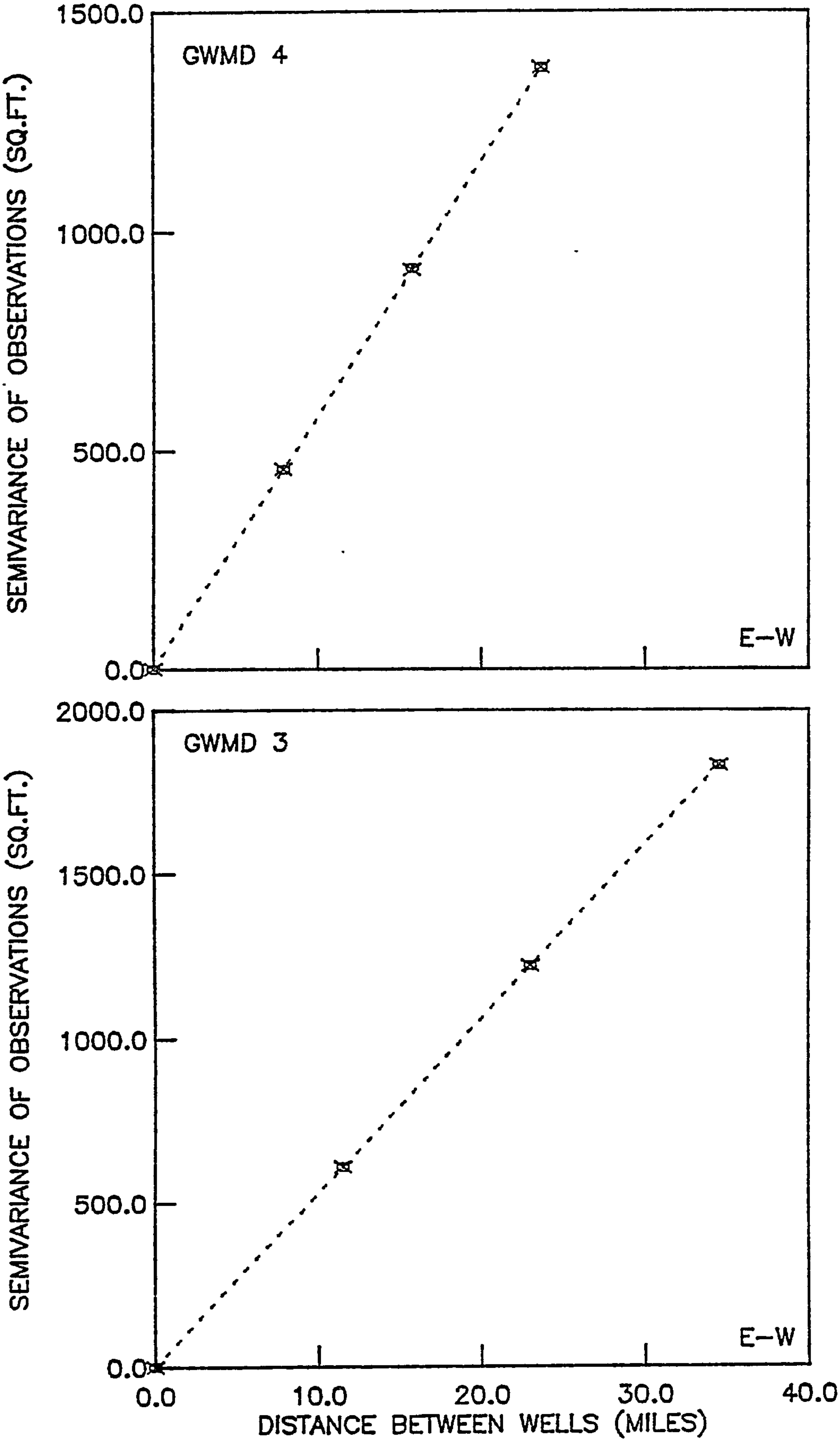
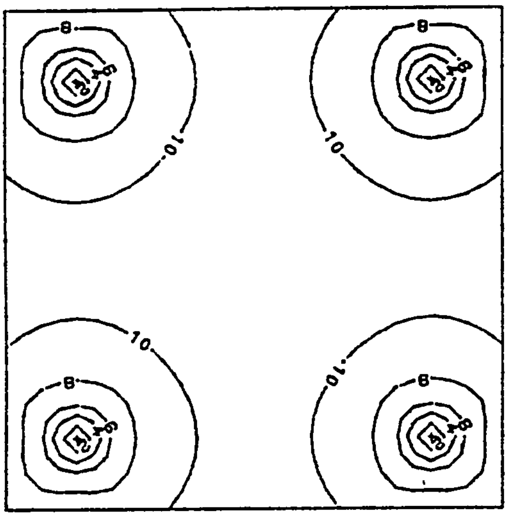
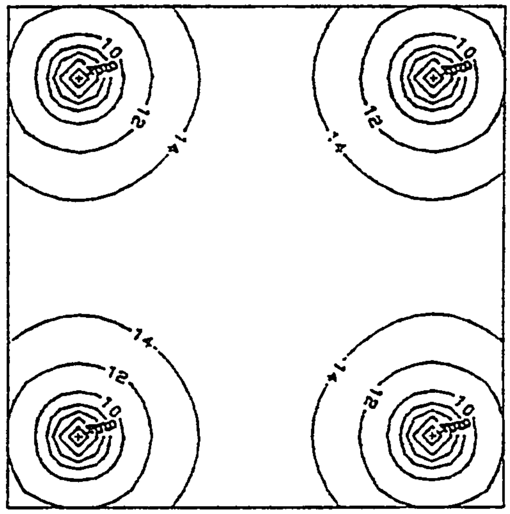

1500.0
GWMD 4
SEMIVARIANCE OF OBSERVATIONS (SQ.FT.)
1000.0
500.0
0.0
E—W
2000.0
GWMD 3
SEMIVARIANCE OF OBSERVATIONS (SQ.FT.)
1500.0
1000.0
500.0
0.0
E—W
0.0
10.0
20.0
30.0
40.0
DISTANCE BETWEEN WELLS (MILES)

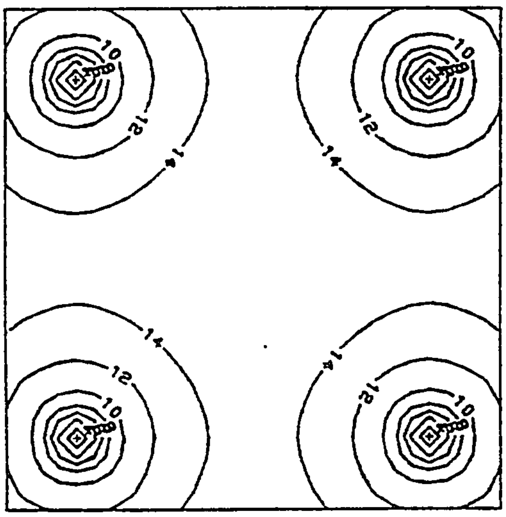
Figure 5 Estimation standard deviation contours (in feet) for various GWMDs assuming a hypothetical network of observation wells spaced four miles apart in a square pattern that repeats indefinitely over the area.



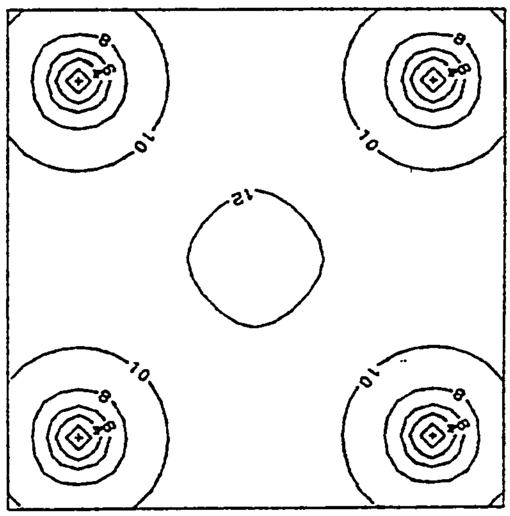
GWMD 1



GWMD 3

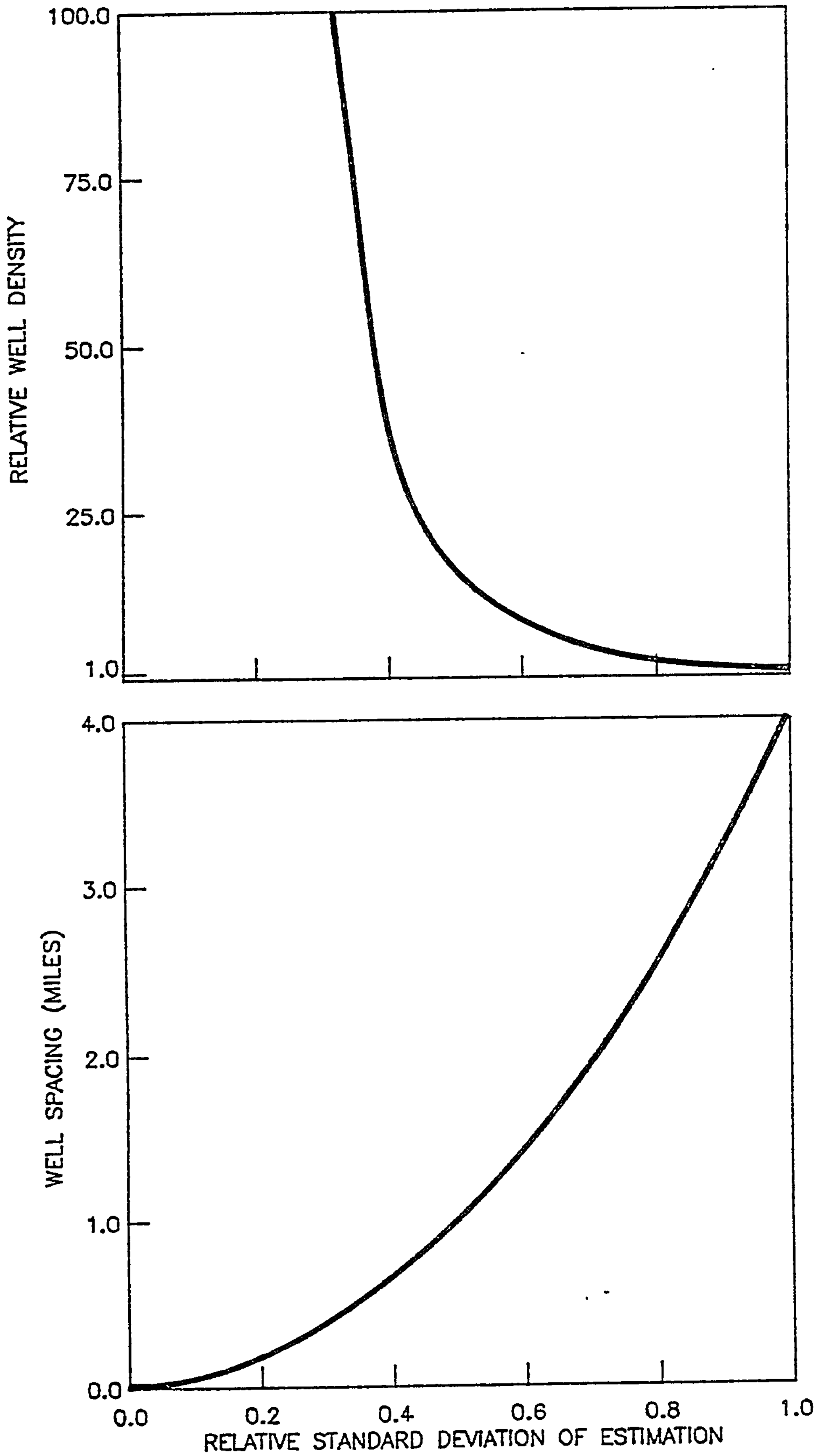


GWMD 4



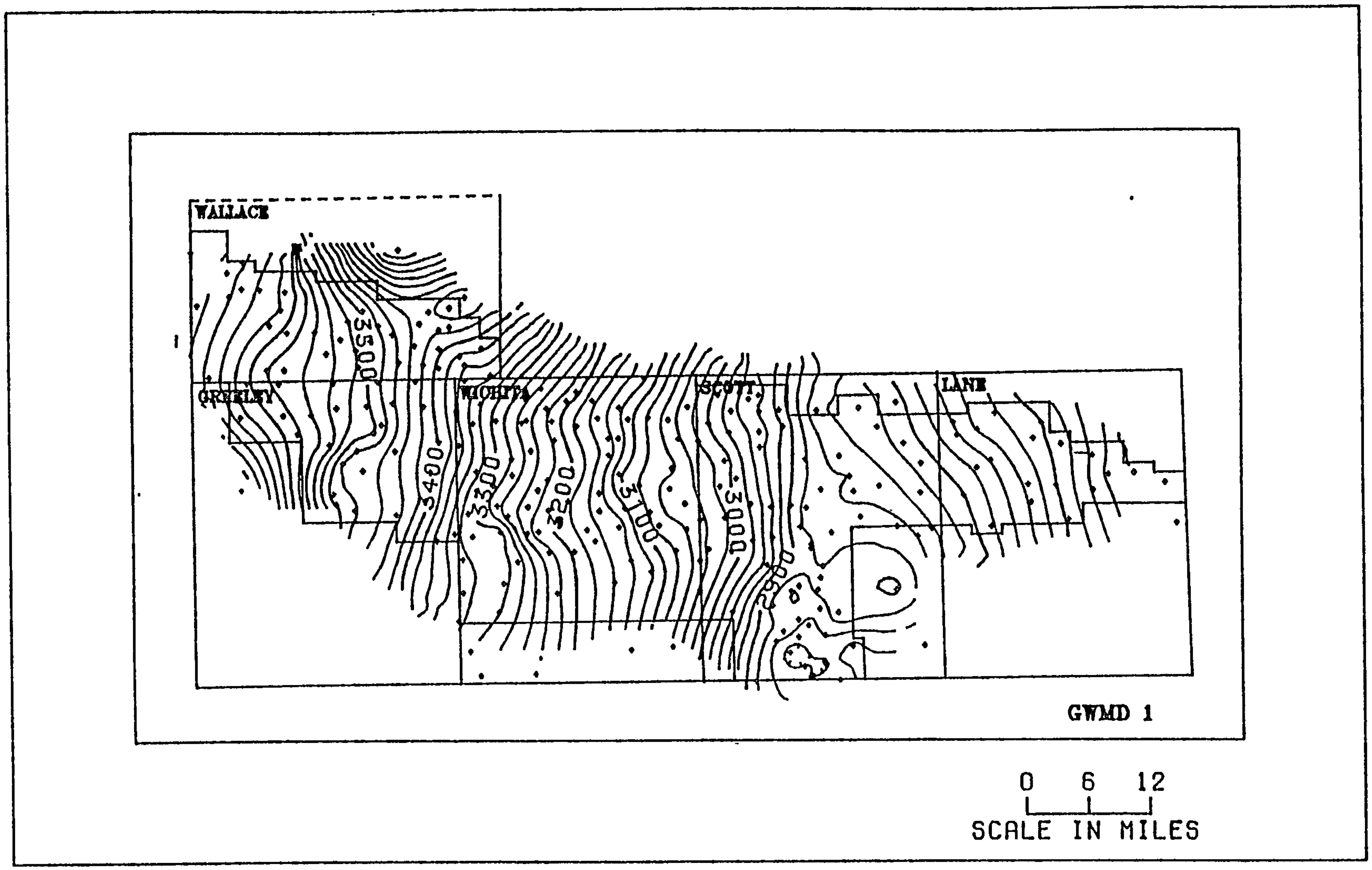
GWMD 5

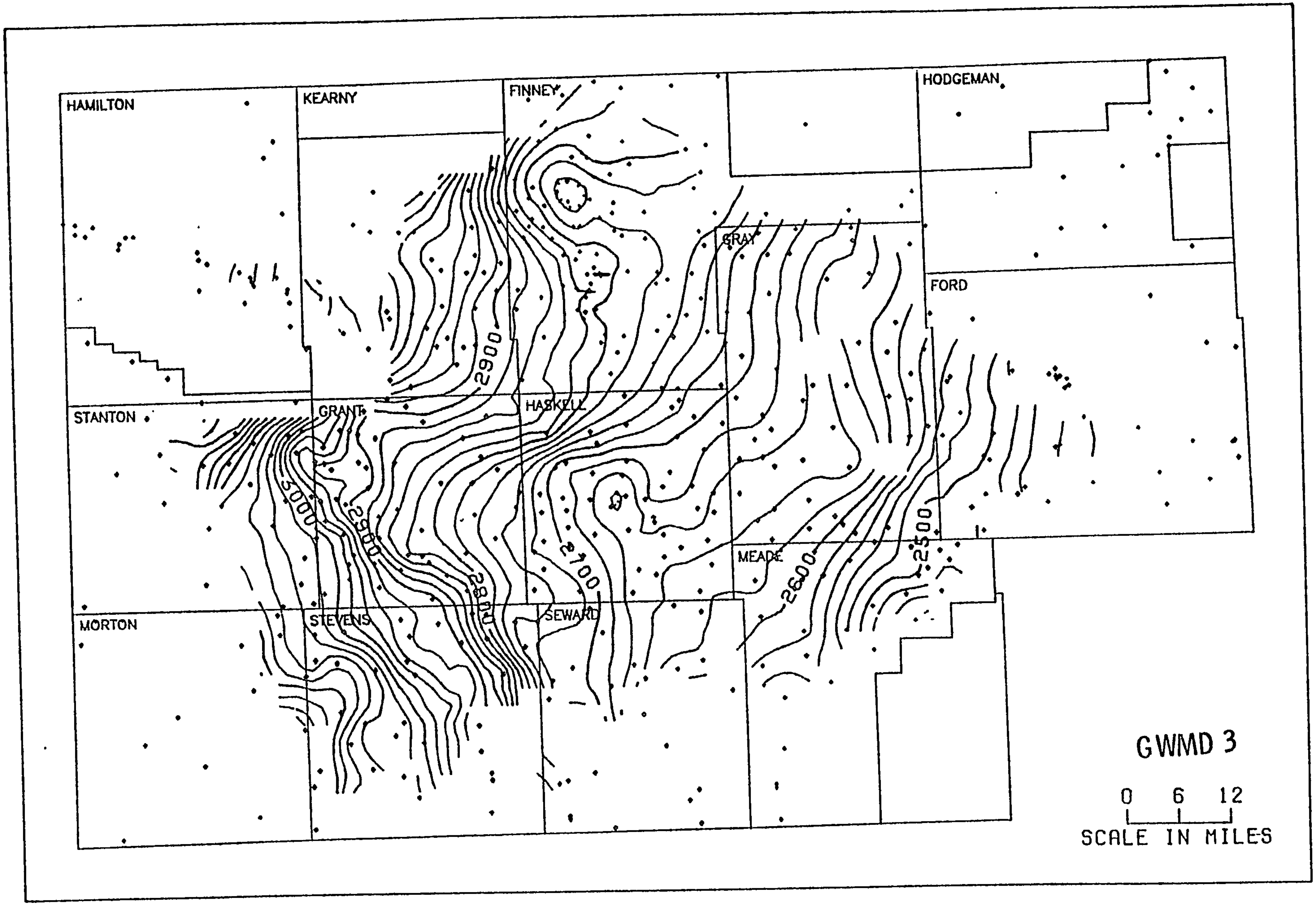
Figure 6 Reduction in well spacing and increase in relative well density that would be required to reduce the estimation error of the water-table elevation for a four-mile well spacing, shown in Figure 5, to any desired value for a linear semivariogram.



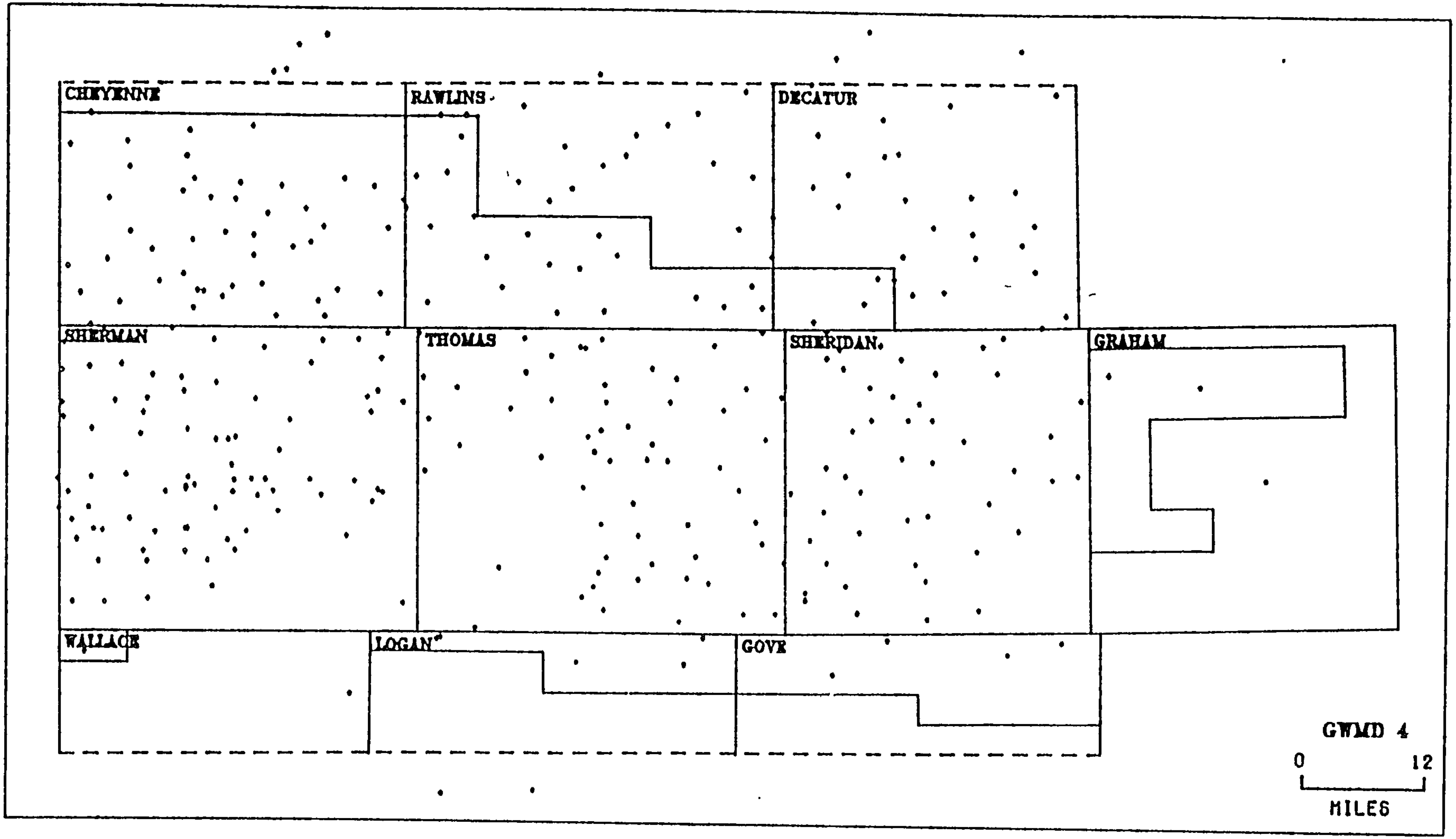
100.0
75.0
50.0
25.0
1.0
RELATIVE WELL DENSITY
4.0
3.0
2.0
1.0
0.0
WELL SPACING (MILES)
0.0
0.2
0.4
0.6
0.8
1.0
RELATIVE STANDARD DEVIATION OF ESTIMATION

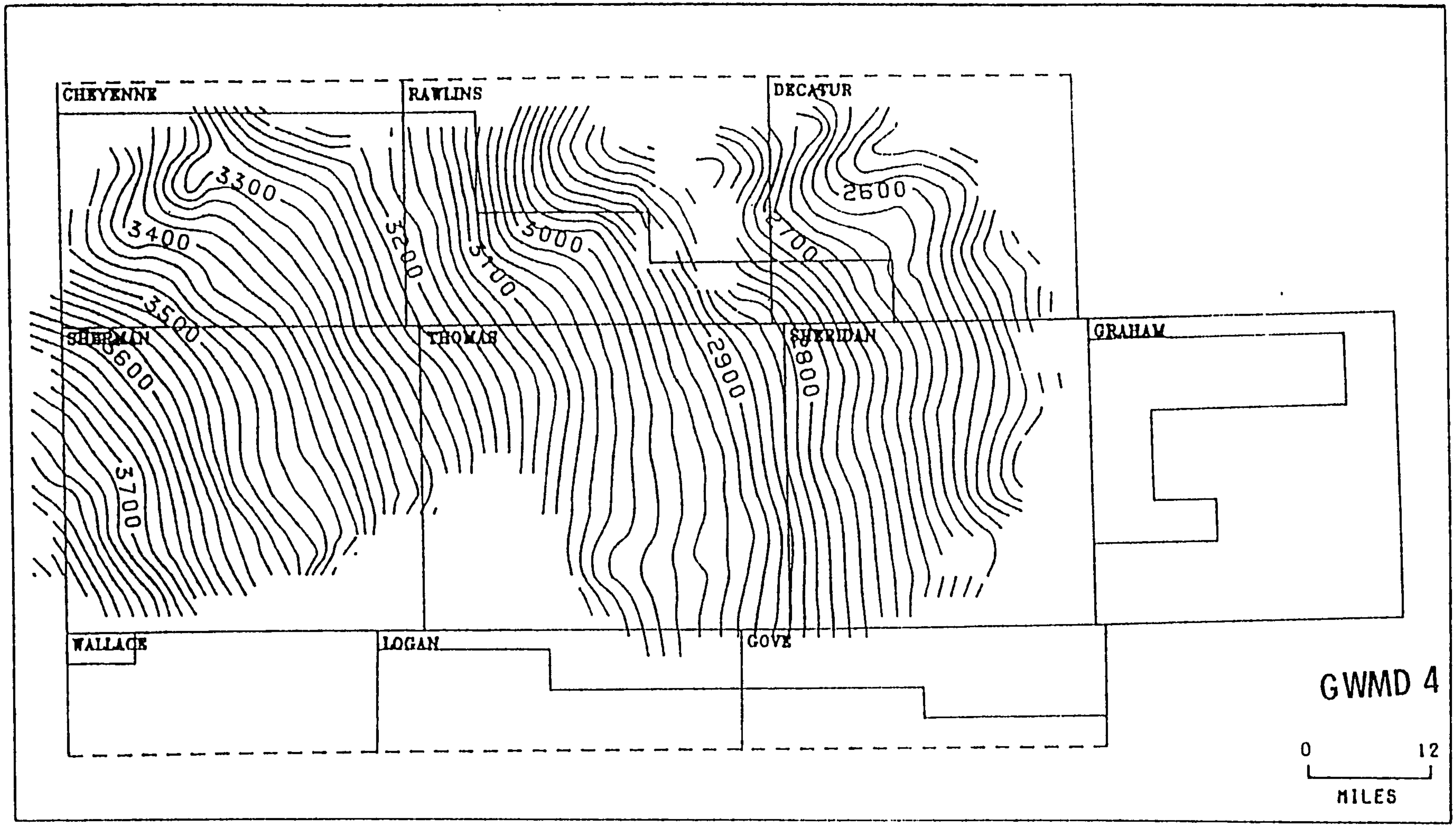
Figure 7 January 1979 or1980 water-table maps based on the existing network for various GWMDs. Contours are in feet.


WALLACE
GREELEY
WICHITA
SCOTT
LANE
3500
3400
3300
3200
3100
3000
2900
GWMD 1
0 6 12
SCALE IN MILES



HAMILTON
KEARNY
FINNEY
HODGEMAN
GRAY
FORD
STANTON
GRANT
HASKELL
MORTON
STEVENS
SEWARD
MEADE
2900
3000
2900
2800
2700
2600
2500
GWMD 3
0 6 12
SCALE IN MILES


CHEYENNE
RAWLINS
DECATUR
SHERMAN
THOMAS
SHERIDAN
GRAHAM
WALLACE
LOGAN
GOVE
GWMD 4
0
12
MILES


CHEYENNE
RAWLINS
DECATUR
SHERMAN
THOMAS
SHERIDAN
GRAHAM
WALLACE
LOGAN
GOVE
3300
3400
3500
3600
3700
3200
3100
3000
2900
2800
2700
2600
GWMD 4
0
12
MILES

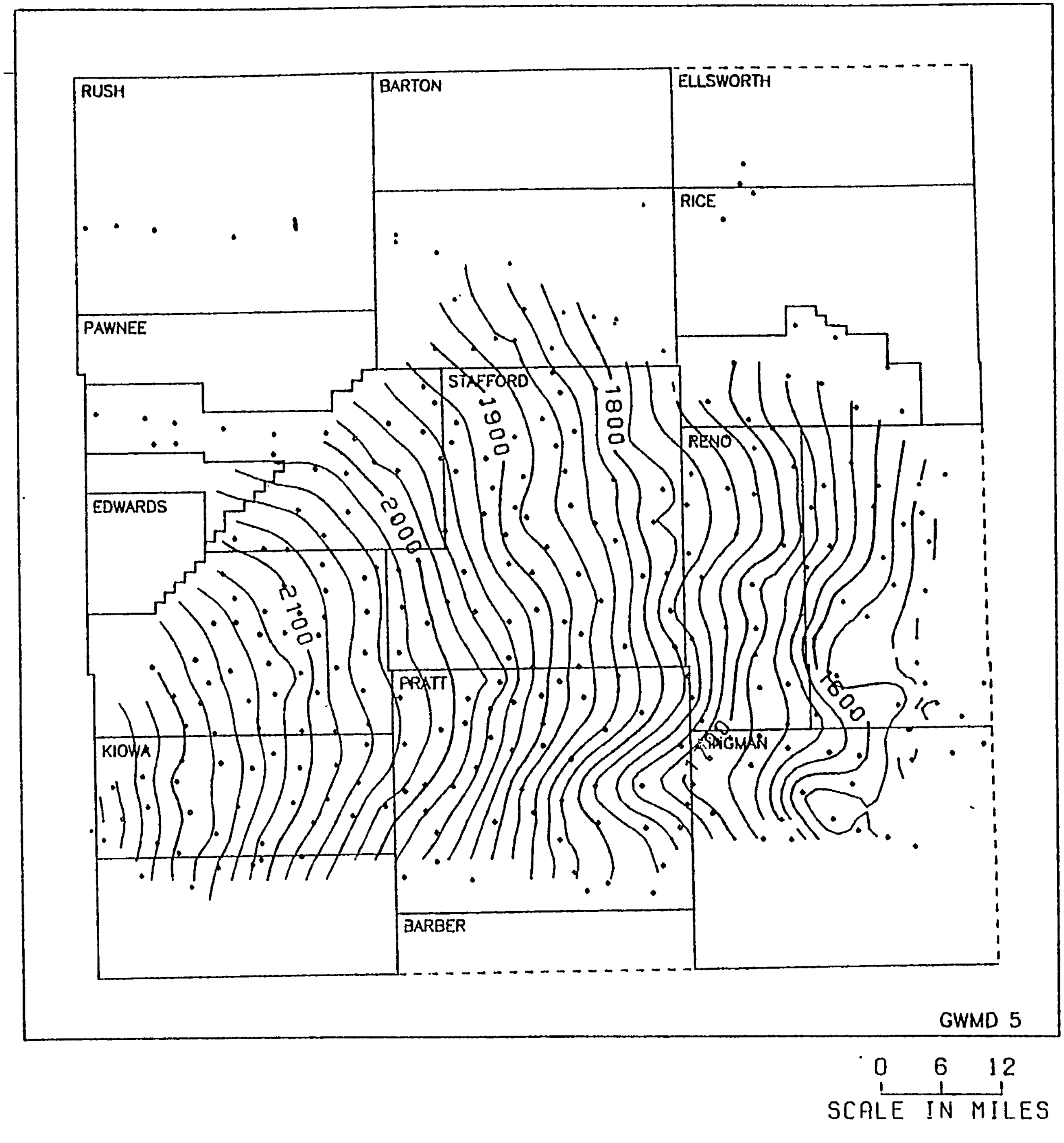
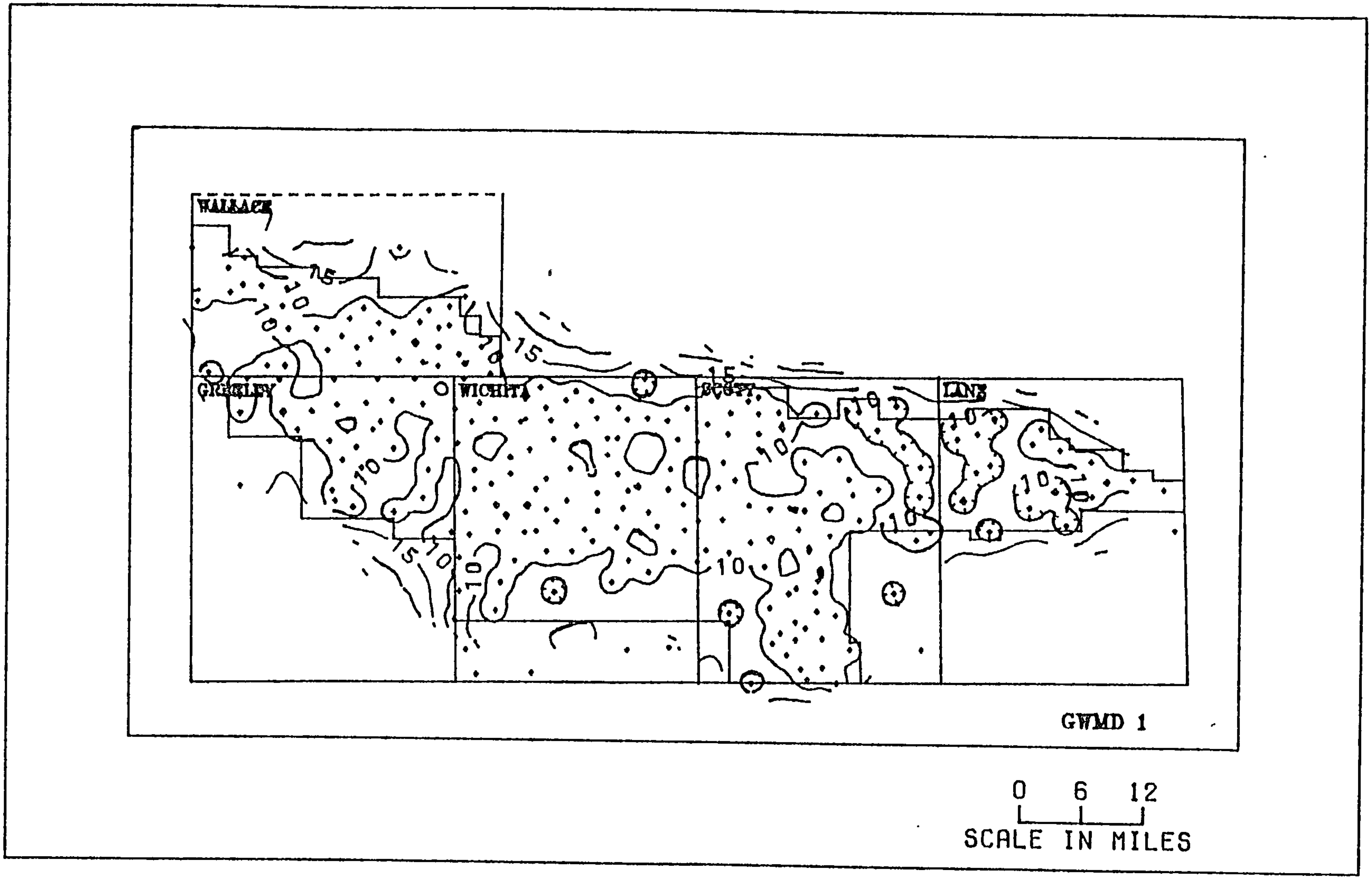
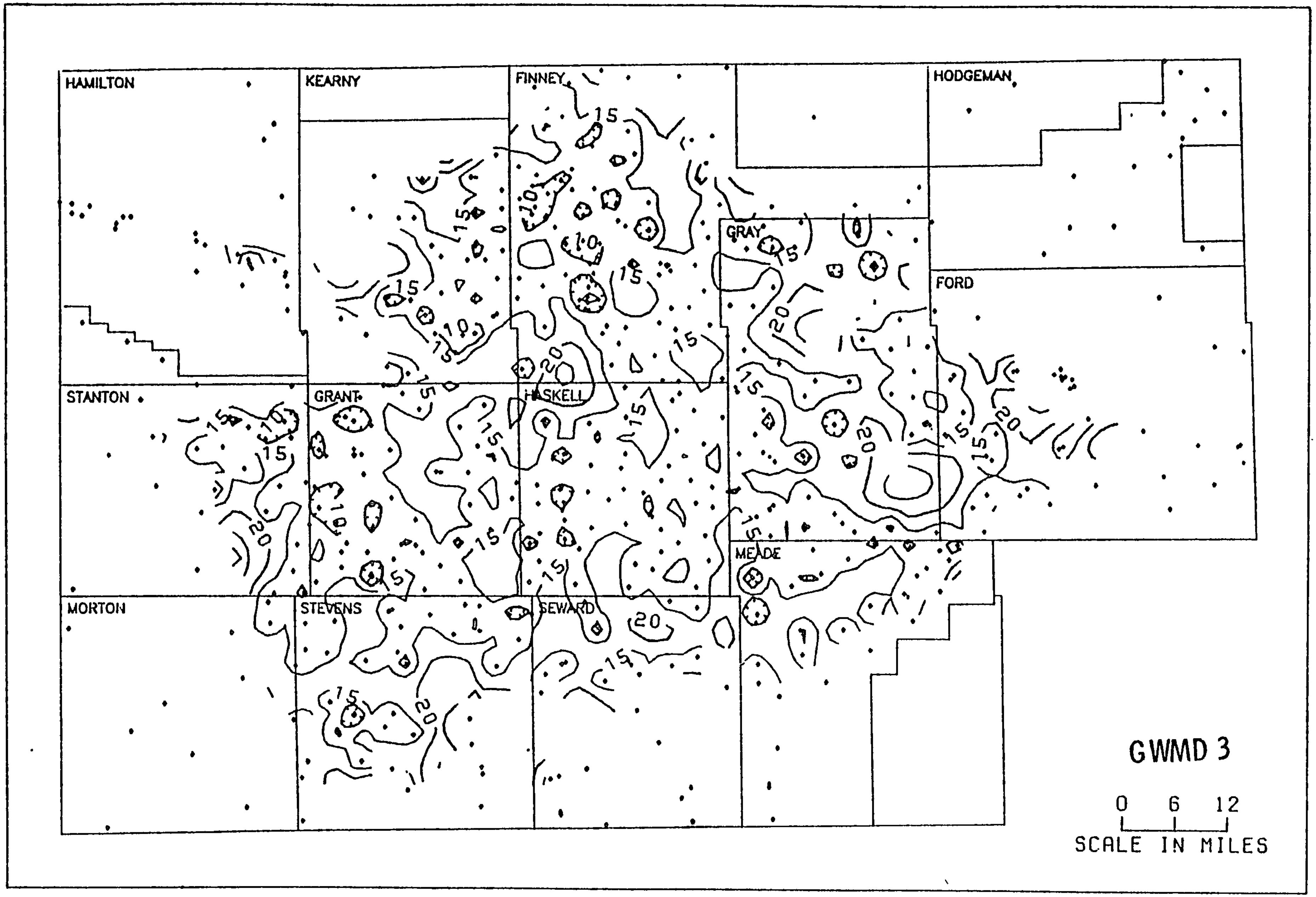
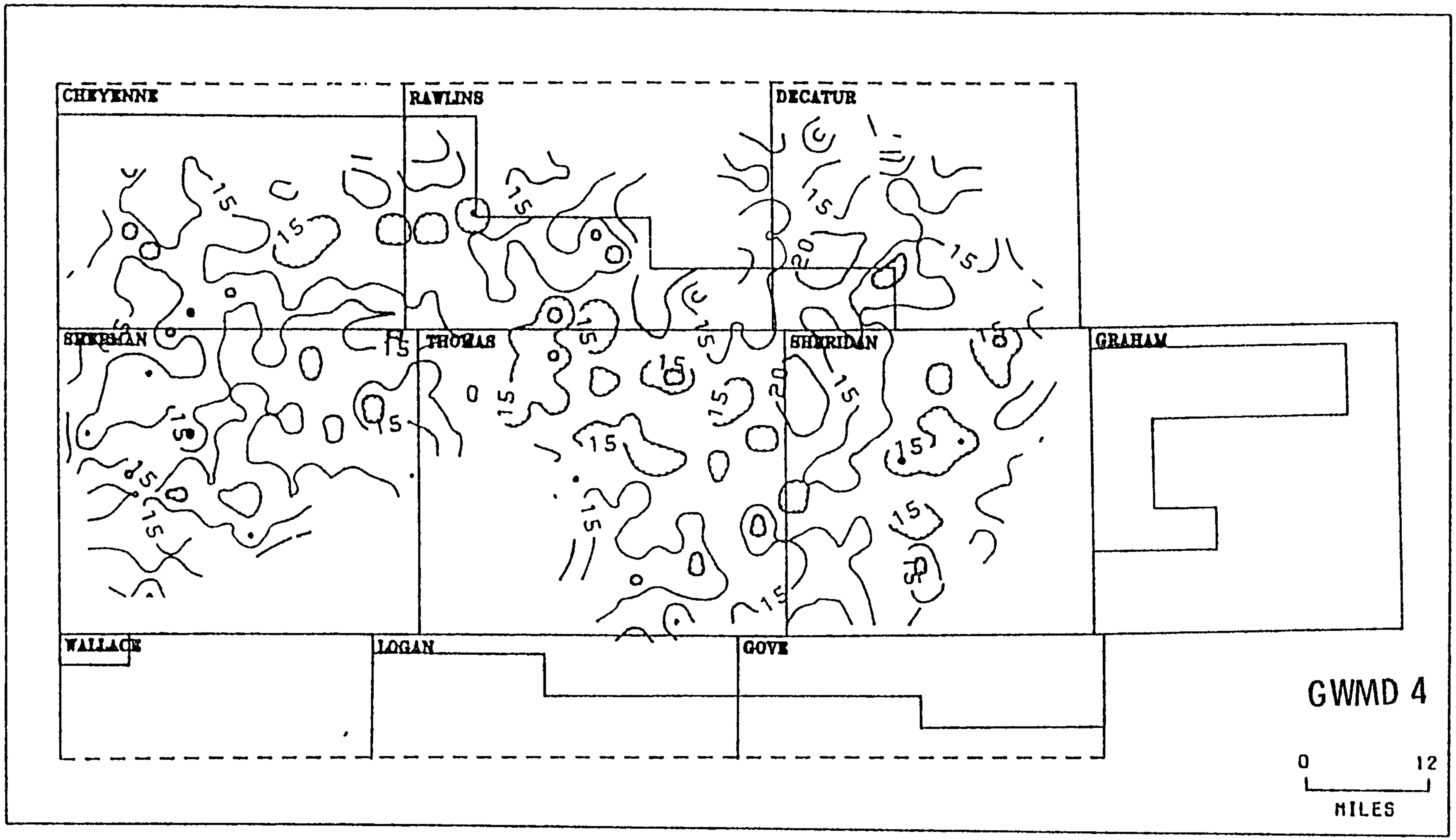

RUSH
BARTON
ELLSWORTH
RICE
PAWNEE
STAFFORD
RENO
EDWARDS
KIOWA
PRATT
KINGMAN
BARBER
1900
1800
2000
2100
1600
GWMD 5
0 6 12
SCALE IN MILES

Figure 8 January 1979 or 1980 estimation errors given as standard deviations of estimation for the water-table maps shown in Figure 7. Contours are in feet.


WALLACE
GREELEY
WICHITA
SCOTT
LANE
15
10
GWMD 1
0 6 12
SCALE IN MILES


HAMILTON
KEARNY
FINNEY
HODGEMAN
GRAY
FORD
STANTON
GRANT
HASKELL
MEADE
MORTON
STEVENS
SEWARD
GWMD 3
0 6 12
SCALE IN MILES


CHEYENNE
RAWLINS
DECATUR
SHERMAN
THOMAS
SHERIDAN
GRAHAM
WALLACE
LOGAN
GOVE
GWMD 4
0
12
MILES

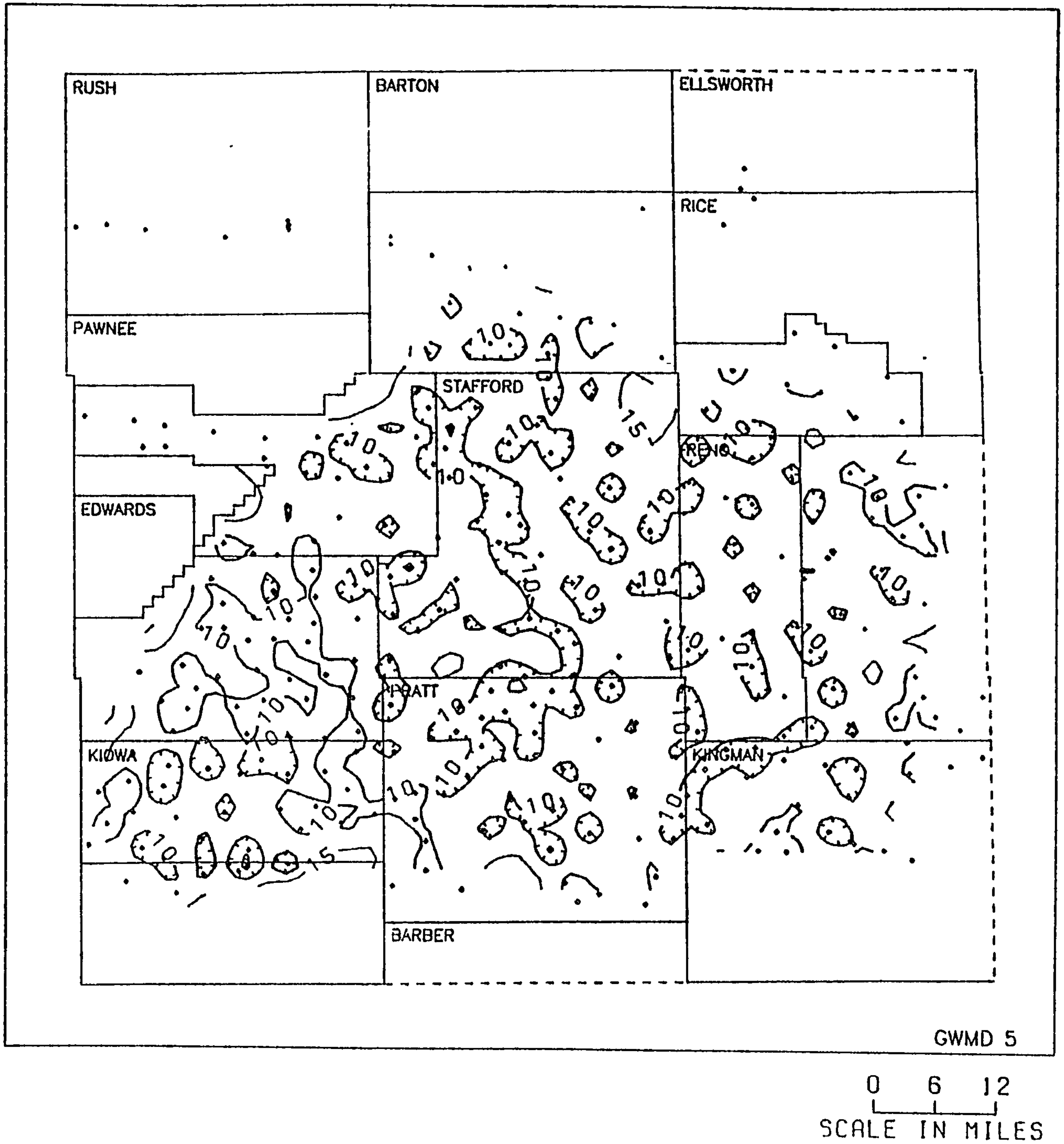
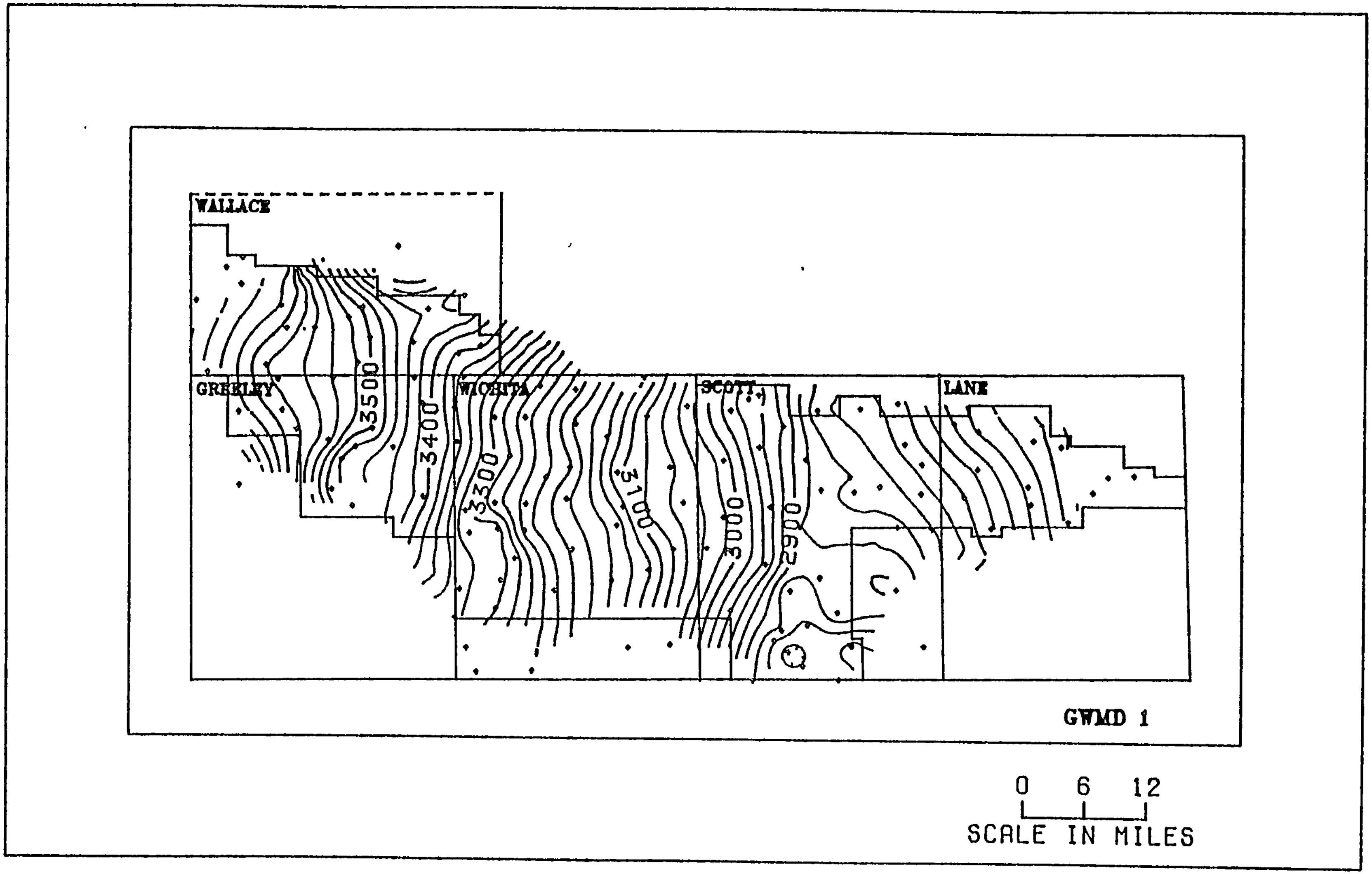
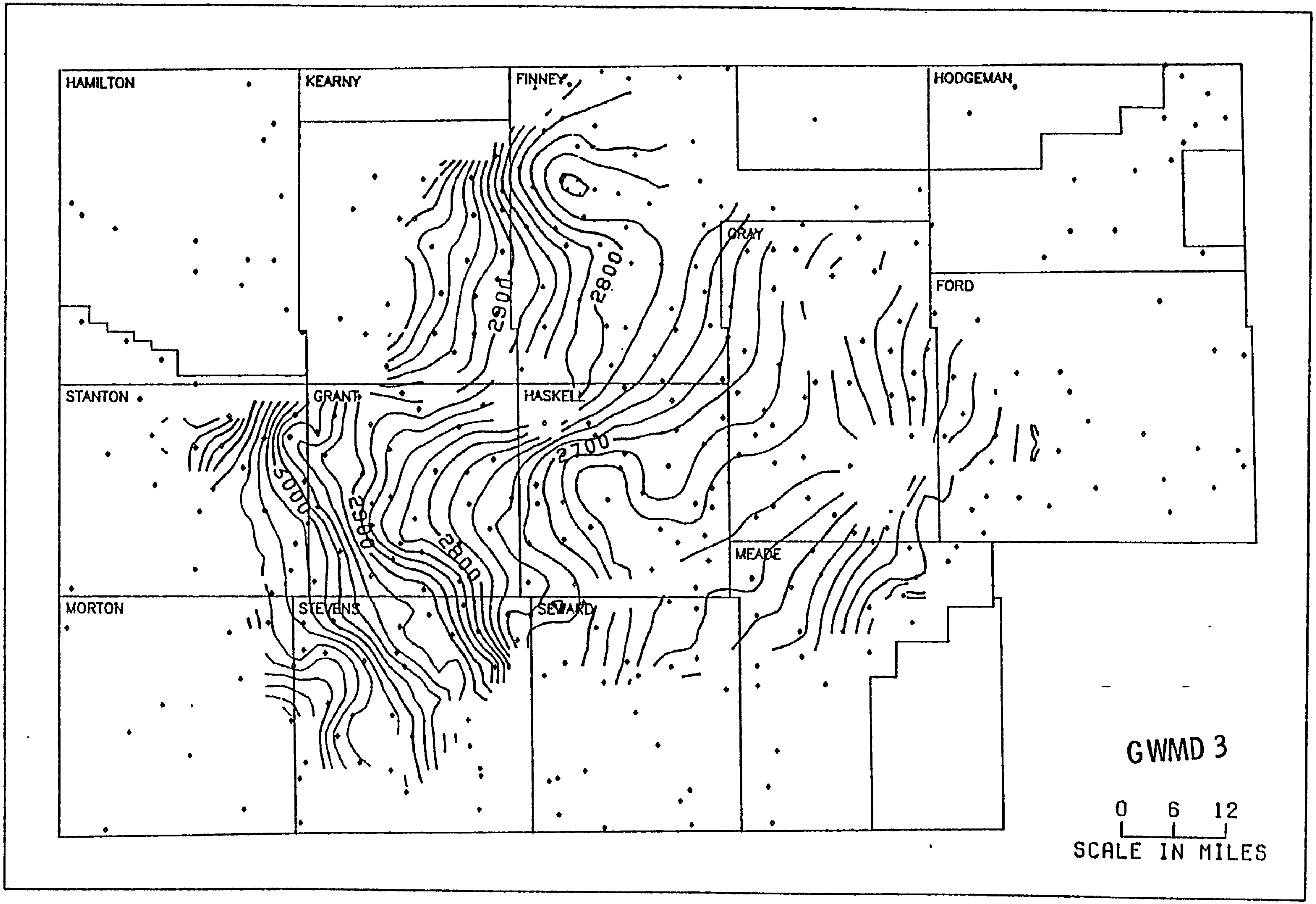

RUSH
BARTON
ELLSWORTH
RICE
PAWNEE
STAFFORD
RENO
EDWARDS
PRATT
KIOWA
KINGMAN
BARBER
GWMD 5
0 6 12
SCALE IN MILES

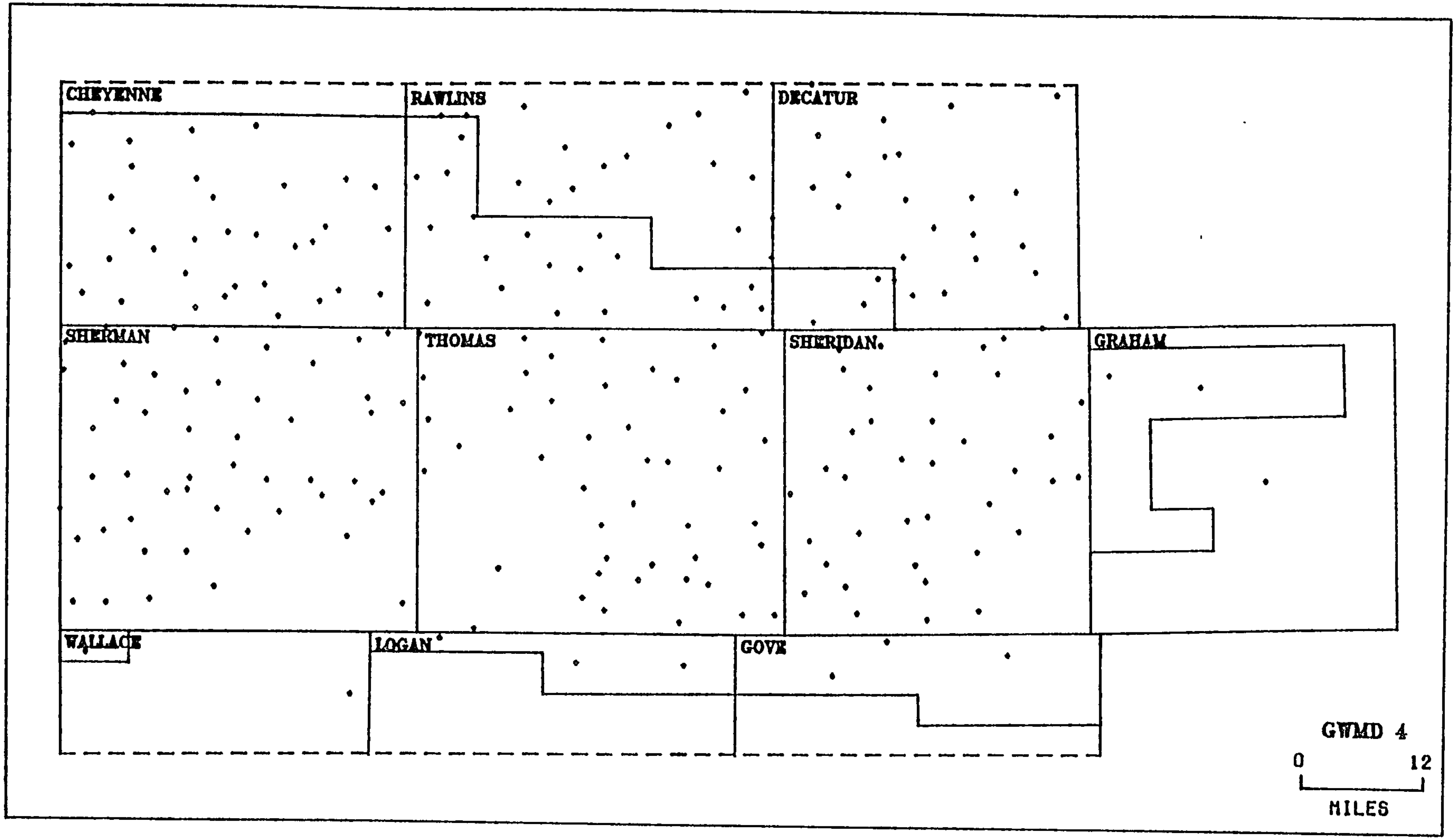
Figure 9 January 1979 or 1980 water-table maps based on a reduced network for the same GWMDs shown in Figure 7. Contours are in feet.

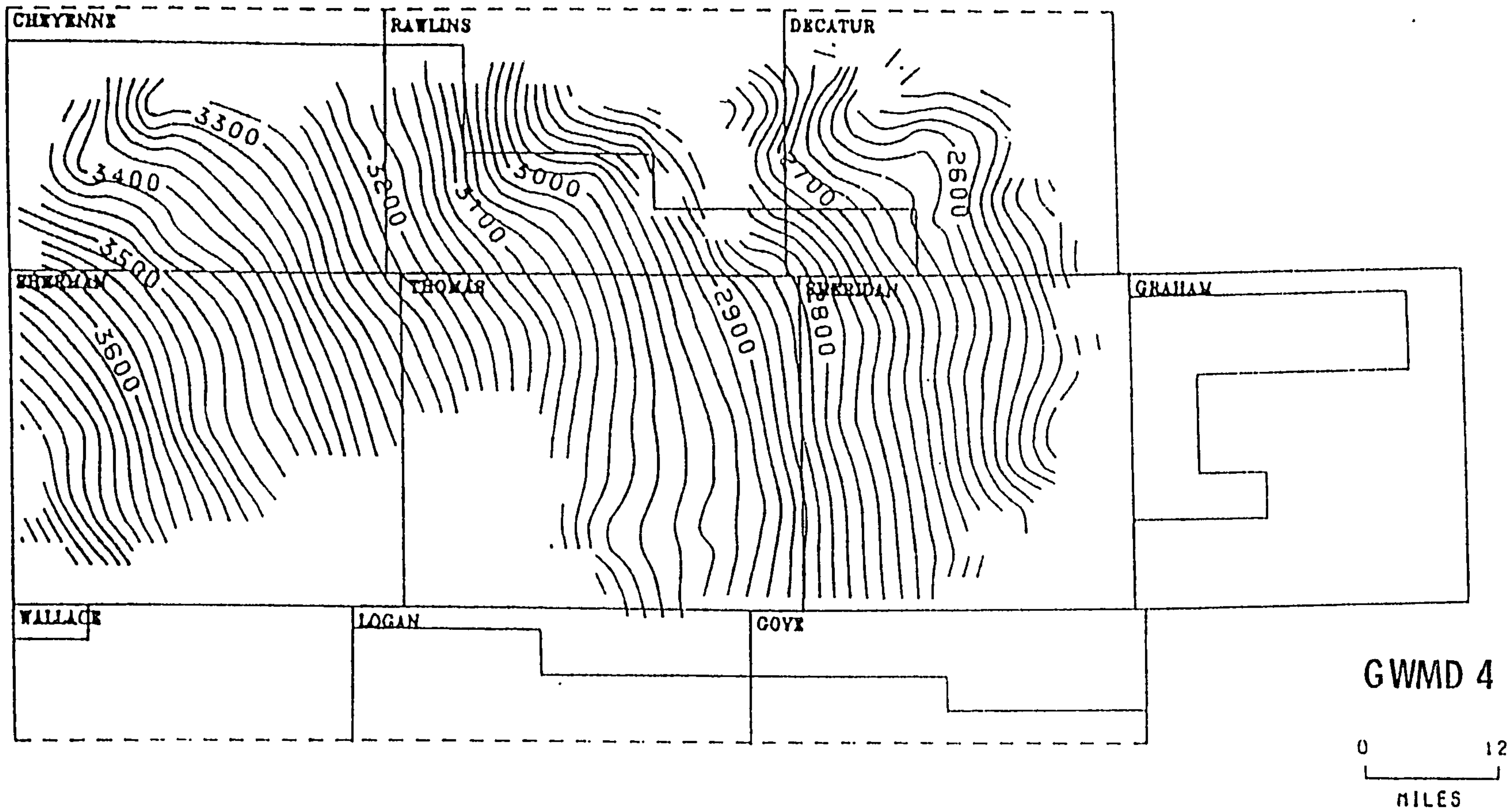


WALLACE
GREELEY
WICHITA
SCOTT
LANE
3500
3400
3300
3100
3000
2900
GWMD 1
0 6 12
SCALE IN MILES



HAMILTON
KEARNY
FINNEY
HODGEMAN
GRAY
FORD
STANTON
GRANT
HASKELL
MEADE
MORTON
STEVENS
SEWARD
3000
2900
2800
2700
GWMD 3
0 6 12
SCALE IN MILES


CHEYENNE
RAWLINS
DECATUR
SHERMAN
THOMAS
SHERIDAN
GRAHAM
WALLACE
LOGAN
GOVE
GWMD 4
0
12
MILES


CHEYENNE
RAWLINS
DECATUR
SHERMAN
THOMAS
SHERIDAN
GRAHAM
WALLACE
LOGAN
GOVE
3300
3400
3500
3600
3200
3100
3000
2900
2800
2700
2600
GWMD 4
0
12
MILES

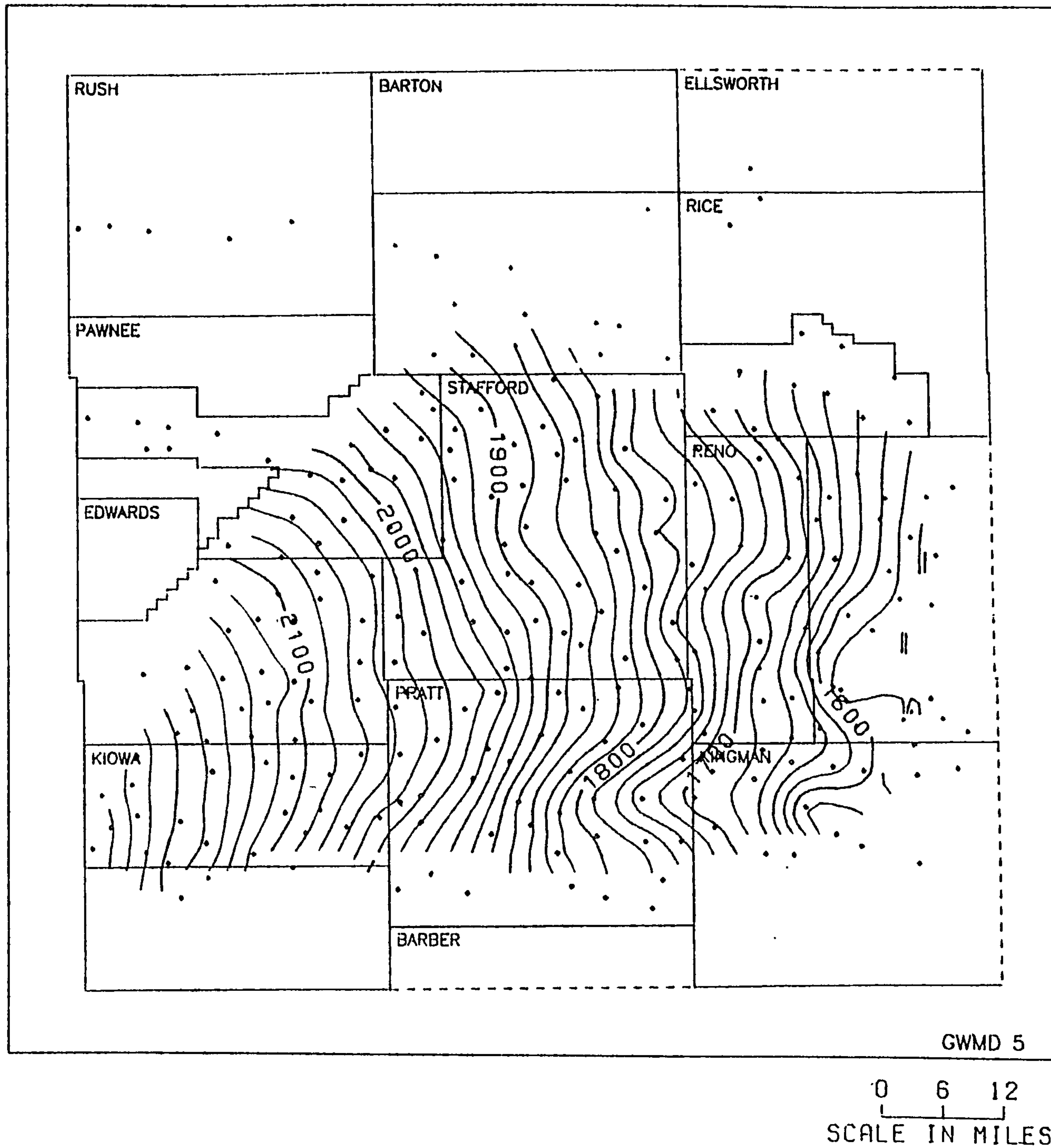
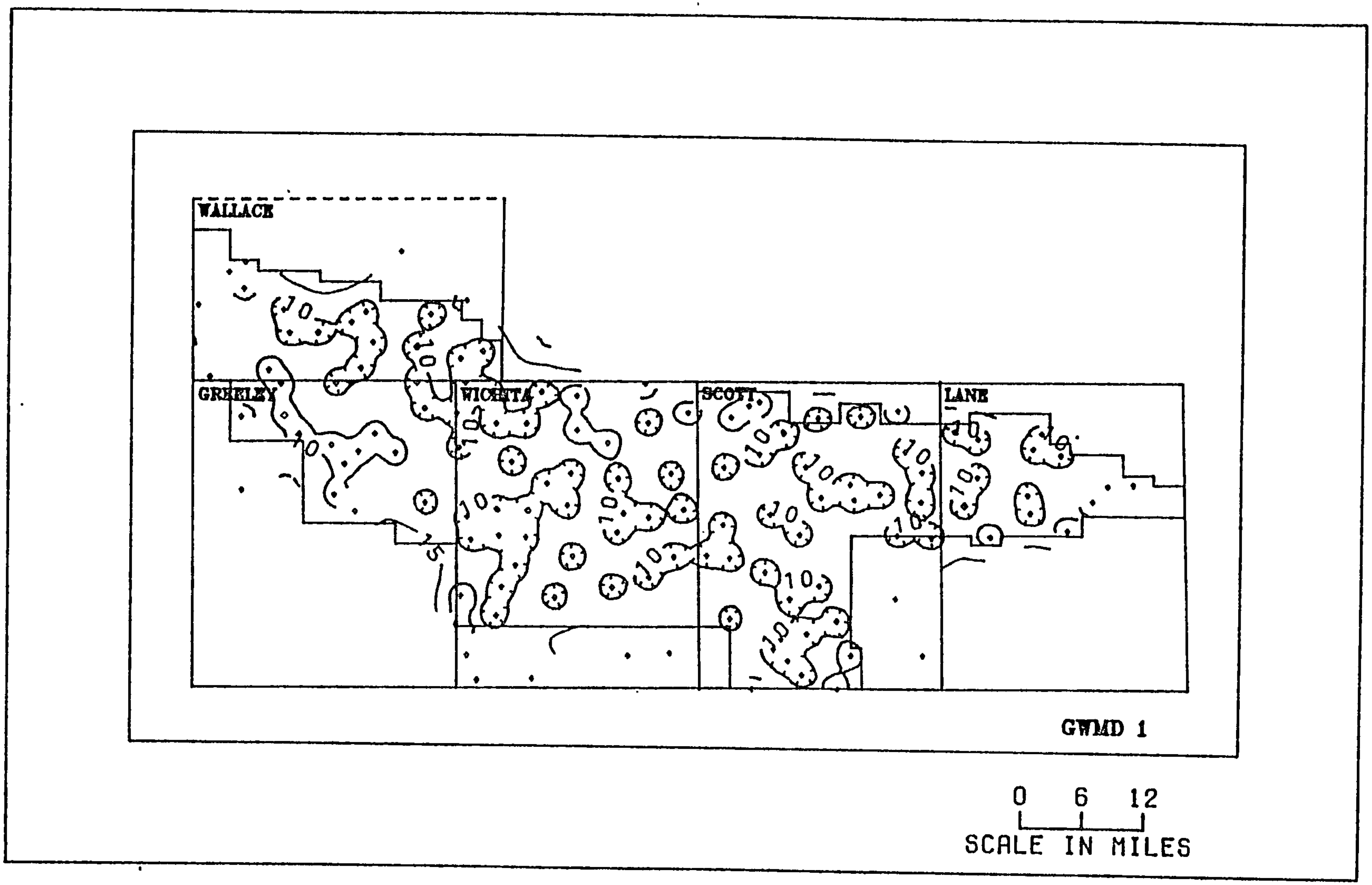
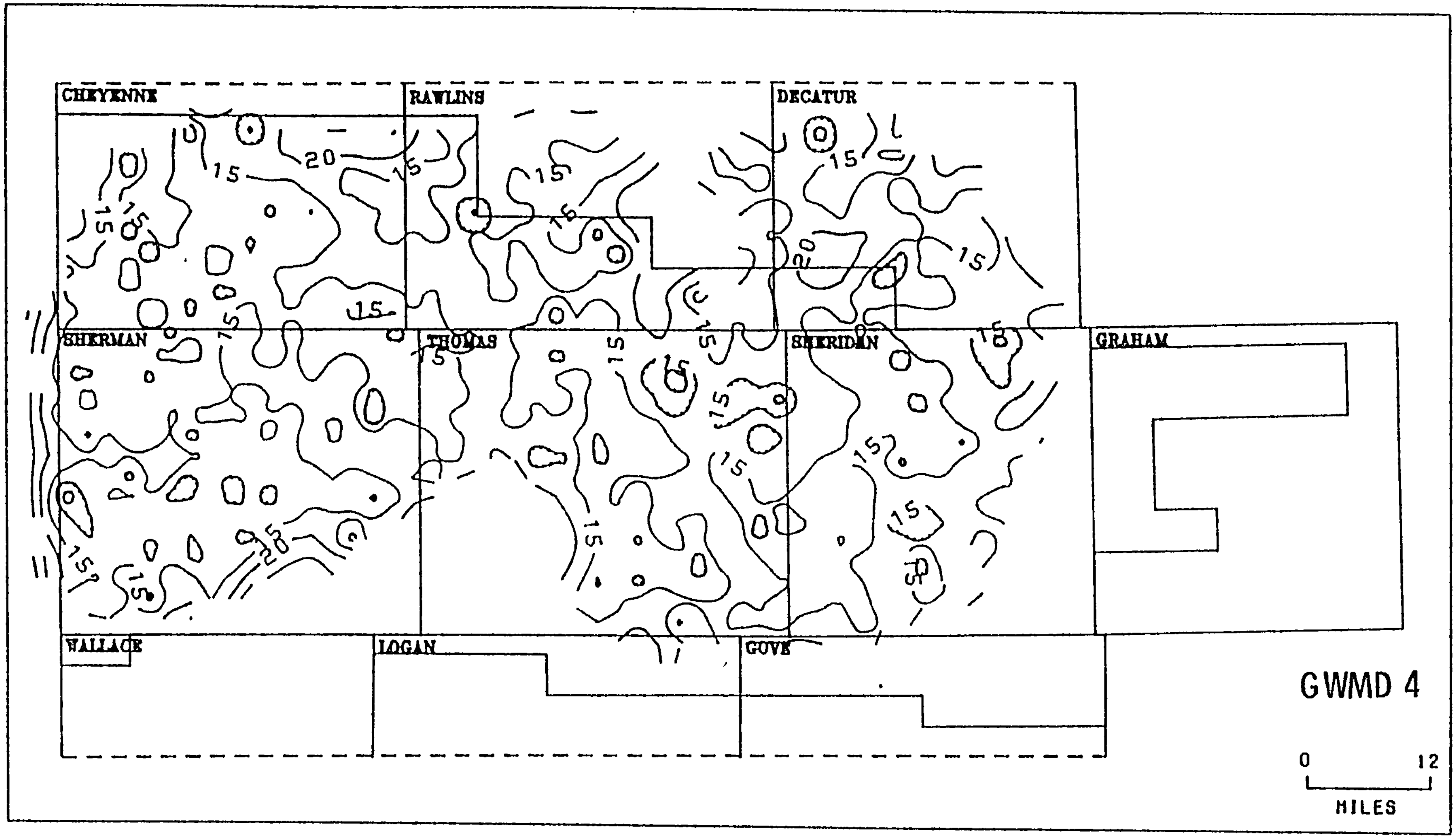
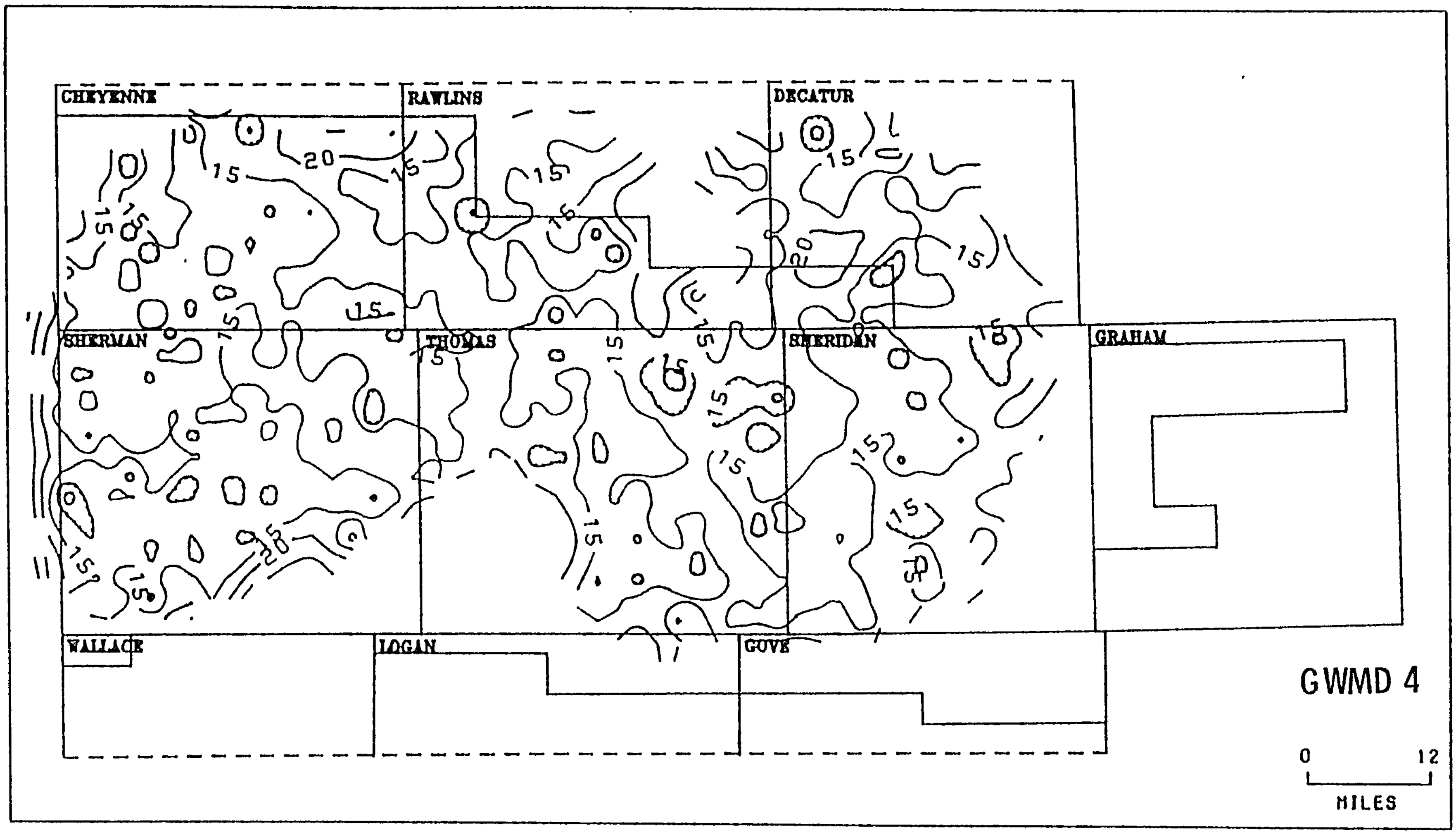

RUSH
BARTON
ELLSWORTH
RICE
PAWNEE
STAFFORD
RENO
EDWARDS
PRATT
KIOWA
KINGMAN
BARBER
1900
2000
2100
1800
1800
1700
1800
GWMD 5
0 6 12
SCALE IN MILES

Figure 10 January 1979 or 1980 estimation errors given as standard deviations of estimation for the water-table maps shown in Figure 9. Contours are in feet.

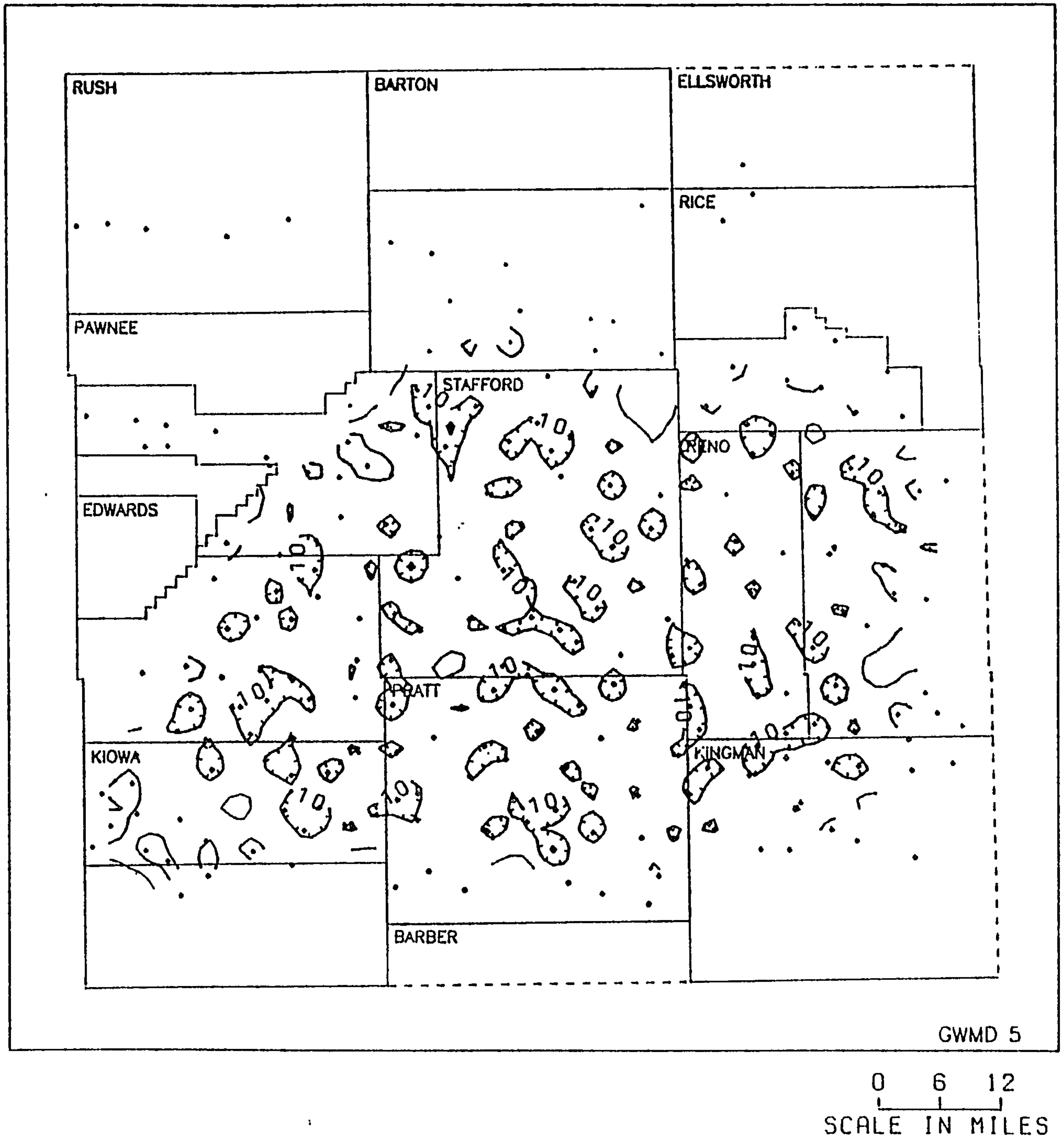

WALLACE
GREELEY
WICHITA
SCOTT
LANE
10
15
GWMD 1
0 6 12
SCALE IN MILES

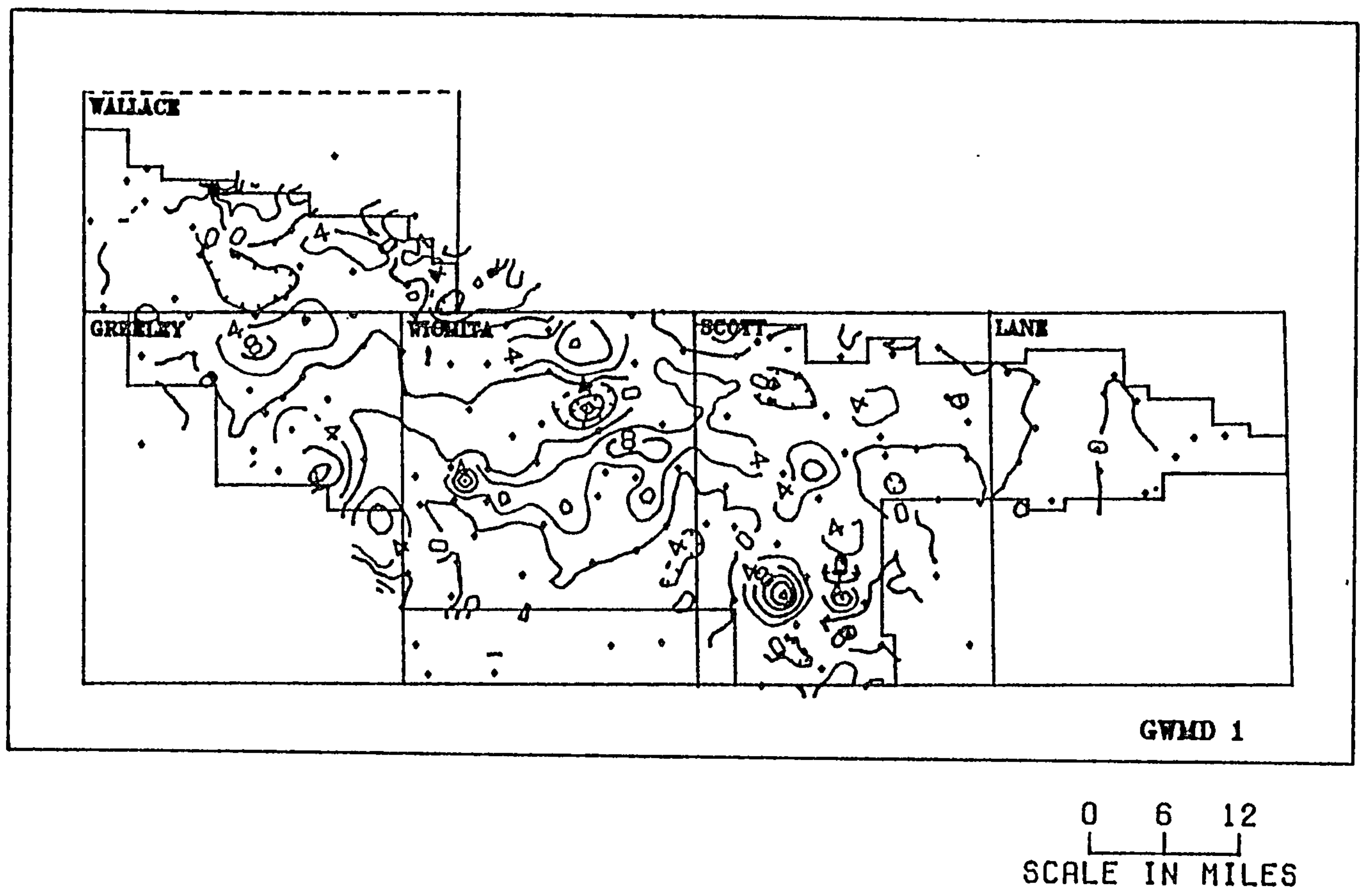


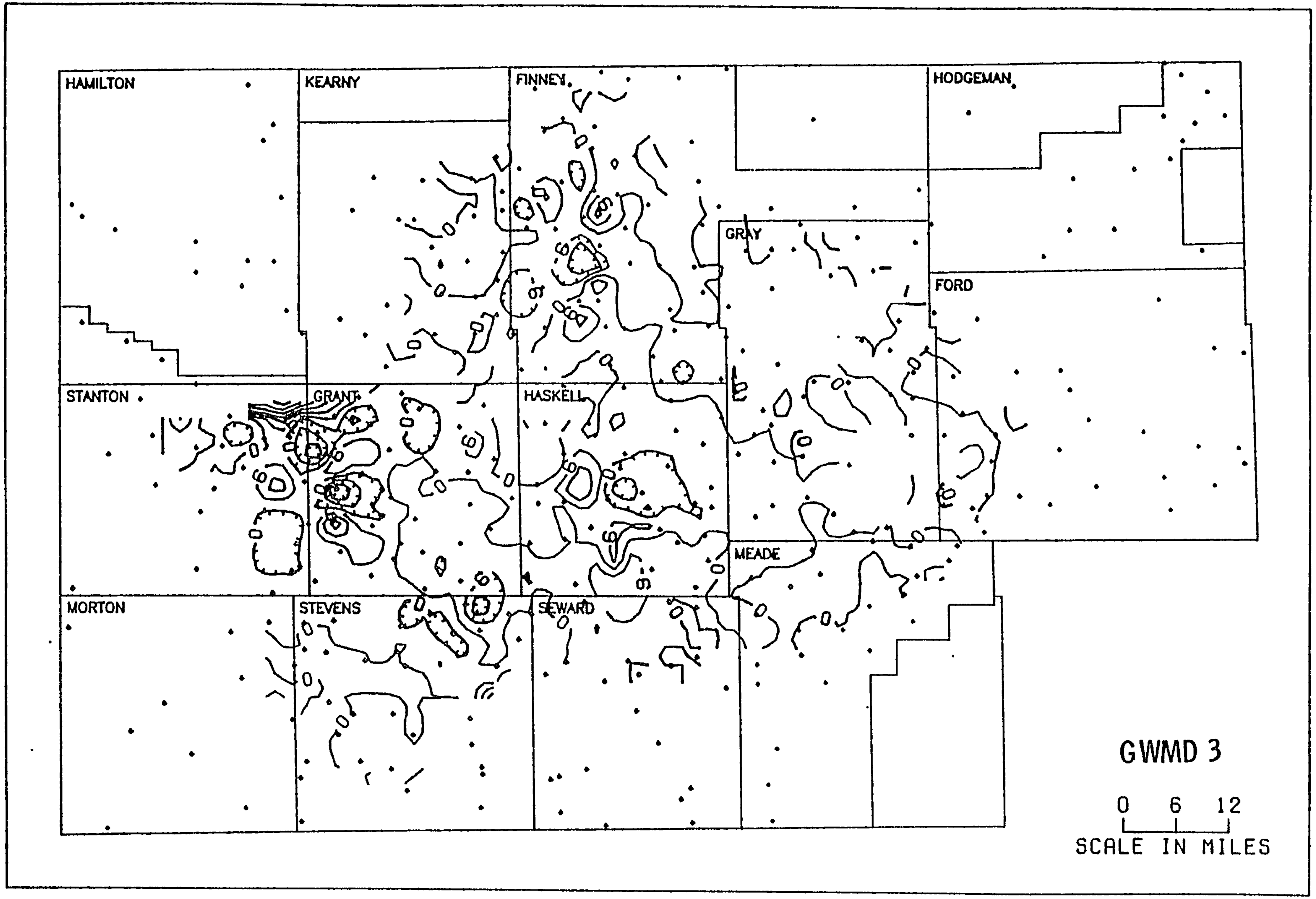
CHEYENNE
RAWLINS
DECATUR
SHERMAN
THOMAS
SHERIDAN
GRAHAM
WALLACE
LOGAN
GOVE
GWMD 4
0
12
MILES

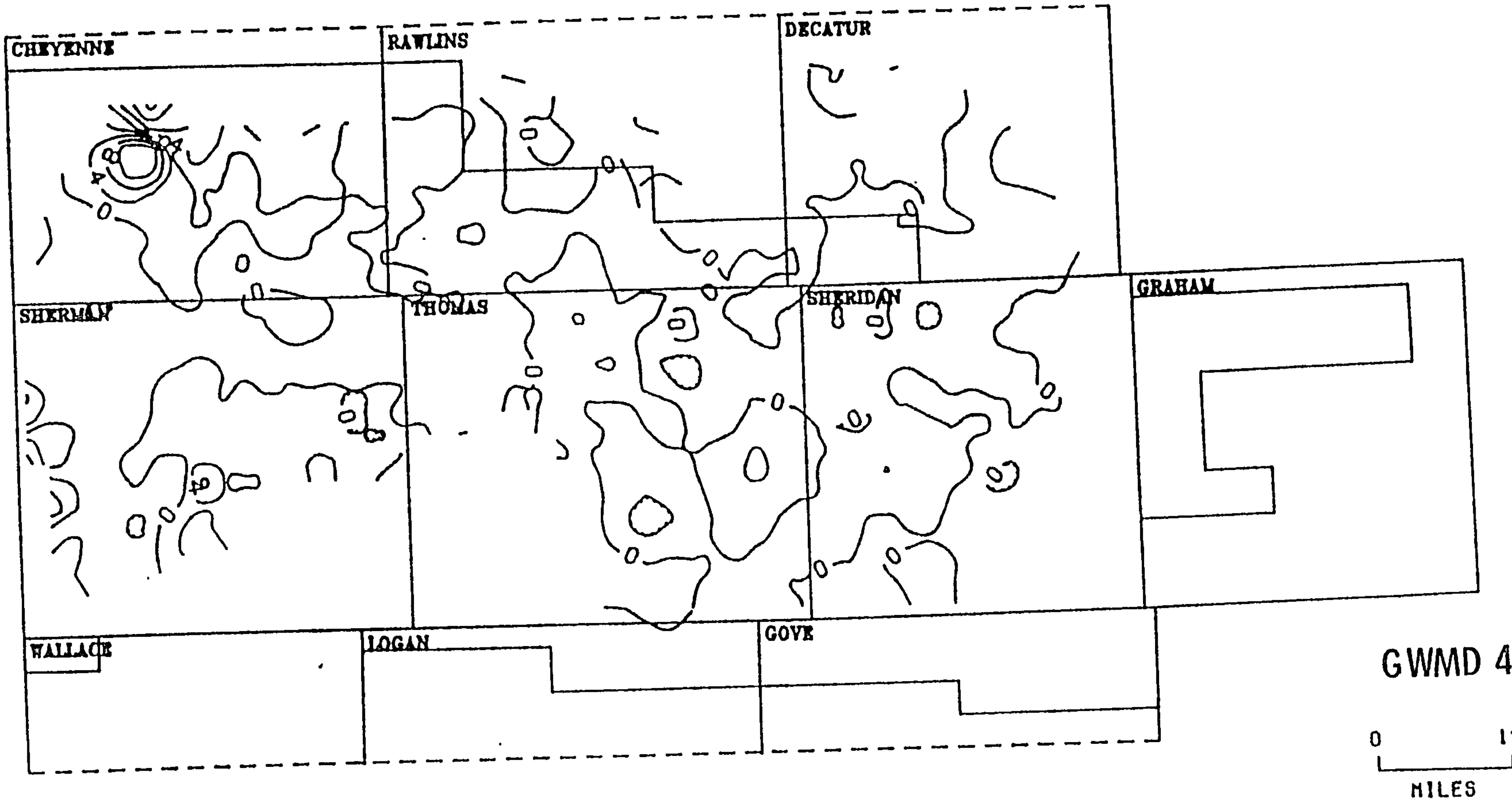


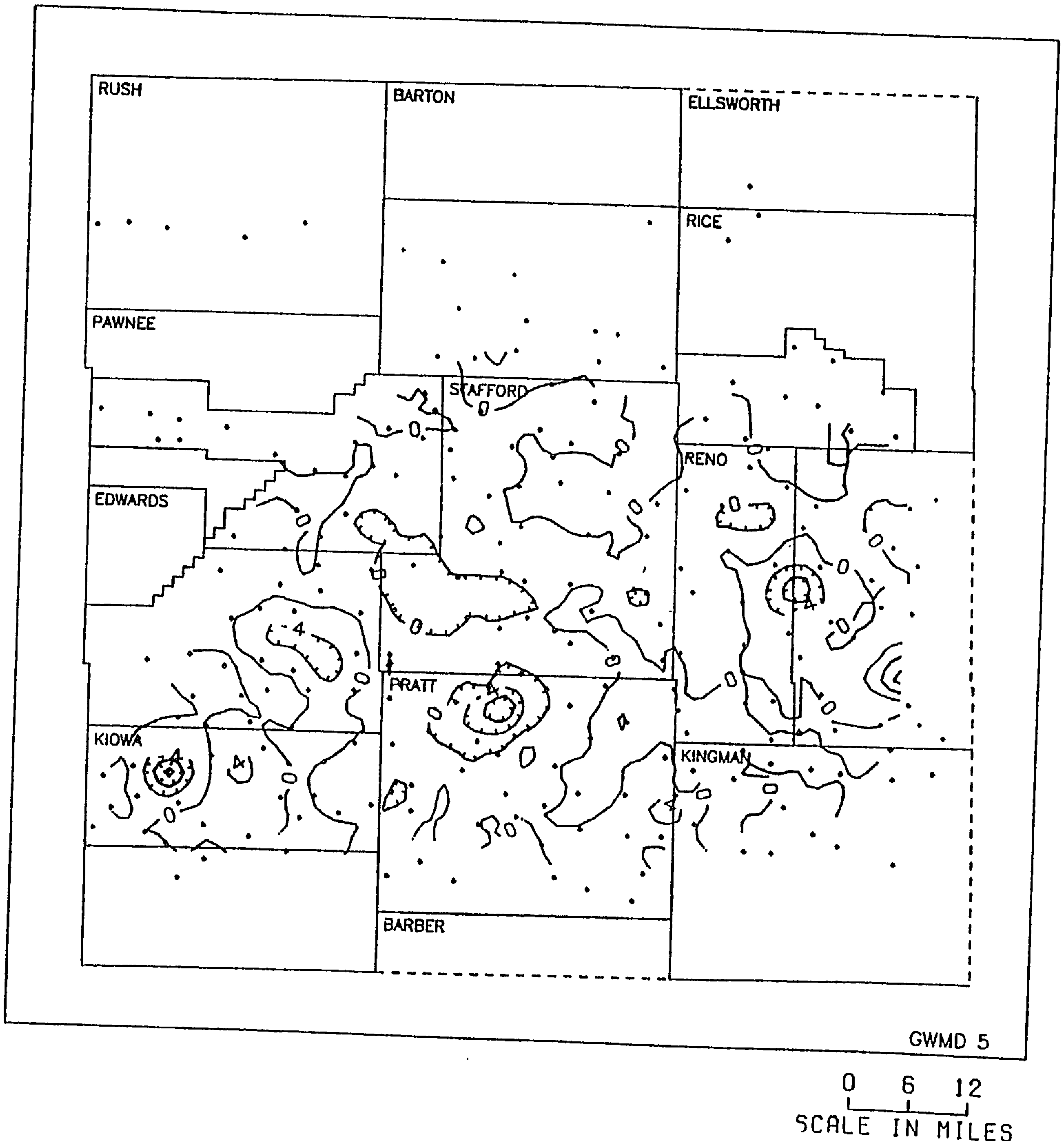
CHEYENNE
RAWLINS
DECATUR
SHERMAN
THOMAS
SHERIDAN
GRAHAM
WALLACE
LOGAN
GOVE
GWMD 4
0
12
MILES


RUSH
BARTON
ELLSWORTH
RICE
PAWNEE
STAFFORD
RENO
EDWARDS
PRATT
KIOWA
KINGMAN
BARBER
GWMD 5
0 6 12
SCALE IN MILES


WALLACE
GREELEY
WICHITA
SCOTT
LANE
GWMD 1
0 6 12
SCALE IN MILES


HAMILTON
KEARNY
FINNEY
HODGEMAN
GRAY
FORD
STANTON
GRANT
HASKELL
MEADE
MORTON
STEVENS
SEWARD
GWMD 3
0 6 12
SCALE IN MILES


CHEYENNE
RAWLINS
DECATUR
SHERMAN
THOMAS
SHERIDAN
GRAHAM
WALLACE
LOGAN
GOVE
GWMD 4
0
12
MILES



RUSH
BARTON
ELLSWORTH
RICE
PAWNEE
STAFFORD
EDWARDS
RENO
KIOWA
PRATT
KINGMAN
BARBER
GWMD 5
0 6 12
SCALE IN MILES

APPENDIX A

I.D. JAN. 1979	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
1	16 39W 4 BAB	-101.638	38.698	54.983	64.426	3430.
2	16 39W 15 CBB	-101.624	38.662	55.767	61.931	3415.
3	16 39W 18 BBC	-101.680	38.667	52.739	62.263	3463.
4	16 40W 2 ABA	-101.706	38.698	51.323	64.369	3483.
5	16 40W 6 BAA	-101.785	38.697	47.023	64.302	3538.
6	16 40W 15 ACC	-101.726	38.663	50.211	61.975	3504.
7	16 40W 18 DBA	-101.780	38.661	47.303	61.809	3530.
8	16 40W 26 ADA	-101.700	38.636	51.626	60.118	3490.
9	16 40W 35 BBA	-101.714	38.625	50.875	59.357	3503.
10	16 41W 5 BBB	-101.884	38.696	41.659	64.207	3574.
11	16 41W 20 BAD	-101.877	38.651	42.068	61.098	3588.
12	16 41W 23 BBD	-101.826	38.651	44.811	61.144	3560.
13	16 41W 33 AAB	-101.851	38.624	43.462	59.249	3584.
14	16 42W 10 CBC	-101.956	38.672	37.768	62.529	3620.
15	16 42W 22 BCB	-101.956	38.648	37.780	60.912	3630.
16	17 39W 2 BAA	-101.598	38.611	57.190	58.442	3399.
17	17 39W 6 CCD	-101.677	38.598	52.921	57.506	3447.
18	17 39W 22 ABB	-101.614	38.568	56.339	55.421	3400.
19	17 39W 34 CCB	-101.623	38.528	55.865	52.658	3411.
20	17 40W 4 DCB	-101.744	38.599	49.253	57.584	3477.
21	17 40W 15 CCB	-101.735	38.570	49.781	55.591	3471.
22	17 40W 17 BBA	-101.770	38.581	47.876	56.318	3476.
23	17 40W 31 BBA	-101.788	38.538	46.901	53.311	3488.
24	17 41W 1 AAD	-101.794	38.608	46.591	58.177	3551.
25	17 42W 27 CBB	-101.955	38.543	37.833	53.692	3729.
26	18 39W 7 BBD	-101.676	38.507	52.994	51.245	3448.
27	18 39W 23 CCB	-101.604	38.469	56.908	48.659	3353.
28	18 39W 24 AAC	-101.572	38.479	58.659	49.307	3330.
29	18 40W 4 CBD	-101.751	38.514	48.944	51.706	3483.
30	18 40W 6 BAA	-101.783	38.523	47.165	52.314	3500.
31	16 35W 6 AAB	-101.223	38.699	77.410	64.615	3125.
32	16 35W 13 CCC	-101.146	38.657	81.616	61.792	3028.
33	16 35W 20 CCC	-101.218	38.642	77.713	60.736	3077.
34	16 35W 27 BBC	-101.182	38.639	79.676	60.512	3049.
35	16 36W 7 BCB	-101.348	38.681	70.674	63.330	3210.
36	16 36W 14 CCD	-101.271	38.657	74.837	61.717	3125.
37	16 36W 17 ABC	-101.320	38.668	72.191	62.457	3166.
38	16 36W 21 CCC	-101.310	38.642	72.718	60.705	3151.
39	16 36W 25 BBB	-101.255	38.640	75.731	60.593	3108.
40	16 36W 30 CBC	-101.347	38.632	70.720	59.946	3173.
41	16 36W 34 CCC	-101.292	38.613	73.749	58.705	3145.
42	16 36W 35 CCC	-101.273	38.613	74.752	58.709	3133.
43	16 37W 4 DCC	-101.412	38.686	67.215	63.670	3257.
44	16 37W 13 BBC	-101.366	38.668	69.697	62.442	3207.
45	16 37W 15 CCC	-101.402	38.657	67.732	61.668	3225.
46	16 37W 17 BBB	-101.439	38.670	65.749	62.525	3262.
47	16 37W 27 ABC	-101.393	38.639	68.241	60.420	3212.
48	16 37W 29 BBB	-101.439	38.641	65.769	60.519	3247.
49	16 37W 30 ACB	-101.448	38.637	65.277	60.263	3252.
50	16 38W 5 BBB	-101.549	38.699	59.765	64.491	3354.

I.D. JAN. 1979	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
51	16 38W 10 ABB	-101.503	38.684	62.261	63.502	3321.
52	16 38W 16 ACC	-101.522	38.664	61.280	62.117	3322.
53	16 38W 19 BBA	-101.565	38.655	58.920	61.476	3363.
54	16 38W 26 BBB	-101.494	38.641	62.789	60.495	3292.
55	16 38W 29 ADB	-101.535	38.637	60.550	60.231	3332.
56	17 35W 2 BBB	-101.163	38.612	80.688	58.646	3043.
57	17 35W 15 CDC	-101.177	38.570	79.998	55.754	3065.
58	17 35W 27 CCC	-101.181	38.541	79.788	53.747	3050.
59	17 35W 30 CBB	-101.236	38.546	76.827	54.086	3079.
60	17 36W 10 CBB	-101.292	38.590	73.772	57.076	3150.
61	17 36W 23 BCC	-101.273	38.562	74.801	55.202	3104.
62	17 36W 33 BCB	-101.310	38.535	72.820	53.313	3147.
63	17 36W 36 BBB	-101.254	38.539	75.831	53.579	3091.
64	17 37W 3 AAB	-101.388	38.612	68.510	58.543	3217.
65	17 37W 8 BAA	-101.432	38.597	66.172	57.514	3249.
66	17 37W 13 CDD	-101.359	38.570	70.157	55.679	3204.
67	17 37W 22 CCC	-101.402	38.555	67.815	54.649	3221.
68	17 37W 28 CCC	-101.420	38.541	66.834	53.635	3228.
69	17 38W 6 BDD	-101.561	38.606	59.200	58.091	3369.
70	17 38W 12 DCB	-101.466	38.586	64.320	56.745	3280.
71	17 38W 21 BBB	-101.530	38.568	60.846	55.467	3326.
72	17 38W 24 ACC	-101.466	38.562	64.337	55.114	3271.
73	17 38W 27 ACD	-101.501	38.548	62.476	54.098	3289.
74	17 38W 28 CCC	-101.530	38.541	60.863	53.586	3303.
75	18 35W 2 ACC	-101.154	38.519	81.289	52.261	3052.
76	18 35W 8 BBC	-101.217	38.508	77.850	51.468	3074.
77	18 35W 14 DCD	-101.151	38.483	81.457	49.756	3060.
78	18 35W 17 DAA	-101.201	38.488	78.734	50.099	3068.
79	18 35W 34 ABB	-101.171	38.452	80.379	47.613	3078.
80	18 36W 2 DCB	-101.263	38.513	75.353	51.823	3125.
81	18 36W 9 BBB	-101.310	38.510	72.844	51.559	3150.
82	18 36W 15 DAD	-101.275	38.486	74.751	49.940	3151.
83	18 36W 18 DDC	-101.333	38.483	71.612	49.673	3169.
84	18 36W 29 ABB	-101.319	38.466	72.380	48.550	3164.
85	18 36W 36 CCC	-101.253	38.439	75.927	46.691	3141.
86	18 37W 1 BBB	-101.365	38.524	69.824	52.540	3182.
87	18 37W 3 CCC	-101.402	38.512	67.850	51.639	3209.
88	18 37W 5 CBB	-101.438	38.517	65.857	51.994	3231.
89	18 37W 14 BBB	-101.383	38.495	68.856	50.523	3192.
90	18 37W 19 AAD	-101.441	38.479	65.760	49.360	3229.
91	18 37W 21 BBB	-101.420	38.481	66.879	49.497	3207.
92	18 37W 34 BBB	-101.401	38.452	67.899	47.503	3225.
93	18 37W 36 ABB	-101.355	38.452	70.388	47.533	3196.
94	18 38W 2 BCC	-101.493	38.519	62.868	52.095	3266.
95	18 38W 8 BBD	-101.546	38.508	60.013	51.323	3308.
96	18 38W 12 BCC	-101.475	38.504	63.876	51.098	3249.
97	18 38W 20 ACC	-101.539	38.475	60.405	49.068	3303.
98	18 38W 23 BAB	-101.489	38.481	63.144	49.463	3314.
99	18 38W 31 DBC	-101.558	38.442	59.429	46.804	3324.
100	18 38W 36 DDD	-101.459	38.439	64.793	46.591	3292.

I.D. JAN. 1979	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
101	19 35W 1 AAA	-101.128	38.437	82.746	46.637	3051.
102	19 35W 8 BBB	-101.217	38.423	77.939	45.580	3125.
103	19 36W 15 BAA	-101.283	38.408	74.321	44.551	3159.
104	19 37W 22 AAB	-101.387	38.394	68.695	43.502	3224.
105	19 38W 14 ABB	-101.484	38.408	63.441	44.449	3305.
106	19 38W 18 DCC	-101.557	38.395	59.460	43.543	3324.
107	19 38W 26 CCB	-101.493	38.368	62.970	41.687	3302.
108	19 38W 31 CBC	-101.566	38.355	58.987	40.781	3324.
109	20 35W 15 BCC	-101.179	38.315	80.037	38.210	3055.
110	20 36W 14 DAD	-101.255	38.312	75.924	37.923	3129.
111	20 37W 29 DCC	-101.428	38.279	66.530	35.578	3243.
112	20 38W 17 CBD	-101.546	38.311	60.138	37.779	3300.
113	20 38W 33 BBA	-101.527	38.277	61.160	35.404	3283.
114	16 31W 17 DDD	-100.764	38.660	102.282	62.271	2808.
115	16 31W 31 BCB	-100.799	38.625	100.425	59.826	2824.
116	16 32W 23 BCD	-100.832	38.652	98.584	61.675	2833.
117	16 33W 7 CCC	-101.016	38.673	88.646	62.964	2948.
118	16 33W 19 CBB	-101.015	38.649	88.668	61.328	2938.
119	16 33W 21 BCC	-100.979	38.651	90.664	61.494	2913.
120	16 33W 24 DAB	-100.909	38.650	94.407	61.447	2843.
121	16 33W 31 CBB	-101.015	38.620	88.698	59.317	2952.
122	16 33W 33 BAA	-100.972	38.628	91.063	59.867	2919.
123	16 34W 9 CCB	-101.090	38.674	84.600	62.986	2994.
124	16 34W 13 BCB	-101.034	38.667	87.640	62.561	2947.
125	16 34W 22 BDC	-101.067	38.650	85.889	61.386	2966.
126	16 34W 29 CBB	-101.109	38.634	83.637	60.202	3000.
127	16 34W 34 CBB	-101.071	38.619	85.671	59.245	2978.
128	17 31W 4 DCC	-100.751	38.602	103.015	58.241	2811.
129	17 31W 14 CCD	-100.720	38.573	104.713	56.255	2813.
130	17 31W 31 BBB	-100.797	38.541	100.570	54.020	2851.
131	17 31W 35 CCB	-100.722	38.530	104.648	53.342	2828.
132	17 32W 16 BBB	-100.869	38.584	96.652	56.963	2849.
133	17 32W 27 BBB	-100.851	38.555	97.655	54.968	2862.
134	17 32W 31 BCB	-100.904	38.537	94.790	53.650	2867.
135	17 32W 34 CAA	-100.844	38.533	98.049	53.462	2852.
136	17 33W 7 BBB	-101.015	38.598	88.719	57.808	2945.
137	17 33W 14 ACB	-100.932	38.580	93.239	56.639	2882.
138	17 34W 6 BCB	-101.127	38.608	82.657	58.423	3020.
139	17 34W 16 ACB	-101.080	38.579	85.213	56.472	3011.
140	17 34W 27 ABA	-101.059	38.554	86.372	54.740	2992.
141	17 34W 28 CCB	-101.089	38.543	84.750	53.951	3013.
142	18 31W 20 ABA	-100.766	38.483	102.315	50.009	2867.
143	18 31W 24 BCB	-100.703	38.479	105.737	49.820	2841.
144	18 31W 27 ABA	-100.729	38.468	104.362	49.035	2860.
145	18 32W 14 BBB	-100.833	38.497	98.708	50.952	2869.
146	18 32W 20 CBB	-100.886	38.475	95.832	49.388	2871.
147	18 33W 3 CCB	-100.960	38.515	91.810	52.081	2895.
148	18 33W 5 CCC	-100.997	38.513	89.804	51.919	2946.
149	18 33W 11 ABB	-100.932	38.511	93.317	51.859	2874.
150	18 33W 15 DDD	-100.943	38.484	92.719	49.960	2881.

I.D. JAN. 1979	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
151	18 33W 20 CCD	-100.994	38.469	89.976	48.903	2936.
152	18 33W 26 DAD	-100.925	38.458	93.752	48.218	2883.
153	18 33W 35 AAA	-100.925	38.453	93.759	47.840	2880.
154	18 34W 1 CBB	-101.034	38.518	87.792	52.256	2975.
155	18 34W 9 CDD	-101.082	38.497	85.178	50.822	3025.
156	18 34W 18 BBB	-101.126	38.495	82.798	50.650	3043.
157	18 34W 25 BBD	-101.031	38.465	87.971	48.615	2982.
158	18 34W 30 DDC	-101.112	38.454	83.602	47.781	3034.
159	18 34W 34 BBC	-101.070	38.450	85.860	47.570	3015.
160	19 31W 20 BAD	-100.770	38.393	102.212	43.815	2905.
161	19 32W 6 CCB	-100.904	38.427	94.917	46.100	2879.
162	19 32W 32 ACB	-100.876	38.362	96.466	41.588	2900.
163	19 33W 6 DBB	-101.006	38.431	89.386	46.251	2956.
164	19 33W 12 DDC	-100.908	38.411	94.686	44.962	2889.
165	19 33W 15 DBD	-100.947	38.400	92.563	44.170	2865.
166	19 33W 21 AAD	-100.961	38.392	91.813	43.652	2856.
167	19 33W 24 ABB	-100.913	38.394	94.454	43.825	2890.
168	19 33W 25 DCD	-100.910	38.367	94.612	41.940	2862.
169	19 33W 29 CBB	-100.996	38.372	89.947	42.237	2871.
170	19 33W 34 DCC	-100.950	38.352	92.489	40.896	2865.
171	19 34W 34 BBB	-101.070	38.365	85.953	41.669	2961.
172	20 31W 14 CBC	-100.721	38.312	104.970	38.290	2838.
173	20 32W 7 CBA	-100.901	38.329	95.157	39.305	2862.
174	20 32W 16 DAD	-100.851	38.312	97.886	38.204	2832.
175	20 32W 30 BCD	-100.901	38.287	95.206	36.411	2838.
176	20 32W 32 DCC	-100.875	38.265	96.596	34.915	2852.
177	20 33W 2 DBB	-100.931	38.343	93.505	40.285	2856.
178	20 33W 9 BBB	-100.977	38.336	90.992	39.739	2878.
179	20 33W 10 DBC	-100.949	38.327	92.516	39.135	2847.
180	20 33W 17 BAB	-100.991	38.321	90.250	38.720	2861.
181	20 33W 21 ABD	-100.966	38.305	91.656	37.612	2828.
182	20 33W 26 CBB	-100.940	38.285	93.066	36.251	2842.
183	20 33W 26 CBB	-100.940	38.285	93.066	36.251	2842.
184	20 33W 35 DBA	-100.928	38.270	93.715	35.254	2839.
185	20 34W 36 CCD	-101.030	38.265	88.175	34.791	2882.
186	16 29W 26 CCD	-100.501	38.627	116.541	60.203	2702.
187	16 30W 24 DCC	-100.584	38.642	111.998	61.172	2722.
188	16 30W 29 CDD	-100.660	38.630	107.911	60.301	2759.
189	16 30W 34 DAB	-100.616	38.620	110.285	59.594	2737.
190	17 27W 20 CCC	-100.337	38.553	125.487	55.294	2618.
191	17 27W 26 CCC	-100.281	38.539	128.522	54.328	2581.
192	17 28W 7 BBB	-100.466	38.596	118.427	58.093	2690.
193	17 28W 15 BBC	-100.411	38.579	121.447	57.000	2657.
194	17 28W 26 ABB	-100.383	38.552	122.991	55.136	2635.
195	17 28W 34 CBB	-100.411	38.530	121.533	53.612	2658.
196	17 29W 3 BDC	-100.516	38.605	115.719	58.686	2706.
197	17 29W 28 DCD	-100.527	38.540	115.205	54.160	2735.
198	17 29W 36 BAA	-100.477	38.538	117.912	54.069	2701.
199	17 30W 5 AAC	-100.653	38.612	108.310	59.026	2762.
200	17 30W 13 CBB	-100.593	38.575	111.586	56.538	2758.

I.D. JAN. 1979	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
201	17 30W 22 ACA	-100.619	38.565	110.234	55.820	2776.
202	18 27W 13 CCC	-100.263	38.480	129.621	50.322	2587.
203	18 28W 18 ACC	-100.456	38.488	119.113	50.695	2695.
204	18 29W 4 DAD	-100.523	38.514	115.489	52.407	2737.
205	18 30W 4 BAB	-100.644	38.526	108.919	53.078	2801.
206	18 30W 23 AAA	-100.595	38.480	111.581	50.004	2783.
207	13 39W 33 BBB	-101.666	38.886	53.385	77.383	3294.
208	13 43W 36 ABB	-102.045	38.884	32.961	77.178	3716.
209	14 38W 21 DCC	-101.547	38.816	59.849	72.587	3456.
210	14 38W 29 CCC	-101.575	38.802	58.333	71.581	3451.
211	14 39W 36 BCB	-101.612	38.796	56.320	71.189	3440.
212	14 40W 35 ABA	-101.731	38.799	49.919	71.353	3497.
213	14 41W 18 DCB	-101.918	38.830	39.844	73.474	3636.
214	14 41W 22 BBB	-101.872	38.827	42.325	73.256	3614.
215	14 41W 28 DCA	-101.879	38.801	41.925	71.497	3620.
216	14 42W 2 AAB	-101.949	38.870	38.156	76.216	3663.
217	14 42W 10 BBA	-101.979	38.855	36.537	75.197	3666.
218	14 42W 14 DBD	-101.952	38.832	37.996	73.580	3655.
219	14 42W 22 BDD	-101.975	38.821	36.756	72.814	3661.
220	14 42W 30 BCA	-102.034	38.807	33.548	71.903	3688.
221	15 38W 5 CCB	-101.576	38.775	58.314	69.713	3430.
222	15 38W 7 BBB	-101.594	38.771	57.306	69.458	3421.
223	15 38W 14 CCD	-101.518	38.744	61.437	67.615	3386.
224	15 38W 18 CCC	-101.595	38.744	57.284	67.590	3406.
225	15 38W 21 CBC	-101.558	38.733	59.290	66.854	3377.
226	15 38W 28 DBB	-101.549	38.720	59.785	65.984	3360.
227	15 38W 30 CCB	-101.596	38.717	57.265	65.722	3395.
228	15 38W 36 CBB	-101.503	38.706	62.296	65.003	3349.
229	15 39W 2 BCD	-101.629	38.780	55.427	70.056	3432.
230	15 39W 6 CBA	-101.704	38.777	51.406	69.876	3477.
231	15 39W 8 ACC	-101.678	38.765	52.776	69.021	3464.
232	15 39W 15 DBA	-101.639	38.749	54.900	67.929	3435.
233	15 39W 26 ACC	-101.623	38.722	55.757	66.073	3419.
234	15 39W 28 BBD	-101.668	38.725	53.370	66.287	3458.
235	15 40W 3 BAB	-101.757	38.784	48.527	70.337	3520.
236	15 40W 7 BBB	-101.818	38.769	45.256	69.294	3559.
237	15 40W 9 DCB	-101.771	38.759	47.752	68.578	3530.
238	15 40W 13 BAA	-101.718	38.756	50.630	68.368	3500.
239	15 40W 14 CCC	-101.744	38.743	49.241	67.475	3519.
240	15 40W 20 BBD	-101.797	38.739	46.358	67.184	3548.
241	15 40W 26 CAB	-101.740	38.719	49.471	65.855	3519.
242	15 41W 5 ACB	-101.900	38.779	40.787	69.978	3615.
243	15 41W 10 BAB	-101.868	38.769	42.518	69.251	3593.
244	15 41W 27 CBC	-101.874	38.716	42.217	65.616	3569.
245	15 41W 29 CAC	-101.906	38.716	40.472	65.586	3579.
246	15 42W 32 BDA	-102.013	38.706	34.711	64.877	3654.
247	15 42W 36 CDC	-101.943	38.697	38.472	64.301	3604.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
1	21 29W 36 CCB	-100.463	38.178	119.128	118.926	2589.
2	21 30W 5 BBB	-100.645	38.262	109.128	124.555	2823.
3	21 31W 8 ABB	-100.746	38.248	103.651	123.507	2856.
4	21 32W 8 ABD	-100.853	38.247	97.830	123.355	2821.
5	21 33W 2 ACB	-100.910	38.259	94.720	124.143	2831.
6	21 33W 7 DDA	-100.977	38.238	91.095	122.649	2848.
7	21 33W 31 CBB	-100.992	38.183	90.323	118.845	2821.
8	21 34W 16 AAD	-101.050	38.232	87.128	122.188	2888.
9	22 31W 12 CDC	-100.677	38.148	107.508	116.664	2802.
10	22 31W 16 ADD	-100.720	38.142	105.172	116.215	2803.
11	22 31W 35 ABB	-100.690	38.103	106.847	113.550	2780.
12	22 32W 8 ACB	-100.854	38.158	97.859	117.216	2811.
13	22 33W 17 DCD	-100.962	38.135	91.996	115.553	2785.
14	22 33W 22 BAA	-100.930	38.133	93.742	115.437	2808.
15	22 33W 32 CBC	-100.973	38.095	91.431	112.788	2752.
16	22 33W 36 AAA	-100.883	38.104	96.328	113.470	2792.
17	22 34W 10 AAA	-101.031	38.162	88.218	117.372	2824.
18	22 34W 32 BCB	-101.084	38.100	85.379	113.063	2813.
19	23 27W 12 CCC	-100.244	38.060	131.213	111.011	2556.
20	23 27W 22 DAB	-100.267	38.037	129.990	109.400	2570.
21	23 28W 22 DCD	-100.379	38.032	123.886	108.938	2657.
22	23 28W 34 DDC	-100.376	38.003	124.087	106.941	2647.
23	23 29W 30 BBB	-100.554	38.030	114.342	108.633	2716.
24	23 29W 34 CDD	-100.493	38.003	117.704	106.827	2685.
25	23 30W 19 CCB	-100.663	38.034	108.394	108.813	2778.
26	23 31W 3 DCD	-100.706	38.076	106.005	111.675	2775.
27	23 31W 35 CCC	-100.699	38.004	106.461	106.713	2765.
28	23 32W 18 BCD	-100.878	38.056	96.646	110.163	2767.
29	23 32W 19 CBB	-100.881	38.039	96.497	108.988	2767.
30	23 32W 22 DAB	-100.813	38.039	100.205	109.038	2780.
31	23 33W 10 DCC	-100.927	38.063	93.967	110.611	2761.
32	23 33W 17 BBB	-100.973	38.061	91.460	110.443	2747.
33	23 33W 26 ABB	-100.908	38.032	95.031	108.486	2791.
34	23 33W 28 CDC	-100.950	38.019	92.750	107.560	2773.
35	23 33W 32 ABB	-100.964	38.018	91.988	107.483	2777.
36	23 34W 3 BCB	-101.047	38.086	87.406	112.119	2789.
37	23 34W 9 DBB	-101.056	38.068	86.928	110.872	2808.
38	23 34W 14 BDC	-101.024	38.055	88.685	109.995	2793.
39	23 34W 17 CCC	-101.083	38.047	85.472	109.407	2825.
40	23 34W 21 DDC	-101.051	38.033	87.230	108.462	2816.
41	23 34W 26 CCC	-101.028	38.019	88.496	107.510	2813.
42	23 34W 28 CDA	-101.058	38.021	86.857	107.629	2827.
43	24 31W 27 CCB	-100.717	37.934	105.549	101.871	2755.
44	24 31W 31 BCD	-100.769	37.925	102.720	101.209	2777.
45	24 32W 3 DAC	-100.813	37.994	100.248	105.934	2781.
46	24 32W 5 BCB	-100.862	38.000	97.570	106.311	2785.
47	24 32W 25 CBB	-100.790	37.938	101.558	102.090	2782.
48	24 32W 29 AC	-100.852	37.941	98.171	102.249	2795.
49	24 32W 35 DD	-100.793	37.919	101.412	100.776	2772.
50	24 33W 9 CCD	-100.952	37.976	92.679	104.593	2805.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
51	24 33W 14 BCB	-100.917	37.971	94.593	104.272	2817.
52	24 33W 17 DCA	-100.961	37.963	92.198	103.691	2807.
53	24 33W 22 DCA	-100.924	37.949	94.230	102.750	2808.
54	24 33W 28 DAA	-100.938	37.938	93.476	101.982	2796.
55	24 33W 31 CCA	-100.989	37.920	90.703	100.706	2838.
56	24 33W 34 CAC	-100.931	37.922	93.872	100.883	2795.
57	24 34W 1 BCB	-101.010	37.999	89.493	106.141	2815.
58	24 34W 5 AAB	-101.070	38.002	86.216	106.311	2860.
59	25 31W 11 CBC	-100.699	37.892	106.578	98.989	2744.
60	25 31W 19 CBD	-100.769	37.864	102.780	97.001	2768.
61	25 31W 21 CAB	-100.731	37.865	104.855	97.101	2755.
62	25 31W 35 DBA	-100.688	37.836	107.236	95.135	2735.
63	25 32W 31 DD	-100.865	37.833	97.559	94.790	2788.
64	25 32W 35 ADB	-100.794	37.840	101.435	95.326	2770.
65	25 33W 5 ABD	-100.961	37.915	92.239	100.379	2820.
66	25 33W 9 ABD	-100.942	37.900	93.287	99.358	2808.
67	25 33W 15 DAC	-100.921	37.879	94.455	97.924	2794.
68	25 33W 17 DBD	-100.961	37.879	92.269	97.897	2821.
69	25 33W 21 CAC	-100.949	37.864	92.936	96.870	2830.
70	25 33W 35 DBD	-100.905	37.836	95.368	94.969	2801.
71	25 34W 6 AAA	-101.086	37.915	85.408	100.301	2880.
72	25 34W 10 ABB	-101.037	37.902	88.096	99.434	2878.
73	25 34W 34 DBD	-101.034	37.835	88.313	94.815	2850.
74	26 31W 31 CDC	-100.755	37.743	103.664	88.666	2720.
75	26 32W 22 ABB	-100.805	37.786	100.885	91.593	2762.
76	26 32W 35 CDA	-100.789	37.745	101.801	88.777	2744.
77	26 33W 3 DBB	-100.914	37.823	94.887	94.066	2803.
78	26 33W 12 CAD	-100.880	37.806	96.761	92.918	2792.
79	26 33W 26 ABB	-100.896	37.771	95.916	90.492	2785.
80	26 34W 30 BD	-101.082	37.765	85.738	89.957	2856.
81	27 23W 36 CCC	-99.791	37.650	156.609	83.281	2385.
82	27 24W 3 BBD	-99.936	37.737	148.520	89.093	2425.
83	27 24W 4 BBC	-99.957	37.737	147.371	89.066	2438.
84	27 24W 26 DAA	-99.904	37.672	150.378	84.650	2424.
85	27 26W 21 DAA	-100.162	37.687	136.216	85.373	2531.
86	28 21W 10 DDD	-99.594	37.620	167.465	81.489	2308.
87	28 22W 12 CAC	-99.677	37.624	162.904	81.645	2347.
88	28 22W 32 BAB	-99.750	37.574	158.987	78.095	2363.
89	28 24W 9 CBC	-99.957	37.626	147.546	81.410	2440.
90	28 25W 19 BBB	-100.105	37.606	139.461	79.852	2495.
91	28 26W 6 AAB	-100.201	37.650	134.132	82.777	2523.
92	29 21W 5 BBB	-99.645	37.559	164.777	77.208	2321.
93	29 22W 17 DAD	-99.738	37.520	159.740	74.386	2349.
94	29 24W 1 ABA	-99.891	37.561	151.271	77.010	2420.
95	29 24W 18 BAA	-99.987	37.532	146.047	74.888	2452.
96	29 25W 3 ADA	-100.033	37.558	143.481	76.626	2454.
97	29 26W 1 CDD	-100.116	37.549	138.938	75.907	2491.
98	29 26W 36 BBB	-100.123	37.488	138.642	71.692	2510.
99	29 35W 1 CCC	-101.105	37.551	84.639	75.184	2746.
100	29 35W 7 CBD	-101.192	37.541	79.866	74.446	2765.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
101	29 35W 28 ACC	-101.150	37.500	82.202	71.641	2743.
102	29 36W 19 BCB	-101.305	37.517	73.675	72.735	2816.
103	29 37W 3 CDB	-101.355	37.553	70.908	75.195	2844.
104	29 37W 8 CBA	-101.394	37.542	68.772	74.420	2863.
105	29 37W 29 BBA	-101.394	37.506	68.791	71.937	2852.
106	29 38W 3 BAA	-101.463	37.564	64.975	75.910	2887.
107	29 38W 8 CCC	-101.506	37.537	62.626	74.033	2963.
108	29 38W 22 CBB	-101.470	37.513	64.614	72.390	2976.
109	29 38W 35 CCD	-101.449	37.478	65.784	69.984	2955.
110	30 36W 1 BBB	-101.213	37.476	78.756	69.952	2783.
111	30 36W 6 BBC	-101.305	37.474	73.700	69.769	2821.
112	30 36W 7 AAB	-101.291	37.462	74.476	68.949	2842.
113	30 36W 16 DAB	-101.254	37.440	76.526	67.449	2839.
114	30 36W 25 BCB	-101.213	37.414	78.796	65.677	2850.
115	30 36W 32 BBC	-101.287	37.401	74.734	64.743	2911.
116	30 37W 2 BAA	-101.335	37.476	72.050	69.893	2819.
117	30 37W 6 DCC	-101.406	37.463	68.155	68.966	2920.
118	30 37W 10 DCB	-101.351	37.451	71.183	68.163	2879.
119	30 37W 20 CBC	-101.397	37.423	68.668	66.212	2925.
120	30 38W 3 DCC	-101.460	37.463	65.184	68.945	2979.
121	30 38W 15 DBC	-101.460	37.438	65.196	67.222	2985.
122	30 38W 30 ACA	-101.513	37.414	62.295	65.548	3018.
123	31 27W 20 AAA	-100.273	37.342	130.596	61.454	2438.
124	31 28W 10 BCB	-100.362	37.368	125.663	63.155	2490.
125	31 29W 25 AAA	-100.418	37.329	122.629	60.409	2523.
126	31 29W 30 AAA	-100.508	37.329	117.673	60.323	2589.
127	32 28W 4 ADD	-100.363	37.294	125.703	58.050	2476.
128	32 29W 27 AAB	-100.455	37.242	120.696	54.374	2574.
129	32 30W 9 CCC	-100.597	37.273	112.833	56.381	2575.
130	32 30W 28 BBC	-100.596	37.241	112.925	54.175	2561.
131	32 30W 35 CAD	-100.553	37.219	115.321	52.695	2536.
132	33 30W 35 CB	-100.558	37.133	115.140	46.760	2520.
133	34 30W 22 CBC	-100.577	37.074	114.159	42.674	2481.
134	34 30W 27 BBB	-100.577	37.068	114.165	42.260	2485.
135	35 30W 10 CDA	-100.570	37.014	114.609	38.542	2370.
136	35 40W 3 BBB	-101.661	37.039	54.272	39.642	3191.
137	35 43W 13 BDB	-101.947	37.005	38.465	37.248	3437.
138	21 21W 21 BCC	-99.641	38.212	163.808	122.261	2088.
139	21 22W 3 BBA	-99.729	38.261	158.936	125.517	2130.
140	21 22W 12 BCB	-99.695	38.242	160.818	124.254	2105.
141	21 25W 14 BCB	-100.043	38.228	141.913	122.831	2278.
142	21 26W 35 AAC	-100.138	38.186	136.808	119.822	2342.
143	21 39W 7 CBA	-101.648	38.240	54.592	122.476	3299.
144	22 21W 2 BBC	-99.605	38.172	165.842	119.554	2078.
145	22 21W 6 DCC	-99.668	38.161	162.432	118.703	2107.
146	22 22W 4 AAA	-99.734	38.174	158.816	119.507	2178.
147	22 22W 13 CCC	-99.695	38.132	161.014	116.665	2124.
148	22 22W 23 DDD	-99.697	38.118	160.929	115.696	2134.
149	22 22W 27 DCC	-99.722	38.103	159.596	114.626	2139.
150	22 32W 21 CDC	-100.841	38.120	98.603	114.604	2795.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
151	22 33W 3 DBA	-100.925	38.169	93.985	117.925	2811.
152	22 35W 23 CDD	-101.131	38.120	82.803	114.414	2900.
153	22 39W 3 BBB	-101.595	38.175	57.499	118.007	3269.
154	22 39W 8 DDD	-101.616	38.148	56.367	116.139	3291.
155	23 23W 1 BAA	-99.798	38.087	155.482	113.418	2171.
156	23 24W 11 ABB	-99.924	38.073	148.637	112.286	2260.
157	23 26W 31 CDD	-100.219	38.002	132.655	107.038	2550.
158	23 32W 31 CBD	-100.878	38.009	96.688	106.921	2778.
159	23 34W 1 DDC	-100.996	38.077	90.192	111.530	2756.
160	23 35W 5 ACC	-101.183	38.084	79.994	111.903	2946.
161	23 35W 12 CCC	-101.120	38.062	83.444	110.420	2858.
162	23 35W 25 BBB	-101.120	38.031	83.466	108.282	2886.
163	23 35W 29 DAC	-101.179	38.022	80.253	107.629	2953.
164	23 36W 4 CBB	-101.284	38.082	74.490	111.713	3040.
165	23 36W 32 BBB	-101.302	38.017	73.545	107.221	2996.
166	23 37W 4 ABC	-101.385	38.087	68.979	112.013	3092.
167	23 37W 19 CCC	-101.430	38.033	66.555	108.270	3068.
168	23 37W 28 CCB	-101.394	38.020	68.523	107.388	3043.
169	23 37W 36 BAB	-101.334	38.017	71.798	107.207	3011.
170	23 39W 15 ADD	-101.579	38.054	58.418	109.666	3196.
171	23 42W 19 CBB	-101.981	38.037	36.495	108.418	3312.
172	23 42W 26 DCA	-101.896	38.019	41.133	107.185	3280.
173	23 42W 27 DDB	-101.912	38.019	40.259	107.183	3287.
174	23 42W 34 CBB	-101.926	38.008	39.497	106.422	3294.
175	23 43W 21 ABA	-102.043	38.044	33.112	108.898	3346.
176	23 43W 23 BCB	-102.018	38.041	34.474	108.692	3332.
177	23 43W 25 CBD	-101.997	38.021	35.623	107.313	3325.
178	23 43W 26 BCC	-102.018	38.025	34.475	107.588	3334.
179	24 21W 20 CBB	-99.659	37.949	163.307	104.092	2270.
180	24 23W 3 CCC	-99.842	37.988	153.250	106.530	2363.
181	24 24W 2 CCC	-99.934	37.988	148.229	106.411	2425.
182	24 24W 20 CCC	-99.989	37.945	145.296	103.376	2447.
183	24 27W 14 ABB	-100.253	37.972	130.842	104.931	2585.
184	24 28W 10 ADD	-100.374	37.981	124.226	105.426	2643.
185	24 28W 31 DD	-100.431	37.918	121.190	101.023	2634.
186	24 28W 36 ACA	-100.342	37.925	126.044	101.595	2624.
187	24 29W 16 DCA	-100.507	37.962	116.986	103.986	2677.
188	24 29W 18 CCB	-100.554	37.962	114.420	103.942	2695.
189	24 30W 1 BCB	-100.572	37.998	113.398	106.409	2720.
190	24 30W 8 DCD	-100.634	37.975	110.038	104.769	2727.
191	24 30W 15 CCC	-100.609	37.960	111.421	103.756	2713.
192	24 31W 11 DBA	-100.688	37.980	107.086	105.067	2754.
193	24 33W 18 BDB	-100.987	37.971	90.771	104.225	2833.
194	24 35W 9 CCC	-101.174	87.975	80.560	104.390	2944.
195	24 35W 13 CCC	-101.120	37.961	83.517	103.454	2917.
196	24 35W 20 CCC	-101.193	37.946	79.541	102.379	2946.
197	24 35W 22 CCC	-101.156	37.946	81.562	102.399	2935.
198	24 36W 15 BCB	-101.266	37.970	75.539	103.997	2967.
199	24 36W 23 CBB	-101.247	37.952	76.589	102.765	2973.
200	24 39W 19 CBC	-101.650	37.948	54.579	102.335	3163.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
201	24 39W 22 CCB	-101.595	37.947	57.585	102.282	3137.
202	24 39W 30 BBD	-101.648	37.941	54.692	101.852	3164.
203	24 39W 30 CAD	-101.643	37.934	54.966	101.372	3162.
204	24 39W 35 BAC	-101.572	37.927	58.849	100.909	3133.
205	24 39W 35 CBA	-101.574	37.921	58.741	100.495	3129.
206	24 40W 7 CBB	-101.760	37.979	48.564	104.448	3216.
207	24 40W 17 BBB	-101.742	37.972	49.550	103.969	3204.
208	24 40W 23 AAB	-101.673	37.957	53.320	102.950	3175.
209	24 40W 31 BBB	-101.760	37.928	48.577	100.930	3222.
210	24 41W 1 DAD	-101.762	37.992	48.453	105.344	3233.
211	24 42W 4 AAD	-101.928	37.999	39.391	105.801	3293.
212	25 22W 20 AAA	-99.752	37.870	158.367	98.510	2376.
213	25 26W 25 CDD	-100.128	37.843	137.854	96.173	2547.
214	25 26W 30 ABC	-100.217	37.855	132.970	96.900	2569.
215	25 27W 33 ABB	-100.290	37.842	128.996	95.924	2586.
216	25 29W 7 BCB	-100.554	37.897	114.494	99.459	2691.
217	25 30W 20 BCB	-100.645	37.868	109.554	97.378	2720.
218	25 30W 22 ACD	-100.597	37.866	112.179	97.282	2700.
219	25 33W 3 BCC	-100.935	37.911	93.663	100.121	2850.
220	25 33W 16 DCC	-100.944	37.875	93.201	97.632	2832.
221	25 34W 18 ACA	-101.090	37.883	85.214	98.091	2874.
222	25 35W 2 BAA	-101.131	37.915	82.951	100.274	2901.
223	25 35W 17 AAA	-101.177	37.887	80.456	98.318	2914.
224	25 35W 26 BAB	-101.133	37.857	82.882	96.273	2905.
225	25 36W 11 CBC	-101.247	37.892	76.627	98.627	2975.
226	25 36W 18 ACC	-101.311	37.881	73.133	97.837	2998.
227	25 36W 28 BBD	-101.281	37.856	74.788	96.127	2977.
228	25 36W 35 ACC	-101.238	37.838	77.151	94.906	2941.
229	25 37W 15 ABA	-101.364	37.886	70.233	98.159	3037.
230	25 37W 15 DDD	-101.359	37.874	70.514	97.332	3033.
231	25 38W 26 ACC	-101.457	37.851	65.166	95.707	3072.
232	25 39W 2 CAD	-101.569	37.905	59.022	99.393	3124.
233	25 39W 23 BDD	-101.569	37.865	59.038	96.634	3194.
234	25 40W 1 CA	-101.663	37.906	53.886	99.435	3166.
235	25 43W 25 CCD	-101.997	37.844	35.636	95.106	3345.
236	26 21W 17 DBC	-99.638	37.787	164.747	92.946	2288.
237	26 21W 23 ADA	-99.577	37.778	168.104	92.414	2254.
238	26 24W 29 DDD	-99.959	37.755	147.235	90.306	2437.
239	26 24W 32 CBA	-99.973	37.746	146.480	89.668	2445.
240	26 24W 32 DDA	-99.959	37.742	147.255	89.409	2432.
241	26 24W 33 CDA	-99.950	37.742	147.746	89.421	2434.
242	26 25W 34 BBB	-100.049	37.754	142.307	90.126	2476.
243	26 26W 32 ADD	-100.180	37.748	135.144	89.561	2535.
244	26 26W 32 DCC	-100.187	37.741	134.771	89.070	2532.
245	26 27W 13 BBC	-100.233	37.796	132.176	92.813	2558.
246	26 27W 18 ADC	-100.310	37.793	127.967	92.523	2591.
247	26 27W 27 CDD	-100.262	37.756	130.643	90.022	2568.
248	26 28W 10 ACB	-100.369	37.810	124.716	93.635	2608.
249	26 29W 35 CCC	-100.469	37.742	119.327	88.847	2655.
250	26 30W 17 AD	-100.617	37.794	111.164	92.299	2709.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
251	26 30W 24 DDD	-100.544	37.771	115.186	90.776	2680.
252	26 31W 1 DDA	-100.651	37.817	109.280	93.856	2719.
253	26 31W 6 BBB	-100.760	37.829	103.304	94.594	2757.
254	26 31W 36 CAB	-100.663	37.747	108.699	89.016	2707.
255	26 35W 6 ADA	-101.179	37.825	80.388	94.041	2921.
256	26 36W 1 DBB	-101.204	37.822	79.023	93.821	2932.
257	26 36W 4 BDA	-101.261	37.825	75.901	93.998	2956.
258	26 36W 14 ACD	-101.220	37.794	78.166	91.882	2939.
259	26 37W 6 ACB	-101.405	37.824	68.025	93.865	3057.
260	26 37W 21 DDD	-101.362	37.771	70.406	90.227	2973.
261	26 37W 25 CDB	-101.318	37.759	72.821	89.419	2943.
262	26 39W 1 BAA	-101.536	37.827	60.858	94.023	3177.
263	26 41W 20 BBD	-101.831	37.782	44.728	90.848	3287.
264	26 41W 36 CCC	-101.760	37.741	48.624	88.033	3225.
265	26 42W 10 BB	-101.904	37.812	40.728	92.907	3300.
266	27 24W 3 CDD	-99.932	37.726	148.759	88.339	2429.
267	27 24W 9 AAD	-99.941	37.722	148.271	88.052	2431.
268	27 27W 7 ADC	-100.310	37.719	128.065	87.419	2596.
269	27 27W 10 CDB	-100.265	37.713	130.536	87.053	2576.
270	27 27W 25 CCD	-100.231	37.667	132.464	83.917	2557.
271	27 28W 5 AAA	-100.398	37.740	123.217	88.778	2627.
272	27 28W 30 CCA	-100.430	37.670	121.552	83.917	2646.
273	27 29W 9 DA	-100.491	37.717	118.151	87.101	2663.
274	27 30W 8 BBB	-100.632	37.725	110.420	87.526	2694.
275	27 30W 23 BB	-100.577	37.695	113.467	85.505	2682.
276	27 30W 25 CCB	-100.560	37.670	114.427	83.795	2673.
277	27 30W 34 CCC	-100.596	37.654	112.471	82.660	2675.
278	27 31W 7 BDA	-100.753	37.723	103.792	87.289	2728.
279	27 31W 21 BBC	-100.723	37.695	105.464	85.381	2707.
280	27 31W 24 CDC	-100.663	37.683	108.767	84.603	2685.
281	27 31W 31 BCC	-100.760	37.662	103.469	83.076	2697.
282	27 32W 6 CBB	-100.868	37.734	97.485	87.960	2766.
283	27 32W 13 ABB	-100.769	37.712	102.929	86.517	2727.
284	27 32W 19 CCD	-100.866	37.685	97.637	84.582	2738.
285	27 33W 29 DAA	-100.943	37.675	93.426	83.839	2748.
286	27 33W 33 DCD	-100.930	37.655	94.156	82.468	2728.
287	27 34W 28 DAA	-101.035	37.675	88.382	83.779	2822.
288	27 35W 17 ADD	-101.161	37.706	81.456	85.842	2865.
289	27 36W 18 DCB	-101.295	37.700	74.116	85.360	2895.
290	27 36W 25 CC	-101.212	37.670	78.684	83.333	2837.
291	27 37W 4 ABB	-101.369	37.740	70.040	88.087	2930.
292	27 37W 11 ABA	-101.330	37.726	72.185	87.138	2906.
293	27 37W 29 CBB	-101.396	37.674	68.596	83.523	2884.
294	27 38W 12 ADC	-101.419	37.720	67.312	86.686	2896.
295	27 38W 22 CBB	-101.470	37.689	64.533	84.528	2938.
296	27 38W 23 CB	-101.450	37.688	65.630	84.467	2949.
297	27 38W 25 BBB	-101.433	37.681	66.564	83.991	2894.
298	27 38W 32 BCC	-101.506	37.661	62.572	82.584	2975.
299	27 39W 2 BBB	-101.561	37.739	59.524	87.946	3131.
300	27 39W 23 ACC	-101.552	37.690	60.037	84.570	2973.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
301	27 39W 27 BBA	-101.577	37.681	58.669	83.941	3005.
302	27 39W 34 DDD	-101.563	37.653	59.447	82.014	2928.
303	27 40W 21 DAA	-101.690	37.688	52.473	84.393	3172.
304	27 40W 25 CBC	-101.652	37.671	54.563	83.230	3088.
305	27 41W 31 CCB	-101.851	37.655	43.657	82.086	3169.
306	27 42W 11 DBD	-101.876	37.716	42.274	86.290	3249.
307	28 21W 11 C	-99.588	37.623	167.787	81.705	2308.
308	28 21W 23 DBC	-99.582	37.594	168.170	79.713	2297.
309	28 24W 8 DCC	-99.966	37.623	147.056	81.192	2443.
310	28 25W 6 ABB	-100.095	37.650	139.944	82.898	2499.
311	28 26W 13 CAA	-100.116	37.613	138.845	80.322	2506.
312	28 27W 3 BBB	-100.269	37.651	130.401	82.772	2580.
313	28 28W 20 ADD	-100.399	37.602	123.336	79.258	2647.
314	28 29W 16 ACC	-100.496	37.617	117.997	80.199	2646.
315	28 30W 10 DDD	-100.580	37.624	113.379	80.605	2660.
316	28 30W 17 BBA	-100.630	37.622	110.639	80.423	2660.
317	28 30W 24 BAB	-100.556	37.608	114.716	79.523	2651.
318	28 31W 3 CCD	-100.703	37.639	106.617	81.535	2680.
319	28 31W 32 ABB	-100.732	37.579	105.089	77.373	2680.
320	28 31W 35 CCB	-100.687	37.567	107.570	76.582	2656.
321	28 32W 18 BBB	-100.868	37.624	97.584	80.373	2674.
322	28 32W 24 BCC	-100.778	37.603	102.541	78.992	2694.
323	28 32W 35 BBA	-100.794	37.579	101.686	77.324	2687.
324	28 33W 21 BCB	-100.941	37.605	93.596	79.012	2671.
325	28 33W 24 DBC	-100.878	37.600	97.057	78.711	2656.
326	28 34W 13 BBB	-100.996	37.624	90.562	80.286	2691.
327	28 34W 15 DAB	-101.019	37.616	89.306	79.719	2692.
328	28 34W 32 ADD	-101.053	37.573	87.475	76.733	2707.
329	28 35W 8 BBA	-101.175	37.638	80.733	81.145	2809.
330	28 35W 15 CBB	-101.141	37.616	82.613	79.647	2771.
331	28 35W 30 BBB	-101.195	37.594	79.666	78.100	2777.
332	28 35W 36 ABC	-101.096	37.577	85.111	76.982	2739.
333	28 36W 21 CDD	-101.261	37.596	76.042	78.204	2807.
334	28 37W 10 BCD	-101.357	37.632	70.757	80.643	2854.
335	28 37W 30 BBD	-101.413	37.592	67.706	77.860	2909.
336	28 38W 7 BBB	-101.524	37.637	61.593	80.923	2919.
337	28 38W 8 BC	-101.505	37.633	62.638	80.653	2905.
338	28 38W 12 BCB	-101.433	37.634	66.587	80.750	2913.
339	28 38W 12 DDD	-101.417	37.625	67.467	80.135	2914.
340	28 38W 17 AAA	-101.490	37.623	63.464	79.970	2907.
341	28 38W 31 DBB	-101.515	37.571	62.116	76.374	2951.
342	28 38W 33 BD	-101.482	37.574	63.926	76.593	2959.
343	28 39W 5 BBB	-101.616	37.651	56.545	81.860	3041.
344	28 39W 33 ACC	-101.588	37.573	58.108	76.489	3029.
345	28 39W 36 ABB	-101.533	37.579	61.123	76.920	2971.
346	28 40W 4 CCC	-101.706	37.638	51.613	80.940	3108.
347	28 40W 23 ACC	-101.661	37.602	54.091	78.469	3076.
348	28 40W 32 CCB	-101.724	37.567	50.644	76.040	3079.
349	28 41W 12 BBC	-101.760	37.635	48.650	80.721	3162.
350	28 41W 31 BDD	-101.845	37.573	44.002	76.432	3248.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
351	28 42W 8 CCC	-101.942	37.624	38.669	79.937	3284.
352	29 25W 10 BBB	-100.049	37.547	142.619	75.848	2464.
353	29 26W 15 ADB	-100.146	37.528	137.321	74.424	2480.
354	29 27W 30 BCC	-100.323	37.498	127.641	72.162	2534.
355	29 27W 36 ABA	-100.222	37.488	133.202	71.580	2490.
356	29 28W 18 CCC	-100.433	37.521	121.570	73.637	2606.
357	29 28W 19 DDD	-100.417	37.506	122.465	72.618	2598.
358	29 28W 28 CDC	-100.392	37.491	123.858	71.608	2577.
359	29 29W 10 BBB	-100.487	37.549	118.572	75.517	2633.
360	29 29W 27 BCB	-100.488	37.501	118.572	72.206	2615.
361	29 30W 5 BBB	-100.632	37.564	110.594	76.421	2655.
362	29 30W 12 CCC	-100.560	37.536	114.578	74.553	2640.
363	29 30W 22 BBC	-100.596	37.518	112.621	73.280	2638.
364	29 30W 35 ACD	-100.567	37.485	114.249	71.029	2632.
365	29 31W 9 CB	-100.722	37.541	105.677	74.760	2669.
366	29 31W 14 BBB	-100.687	37.534	107.604	74.306	2654.
367	29 31W 34 BCA	-100.703	37.487	106.773	71.051	2653.
368	29 32W 4 BCC	-100.832	37.559	99.620	75.917	2686.
369	29 32W 16 DAA	-100.816	37.528	100.528	73.790	2658.
370	29 32W 19 CCC	-100.869	37.508	97.632	72.372	2658.
371	29 32W 22 BBB	-100.814	37.520	100.644	73.240	2679.
372	29 32W 26 CBB	-100.796	37.498	101.652	71.736	2647.
373	29 33W 1 AAB	-100.873	37.565	97.362	76.301	2637.
374	29 33W 5 ACA	-100.948	37.561	93.250	75.973	2670.
375	29 33W 11 BBC	-100.905	37.548	95.622	75.106	2633.
376	29 33W 28 BCB	-100.941	37.502	93.684	71.908	2675.
377	29 34W 2 ABB	-101.005	37.565	90.115	76.211	2694.
378	29 34W 9 CBB	-101.051	37.542	87.610	74.596	2711.
379	29 34W 11 ADD	-100.998	37.544	90.519	74.768	2686.
380	29 34W 24 BCC	-100.996	37.515	90.650	72.768	2686.
381	29 34W 28 CCD	-101.048	37.493	87.812	71.218	2720.
382	29 34W 36 CBC	-100.996	37.482	90.677	70.492	2695.
383	29 39W 17 BCB	-101.616	37.531	56.587	73.585	3039.
384	29 39W 24 DDA	-101.526	37.509	61.539	72.095	3021.
385	29 41W 13 ACC	-101.752	37.529	49.118	73.414	3098.
386	30 26W 4 CBB	-100.179	37.466	135.596	70.110	2483.
387	30 26W 7 BBB	-100.216	37.458	133.574	69.517	2484.
388	30 26W 17 BBC	-100.197	37.442	134.642	68.434	2483.
389	30 26W 31 CBC	-100.216	37.390	133.668	64.827	2458.
390	30 27W 4 DBD	-100.276	37.465	130.267	69.935	2508.
391	30 27W 22 CDD	-100.263	37.417	131.046	66.639	2510.
392	30 27W 23 ABB	-100.243	37.429	132.130	67.488	2493.
393	30 27W 32 DDD	-100.290	37.387	129.601	64.540	2466.
394	30 28W 2 BAA	-100.353	37.475	126.022	70.545	2546.
395	30 28W 17 ABB	-100.406	37.446	123.146	68.491	2556.
396	30 29W 3 DCC	-100.479	37.462	119.113	69.524	2600.
397	30 29W 23 CAD	-100.463	37.422	120.041	66.780	2580.
398	30 29W 28 BBB	-100.506	37.417	117.682	66.395	2593.
399	30 29W 32 BBB	-100.524	37.402	116.707	65.343	2596.
400	30 30W 12 CBB	-100.560	37.453	114.672	68.829	2614.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
401	30 30W 28 ABB	-100.606	37.417	112.182	66.305	2629.
402	30 31W 6 BBB	-100.760	37.476	103.652	70.247	2655.
403	30 31W 15 ABB	-100.696	37.446	107.203	68.229	2625.
404	30 31W 33 BBB	-100.723	37.402	105.760	65.172	2621.
405	30 32W 11 BBB	-100.796	37.461	101.687	69.184	2639.
406	30 32W 17 BCC	-100.850	37.441	98.738	67.764	2647.
407	30 32W 22 BBB	-100.814	37.432	100.726	67.171	2643.
408	30 32W 31 BAB	-100.864	37.403	98.003	65.134	2649.
409	30 33W 6 DBD	-100.966	37.467	92.338	69.477	2694.
410	30 33W 30 CBD	-100.975	37.408	91.891	65.403	2724.
411	30 34W 5 BBB	-101.069	37.476	86.669	70.033	2717.
412	30 34W 16 BBB	-101.050	37.447	87.737	68.045	2729.
413	30 34W 30 ADD	-101.071	37.412	86.610	65.618	2755.
414	30 39W 2 ABB	-101.552	37.476	60.124	69.810	3027.
415	30 39W 23 BBB	-101.561	37.432	59.645	66.773	3031.
416	30 39W 32 DA	-101.601	37.395	57.459	64.210	3057.
417	30 39W 36 BDD	-101.536	37.398	61.036	64.436	3031.
418	30 41W 13 CCC	-101.761	37.434	48.646	66.860	3139.
419	30 43W 34 BBB	-102.017	37.402	34.570	64.621	3543.
420	31 30W 16 BBC	-100.597	37.356	112.742	62.106	2600.
421	31 31W 8 BCC	-100.722	37.368	105.851	62.828	2624.
422	31 32W 3 DAD	-100.779	37.379	102.701	63.542	2638.
423	31 33W 6 CBD	-100.956	37.379	92.961	63.414	2715.
424	31 33W 20 DBB	-100.931	37.337	94.374	60.535	2690.
425	31 34W 18 BBB	-101.067	37.359	86.869	61.964	2744.
426	31 35W 7 BBB	-101.174	37.373	80.970	62.869	2787.
427	31 35W 15 BAA	-101.114	37.359	84.282	61.937	2737.
428	31 35W 19 CCC	-101.174	37.332	80.998	60.042	2822.
429	31 35W 26 DCC	-101.094	37.317	85.414	59.052	2721.
430	31 36W 2 CDD	-101.204	37.375	79.318	62.991	2844.
431	31 36W 18 BAA	-101.276	37.359	75.364	61.851	2910.
432	31 36W 27 BCB	-101.228	37.326	78.026	59.600	2897.
433	31 37W 9 BCC	-101.355	37.368	71.009	62.436	2930.
434	31 37W 22 BCC	-101.337	37.339	72.015	60.444	2920.
435	31 38W 17 CDA	-101.475	37.349	64.413	61.078	2987.
436	31 39W 18 CCC	-101.609	37.346	57.038	60.827	3065.
437	31 39W 23 BBB	-101.536	37.345	61.058	60.781	3042.
438	31 40W 1 DA	-101.613	37.380	56.803	63.172	3067.
439	31 40W 29 ABB	-101.690	37.330	52.581	59.703	3151.
440	31 43W 20 CBB	-102.026	37.337	34.077	60.139	3559.
441	32 29W 5 CC	-100.504	37.288	117.940	57.499	2561.
442	32 31W 8 BBB	-100.722	37.286	105.934	57.172	2616.
443	32 31W 26 CAA	-100.662	37.235	109.293	53.705	2574.
444	32 32W 14 BBB	-100.776	37.272	102.970	56.165	2604.
445	32 32W 19 BAB	-100.844	37.258	99.236	55.148	2633.
446	32 33W 12 BCC	-100.867	37.281	97.948	56.718	2655.
447	32 33W 21 CDB	-100.916	37.247	95.276	54.338	2676.
448	32 34W 10 DAA	-100.996	37.279	90.841	56.492	2712.
449	32 34W 17 DCC	-101.039	37.259	88.486	55.085	2709.
450	32 34W 32 BBB	-101.048	37.228	88.016	52.942	2744.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
451	32 35W 8 DDD	-101.140	37.273	82.911	55.991	2864.
452	32 37W 4 ACA	-101.344	37.297	71.656	57.544	2933.
453	32 37W 10 DCC	-101.328	37.274	72.548	55.965	2963.
454	32 38W 6 ACC	-101.491	37.296	63.555	57.417	3090.
455	32 38W 11 ADA	-101.411	37.283	67.969	56.551	3038.
456	32 39W 2 BBB	-101.536	37.301	61.076	57.746	3042.
457	32 39W 9 DD	-101.557	37.275	59.927	55.946	3066.
458	32 40W 21 ADB	-101.667	37.254	53.872	54.467	3164.
459	33 32W 28 CDD	-100.805	37.144	101.494	47.315	2571.
460	33 33W 12 AAD	-100.850	37.198	98.960	51.005	2618.
461	33 36W 11 DDC	-101.196	37.186	79.881	49.961	2898.
462	33 36W 26 DDD	-101.193	37.143	80.075	46.997	2895.
463	33 37W 9 BCC	-101.354	37.194	71.158	50.437	3032.
464	33 37W 17 CCC	-101.372	37.172	70.178	48.912	3037.
465	33 37W 23 CDB	-101.313	37.159	73.442	48.041	2996.
466	33 38W 6 AAB	-101.486	37.214	63.869	51.764	3112.
467	33 38W 10 ACC	-101.436	37.194	66.636	50.403	3039.
468	33 38W 20 DDB	-101.467	37.160	64.943	48.047	3046.
469	33 39W 16 ABB	-101.562	37.185	59.688	49.738	3160.
470	33 41W 33 DDD	-101.773	37.128	48.058	45.755	3309.
471	33 42W 1 AA	-101.829	37.212	44.952	51.538	3388.
472	33 42W 21 BCB	-101.898	37.166	41.152	48.356	3427.
473	34 31W 30 BBB	-100.739	37.069	105.212	42.193	2523.
474	34 32W 35 ADA	-100.759	37.051	104.125	40.936	2544.
475	34 33W 7 CCB	-100.956	37.102	93.192	44.311	2771.
476	34 34W 16 DAA	-101.013	37.090	90.054	43.446	2821.
477	34 34W 17 DDD	-101.031	37.085	89.064	43.091	2830.
478	34 35W 7 BCC	-101.173	37.106	81.204	44.456	2878.
479	34 35W 18 BCA	-101.171	37.094	81.321	43.629	2891.
480	34 37W 8 DAC	-101.358	37.103	70.987	44.159	3038.
481	34 37W 27 ABC	-101.326	37.067	72.776	41.691	3021.
482	34 38W 2 CDB	-101.422	37.116	67.446	45.029	3045.
483	34 39W 2 CCA	-101.533	37.116	61.315	44.989	3147.
484	34 39W 15 CAD	-101.546	37.089	60.610	43.123	3144.
485	35 31W 18 BBA	-100.736	37.012	105.435	38.264	2535.
486	35 33W 16 BCA	-100.917	37.008	95.428	37.854	2724.
487	35 34W 3 CBC	-101.011	37.030	90.213	39.310	2823.
488	35 34W 10 BBB	-101.010	37.025	90.271	38.965	2840.
489	35 36W 1 AAA	-101.175	37.039	81.138	39.835	2910.
490	35 39W 10 CAD	-101.545	37.016	60.694	38.090	3114.

I.D.	LOCATION	LAT.	LONG.	X-COORD	Y-COORD	WATER
JAN. 1979				(MI)	(MI)	LEVEL
1	1 38W 2 CDC	-101.555	39.989	56.293	102.471	3008.
2	1 38W 8 DCC	-101.607	39.975	53.538	101.460	3041.
3	1 38W 30 BDC	-101.630	39.939	52.285	98.958	3080.
4	1 39W 25 CBC	-101.654	39.935	51.041	98.703	3092.
5	2 39W 27 BBB	-101.692	39.857	49.054	93.321	3216.
6	2 40W 28 DBA	-101.811	39.850	42.687	92.801	3339.
7	2 41W 33 DBC	-101.926	39.834	36.598	91.677	3412.
8	2 42W 14 DDD	-101.993	39.874	33.009	94.444	3461.
9	3 37W 19 BBC	-101.523	39.783	58.048	88.239	3239.
10	3 37W 21 DDD	-101.469	39.772	60.909	87.506	3196.
11	3 37W 36 ADB	-101.416	39.752	63.775	86.151	3175.
12	3 39W 20 DAC	-101.715	39.776	47.808	87.691	3306.
13	3 39W 24 DDD	-101.638	39.772	51.920	87.461	3285.
14	3 39W 32 BDB	-101.725	39.752	47.308	86.064	3333.
15	3 40W 9 BAA	-101.816	39.814	42.435	90.299	3338.
16	3 40W 22 BCA	-101.802	39.781	43.182	88.049	3270.
17	3 40W 28 CBB	-101.824	39.763	42.054	86.794	3295.
18	3 40W 35 AAC	-101.772	39.754	44.808	86.178	3344.
19	3 41W 16 AAC	-101.921	39.798	36.840	89.172	3434.
20	3 41W 31 ADB	-101.959	39.752	34.854	86.049	3435.
21	3 42W 4 AAA	-102.031	39.829	31.006	91.329	3496.
22	4 37W 14 BAB	-101.444	39.712	62.286	83.394	3205.
23	4 38W 4 BAC	-101.594	39.740	54.296	85.223	3295.
24	4 38W 11 CCC	-101.561	39.714	56.046	83.482	3292.
25	4 38W 20 CCC	-101.618	39.685	53.048	81.469	3330.
26	4 38W 21 ADC	-101.585	39.693	54.799	81.978	3308.
27	4 39W 2 DBC	-101.664	39.732	50.550	84.705	3317.
28	4 39W 15 CCA	-101.690	39.701	49.176	82.573	3350.
29	4 39W 18 CAB	-101.744	39.705	46.310	82.809	3372.
30	4 39W 27 CCA	-101.690	39.673	49.178	80.574	3367.
31	4 40W 22 BCB	-101.805	39.694	43.050	82.044	3395.
32	4 41W 16 DAA	-101.920	39.705	36.951	82.789	3387.
33	4 41W 25 BCB	-101.880	39.680	39.054	81.031	3429.
34	4 41W 31 ACA	-101.962	39.665	34.717	80.042	3454.
35	5 37W 15 DBB	-101.459	39.618	61.546	76.892	3244.
36	5 38W 13 BAD	-101.536	39.624	57.421	77.245	3312.
37	5 38W 22 ACB	-101.571	39.607	55.550	76.110	3339.
38	5 38W 26 CCA	-101.560	39.586	56.173	74.614	3341.
39	5 39W 8 CCC	-101.730	39.627	47.054	77.438	3411.
40.	5 39W 11 CBC	-101.674	39.631	50.052	77.704	3380.
41	5 39W 18 CCC	-101.749	39.613	46.051	76.432	3412.
42	5 39W 25 CDA	-101.649	39.586	51.428	74.588	3403.
43	5 40W 4 CBD	-101.822	39.645	42.171	78.662	3444.
44	5 40W 14 BCD	-101.784	39.620	44.172	76.921	3429.
45	5 40W 15 ACB	-101.796	39.622	43.548	77.042	3433.
46	5 40W 27 BBA	-101.803	39.596	43.171	75.290	3454.
47	5 41W 12 ADC	-101.866	39.634	39.791	77.901	3469.
48	5 41W 20 DAA	-101.939	39.604	35.946	75.784	3517.
49	5 42W 4 AAB	-102.034	39.655	30.848	79.305	3496.
50	5 42W 14 CBC	-102.011	39.616	32.093	76.671	3531.

I.D.	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
51	5 42W 36 CCB	-101.992	39.571	33.084	73.539	3589.
52	1 26W 18 DDB	-100.276	39.962	124.168	101.463	2391.
53	1 29W 3 DDB	-100.557	39.991	109.223	103.196	2508.
54	1 29W 19 BDD	-100.620	39.953	105.948	100.519	2549.
55	1 30W 34 DDD	-100.667	39.917	103.497	97.986	2575.
56	2 26W 11 BBA	-100.213	39.900	127.589	97.241	2423.
57	2 28W 13 ABA	-100.409	39.886	117.193	96.074	2456.
58	2 29W 24 BCC	-100.534	39.866	110.584	94.592	2587.
59	2 30W 26 DCC	-100.655	39.845	104.179	92.990	2683.
60	3 26W 30 CBB	-100.291	39.763	123.656	87.688	2484.
61	3 27W 32 ABA	-100.373	39.756	119.316	87.106	2563.
62	3 28W 6 DCB	-100.506	39.818	112.127	91.243	2528.
63	3 28W 32 BCA	-100.495	39.752	112.824	86.753	2616.
64	3 29W 12 BBA	-100.532	39.814	110.762	90.969	2525.
65	3 29W 17 DCB	-100.600	39.788	107.200	89.158	2562.
66	3 29W 31 DCC	-100.618	39.743	106.250	86.015	2608.
67	3 30W 26 BBB	-100.665	39.770	103.744	87.852	2617.
68	4 26W 8 DDD	-100.256	39.714	125.571	84.328	2426.
69	4 26W 19 DCA	-100.280	39.687	124.365	82.438	2445.
70	4 27W 17 DAC	-100.371	39.703	119.495	83.482	2543.
71	4 27W 33 BBB	-100.366	39.669	119.781	81.110	2509.
72	4 28W 15 AAA	-100.443	39.712	115.617	84.043	2607.
73	4 28W 30 DDD	-100.500	39.671	112.662	81.126	2635.
74	4 30W 7 BBB	-100.740	39.727	99.803	84.788	2683.
75	5 26W 5 ADD	-100.257	39.648	125.646	79.824	2479.
76	5 26W 26 DDA	-100.201	39.584	128.689	75.480	2414.
77	5 26W 33 DCC	-100.245	39.569	126.357	74.325	2457.
78	5 28W 7 BBC	-100.516	39.638	111.824	78.864	2625.
79	5 28W 14 ADD	-100.425	39.620	116.714	77.683	2589.
80	5 28W 17 DAC	-100.483	39.616	113.596	77.388	2633.
81	5 29W 11 BAA	-100.546	39.640	110.201	78.959	2657.
82	5 29W 22 CBB	-100.572	39.604	108.864	76.433	2673.
83	5 30W 35 BCB	-100.666	39.578	103.900	74.590	2769.
84	11 26W 4 CDC	-100.216	39.118	128.528	43.274	2517.
85	11 27W 16 AAA	-100.315	39.102	123.232	42.080	2608.
86	11 29W 4 DAD	-100.535	39.123	111.403	43.298	2732.
87	11 30W 27 ABB	-100.636	39.075	106.050	39.878	2793.
88	6 24W 35 DDD	-99.958	39.481	141.826	68.627	2357.
89	6 25W 28 CBC	-100.124	39.499	132.909	69.671	2432.
90	8 23W 24 BBD	-99.842	39.347	148.265	59.491	2124.
91	11 32W 4 ACD	-100.873	39.127	93.255	43.314	2953.
92	11 32W 19 AAB	-100.908	39.089	91.401	40.684	2970.
93	11 34W 16 CDB	-101.103	39.093	80.923	40.817	3099.
94	11 36W 6 ADD	-101.350	39.128	67.601	43.081	3219.
95	11 36W 6 DBB	-101.357	39.126	67.224	42.956	3216.
96	13 35W 23 BCC	-101.184	38.910	76.699	28.163	2912.
97	13 36W 20 CCB	-101.351	38.905	67.696	27.734	3011.
98	1 33W 29 CCC	-101.055	39.931	82.871	98.695	2878.
99	2 31W 3 CAD	-100.788	39.906	97.058	97.151	2646.
100	2 32W 14 DCA	-100.876	39.876	92.395	94.953	2700.

I.D.	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
101	2 32W 20 DCD	-100.932	39.859	89.461	93.784	2721.
102	2 33W 26 DCC	-100.990	39.845	86.384	92.743	2772.
103	2 35W 13 ABB	-101.195	39.886	75.425	95.505	3009.
104	2 36W 13 DDD	-101.301	39.874	69.827	94.598	3096.
105	2 36W 15 CDD	-101.347	39.874	67.347	94.566	3131.
106	2 36W 36 BAA	-101.310	39.843	69.342	92.466	3086.
107	3 31W 7 CBD	-100.849	39.805	93.924	90.095	2814.
108	3 31W 23 BBB	-100.777	39.785	97.776	88.769	2776.
109	3 33W 3 DCC	-101.009	39.816	85.408	90.730	2795.
110	3 33W 8 CDC	-101.051	39.801	83.178	89.701	2830.
111	3 34W 3 ABB	-101.121	39.828	79.437	91.537	2866.
112	3 34W 26 BAC	-101.107	39.768	80.207	87.419	2886.
113	3 34W 33 BCC	-101.149	39.750	77.976	86.149	2926.
114	3 35W 24 CBB	-101.205	39.778	74.976	88.000	2973.
115	3 36W 14 CBB	-101.336	39.792	67.993	88.950	3128.
116	3 36W 17 CCC	-101.392	39.787	65.012	88.538	3161.
117	4 31W 16 ABD	-100.802	39.710	96.474	83.619	2748.
118	4 31W 25 DDD	-100.742	39.670	99.723	80.902	2737.
119	4 33W 18 DDA	-101.058	39.701	82.847	82.824	2981.
120	4 33W 28 DCA	-101.026	39.673	84.608	80.849	2972.
121	4 34W 33 CBC	-101.150	39.660	78.016	79.897	3039.
122	4 35W 6 DCD	-101.287	39.729	70.630	84.600	3092.
123	4 35W 13 DAD	-101.189	39.703	75.883	82.878	2986.
124	4 35W 29 DDD	-101.264	39.671	71.899	80.606	3068.
125	4 36W 6 BBB	-101.411	39.741	64.025	85.403	3176.
126	4 36W 9 CDD	-101.367	39.714	66.397	83.555	3172.
127	5 31W 10 DDA	-100.779	39.629	97.780	78.000	2774.
128	5 31W 20 CCA	-100.831	39.600	95.079	75.969	2830.
129	5 31W 23 DDD	-100.761	39.598	98.793	75.881	2829.
130	5 32W 14 CDD	-100.882	39.613	92.346	76.817	2889.
131	5 33W 29 BDA	-101.050	39.593	83.396	75.334	3023.
132	5 34W 1 BBB	-101.094	39.654	81.001	79.553	3021.
133	5 34W 28 ADC	-101.136	39.591	78.793	75.154	3072.
134	5 35W 10 CDD	-101.236	39.627	73.418	77.613	3099.
135	5 36W 21 BCD	-101.372	39.606	66.177	76.055	3200.
136	6 27W 3 DCD	-100.317	39.554	122.569	73.275	2526.
137	6 27W 8 DCA	-100.354	39.542	120.593	72.364	2568.
138	6 27W 27 BCC	-100.328	39.503	122.000	69.754	2557.
139	6 28W 28 ADD	-100.443	39.504	115.903	69.662	2636.
140	6 29W 10 DBC	-100.542	39.544	110.531	72.333	2693.
141	6 29W 24 ABB	-100.505	39.524	112.525	70.993	2680.
142	6 29W 33 CDA	-100.563	39.484	109.482	68.181	2726.
143	6 30W 2 BCA	-100.642	39.564	105.184	73.609	2759.
144	6 30W 13 BAA	-100.619	39.538	106.460	71.882	2745.
145	6 30W 14 CCD	-100.642	39.525	105.222	70.982	2776.
146	6 30W 24 DDC	-100.612	39.511	106.861	70.013	2760.
147	7 26W 12 BAC	-100.176	39.463	130.205	67.108	2462.
148	7 26W 28 CAB	-100.232	39.414	127.302	63.687	2481.
149	7 28W 8 BDC	-100.473	39.460	114.332	66.633	2652.
150	7 28W 19 BBA	-100.494	39.437	113.236	64.989	2662.

I.D.	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
151	7 28W 21 ABB	-100.450	39.437	115.600	65.021	2623.
152	7 28W 36 ABA	-100.392	39.407	118.741	63.061	2587.
153	7 29W 2 DBD	-100.522	39.471	111.716	67.344	2690.
154	7 29W 21 ABB	-100.561	39.437	109.652	64.929	2712.
155	7 29W 30 ABA	-100.596	39.422	107.815	63.898	2738.
156	8 26W 14 DAA	-100.183	39.356	129.961	59.707	2380.
157	8 26W 16 CDD	-100.230	39.351	127.498	59.300	2411.
158	8 27W 11 DCD	-100.299	39.365	123.765	60.254	2494.
159	8 27W 33 BBD	-100.346	39.318	121.322	56.958	2535.
160	8 28W 9 ABC	-100.450	39.377	115.665	60.886	2631.
161	8 29W 1 DCB	-100.506	39.382	112.674	61.221	2681.
162	8 29W 29 BAA	-100.582	39.335	108.644	57.903	2748.
163	8 30W 11 CBC	-100.645	39.370	105.250	60.224	2768.
164	8 30W 13 DAA	-100.610	39.357	107.136	59.382	2756.
165	8 30W 30 ABC	-100.710	39.333	101.782	57.666	2840.
166	9 27W 12 CCC	-100.292	39.278	124.233	54.242	2569.
167	9 27W 19 DDD	-100.369	39.249	120.149	52.177	2622.
168	9 28W 4 BCC	-100.460	39.300	115.245	55.617	2650.
169	9 28W 6 CCB	-100.497	39.295	113.263	55.216	2686.
170	9 28W 31 AAC	-100.483	39.232	114.077	50.841	2686.
171	9 29W 17 BAB	-100.584	39.277	108.577	53.896	2755.
172	9 30W 3 AAB	-100.649	39.306	105.060	55.844	2796.
173	9 30W 16 CDA	-100.675	39.266	103.723	53.071	2822.
174	9 30W 35 BBB	-100.645	39.234	105.381	50.845	2799.
175	10 27W 20 CBC	-100.367	39.166	120.358	46.415	2585.
176	10 28W 5 DDB	-100.464	39.208	115.094	49.225	2684.
177	10 28W 29 DAA	-100.462	39.153	115.274	45.468	2664.
178	10 29W 20 CCC	-100.589	39.163	108.440	46.010	2762.
179	10 30W 8 DDD	-100.685	39.192	103.296	47.937	2830.
180	10 30W 12 ADA	-100.610	39.201	107.287	48.623	2774.
181	10 30W 17 DAD	-100.685	39.181	103.304	47.187	2829.
182	6 37W 3 BCC	-101.445	39.562	62.327	73.025	3261.
183	6 37W 7 BBA	-101.498	39.553	59.498	72.384	3294.
184	6 37W 16 CDD	-101.456	39.526	61.719	70.521	3288.
185	6 38W 9 ABD	-101.563	39.551	56.035	72.237	3354.
186	6 38W 20 ACC	-101.584	39.519	54.926	69.977	3391.
187	6 39W 9 DDD	-101.670	39.540	50.315	71.450	3439.
188	6 40W 10 AAC	-101.765	39.551	45.240	72.169	3481.
189	6 40W 30 DCC	-101.825	39.496	42.042	68.397	3555.
190	6 40W 35 BCC	-101.761	39.489	45.475	67.916	3510.
191	6 41W 1 ABB	-101.843	39.567	41.076	73.273	3518.
192	6 41W 9 BCB	-101.908	39.549	37.562	72.030	3572.
193	6 41W 19 DBD	-101.934	39.515	36.176	69.655	3606.
194	6 41W 27 DBD	-101.878	39.500	39.176	68.647	3580.
195	6 42W 2 AAA	-101.967	39.568	34.426	73.289	3583.
196	6 42W 8 CBB	-102.040	39.546	30.511	71.793	3631.
197	6 42W 22 DCC	-101.993	39.511	33.028	69.409	3645.
198	6 42W 30 ADA	-102.043	39.506	30.377	69.037	3671.
199	7 37W 4 BBC	-101.463	39.479	61.358	67.267	3318.
200	7 37W 5 CCB	-101.482	39.470	60.369	66.635	3336.

I.D.	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
201	7 37W 11 ACB	-101.417	39.463	63.834	66.162	3290.
202	7 37W 17 BDA	-101.475	39.448	60.744	65.136	3337.
203	7 39W 9 BBB	-101.686	39.466	49.440	66.312	3477.
204	7 39W 24 BAA	-101.623	39.437	52.827	64.330	3440.
205	7 39W 30 CCB	-101.724	39.411	47.434	62.546	3502.
206	7 40W 6 ADB	-101.820	39.476	42.279	67.021	3559.
207	7 40W 29 BBA	-101.814	39.422	42.634	63.270	3571.
208	7 40W 35 BBB	-101.761	39.408	45.461	62.285	3524.
209	7 40W 36 BAB	-101.738	39.408	46.692	62.292	3509.
210	7 41W 7 BCB	-101.946	39.462	35.540	66.026	3646.
211	7 41W 10 BBA	-101.888	39.466	38.666	66.270	3611.
212	7 41W 16 ADC	-101.895	39.446	38.286	64.895	3624.
213	7 41W 28 DBB	-101.900	39.415	38.029	62.767	3648.
214	7 42W 7 DAA	-102.043	39.459	30.365	65.781	3706.
215	7 42W 17 CCC	-102.041	39.439	30.488	64.403	3729.
216	7 42W 27 AAB	-101.989	39.422	33.263	63.273	3700.
217	8 37W 21 CCC	-101.464	39.337	61.380	57.513	3356.
218	8 37W 28 ABC	-101.455	39.334	61.880	57.268	3349.
219	8 37W 32 ABB	-101.474	39.321	60.884	56.381	3372.
220	8 38W 17 CDD	-101.587	39.352	54.818	58.458	3445.
221	8 38W 24 AAB	-101.506	39.350	59.142	58.366	3391.
222	8 38W 28 ACC	-101.566	39.330	55.933	56.964	3443.
223	8 39W 2 BAA	-101.642	39.393	51.826	61.319	3452.
224	8 39W 15 CCC	-101.668	39.352	50.446	58.432	3476.
225	8 39W 17 DCD	-101.694	39.352	49.065	58.424	3491.
226	8 39W 27 AAB	-101.654	39.335	51.203	57.309	3468.
227	8 39W 28 CAB	-101.682	39.328	49.692	56.800	3495.
228	8 40W 12 DBA	-101.731	39.371	47.061	59.791	3504.
229	8 40W 17 CDB	-101.812	39.353	42.737	58.518	3596.
230	8 40W 20 CBC	-101.817	39.340	42.484	57.641	3600.
231	8 40W 20 CCC	-101.817	39.337	42.485	57.391	3602.
232	8 40W 20 DAA	-101.801	39.342	43.350	57.770	3596.
233	8 40W 24 AAA	-101.727	39.350	47.306	58.290	3508.
234	8 40W 25 AAC	-101.729	39.333	47.181	57.163	3517.
235	8 40W 35 CCB	-101.762	39.310	45.448	55.528	3571.
236	8 41W 17 CBA	-101.926	39.357	36.643	58.763	3702.
237	8 41W 25 BBC	-101.854	39.333	40.498	57.137	3641.
238	8 42W 15 DDB	-101.989	39.353	33.249	58.515	3736.
239	8 42W 19 ABB	-102.051	39.350	29.968	58.268	3761.
240	8 42W 29 ACB	-102.032	39.332	30.972	57.015	3782.
241	8 42W 31 DCD	-102.048	39.308	30.085	55.387	3797.
242	8 42W 34 DCB	-101.994	39.310	32.990	55.509	3766.
243	9 38W 13 BCC	-101.520	39.272	58.406	52.978	3433.
244	9 39W 2 BAB	-101.645	39.306	51.707	55.309	3480.
245	9 39W 17 BBA	-101.704	39.277	48.560	53.289	3544.
246	9 39W 19 CCC	-101.725	39.250	47.427	51.407	3558.
247	9 40W 8 CCB	-101.817	39.281	42.466	53.514	3623.
248	9 40W 8 CDB	-101.813	39.281	42.715	53.514	3612.
249	9 40W 13 CDC	-101.739	39.264	46.682	52.404	3563.
250	9 40W 27 CDC	-101.776	39.235	44.690	50.394	3597.

I.D.	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
251	9 40W 29 BBB	-101.818	39.248	42.457	51.262	3625.
252	9 41W 5 DCC	-101.919	39.293	37.004	54.382	3693.
253	9 41W 14 BBC	-101.873	39.275	39.484	53.132	3664.
254	9 41W 28 AAA	-101.894	39.248	38.359	51.253	3680.
255	9 41W 34 BAB	-101.887	39.234	38.727	50.253	3693.
256	9 42W 8 AAA	-102.025	39.292	31.344	54.259	3788.
257	9 42W 11 CCC	-101.985	39.279	33.489	53.381	3757.
258	9 42W 14 AAA	-101.968	39.277	34.371	53.254	3733.
259	9 42W 16 CDD	-102.016	39.264	31.843	52.380	3801.
260	9 42W 35 ABB	-101.976	39.234	33.984	50.250	3776.
261	10 37W 23 ABB	-101.418	39.176	63.917	46.422	3228.
262	10 40W 10 ADC	-101.767	39.199	45.182	47.893	3606.
263	10 41W 15 CAD	-101.885	39.181	38.837	46.624	3742.
264	10 42W 21 BBB	-102.023	39.175	31.446	46.244	3859.
265	10 42W 24 BBA	-101.964	39.175	34.606	46.243	3807.
266	6 31W 3 ADB	-100.761	39.563	98.838	73.507	2838.
267	6 31W 33 CCD	-100.791	39.482	97.304	67.866	2887.
268	6 32W 12 CBC	-100.849	39.544	94.165	72.087	2903.
269	6 32W 29 CDC	-100.918	39.497	90.491	68.797	2952.
270	6 33W 7 BBB	-101.054	39.553	83.205	72.579	3039.
271	6 33W 23 DDD	-100.962	39.511	88.119	69.771	2983.
272	6 33W 31 CAB	-101.049	39.488	83.494	68.087	3050.
273	6 34W 10 DDA	-101.093	39.542	81.112	71.805	3060.
274	6 34W 11 CDD	-101.084	39.540	81.607	71.686	3054.
275	6 34W 17 CBC	-101.146	39.529	78.275	70.898	3101.
276	6 35W 2 CDD	-101.195	39.555	75.658	72.627	3112.
277	6 35W 26 ACB	-101.193	39.506	75.804	69.251	3146.
278	6 36W 6 BCD	-101.387	39.562	65.411	73.045	3219.
279	6 36W 11 ACC	-101.305	39.548	69.799	72.090	3189.
280	6 36W 30 DCB	-101.380	39.499	65.809	68.678	3263.
281	6 36W 34 DDB	-101.319	39.484	69.070	67.704	3229.
282	7 31W 1 DCA	-100.726	39.469	100.778	67.026	2842.
283	7 31W 26 CCC	-100.756	39.410	99.224	62.886	2870.
284	7 32W 7 ACA	-100.930	39.463	89.889	66.415	2979.
285	7 32W 13 AAA	-100.833	39.451	95.101	65.720	2920.
286	7 33W 7 BDA	-101.047	39.462	83.637	66.339	3041.
287	7 33W 21 DBC	-101.007	39.428	85.782	63.990	3026.
288	7 33W 35 ADD	-100.963	39.403	88.168	62.266	2992.
289	7 34W 8 BBB	-101.147	39.466	78.308	66.522	3124.
290	7 34W 25 AAA	-101.056	39.423	83.161	63.585	3055.
291	7 34W 26 DBD	-101.080	39.413	81.926	62.945	3065.
292	7 35W 10 CCC	-101.221	39.453	74.327	65.613	3169.
293	7 36W 17 CCC	-101.371	39.439	66.330	64.558	3273.
294	7 36W 35 CBB	-101.315	39.401	69.348	61.952	3252.
295	8 31W 20 CDD	-100.805	39.337	96.682	57.858	2916.
296	8 32W 7 BAA	-100.935	39.379	89.677	60.656	2985.
297	8 32W 12 DBC	-100.840	39.370	94.790	60.089	2947.
298	8 33W 2 CDD	-100.973	39.381	87.678	60.760	2999.
299	8 33W 7 AAB	-101.040	39.379	84.060	60.598	3041.
300	8 33W 34 BBC	-100.999	39.319	86.337	56.495	3018.

I.D.	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
301	8 34W 1 BAC	-101.068	39.392	82.559	61.454	3056.
302	8 34W 6 CBC	-101.165	39.384	77.355	60.885	3124.
303	8 34W 23 CBD	-101.089	39.341	81.470	57.941	3062.
304	8 36W 18 ABA	-101.378	39.365	65.983	59.435	3302.
305	9 31W 10 BBB	-100.775	39.292	98.336	54.750	2912.
306	9 31W 22 ABD	-100.764	39.261	98.984	52.632	2910.
307	9 31W 36 AAB	-100.724	39.234	101.130	50.781	2870.
308	9 32W 9 BDA	-100.899	39.288	91.720	54.424	2972.
309	9 32W 27 BCD	-100.885	39.243	92.498	51.306	2952.
310	9 33W 15 ACC	-100.990	39.272	86.859	53.249	3014.
311	9 33W 30 CAA	-101.048	39.242	83.765	51.101	3017.
312	9 33W 35 AAD	-100.964	39.232	88.245	50.508	2990.
313	9 34W 12 ADA	-101.057	39.289	83.240	54.345	3043.
314	9 35W 32 DAA	-101.243	39.227	73.286	49.965	3173.
315	10 31W 26 AAA	-100.741	39.161	100.323	45.772	2881.
316	10 31W 29 AAB	-100.799	39.161	97.198	45.737	2908.
317	10 32W 4 CAB	-100.901	39.212	91.637	49.168	2972.
318	10 32W 11 BAA	-100.862	39.205	93.781	48.697	2959.
319	10 32W 29 DCB	-100.916	39.151	90.913	44.905	2971.
320	10 33W 3 DBC	-100.990	39.211	86.888	48.998	2999.
321	10 33W 19 CBD	-101.053	39.167	83.560	45.979	3057.
322	10 34W 1 ABA	-101.062	39.220	83.031	49.595	3015.
323	10 34W 12 BCD	-101.071	39.200	82.544	48.213	3038.
324	10 34W 14 BCC	-101.092	39.185	81.432	47.195	3076.
325	10 36W 36 ACC	-101.288	39.141	70.932	44.064	3189.
326	11 38W 35 CCC	-101.515	39.047	58.794	37.484	3229.
327	11 42W 8 DDC	-102.000	39.105	32.661	41.354	3844.

I.D.	LOCATION	LAT.	LONG.	X-COORD	Y-COORD	WATER
JAN. 1980				(MI)	(MI)	LEVEL
1	18 11W 10 BCC	-98.535	38.501	86.645	107.638	1769.
2	18 15W 28 BBC	-98.995	38.462	61.730	104.727	1892.
3	18 15W 28 CCC	-98.995	38.451	61.734	103.968	1893.
4	19 13W 8 BAD	-98.785	38.418	73.144	101.777	1835.
5	19 14W 29 DDB	-98.888	38.366	67.582	98.145	1868.
6	20 11W 6 CCC	-98.590	38.334	83.789	96.085	1778.
7	20 11W 26 AAC	-98.503	38.287	88.552	92.897	1742.
8	20 12W 3 DAC	-98.631	38.338	81.557	96.338	1792.
9	20 12W 6 AAC	-98.687	38.345	78.512	96.791	1814.
10	20 12W 23 CCA	-98.624	38.293	81.972	93.238	1800.
11	20 13W 17 DDC	-98.778	38.306	73.591	94.055	1860.
12	20 13W 24 DCB	-98.710	38.293	77.293	93.192	1831.
13	20 14W 13 DDB	-98.814	38.308	71.633	94.176	1860.
14	20 14W 22 DCB	-98.856	38.293	69.360	93.123	1883.
15	20 15W 24 D	-98.926	38.294	65.554	93.164	1901.
16	22 6W 33 BAB	-97.991	38.100	116.605	80.399	1543.
17	22 8W 23 DAD	-98.162	38.120	107.267	81.626	1620.
18	22 8W 33 CCD	-98.213	38.087	104.520	79.309	1652.
19	22 9W 3 BBD	-98.305	38.171	99.427	85.032	1679.
20	22 9W 17 BAB	-98.339	38.143	97.600	83.076	1714.
21	22 9W 25 BBA	-98.268	38.115	101.496	81.197	1685.
22	22 10W 2 DCC	-98.389	38.160	94.861	84.212	1727.
23	22 10W 8 BBB	-98.454	38.158	91.325	84.030	1750.
24	22 10W 30 DAA	-98.456	38.107	91.258	80.510	1767.
25	23 6W 31 DCB	-98.023	38.002	114.977	73.609	1546.
26	23 7W 1 ABA	-98.039	38.086	114.007	79.388	1560.
27	23 7W 5 ABA	-98.112	38.085	110.029	79.255	1598.
28	23 7W 13 DDD	-98.035	38.044	114.272	76.495	1551.
29	23 7W 17 BBC	-98.123	38.055	109.460	77.175	1602.
30	23 7W 26 BBB	-98.069	38.028	112.437	75.361	1568.
31	23 8W 18 AAD	-98.236	38.055	103.298	77.083	1662.
32	23 9W 5 CBD	-98.341	38.076	97.554	78.452	1723.
33	23 9W 35 CCC	-98.288	38.000	100.517	73.249	1702.
34	23 10W 2 ABB	-98.389	38.085	94.928	79.039	1745.
35	23 10W 7 CAD	-98.465	38.062	90.803	77.400	1775.
36	23 10W 25 CAC	-98.375	38.018	95.750	74.427	1742.
37	24 6W 30 CBC	-98.032	37.931	114.566	68.703	1543.
38	24 7W 8 ADA	-98.107	37.980	110.415	72.016	1589.
39	24 7W 28 AAA	-98.089	37.940	111.443	69.273	1577.
40	24 8W 18 BAC	-98.247	37.968	102.785	71.074	1646.
41	24 8W 34 DAC	-98.182	37.917	106.385	67.608	1584.
42	24 9W 19 DDB	-98.348	37.944	97.290	69.342	1682.
43	24 10W 6 DBB	-98.463	37.991	90.973	72.505	1776.
44	24 10W 17 DDC	-98.440	37.956	92.258	70.106	1740.
45	25 7W 7 BBD	-98.139	37.895	108.757	66.126	1579.
46	25 7W 36 CCC	-98.050	37.826	113.700	61.444	1544.
47	25 8W 19 ADB	-98.237	37.864	103.434	63.908	1599.
48	25 9W 1 DCC	-98.260	37.899	102.142	66.304	1644.
49	25 9W 17 BBC	-98.343	37.880	97.624	64.932	1696.
50	25 9W 30 DDA	-98.345	37.842	97.548	62.309	1676.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
51	25 10W 14 BBB	-98.398	37.882	94.617	65.031	1723.
52	25 10W 19 ABD	-98.460	37.866	91.240	63.885	1762.
53	26 6W 13 BAB	-97.930	37.796	120.303	59.487	1468.
54	26 6W 19 DCD	-98.015	37.768	115.683	57.476	1549.
55	26 6W 34 BBC	-97.971	37.749	118.113	56.205	1527.
56	26 7W 12 DCC	-98.036	37.797	114.501	59.456	1551.
57	26 7W 21 DDC	-98.086	37.767	111.798	57.343	1597.
58	26 8W 9 ABA	-98.197	37.810	105.676	60.215	1562.
59	26 8W 26 CBA	-98.170	37.758	107.207	56.650	1607.
60	26 8W 30 DCB	-98.236	37.755	103.596	56.391	1646.
61	26 9W 10 DDB	-98.286	37.799	100.816	59.386	1664.
62	26 9W 18 AAA	-98.338	37.795	97.976	59.072	1661.
63	26 9W 34 DBD	-98.288	37.742	100.763	55.454	1659.
64	26 10W 18 CDC	-98.461	37.782	91.256	58.091	1773.
65	26 10W 32 BBD	-98.444	37.749	92.214	55.825	1735.
66	26 16W 10 CCC	-99.067	37.798	58.077	58.905	2056.
67	26 16W 31 CCA	-99.118	37.740	55.307	54.890	2081.
68	26 16W 34 ABC	-99.058	37.750	58.589	55.597	2061.
69	26 17W 4 AAC	-99.180	37.824	51.885	60.668	2122.
70	26 17W 14 BAA	-99.150	37.796	53.535	58.744	2088.
71	26 17W 18 BBD	-99.227	37.794	49.322	58.589	2127.
72	26 17W 33 DDB	-99.179	37.741	51.964	54.943	2107.
73	26 18W 15 DCB	-99.275	37.785	46.698	57.959	2148.
74	26 18W 31 CCC	-99.338	37.739	43.258	54.775	2176.
75	26 18W 35 ACC	-99.257	37.746	47.692	55.272	2139.
76	26 19W 12 ABB	-99.348	37.811	42.695	59.741	2165.
77	26 19W 16 BCB	-99.411	37.793	39.253	58.491	2198.
78	26 19W 23 ABA	-99.364	37.782	41.827	57.738	2183.
79	26 19W 34 BBD	-99.390	37.750	40.407	55.528	2199.
80	27 16W 10 BAC	-99.062	37.720	58.382	53.527	2066.
81	27 16W 19 BBD	-99.118	37.691	55.323	51.510	2083.
82	27 16W 28 CDD	-99.078	37.665	57.525	49.728	2058.
83	27 17W 21 ACC	-99.184	37.687	51.707	51.218	2108.
84	27 18W 13 AAA	-99.231	37.708	49.126	52.655	2131.
85	27 18W 22 ADC	-99.270	37.687	46.993	51.200	2154.
86	27 19W 16 DBD	-99.399	37.699	39.921	52.010	2201.
87	27 19W 28 CBD	-99.408	37.669	39.430	49.940	2192.
88	27 20W 12 BCD	-99.463	37.717	36.412	53.245	2233.
89	27 20W 26 ABD	-99.471	37.676	35.979	50.417	2232.
90	27 20W 32 ABD	-99.526	37.661	32.963	49.380	2264.
91	28 16W 12 BCA	-99.029	37.630	60.224	47.330	2013.
92	28 16W 17 AAC	-99.089	37.617	56.937	46.415	2045.
93	28 17W 1 CAB	-99.134	37.641	54.462	48.058	2078.
94	28 17W 5 DDB	-99.197	37.637	51.008	47.766	2107.
95	28 17W 15 DDB	-99.161	37.608	52.992	45.775	2083.
96	28 18W 9 BAC	-99.297	37.632	45.525	47.403	2159.
97	28 18W 19 CCB	-99.338	37.593	43.284	44.707	2181.
98	28 18W 26 DCA	-99.254	37.578	47.897	43.686	2113.
99	28 19W 10 CAD	-99.385	37.624	40.698	46.838	2195.
100	28 19W 30 CBC	-99.446	37.580	37.357	43.798	2222.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
101	28 19W 33 CBD	-99.407	37.565	39.500	42.767	2192.
102	28 20W 12 BBD	-99.462	37.632	36.474	47.383	2233.
103	28 20W 16 ACB	-99.510	37.615	33.843	46.208	2264.
104	28 20W 30 ACA	-99.543	37.585	32.033	44.139	2278.
105	29 17W 4 ABC	-99.184	37.558	51.744	42.321	2073.
106	29 18W 3 DCD	-99.272	37.547	46.914	41.545	2120.
107	29 18W 7 BBD	-99.335	37.543	43.455	41.258	2157.
108	29 19W 22 BAA	-99.384	37.515	40.770	39.321	2184.
109	29 20W 11 CDD	-99.475	37.532	35.768	40.485	2231.
110	17 9W 20 BCD	-98.348	38.559	96.726	111.764	1747.
111	17 9W 31 ADC	-98.355	38.530	96.376	109.758	1674.
112	18 9W 4 BCC	-98.331	38.516	97.689	108.811	1691.
113	18 10W 24 BBB	-98.387	38.478	94.688	106.148	1718.
114	18 17W 14 CCC	-99.178	38.480	51.800	105.915	1924.
115	18 17W 15 DAA	-99.180	38.486	51.688	106.328	1926.
116	18 17W 22 AAD	-99.180	38.477	51.691	105.708	1926.
117	18 17W 23 BCC	-99.178	38.473	51.802	105.433	1926.
118	18 18W 27 AAC	-99.292	38.462	45.620	104.651	1959.
119	18 19W 20 ADD	-99.438	38.473	37.701	105.391	2001.
120	18 20W 14 CCC	-99.509	38.480	33.852	105.869	2027.
121	18 20W 19 AAD	-99.567	38.476	30.708	105.592	2050.
122	19 13W 33 DDB	-98.760	38.351	74.543	97.167	1838.
123	19 14W 6 BBB	-98.920	38.435	65.809	102.891	1878.
124	20 8W 22 AAA	-98.186	38.303	105.767	94.230	1630.
125	20 9W 12 DDA	-98.259	38.322	101.781	95.483	1652.
126	20 10W 36 ADC	-98.373	38.268	95.636	91.673	1702.
127	21 7W 4 AAC	-98.092	38.258	110.927	91.205	1602.
128	21 7W 26 CBD	-98.067	38.193	112.359	86.743	1586.
129	21 8W 9 CBD	-98.213	38.236	104.368	89.586	1638.
130	21 8W 25 AB	-98.150	38.200	107.834	87.155	1617.
131	21 9W 2 DD	-98.274	38.248	101.039	90.367	1658.
132	21 9W 31 AAC	-98.348	38.185	97.070	85.965	1693.
133	21 10W 21 ADB	-98.422	38.212	93.019	87.776	1711.
134	21 12W 10 CDD	-98.630	38.233	81.687	89.096	1821.
135	21 13W 1 BCB	-98.710	38.257	77.317	90.709	1842.
136	21 13W 13 ADB	-98.696	38.228	78.100	88.715	1850.
137	21 13W 27 DDD	-98.730	38.190	76.275	86.077	1868.
138	21 14W 22 AAC	-98.842	38.215	70.163	87.749	1908.
139	21 14W 32 BAC	-98.889	38.186	67.621	85.730	1925.
140	21 15W 11 CBB	-98.948	38.239	64.383	89.362	1923.
141	21 15W 24 BBD	-98.928	38.215	65.483	87.714	1926.
142	21 15W 31 BAD	-99.014	38.186	60.815	85.683	1955.
143	21 18W 32 DAA	-99.315	38.181	44.428	85.264	2028.
144	21 19W 27 CCC	-99.404	38.190	39.584	85.874	2035.
145	21 19W 30 BCC	-99.459	38.197	36.588	86.352	2044.
146	21 20W 29 BBB	-99.550	38.203	31.636	86.762	2061.
147	22 11W 7 BBB	-98.582	38.158	84.353	83.950	1780.
148	22 12W 5 BBD	-98.671	38.171	79.497	84.797	1851.
149	22 12W 30 BBD	-98.689	38.113	78.556	80.787	1856.
150	22 12W 36 BBB	-98.600	38.100	83.416	79.939	1823.

I.D.	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL JAN. 1980
151	22 13W 5 CBC	-98.782	38.164	73.458	84.259	1890.
152	22 13W 12 CAC	-98.705	38.150	77.660	83.330	1865.
153	22 13W 29 DAD	-98.767	38.106	74.309	80.265	1887.
154	22 14W 7 AAC	-98.898	38.157	67.145	83.725	1932.
155	22 14W 14 CCA	-98.835	38.133	70.589	82.096	1913.
156	22 14W 29 BBA	-98.891	38.115	67.547	80.831	1934.
157	22 14W 35 DDB	-98.824	38.090	71.212	79.135	1905.
158	22 15W 3 AAA	-98.950	38.173	64.304	84.809	1944.
159	22 15W 13 DCA	-98.919	38.134	66.013	82.131	1945.
160	22 15W 20 CDC	-98.998	38.117	61.716	80.929	1978.
161	22 16W 3 CBC	-99.076	38.164	57.447	84.146	1982.
162	22 16W 6 BBA	-99.128	38.173	54.614	84.752	1993.
163	22 16W 23 AAA	-99.041	38.130	59.368	81.812	1979.
164	22 16W 28 BBD	-99.092	38.114	56.596	80.692	2015.
165	22 17W 5 BBC	-99.222	38.172	49.494	84.661	2013.
166	22 17W 18 AAD	-99.224	38.143	49.395	82.661	2012.
167	22 17W 24 CBC	-99.149	38.121	53.485	81.160	2024.
168	22 19W 7 AAA	-99.443	38.159	37.463	83.732	2048.
169	22 19W 10 BBA	-99.402	38.160	39.695	83.805	2033.
170	23 11W 2 BBB	-98.509	38.085	88.387	78.959	1788.
171	23 11W 22 BCC	-98.527	38.037	87.444	75.637	1780.
172	23 12W 7 DBD	-98.680	38.063	79.081	77.343	1851.
173	23 12W 22 BCC	-98.636	38.037	81.498	75.573	1838.
174	23 12W 36 BBC	-98.599	38.011	83.535	73.801	1832.
175	23 13W 8 CCB	-98.783	38.061	73.466	77.154	1884.
176	23 13W 16 CCA	-98.762	38.046	74.619	76.129	1873.
177	23 13W 30 CBB	-98.801	38.021	72.506	74.386	1894.
178	23 13W 35 CCA	-98.725	38.003	76.664	73.181	1879.
179	23 14W 15 ADD	-98.840	38.052	70.363	76.507	1919.
180	23 14W 30 BBB	-98.912	38.028	66.447	74.822	1952.
181	23 15W 18 DDB	-99.008	38.046	61.202	76.029	2006.
182	23 16W 16 BAB	-99.090	38.057	56.724	76.762	2032.
183	23 17W 10 CDB	-99.181	38.061	51.761	77.014	2058.
184	23 17W 25 ADC	-99.135	38.023	54.283	74.404	2057.
185	23 17W 33 CCA	-99.201	38.003	50.687	73.009	2084.
186	23 18W 28 DAD	-99.297	38.020	45.444	74.163	2093.
187	23 18W 36 DAC	-99.244	38.005	48.340	73.138	2093.
188	24 8W 4 AB	-98.204	37.998	105.102	73.177	1648.
189	24 11W 14 CAB	-98.504	37.962	88.759	70.479	1782.
190	24 11W 17 DDB	-98.549	37.959	86.303	70.244	1810.
191	24 12W 17 CAB	-98.668	37.963	79.801	70.452	1866.
192	24 12W 34 ABC	-98.627	37.924	82.070	67.784	1857.
193	24 13W 7 BDC	-98.796	37.979	72.804	71.492	1905.
194	24 13W 16 ACA	-98.753	37.966	75.160	70.616	1896.
195	24 14W 17 AAC	-98.879	37.968	68.279	70.697	1954.
196	24 14W 31 BBD	-98.910	37.925	66.605	67.719	1978.
197	24 15W 8 CDC	-98.999	37.972	61.725	70.928	2021.
198	24 15W 10 BAB	-98.962	37.985	63.739	71.837	2001.
199	24 15W 32 DBC	-98.994	37.918	62.020	67.205	2023.
200	24 16W 12 CBC	-99.040	37.976	59.483	71.190	2040.

I.D. JAN. 1980	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
201	24 16W 15 DAC	-99.062	37.961	58.290	70.149	2050.
202	24 17W 12 ACA	-99.138	37.981	54.133	71.507	2070.
203	24 17W 20 ADC	-99.208	37.951	50.320	69.421	2102.
204	24 17W 24 DDD	-99.133	37.943	54.417	68.887	2077.
205	24 18W 17 ABD	-99.320	37.969	44.199	70.641	2119.
206	24 18W 28 DAC	-99.299	37.933	45.352	68.162	2130.
207	24 18W 36 DDC	-99.244	37.914	48.362	66.861	2116.
208	25 11W 2 ACB	-98.499	37.908	89.074	66.757	1759.
209	25 11W 23 DDD	-98.492	37.855	89.498	63.106	1781.
210	25 12W 17 CAA	-98.665	37.876	80.024	64.453	1867.
211	25 12W 24 DDB	-98.585	37.857	84.411	63.187	1827.
212	25 12W 32 CCA	-98.670	37.829	79.784	61.208	1873.
213	25 13W 3 BBB	-98.746	37.912	75.575	66.894	1913.
214	25 13W 7 B	-98.797	37.895	72.796	65.698	1936.
215	25 13W 12 ADB	-98.695	37.894	78.373	65.678	1888.
216	25 13W 30 CCA	-98.799	37.843	72.719	62.110	1947.
217	25 13W 33 DCB	-98.755	37.829	75.133	61.165	1922.
218	25 14W 4 AAD	-98.859	37.910	69.402	66.705	1955.
219	25 15W 11 BCB	-98.948	37.894	64.545	65.566	2006.
220	25 15W 29 BBD	-99.001	37.852	61.666	62.651	2024.
221	25 16W 2 BBB	-99.058	37.912	58.526	66.770	2051.
222	25 16W 27 AAC	-99.063	37.852	58.275	62.631	2049.
223	25 16W 31 DAD	-99.115	37.831	55.440	61.167	2069.
224	25 17W 1 DAB	-99.136	37.905	54.265	66.265	2082.
225	25 17W 3 BAC	-99.181	37.911	51.806	66.668	2096.
226	25 17W 13 BCD	-99.147	37.878	53.673	64.400	2086.
227	25 17W 17 AAC	-99.208	37.882	50.339	64.662	2105.
228	25 17W 31 BBD	-99.238	37.838	48.707	61.621	2129.
229	25 18W 7 ABD	-99.338	37.897	43.230	65.673	2153.
230	25 18W 9 AAA	-99.297	37.898	45.470	65.748	2137.
231	25 18W 13 BDB	-99.254	37.880	47.824	64.515	2126.
232	25 18W 33 CDC	-99.308	37.828	44.883	60.919	2157.
233	25 19W 26 DDB	-99.372	37.844	41.378	62.013	2172.
234	25 19W 31 CAA	-99.451	37.834	37.057	61.316	2202.
235	26 11W 1 DDB	-98.470	37.813	90.737	60.223	1778.
236	26 11W 29 BCB	-98.555	37.762	86.124	56.652	1815.
237	26 12W 2 DBD	-98.598	37.815	83.731	60.283	1840.
238	26 12W 17 CCA	-98.662	37.785	80.250	58.178	1871.
239	26 12W 34 CDC	-98.623	37.738	82.419	54.958	1840.
240	26 13W 11 AAC	-98.706	37.808	77.828	59.741	1885.
241	26 13W 16 DAA	-98.740	37.788	75.978	58.344	1907.
242	26 13W 19 BBD	-98.791	37.779	73.192	57.700	1931.
243	26 13W 34 BCB	-98.738	37.748	76.113	55.587	1899.
244	26 14W 11 AAC	-98.816	37.808	71.809	59.688	1974.
245	26 14W 17 DCB	-98.875	37.785	68.592	58.077	1988.
246	26 14W 22 DDB	-98.834	37.770	70.843	57.060	1959.
247	26 14W 32 BBD	-98.881	37.750	68.281	55.660	1987.
248	26 15W 8 AAC	-98.980	37.809	62.833	59.692	2030.
249	26 15W 18 DAB	-98.999	37.788	61.804	58.236	2037.
250	26 15W 35 DDB	-98.925	37.741	65.877	55.022	2014.

I.D. JAN. 1980	LOCATION				LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
251	27	6W	12	CCD	-97.932	37.709	120.298	53.484	1482.
252	27	6W	16	CCB	-97.989	37.696	117.191	52.533	1460.
253	27	7W	3	ADC	-98.067	37.731	112.876	54.876	1536.
254	27	7W	23	BCC	-98.063	37.687	113.144	51.845	1559.
255	27	8W	14	DDC	-98.158	37.694	107.932	52.246	1608.
256	27	8W	17	DAB	-98.213	37.700	104.911	52.615	1630.
257	27	8W	35	CBC	-98.172	37.654	107.207	49.476	1589.
258	27	9W	6	DDB	-98.340	37.725	97.930	54.243	1675.
259	27	9W	15	ABA	-98.288	37.707	100.796	53.040	1653.
260	27	10W	3	DDD	-98.393	37.723	95.028	54.068	1693.
261	27	10W	17	DDD	-98.431	37.694	92.972	52.041	1693.
262	27	10W	24	DAD	-98.356	37.683	97.091	51.334	1674.
263	27	10W	31	BCD	-98.463	37.657	91.248	49.468	1683.
264	27	11W	12	CBC	-98.483	37.712	90.107	53.248	1737.
265	27	11W	31	DAA	-98.557	37.656	86.096	49.340	1723.
266	27	12W	33	CBA	-98.644	37.656	81.326	49.291	1774.
267	27	13W	10	CBB	-98.738	37.715	76.134	53.310	1891.
268	27	13W	13	DDC	-98.687	37.695	78.943	51.958	1838.
269	27	13W	31	DDB	-98.779	37.652	73.925	48.945	1875.
270	27	14W	3	DAC	-98.834	37.728	70.866	54.162	1956.
271	27	14W	12	DDD	-98.795	37.709	73.015	52.870	1923.
272	27	14W	21	CAB	-98.861	37.685	69.411	51.185	1965.
273	27	15W	8	BBD	-98.992	37.720	62.217	53.549	2035.
274	27	15W	32	CCA	-98.992	37.652	62.246	48.859	2020.
275	27	15W	34	BBD	-98.955	37.661	64.270	49.493	2001.
276	27	15W	36	ADD	-98.904	37.658	67.067	49.306	1978.
277	27	18W	18	DCD	-99.327	37.695	43.868	51.743	2176.
278	28	7W	29	CDD	-98.110	37.576	110.688	44.149	1574.
279	28	7W	35	CCD	-98.060	37.562	113.448	43.226	1565.
280	28	8W	21	BBB	-98.208	37.604	105.283	45.999	1560.
281	28	8W	26	ABC	-98.163	37.587	107.768	44.862	1590.
282	28	9W	1	BCC	-98.263	37.643	102.226	48.645	1573.
283	28	9W	21	AAA	-98.302	37.604	100.124	45.926	1636.
284	28	9W	29	CCC	-98.336	37.577	98.284	44.038	1674.
285	28	9W	34	AAB	-98.285	37.575	101.087	43.938	1645.
286	28	10W	16	BCB	-98.428	37.615	93.204	46.595	1705.
287	28	11W	12	ACC	-98.474	37.628	90.669	47.461	1721.
288	28	11W	20	CAC	-98.551	37.595	86.471	45.137	1777.
289	28	11W	23	DAC	-98.488	37.595	89.926	45.176	1747.
290	28	12W	21	BAD	-98.639	37.603	81.635	45.638	1799.
291	28	13W	2	DDC	-98.706	37.636	77.939	47.878	1818.
292	28	13W	17	AAA	-98.758	37.619	75.096	46.680	1868.
293	28	13W	26	DCB	-98.710	37.579	77.753	43.945	1825.
294	28	14W	14	CCC	-98.829	37.606	71.209	45.751	1906.
295	28	15W	10	CCA	-98.955	37.623	64.288	46.873	1977.
296	28	15W	23	CCD	-98.936	37.592	65.343	44.741	1965.
297	29	11W	9	ADD	-98.521	37.540	88.160	41.361	1776.
298	29	11W	29	AAD	-98.540	37.500	87.147	38.591	1787.
299	29	12W	20	CCD	-98.662	37.504	80.440	38.797	1800.
300	29	12W	22	BAC	-98.624	37.515	82.522	39.577	1801.

I.D.	LOCATION	LAT.	LONG.	X-COORD (MI)	Y-COORD (MI)	WATER LEVEL
JAN. 1980						
301	29 13W 13 AAA	-98.685	37.531	79.158	40.648	1827.
302	29 14W 17 DBD	-98.872	37.522	68.893	39.939	1911.
303	29 15W 2 CCA	-98.936	37.549	65.363	41.776	1948.
304	29 15W 18 ADA	-98.997	37.527	62.024	40.236	1964.
305	29 18W 2 ACC	-99.256	37.554	47.791	42.030	2112.