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A THREE-DIMENSIONAL FINITE DIFFERENCE GROUND WATER FLOW MODEL OF LEE COUNTY, FLORIDA

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A THREE-DIMENSIONAL FINITE DIFFERENCE GROUND WATER FLOW MODEL OF LEE COUNTY, FLORIDA

by

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DRE- 287

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EXECUTIVE SUMMARY

Lee County, Florida, is underlain by three aquifer systems; the Surficial Aquifer System, comprising the water table and lower Tamiami aquifers; the Intermediate Aquifer System, which contains the sandstone and the mid-Hawthorn aquifers; and the Floridan Aquifer System, which includes the lower Hawthorn, Suwannee, and deeper aquifers. Various studies of the aquifers of Lee County have been made, the most recent being a water resources investigation by James M. Montgomery, Inc. (JMM), and a three-dimensional wellfield protection zone model by Camp Dresser & McKee, Inc. (CDM). Information from these studies and other works was used to develop a three-dimensional regional ground water resource availability model.

The Lee County model was developed using the USGS three-dimensional finite difference flow code, MODFLOW. This code was selected because it allows a detailed evaluation of ground water flow, it is available in public domain, it is compatible with most computers, and it contains many features which make it easy to use and modify. The MODFLOW code simulates ground water levels and flow using data on the aquifer parameters hydraulic conductivity, transmissivity, leakance, and storativity, as well as the effects of recharge, evapotranspiration, drains, and rivers.

The model contains seven layers. The upper five layers represent the water table, lower Tamiami, sandstone, mid-Hawthorn, and lower Hawthorn aquifers, as defined by Wedderburn, et al (1982). The lower two layers represent production zones of the Suwannee aquifer. The horizontal model grid comprises 2016 cells in 42 rows and 48 columns; 1512 of these cells are uniform one mile square cells.

After initial steady-state approximate calibrations were made, the model was calibrated by adjusting aquifer parameters to better match computed heads with observed ground water levels for the period April, 1985 through September, 1986. Ground water withdrawal information for the calibration was obtained in several ways. Public water supply water use information is reported directly to the District. Irrigation water use, reported by some permittees, was analyzed to establish water use rates for all irrigation users. Domestic self supply water use was estimated by JMM for a high and low range.

To best use the model for evaluative or predictive purposes, it is important to test the dependency of model results on the parameter estimates used to calibrate it. The model is somewhat sensitive to some changes in the calibrated parameters for the sandstone and lower Hawthorn aquifers, and the mid-Hawthorn aquifer is very sensitive to any changes.

After sensitivity testing was completed, two predictive simulations were run with the model. One represented the low water use projection for the year 2010, and the other the high projection, as presented in the JMM study. In the high-use simulation, the potentiometric surface of the mid-Hawthorn aquifer is drawn below the base of the overlying confining bed, dewatering the aquifer in parts of Cape Coral. In both scenarios, an area of water levels below sea level persists in the lower Tamiami aquifer in the Bonita Springs area, suggesting a likelihood of salt water intrusion along the coast. Another large regional water level drop occurs in the sandstone aquifer in the Lehigh Acres area, where there is significant projected increase in domestic self supply from that aquifer in Lee County planning districts 6 (Lehigh Acres) and 7 (East Fort Myers). Because this water level drop will increase downward recharge from the water table aquifer, land use practices affecting the water table aquifer could have long term regional effects on the sandstone aquifer. In layer 5, the lower Hawthorn aquifer, a regional cone of depression around the Cape Coral, Pine Island and Sanibel wellfields is noted in both simulations; the difference between the two is the extent and depth of the cone. The impacts of either condition, as well as any other potential development of the lower Hawthorn or other parts of the upper Floridan Aquifer System are primarily economic. If declining water levels cause regional degradation of water quality, then rising costs for desalination treatment processes can be expected, and larger users may have to mitigate the loss of free flow in the wells of other users. In layer 1, the water table aquifer, there is practically no difference between the low and high water-use simulation in this layer. No major regional head loss which might induce salt water intrusion is noted in either situation. However, because of the regional scale of the model, it is not possible to predict localized occurrences of salt water intrusion.

Recommendations

Strict management of the development of the mid-Hawthorn aquifer in Cape Coral is a necessity. Levels of stress of the magnitude estimated in the high water use projection from the JMM report will draw the potentiometric surface of the mid-Hawthorn aquifer below the base of its overlying confining bed, thereby dewatering the mid-Hawthorn in that area.

Strict management of the lower Tamiami aquifer in the Bonita Springs area to prevent or minimize salt-water intrusion is a necessity. The model suggests that there is a permanent trend toward water levels below sea level in the aquifer there.

Careful land use planning in planning districts 6 and 7 is recommended. Growth in these districts will create significant increases in use for domestic self supply from the sandstone aquifer, causing a regional lowering of water levels in that aquifer, which in turn increases downward recharge from the water table aquifer. Additionally, the increased downward recharge may cause localized drawdown impacts within the water table aquifer.

Determining the viability of development of the water table aquifer must be accomplished by site-specific models of areas of interest, with the regional model providing the boundary conditions. The flow model suggests that the water table aquifer appears to be a good source of water supply if the water quality is acceptable. The regional nature of the model, however, precludes in-depth determination of effects of water supply development on wetlands.

The upper aquifers of the Floridan Aquifer System appear to be good sources of water supply through desalination treatment. However, long-term development plans for these aquifers should address the degree of interconnection among them and analyze possible trends in water quality deterioration, including economic considerations.

Water conservation measures need to be continued and intensified. Although the model suggests that water is available in certain areas and aquifers to meet the low projected water demand for the year 2010, this short 20-year horizon probably represents only a portion of Lee County's ultimate growth.

Domestic self supply and irrigation are both large and widespread water use types in Lee County. In order to enhance the accuracy and reliability of the model for resource availability determinations, improvements in the estimation of domestic self supply use and the reporting of irrigation use are recommended.

The model should continue to be used in the water use permitting and planning processes for regional problems. Where a finer scale site specific model is needed, the regional model should be used to provide the boundary conditions. The model should be refined and updated as additional data becomes available. In addition, interfaces with the Hendry County model, currently in development, and the Collier County model, scheduled for development, should be made when possible. These interfaces will allow for regional analysis of water availability from the sandstone aquifer in Lee and Hendry counties, and enhance water shortage and water use management of the lower Tamiami aquifer in the Bonita Springs and north Naples areas.

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF FIGURES (Continued)

LIST OF TABLES

LIST OF TABLES (Continued)

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ABSTRACT

Lee County, Florida, is underlain by three aquifer systems; the Surficial, comprising the water table and lower Tamiami aquifers; the Intermediate, represented by the sandstone and mid-Hawthorn aquifers; and the Floridan, which includes the lower Hawthorn, Suwannee, and deeper aquifers. A three dimensional flow model of these aquifers has been developed using the U. S. Geological Survey MODFLOW code. The model comprises seven layers, corresponding to the water table, lower Tamiami, sandstone, mid-Hawthorn, lower Hawthorn aquifers and the upper two zones of the Suwannee aquifer. Areally, the aquifers are represented with a finite-difference grid of 42 rows and 48 columns. Initial aquifer parameters were obtained from recent reports on a wellfield protection zone model and a water resources study. A transient calibration was performed; calibration was made by comparing computed heads against observed water levels in an extensive monitor well network. In sensitivity testing, the sandstone aquifer and lower Hawthorn aquifer layers proved somewhat sensitive to changes in vertical hydraulic conductivity and transmissivity, and the mid-Hawthorn layer is quite sensitive to changes in both vertical hydraulic conductivity and transmissivity. Two predictive simulations, being the high and low water use estimates for the year 2010, were examined. In the high water use simulation, the mid-Hawthorn becomes dewatered in parts of Cape Coral. In both simulations, water levels below sea level persist in the lower Tamiami layer in the Bonita Springs area. Strict water management is accordingly recommended, as is more investigation of the hydrology of the lower Hawthorn and Suwannee aquifers.

INTRODUCTION

PURPOSE AND SCOPE

The purpose of this study is to develop a three-dimensional ground water flow model of the major aquifer systems in Lee County. The model is calibrated to existing data and information and will be used for predictive purposes. It will have immediate use in evaluating requests for large ground water withdrawals, and may be applicable to aspects of water shortage management. In the longer term, it will serve as the basis for ground water elements of a water use management plan for Lee County, and as an aid in determining water availability for future growth within the county.

Several comprehensive water resource evaluations and ground water modeling studies have been done in Lee County. This study incorporates the results of these studies, with as little reinterpretation as possible, into the development of the three dimensional flow model.

LOCATION OF STUDY AREA

Lee County is located on the southwest coast of Florida, between latitudes 26° 18' and 26° 46' North and longitudes 81° 33' and 82° 16' West. It is bounded on the north by Charlotte County, on the east by Hendry County, on the southeast and south by Collier County, and on the west by the Gulf of Mexico (Figure 1).

PREVIOUS INVESTIGATIONS

Water resources studies of Lee County have been done by Wedderburn et al. (1982) and James M. Montgomery, Inc. (1988) and ground water flow models are presented in Knapp et al. (1984) and Camp, Dresser and McKee, Inc. (1987). Painter (1984) reports the results of a three-dimensional flow model for a portion of Lee County in an unpublished thesis. The results of a well-plugging program to prevent inter-aquifer migration of saline ground water are presented by Burns (1983). Hydrogeologic aspects of areas adjacent to Lee County are given by Shaw and Trost (1984) for the South Florida Water Management District (SFWMD) Kissimmee Planing Area, Burns and Shih (1984) and Knapp, Burns and Sharp (1986) for western Collier County, Smith and Adams (1988) for Hendry County, and Duerr et al. (1988) for a portion of the Southwest Florida Water Management District. In addition, numerous localized studies have been conducted and reported by private consultants.

AQUIFER SYSTEMS AND AQUIFERS

There are three aquifer systems within the study area, the Surficial, the Intermediate and the Floridan (Figure 2). The Surficial Aquifer System comprises two aquifers, the water table and the lower Tamiami. Throughout most of the area where the lower Tamiami exists, minimal confinement occurs between the two, causing them to function as a single aquifer. However, in the southern and southeastern part of the area, sufficient confinement exists that the lower Tamiami begins to function somewhat separately. For purposes of defining hydraulic properties within the model, the lower Tamiami is considered a separate aquifer in those areas where its overlying confining bed is greater than 10 feet thick. The Intermediate Aquifer System contains both the sandstone and the mid-Hawthorn aquifers, along with the confining beds underlying each. The confining bed beneath

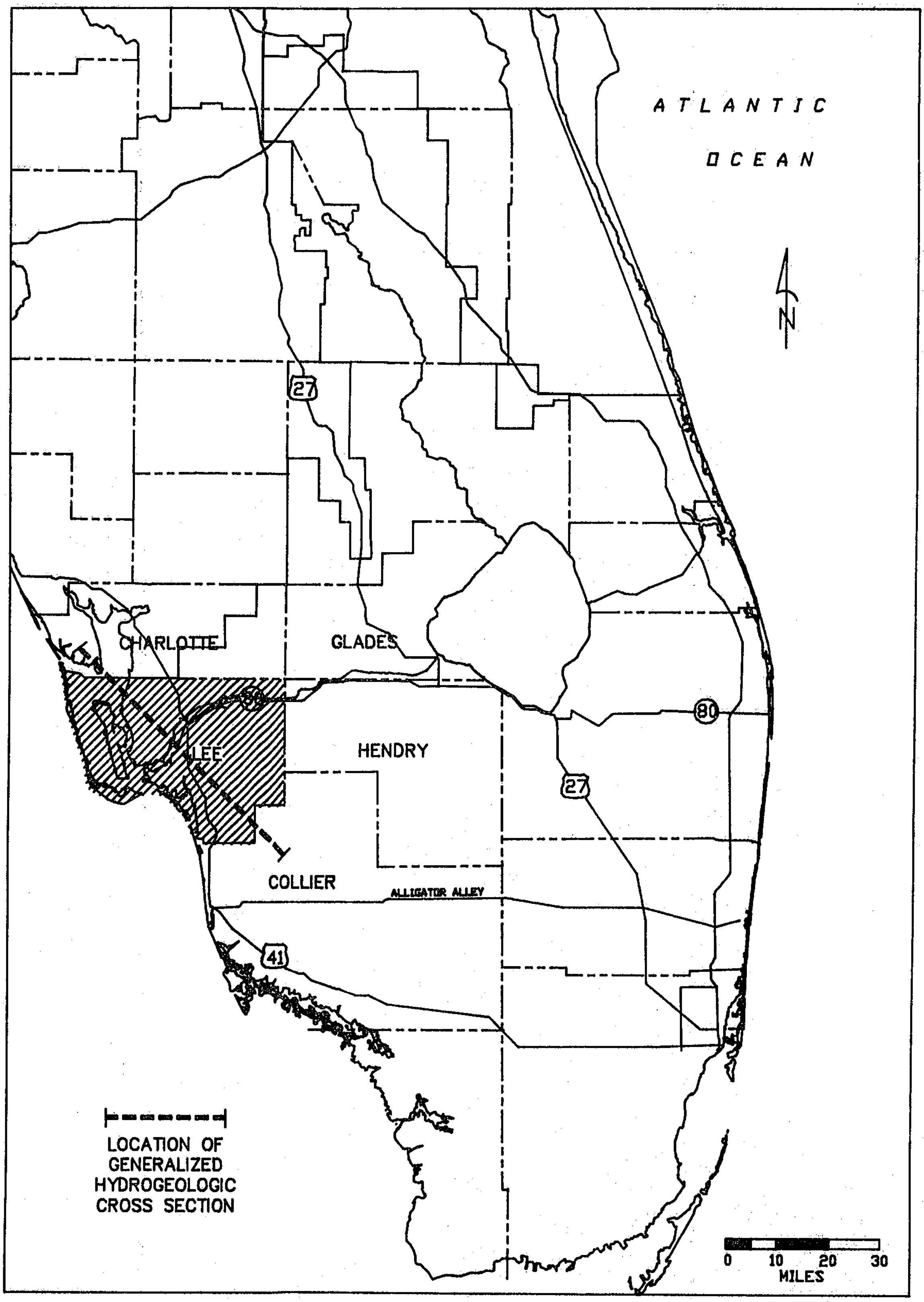


Figure 1. LOCATION OF STUDY AREA

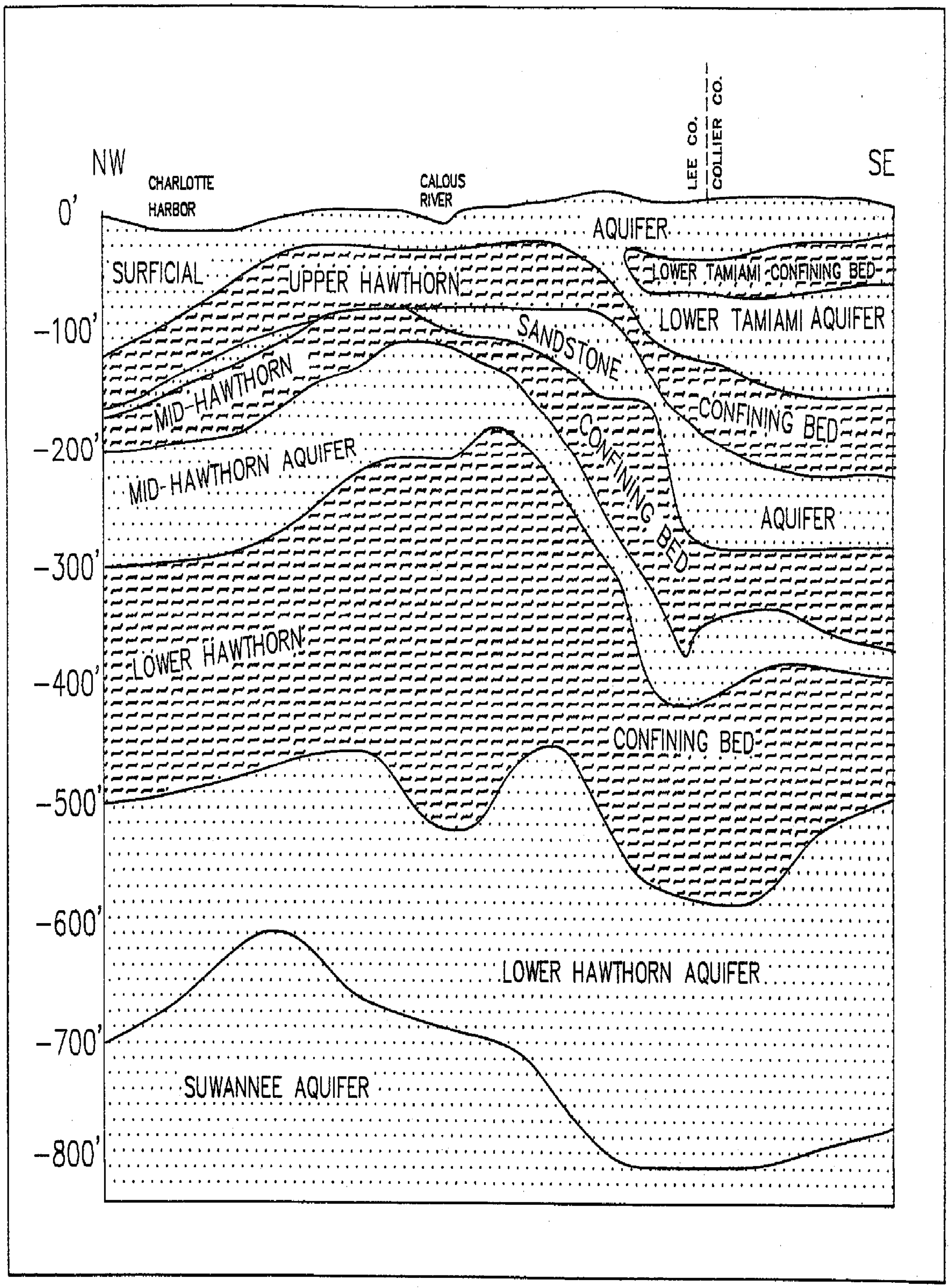


Figure 2. **GENERALIZED HYDROGEOLOGIC CROSS SECTION**

the mid-Hawthorn aquifer contains localized production zones in portions of the study area (Missimer & Associates, 1984). The Floridan Aquifer System includes the lower Hawthorn, Suwannee, and deeper aquifers. All aquifers within the Floridan contain water of salinity above recommended standards for potable use. However, treatment of Floridan water by reverse osmosis technology provides potable water to Cape Coral, Pine Island, and Sanibel.

MODEL DESCRIPTION

INTRODUCTION

The Lee County model uses the USGS three-dimensional finite difference flow code, MODFLOW (McDonald & Harbaugh, 1988). This code was selected for several reasons:

1. It is available in public domain.
2. It is compatible with most computers with only minor modification.
3. The modular structure of the code and its excellent documentation allow easy modification of the code and the addition of new modules for specialty applications.
4. The cell-by-cell flow feature of the code can be used to:
    - Evaluate in detail flow and head changes associated with various withdrawal scenarios.
    - Generate boundary conditions for higher-resolution models within the regional model.
5. MODFLOW allows great flexibility of data file structure and management; this facilitates the employment of and interaction with other software for data manipulation.

The MODFLOW code contains modules which simulate the effects of recharge, evapotranspiration, rivers, drains, and other water sources external to the model on ground water flow. Three iterative solution schemes, slice-successive overrelaxation, strongly implicit procedure, and preconditioned conjugate gradient method, are available. Both constant-head and no-flow conditions can be set within a model grid, and a no-flow boundary is implicit along its outside edges. Table 1 summarily describes the MODFLOW modules and their application to the Lee County model.

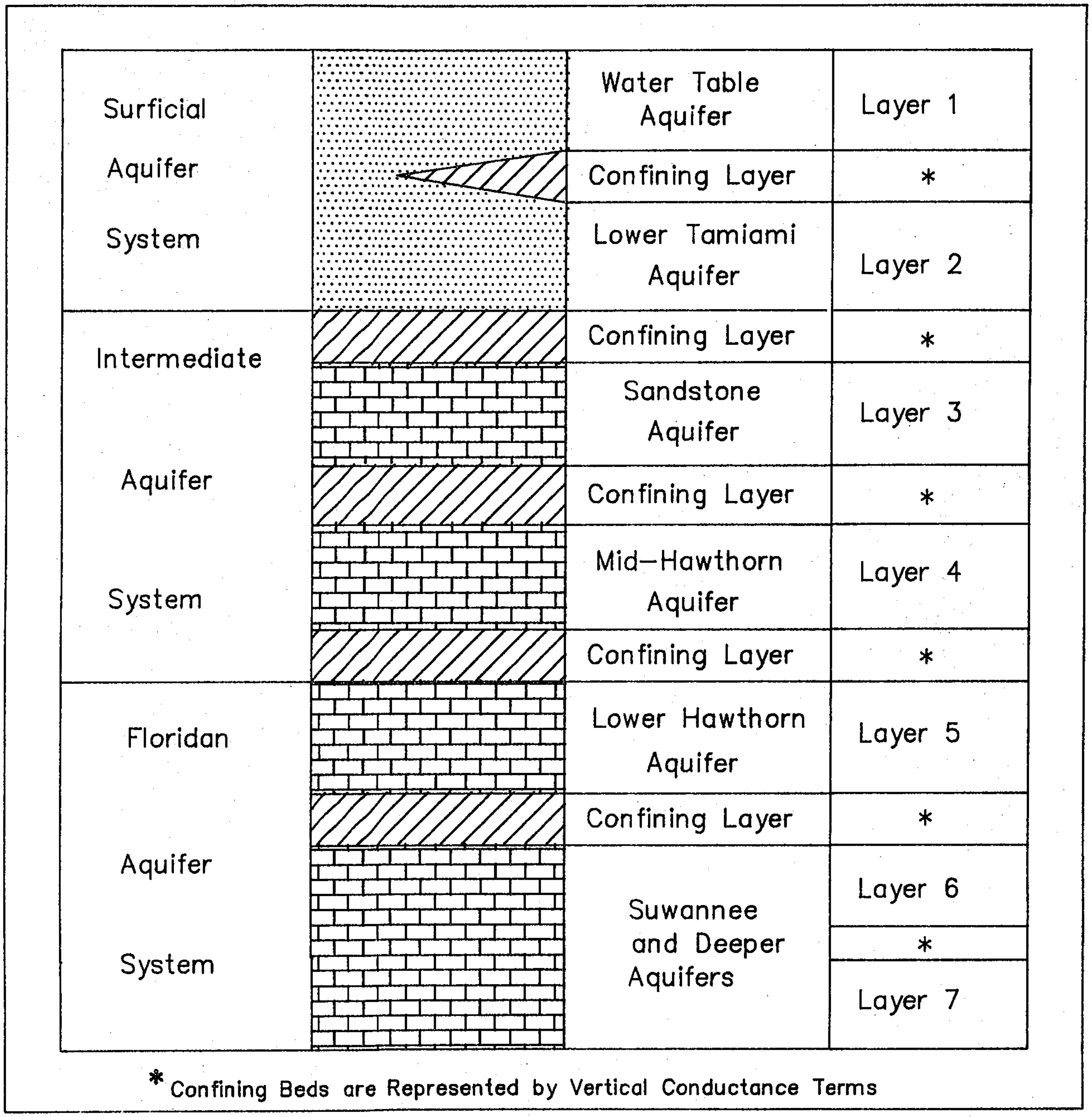
DISCRETIZATION

The model contains seven layers (Figure 3). The upper five layers simulate the water table, lower Tamiami, sandstone, mid-Hawthorn, and lower Hawthorn aquifers, as defined by Wedderburn, et al. (1982). The lower two layers represent production zones of the Suwannee aquifer.

The horizontal model grid comprises 42 rows and 48 columns (Figure 4). As originally designed, all model cells were areally one mile square. However, the early steady-state calibration runs demonstrated that, at current stress levels, cones of depression in the layers representing the mid-Hawthorn, lower Hawthorn and Suwannee aquifers were proximate to the northern and, occasionally, the western boundaries of the model. Therefore, the westernmost and northernmost five cells were expanded as shown in Figure 4.

TABLE 1.
PACKAGES IN MODFLOW USED IN THE LEE COUNTY MODEL

MODFLOW PACKAGE	FUNCTION	USE IN MODEL
BASIC	Model Administration	Used
BLOCK CENTERED FLOW	Computation of conductance and storage components of finite-difference equations.	Used
RIVER	Simulates effects of river leakage. Rivers may recharge or drain the aquifer depending on the head gradient between the river and the aquifer.	Used to represent the Caloosahatchee River and other streams and canals.
RECHARGE	Simulates recharge to the aquifer from infiltration of precipitation.	Used with measured precipitation: a pre-processor program calculates losses to interception/evaporation and runoff.
WELL	Simulates a source/sink to the aquifer that is not affected by heads in the aquifer.	Used to represent discharge from public water supply, domestic self supply, and irrigaton water use.
DRAIN	Simulates discharge from the aquifer to drains.	Major canals, East County Water Control District
EVAPO-TRANSPIRATION	Simulates evapotranspiration where the source of water is the saturated porous medium.	Used with measured or average pan evaporation data.
GENERAL HEAD BOUNDARY	Simulates a source/sink of water providing recharge/discharge to the aquifer at a rate proportional to the head difference between the source/sink and the aquifer.	Not Used
STRONGLY IMPLICIT PROCEDURE (SIP)	Solves the model's finite difference equations using the Strongly Implicit Procedure.	Used for final calibration and predictive runs.
OBSERVATION NODES	Generates a file of computed water levels for selected model cells.	Used to generate comparative hydro-graphs and calibration agreement.



Surficial Aquifer System	Water Table Aquifer	Layer 1
	Confining Layer	*
	Lower Tamiami Aquifer	Layer 2
Intermediate Aquifer System	Confining Layer	*
	Sandstone Aquifer	Layer 3
	Confining Layer	*
	Mid–Hawthorn Aquifer	Layer 4
	Confining Layer	*
Floridan Aquifer System	Lower Hawthorn Aquifer	Layer 5
	Confining Layer	*
	Suwannee and Deeper Aquifers	Layer 6
		*
		Layer 7

* Confining Beds are Represented by Vertical Conductance Terms

Figure 3. AQUIFERS AND CORRESPONDING MODEL LAYERS

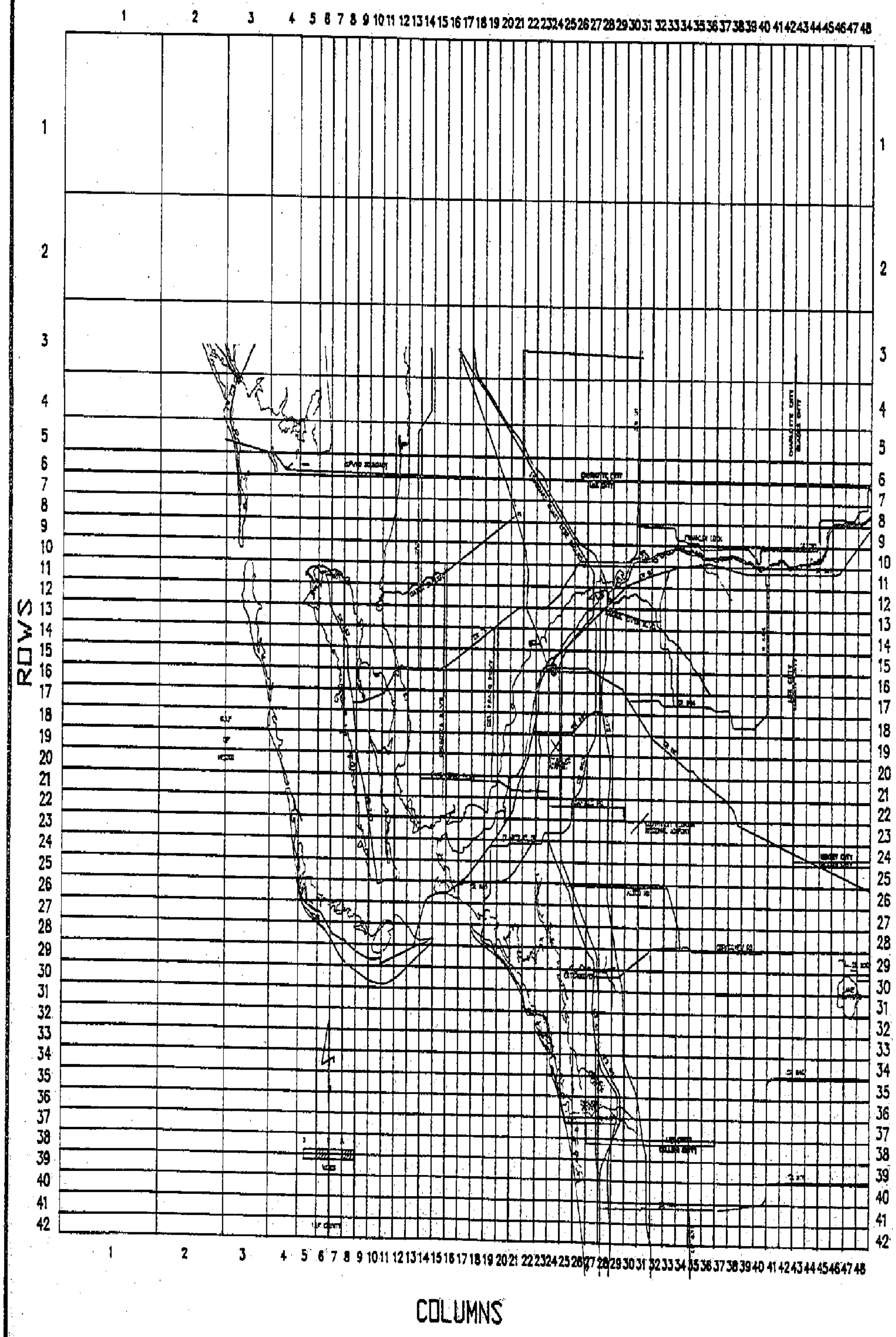


Figure 4. MODEL GRID

BOUNDARY CONDITIONS

The outside rows and columns of cells in all layers are set as specified head boundaries (Figures 5 and 6). This type of boundary was selected over specified flux because 1) the specified head condition allows the model to compute fluxes for a variety of ground water flow configurations whereas the specified flux condition requires the user to estimate fluxes from a single ground water flow condition, 2) the specified head boundary provides a more exact linkage to other regional models that are being developed for Hendry and Collier counties, and 3) specified head is established only once for a model run in a file designated solely for that purpose, rather than for each stress period as required for the specified flux condition, thereby simplifying file management. Calculations of fluxes across several model layer boundaries were made and compared to the flow resulting from specified heads along the same boundaries. Reasonable agreement was found. In the routine uses expected for the model, the constraint established by using the specified head condition on all boundaries is not expected to be a problem. However, in cases where it appears that the specified flux condition will yield a more accurate simulation from the model, the user should substitute that type of boundary.

Within the top layer, the coast and surface of the Gulf of Mexico are established as specified head of 0 feet NGVD (Figure 5); at this time, no correction for equivalent fresh water head has been made. The entire bottom layer, which represents the lower producing zones of the Suwannee aquifer, is also set as specified head. Because there is no water level monitoring data from this part of the aquifer, true water levels are not known. Therefore, as a simplifying assumption, the head distribution within this aquifer was set 5 feet higher than the estimated pre-development surface in the upper producing zone of the Suwannee aquifer (Figure 7), based on water level data collected at the North Fort Myers injection well (Post, Buckley, Schuh, and Jernigan, Inc., 1986).

HYDRAULIC CHARACTERISTICS

Transmissivity: Pre-calibration transmissivities in the model were based on discretizations of hydraulic conductivity values for the water table, lower Tamiami, sandstone and mid-Hawthorn aquifers used in a wellfield protection zone finite-element model described by Camp Dresser and McKee, Inc. (CDM). These discretizations were converted to the finite difference grid used for this model, and in the lower Tamiami, Sandstone, and mid-Hawthorn layers, multiplied by corresponding thicknesses for the aquifers derived from the James M. Montgomery (JMM) report to establish initial cell transmissivities. Transmissivity in layer 5, which simulates the lower Hawthorn aquifer, is based on aquifer thickness reported by JMM and a uniform hydraulic conductivity of 56 ft./day, which is a rough average of hydraulic conductivity based on pump tests. In layer 6, representing the upper portion of the Suwannee aquifer, a uniform transmissivity of 10,368 ft.^{2}/day was assigned. All of layer 7, representing the lower portion of the Suwannee aquifer, is specified head and therefore the value of transmissivity used is immaterial; the dummy value assigned is also 10,368 ft.^{2}/day.

Vertical Conductance: Within the MODFLOW model, flow between layers is controlled by the parameter Vcont (vertical conductance). Within the area, hydraulic conductivities in the aquifers are at least four orders of magnitude higher than those in the surrounding confining beds. Therefore is can be assumed that flow in the aquifer is horizontal and flow in the confining units is vertical, justifying the use of the vertical conductance term to represent the confining beds in a quasi-

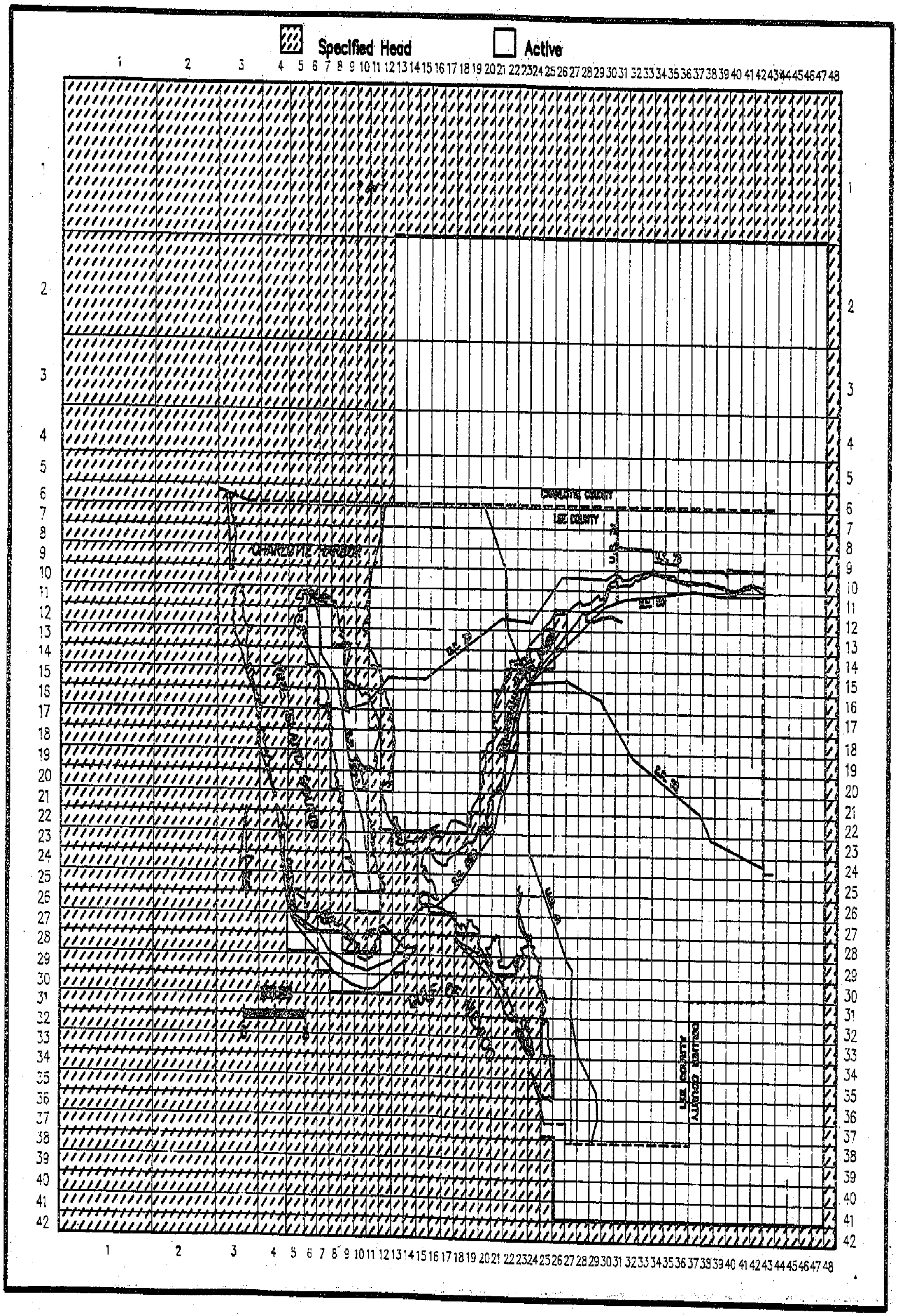


Figure 5. CELL TYPES IN LAYER 1

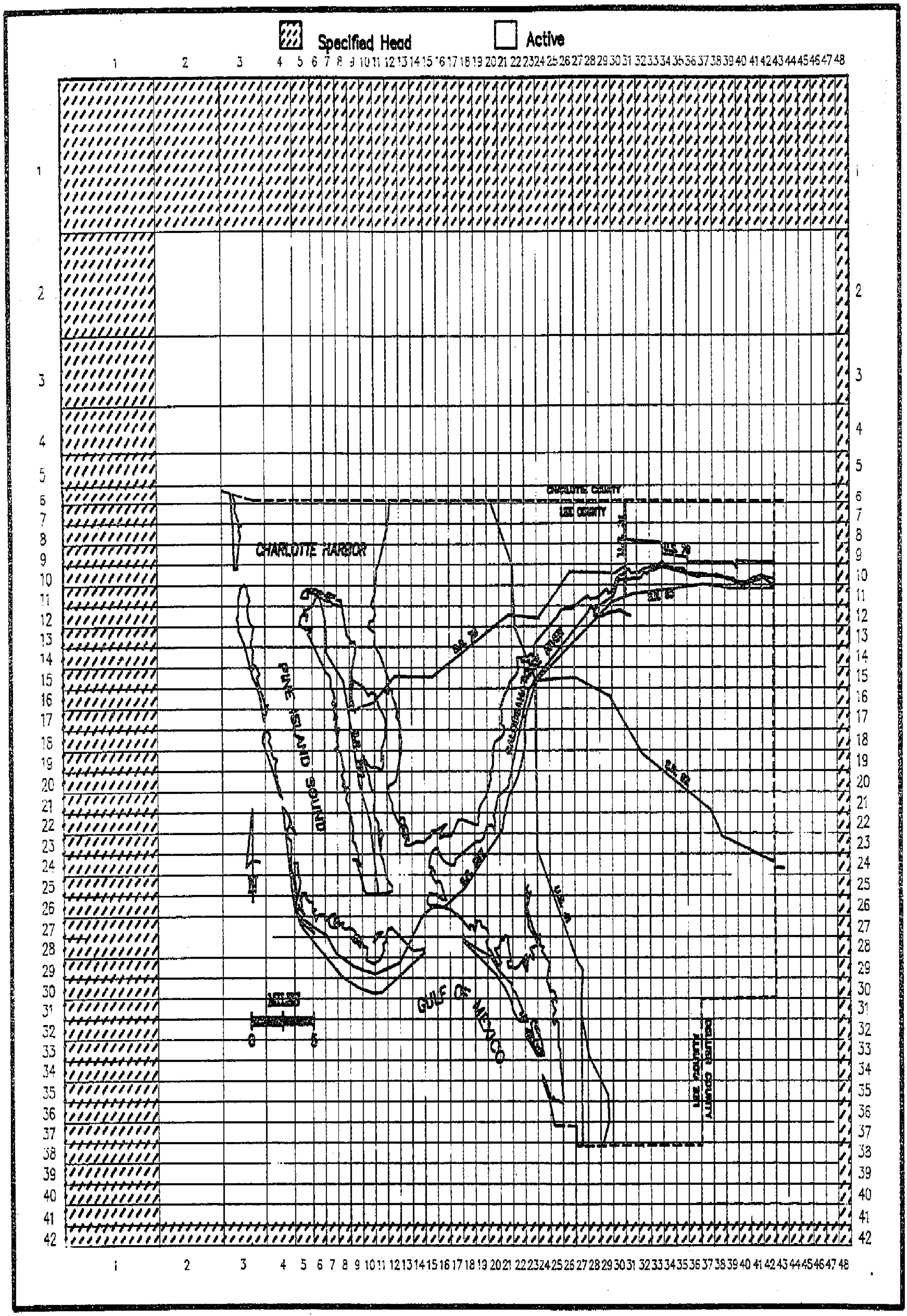


Figure 6. CELL TYPES IN LAYERS 2 THROUGH 6

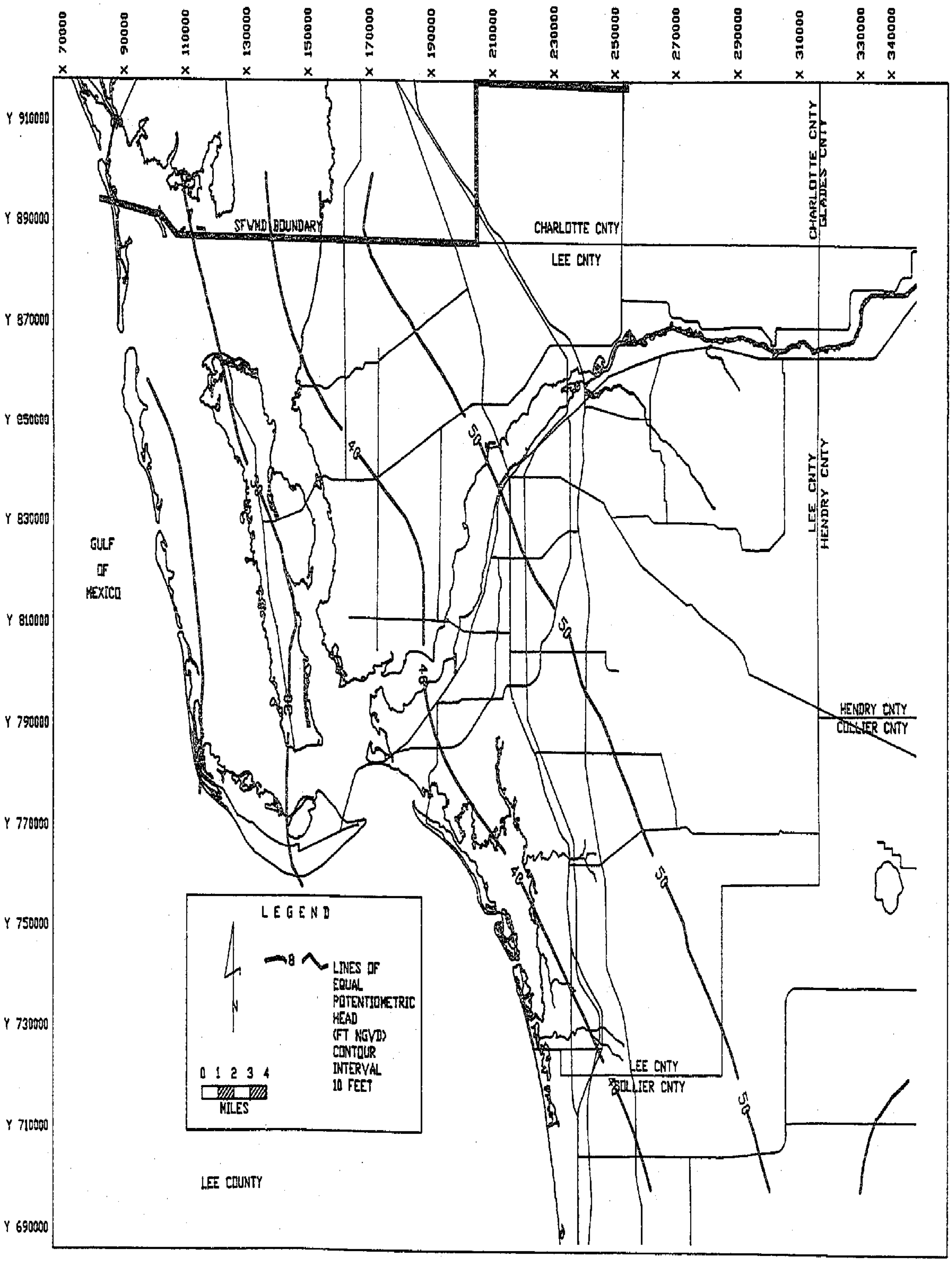


Figure 7. SPECIFIED HEAD USED IN LAYER 7

three-dimensional approach. The JMM study reports the following values of vertical hydraulic conductivity for confining layers:

Lower Tamiami	0.012400 ft./day
Upper Hawthorn	0.008860 ft./day
Mid-Hawthorn	0.000310 ft./day
Lower Hawthorn	0.002565 ft./day

Values of Vcont for these layers are obtained by dividing vertical hydraulic conductivities by confining bed thicknesses obtained from the JMM report. Where the lower Tamiami aquifer is absent, the thickness of its confining bed is set to one foot.

Storage and Specific Yield: Specific yield in layer 1, representing the unconfined water table aquifer, was set at 0.2, a typical value for unconfined aquifers. Storage coefficients in layers 2 through 5, representing the lower Tamiami through the lower Hawthorn aquifers, were set to 1 X 10^{-6} feet^{-1} multiplied by the aquifer thickness. This value was used in flow models of the surficial sediments of Palm Beach County (Shine et al., 1989). In layer 6, representing the Suwannee aquifer, storativity was unknown but set to a uniform value of 0.0001, typical of confined aquifers.

SURFACE WATER

A total of ten rivers and canals are represented in 92 model cells using the river package (Figure 8). This package allows an interaction of ground and surface waters in cells where river reaches occur, controlled by river bank hydraulic conductivity, stage elevation in the river, and the elevation of the river bottom. When heads in the aquifer are higher than the river stage, the aquifer discharges to the river and conversely when stage exceeds head, the river recharges the aquifer. A river conductance term for a cell is obtained by multiplying hydraulic conductivity of the river bed sediments by the length and wetted perimeter of the river reach in the cell, then dividing by the thickness of the river bed. The rate of leakage into or out of the river is linear, being equal to the difference between river stage and aquifer head multiplied by the hydraulic conductance of the riverbed. If the aquifer head falls below the bottom of the river, leakage into the aquifer occurs at the rate equal to the difference between the river stage and river bed elevation multiplied by by the conductance value. River bed elevations were determined from engineering drawings, most of which came from a study by Johnson Engineering (Johnson Eng., 1979). When available, stage data from the District database was used for water level elevations. Additional water levels were either interpreted from the Johnson Eng. study's backwater profiles, or from control structure elevations.

In addition, the major canals in the East County Water Control District (ECWCD) were simulated using the drain package. Drain conductance terms are determined identically to river terms. Flow into a drain is linear, determined by the difference between the drain bottom elevation and aquifer head multiplied by the hydraulic conductance of the drain. If aquifer heads drop below the bottom of the drain, flow to the drain ceases, and no return flow from the drain occurs. Bottom elevation of the drain in each cell was assumed to be the control elevations of the ECWCD canal in the cell, minus three feet.

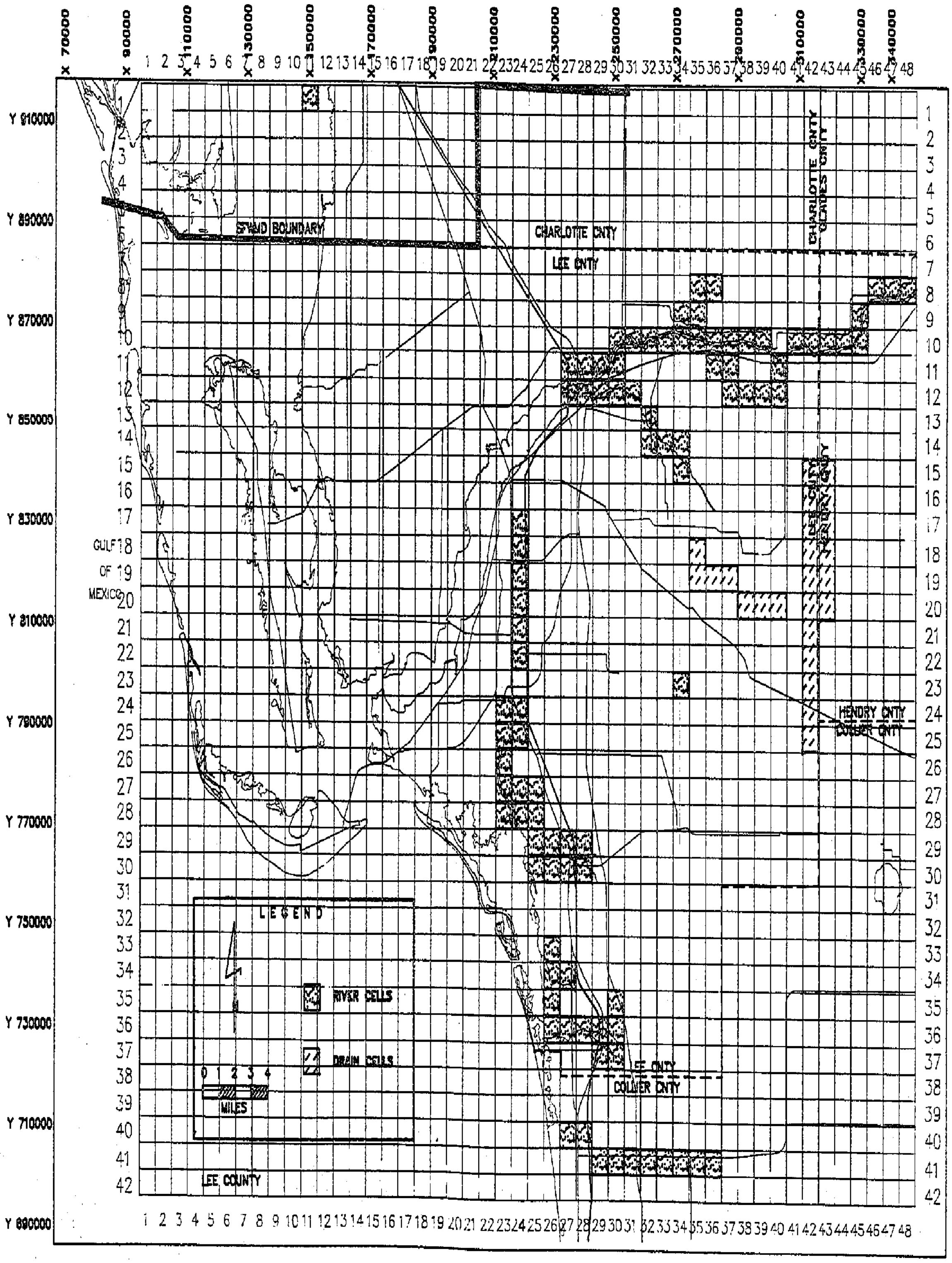


Figure 8. LAYER 1 RIVER AND DRAIN CELLS

RECHARGE

The average recharge depth in a model cell resulting from precipitation, Rp, can be computed using the mass balance equation as:

$$Rp = Pn - Qd - ET \tag{1}$$

where

Pn is the average net precipitation depth over the cell not lost to interception or depressional storage,

Qd is the average depth of water lost to surface drainage, and

ET is the average evapotranspiration depth (calculated by the evapotranspiration package in MODFLOW).

Net Precipitation: The monthly net precipitation depth, Pn, for a cell can be approximately computed from the total monthly precipitation depth over the cell, Pt, as:

$$Pn = MAX\,\{(Ki)(Pt) - (Sum[Kd(d), d = 1, n]), 0\} \tag{2}$$

where

Ki is the interception coefficient,
Kd(d) is the daily maximum depression storage loss, and
n is the number of days in the month.

Interception is that amount of the gross precipitation which wets and adheres to above ground objects until it is returned to the atmosphere through evaporation (Viessman, et al., 1977). The amount of water intercepted is a function of the storm character, as well as the species, age, and density of the prevailing plants and trees, and the season of the year. It was assumed that local variations in types of foliage and consequent amounts of precipitation intercepted were negligible in a regional model. Therefore, a uniform value for Ki of 0.8 was used throughout the area.

Precipitation that reaches the ground surface may infiltrate, flow over the surface, or become trapped in numerous small depressions from which the only escape is evaporation or infiltration. The depression-storage loss for impervious drainage areas varies from 0.05" (on a slope of 2.5%) up to .11" (on a slope of 1%). For the model area, the upper limit of 0.11" is assumed. Then, Kd(d), or simply Kd, can be defined as:

$$Kd = 0.11\,MAX\,\{[1 - \sqrt{(K/Km)}\,], 0\} \tag{3}$$

where

K is the average vertical hydraulic conductivity of the soil zone in a cell, and

Km is the value of the hydraulic conductivity in which a infiltration depth of 0.11" is almost instantaneous related to the potential evaporation rate.

Equation 3 is defined conceptually as the maximum of 0.11 inches times one minus the square root of the ratio of (K/Km), or zero. Since infiltration is normally faster than evaporation in permeable soil conditions, it can be simplified to be the square root of the ratio, (K/Km).

A value of (K/Km) = 0, signifying an impervious drainage area, implies a value of Kd = 0.11 per single precipitation event, and a value of (K/Km) = 1, a highly pervious area, implies a Kd = 0.0. Kd is the critical daily precipitation depth. Rainfall of less than such critical precipitation evaporates and creates neither infiltration nor runoff drainage.

In equation 2 only one precipitation event per rainy day and greater than 0.11" is assumed. Interception-storage capacity is usually satisfied early in a storm so that a large fraction of the rainfall in numerous small storms is intercepted (Linsley et al., 1982).

The value of vertical hydraulic conductivity, K, was set equal to 0.01 of the horizontal hydraulic conductivity in a cell. The instantaneous hydraulic conductivity, Km, was set at 10 ft/day.

Surface Drainage: The surface drainage depth is the difference between net precipitation depth, Pn, and the net infiltration. The net average depth of water lost to surface drainage, Qd, can be roughly estimated, for the South Florida conditions, by:

$$Qd = (Ks)(Pn) \tag{4}$$

where

Ks is a coefficient relating the potential for runoff to surface drainage.

In the model, Qd represents an estimation of water lost to drainage not directly simulated by MODFLOW. It was assumed that such losses are minor in this model, and Ks was set to 0.01 accordingly.

EVAPOTRANSPIRATION

The maximum evapotranspiration rate was set to the recorded monthly pan evaporation rate for the Lehigh station. If a reading for a specific month was not available, the monthly average was substituted. Extinction depths were established for the land use categories found in the area. The overall extinction depth for each cell is the weighted average of the depths for the land use types occurring within the cell.

DISCHARGE

Public Water Supply: Public water supply ground water withdrawals were obtained from pumpage information routinely furnished to the District by the water utilities. Since many wellfields in Lee County are distributed over several model cells and multiple aquifers, individual well discharge records were used. The locations of public water supply wellfields are shown in Figure 9.

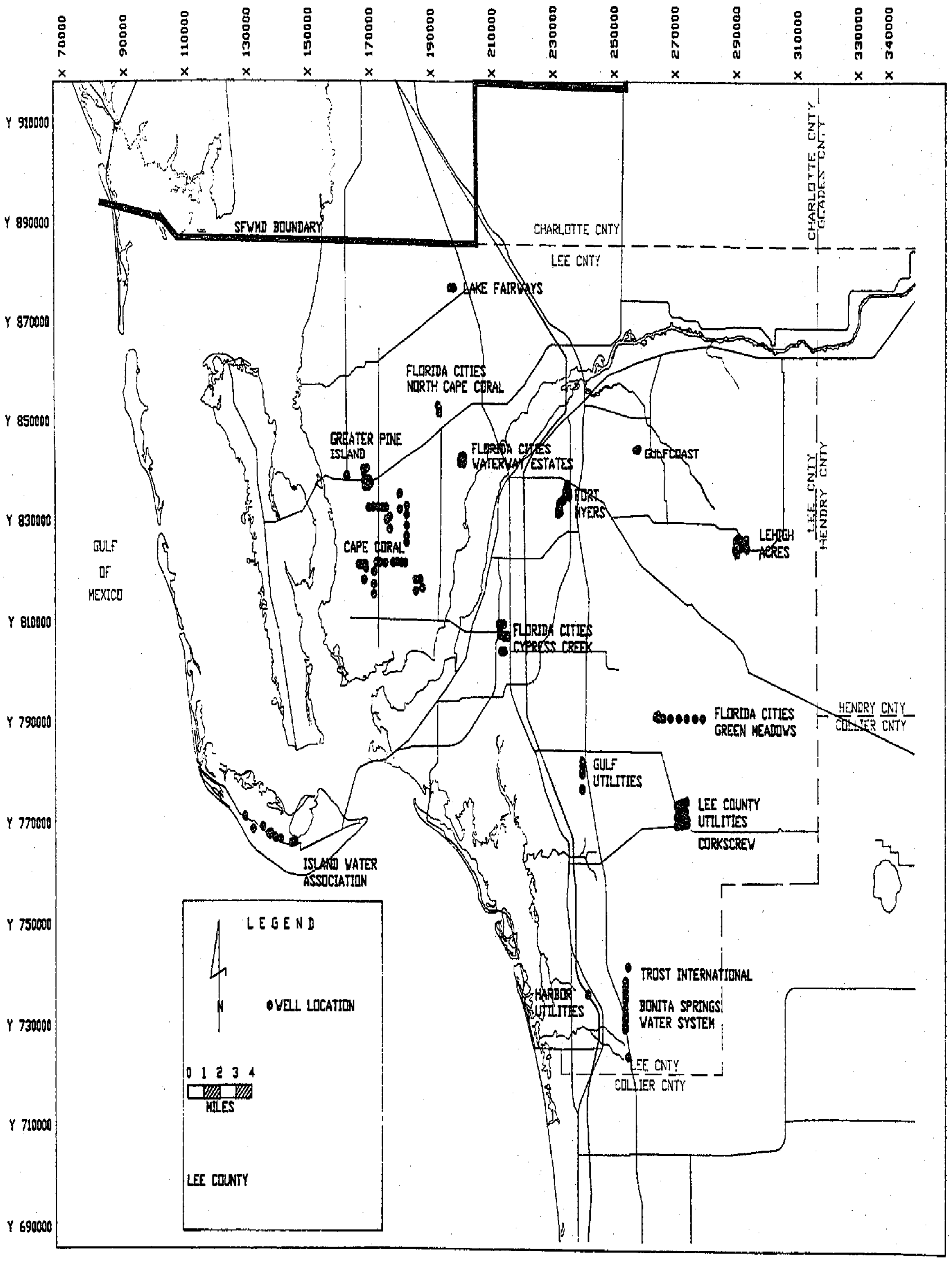


Figure 9. LOCATION OF PUBLIC WATER SUPPLY WELLFIELDS

Agricultural and Other Irrigation: Irrigation water application rates for several major crop types were derived from irrigation pumpage information submitted to the SFWMD for the period selected for transient calibration. Where sufficient information was not available, irrigation application rates were estimated. The application rates used for calculating irrigation water use are presented in Table 2. The irrigation water use is calculated by multiplying irrigated acreages, extracted from District water use permit files, by the appropriate monthly crop irrigation requirements and, if appropriate, dividing by irrigation system efficiency. The water use was distributed among the withdrawal facilities, both surface and ground water, in proportion to their capacities. Withdrawals from surface water sources were not further considered. The location of model cells with irrigation water use are shown in Figure 10.

Domestic Self-Supply: The JMM report presented high and low estimates of historical and projected domestic self supply based on information compiled by Lee County for each of the fifteen planning districts in the county, which are shown in Figure 11. Distribution of domestic self supply discharge for each of the planning districts was estimated based on examination of aerial photographs to determine approximate housing densities within each model cell (Figure 12). The distribution of domestic self supply discharge by planning district and aquifer used in the transient simulation is given in Table 3. These quantities are averages; monthly fluctuations of discharge were made in each planning district in proportion to fluctuations noted in the public water supply wellfield discharges for the wellfield which serves that district (Table 4). The possibly offsetting effects of return flow from domestic septic tanks and exfiltrating water and sewer lines were not considered in this model. Because of the small amount of domestic self supply in districts 13, 14, and 15, they are not included in determination of discharge.

TABLE 2. SUPPLEMENTAL IRRIGATION WATER RATES USED TO CALCULATE IRRIGATION WATER USE (Inches/Month)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Citrus*	0.41	1.50	1.15	1.85	2.29	1.04	2.01	0.00	0.24	0.00	0.53	0.59
Golf Course Turf*	1.88	2.16	2.55	3.08	2.78	0.00	0.93	0.00	1.20	1.46	2.33	0.88
Macadamia Nuts*	0.41	1.50	1.15	1.85	2.29	1.04	2.01	0.00	0.24	0.00	0.53	0.59
Melons	2.73	0.00	2.86	4.76	5.30	0.00	0.00	0.00	0.00	0.00	2.57	3.12
Pototoes	4.98	0.00	2.79	7.29	9.68	0.00	0.00	0.00	0.00	0.00	2.51	4.78
Soybeans	3.08	0.00	1.70	4.86	5.99	0.00	0.00	0.00	0.00	0.00	1.53	3.18
Tomatoes	3.09	0.00	2.57	5.68	6.01	0.00	0.00	0.00	0.00	0.00	2.31	3.72
Small Vegetables	2.17	0.00	2.74	4.87	4.22	0.00	0.00	0.00	0.00	0.00	2.46	3.20

*Irrigation efficiency is included in the supplemental requirement

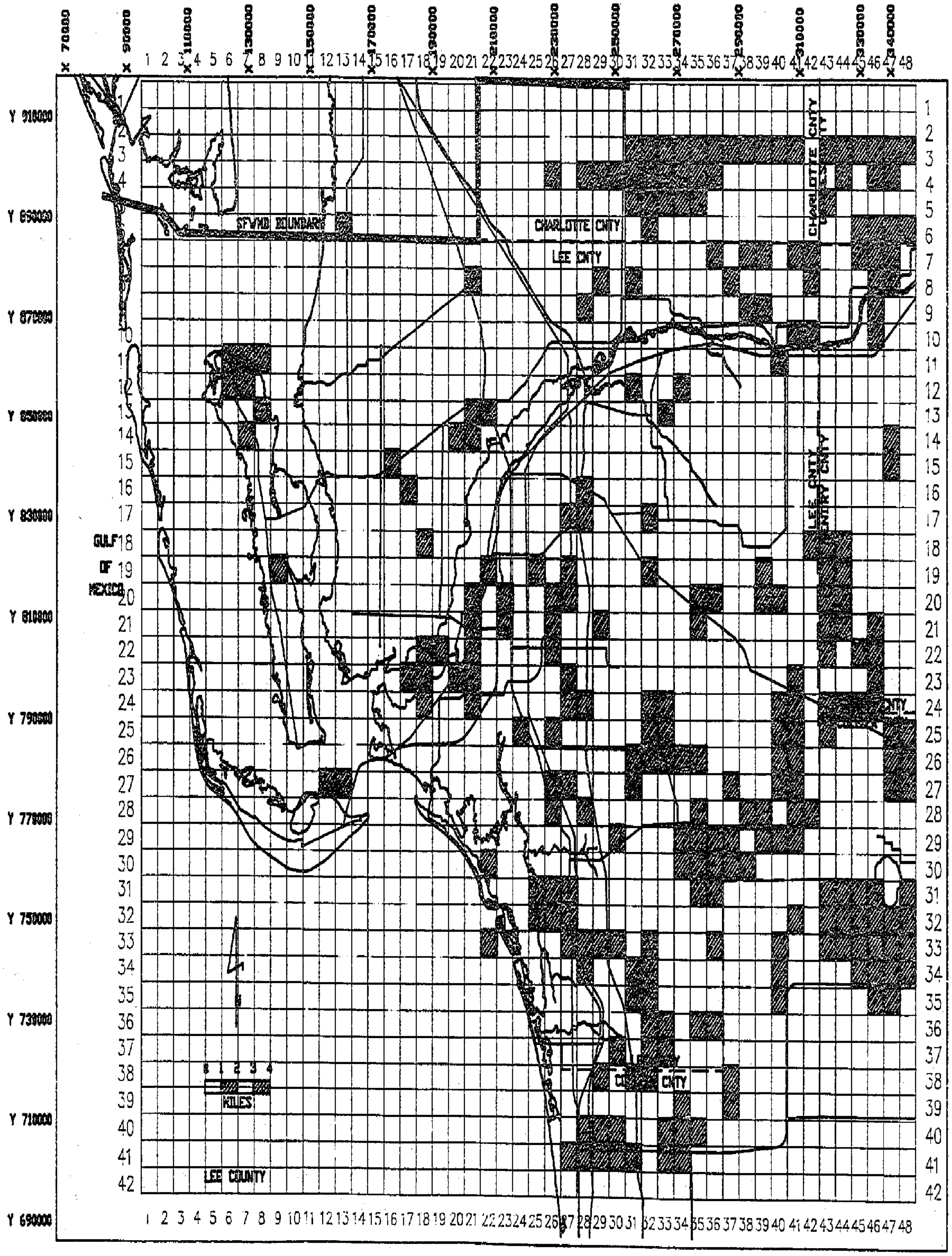


Figure 10. LOCATION OF CELLS WITH IRRIGATION WATER USE, ANY LAYER

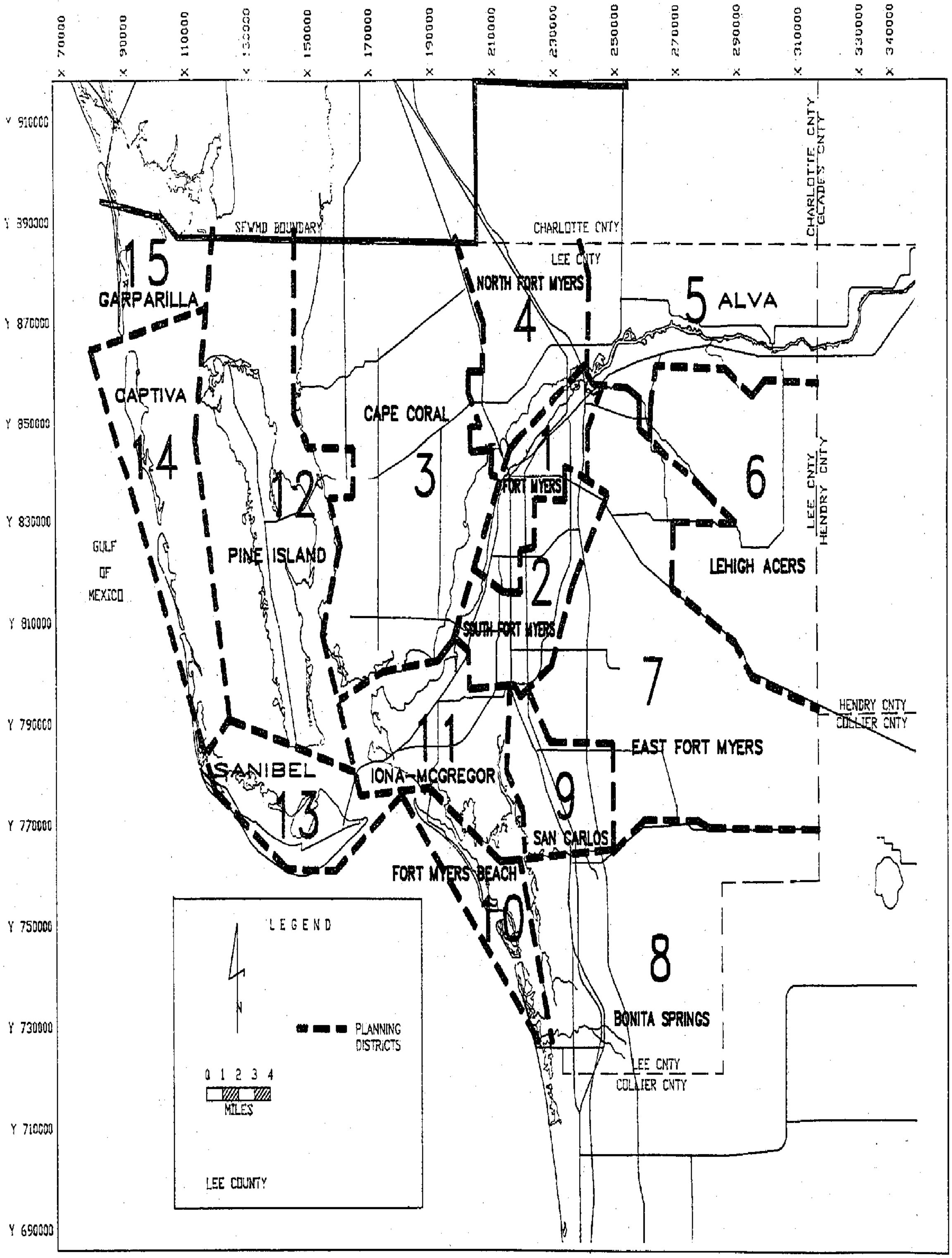


Figure 11. LOCATION OF PLANNING DISTRICTS IN LEE COUNTY

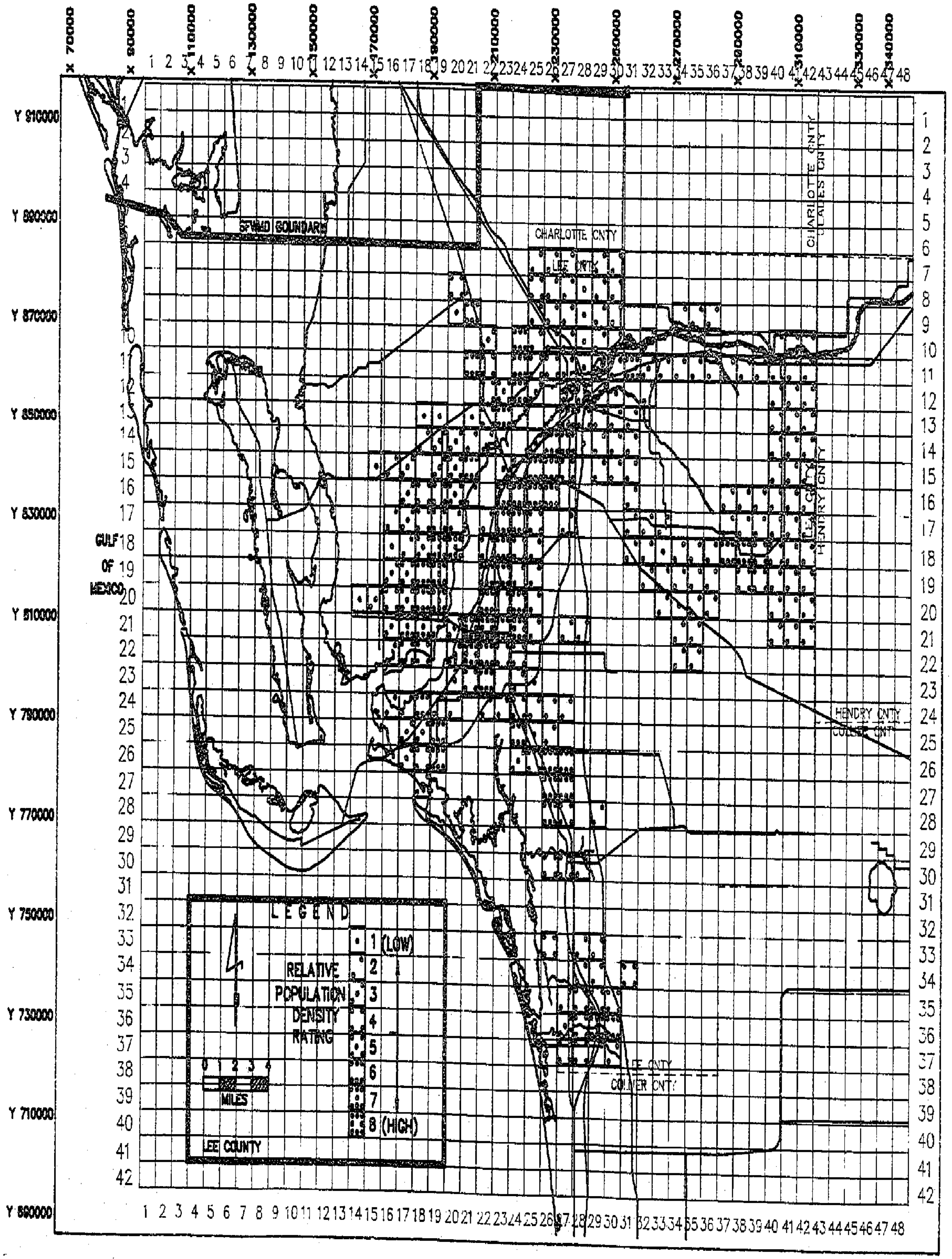


Figure 12. LOCATION OF CELLS WITH DOMESTIC SELF SUPPLY WATER USE

TABLE 3
DOMESTIC SELF SUPPLY
WATER USE ESTIMATES FOR THE MODEL CALIBRATION

	Private Wells				
Planning District	Water Table Aquifer (gpd	Lower Tamiami Aquifer (gpd)	Sandstone Aquifer (gpd)	Mid Hawthorn Aquifer (gpd)	Lower Hawthorn Aquifer (gpd)
1	0	0	827,884	7,179,446	1,861,195
2	0	0	0	6,495,519	600,271
3	0	0	0	13,313,919	0
4	0	0	2,400,000	2,205,025	619,379
5	73,645	0	1,722,462	210,960	252,242
6	305,348	0	5,045,906	152,696	0
7	416,503	0	1,957,312	145,621	0
8	419,192	3,355,059	317,938	139,209	316,373
9	1,805,186	0	207,262	75,032	111,431
10	0	0	0	500,741	22,181
11	0	0	0	2,964,563	343,776
12	847,502	0	0	111,858	244,167
13	56,129	0	0	0	197,379
14	28,034	0	0	13,192	115,013
15	0	0	0	0	0

TABLE 4. RATIOS USED TO PRO-RATE AVERAGE DOMESTIC SELF SUPPLY DISCHARGE

Stress Period	Planning District 1	2	3	4	5	6	7	8	9	10	11	12
1 (Apr 85)	1.02	0.79	0.90	0.95	0.96	0.96	0.85	0.87	0.98	0.79	0.79	0.79
2 (May 85)	1.01	0.77	0.92	0.95	0.96	0.96	0.83	0.83	0.92	0.77	0.77	0.64
3 (Jun 85)	1.02	0.81	0.87	0.96	0.93	0.93	0.89	0.87	0.99	0.81	0.81	0.83
4 (Jul 85)	0.97	0.79	0.91	1.13	0.90	0.90	0.91	0.86	1.02	0.79	0.79	0.72
5 (Aug 85)	1.08	1.29	0.95	1.27	0.98	0.98	1.17	1.04	1.30	1.29	1.29	1.13
6 (Sep 85)	1.13	1.28	0.93	1.37	1.09	1.09	1.22	1.17	1.44	1.28	1.28	1.32
7 (Oct 85)	0.96	1.37	0.91	1.11	1.14	1.14	1.08	1.19	1.09	1.37	1.37	1.08
8 (Nov 85)	0.99	1.32	0.92	1.12	1.13	1.13	1.11	1.23	1.15	1.32	1.32	1.28
9 (Dec 85)	1.01	1.16	0.78	1.04	1.07	1.07	1.04	1.17	1.07	1.16	1.16	1.28
10 (Jan 86)	0.97	1.02	0.78	0.88	1.07	1.07	1.01	1.03	1.02	1.02	1.02	1.28
11 (Feb 86)	1.00	1.07	1.01	0.96	1.05	1.05	0.98	1.01	0.93	1.07	1.07	0.98
12 (Mar 86)	0.98	0.90	1.01	0.70	1.01	1.01	0.90	0.88	0.83	0.90	0.90	0.89
13 (Apr 86)	0.94	0.78	0.98	0.91	0.93	0.93	0.87	0.78	0.75	0.78	0.78	0.74
14 (May 86)	0.95	0.81	1.29	0.89	0.91	0.91	0.87	0.94	0.74	0.81	0.81	0.83
15 (Jun 86)	0.99	0.89	1.46	0.89	0.88	0.88	0.88	0.88	0.74	0.89	0.89	0.95
16 (Jul 86)	1.00	0.89	1.12	1.05	0.92	0.92	1.09	0.96	0.96	0.89	0.89	1.18
17 (Aug 86)	1.02	0.98	1.17	1.12	1.00	1.00	1.18	1.14	1.12	0.98	0.98	1.07
18 (Sep 86)	0.95	1.08	1.09	0.70	1.04	1.04	1.10	1.14	0.94	1.08	1.08	1.01

Based on reported pumpage for the following water utilities; Ratios compare pumpage for the month to the average pumpage for the calibration period April, 1985 through September, 1986.

Fort Myers:	PD 1
Florida Cities South:	PD 2, 10, 11
Cape Coral:	PD 3
Florida Cities North:	PD 4
Lehigh Acres:	PD 5, 6
Lee County Utilities:	PD 7
Bonita Springs:	PD 8
Gulf Utilities:	PD 9
Pine Island:	PD 12

CALIBRATION

STEADY-STATE CALIBRATION

The initial steady state runs served two purposes: 1) to make the initial adjustments to the aquifer parameters used in the model and 2) to generate starting heads for the transient runs. The pumpage applied in the steady state runs comprises average estimated domestic self supply water use, estimated irrigation water use for March, and reported public water supply pumpage for March, 1985, the month prior to the beginning of the transient simulation runs.

TRANSIENT CALIBRATION

Following the initial steady state calibration runs, a series of transient runs were made to calibrate the model to observed water levels using either reported or estimated water use and historical meteorological conditions. The transient calibration simulates the period of April, 1985 through September, 1986. This interval was selected because it represents the most recent and extensive data presented in the JMM report. Of this eighteen-month interval, the twelve-month period from October, 1985 through September, 1986 was used to actually calibrate the model.

Each month is simulated by a stress period comprising three time steps. Although the accuracy of the model is enhanced by using more time steps per stress period, computer utilization considerations dictated the use of a more minimal number of steps. A sensitivity test on the calibrated model demonstrated that using nine time steps per stress period instead of three resulted in an average change in computed water levels of +0.05 feet in the layers representing confined aquifers.

It was attempted to calibrate so that agreement between observed water levels in monitor wells and calculated water levels in the cells which represent location of those wells, averaged for the period from October, 1985 through September, 1986, were generally within the following ranges (+/- feet):

Surficial	2 feet
Lower Tamiami	3 feet
Sandstone	4 feet
Mid-Hawthorn	5 feet
Lower Hawthorn	5 feet
Suwannee	5 feet

Tolerance was increased with increasing aquifer depth because:

1. In the shallower aquifers, small changes in water levels reflect potentially large impacts, particularly with respect to wetland drainage.

2. Low hydraulic conductivity typical of confined aquifers in the area causes heads to fluctuate more widely in response to stress, compared to unconfined aquifers with higher conductivity.

3. There are fewer water level monitor wells in the deeper aquifers which makes determining the actual regional water level trends and deviation of the model results from them more difficult.

The agreement of a computed water level with its counterpart observed level can be affected by two things:

1. The computed water levels represent the average water level over a model cell. If actual levels vary significantly across the one mile square cell, monitor well levels may not closely match the computed levels. This is the case with several wells located within public water supply wellfields where stresses on the aquifer cause steep gradients as well as some located near surface water streams, where strong natural gradients occur. In most cases however,the gradient across a cell is sufficiently small that the monitor well represents the cell conditions.

2. The model head being used for the calibration is an end-of-month value while observed levels may have been measured any day of the month. In some wells, month to month changes are large enough that poor agreement with monthly values is noticed. However, by averaging the difference over a one-year period, this effect is minimized.

As already noted, the initial model is based on existing interpretations of the hydrogeology of Lee County to the extent possible. In the following paragraphs, modifications during calibration are discussed. In the calibration of layers 2, 3 and 4, deviations from the discretizations of hydraulic conductivities used by CDM in the wellfield protection model were made. The intent of the CDM model was to obtain a reliable calibration in the vicinity of public water supply wellfields in order to predict contaminant transport times. The model reported here, however, has to examine regional water availability, including the effects of domestic self supply and irrigation water use, as well as public water supply. Therefore, some variations in parameter estimates between the models is expected; the magnitude of the variations is small. Table 5 shows the water use data used to generate the withdrawals simulated in the calibration runs.

Layer 1, the Water Table Aquifer: This layer of the model is unconfined. As stated previously, the hydraulic conductivity distribution in the layer is based on the CDM wellfield travel time model. The base of the water table aquifer, needed for the model to compute transmissivity, is assumed to be the base of the Surficial Aquifer System where the lower Tamiami aquifer is separated from the water table by a confining bed thickness of less than ten feet. Where confinement of the lower Tamiami exceeds ten feet, the base is the top of the lower Tamiami confining zone. In order to eliminate a sharp change in transmissivity in layer 1, an area several cells wide is allowed for the transition of the bottom of layer 1 from the top of the lower Tamiami confining bed to the bottom of the water table aquifer. No modifications needed to be made to the hydraulic conductivity, aquifer base elevation, or vertical conductance data sets during the transient calibration.

Regional agreement of computed with observed heads is shown in Figure 13. Computed water levels in the cells occupied by wells L-1976, L-1978, and L-2202 do not agree with the observed levels within the desired tolerance of 2 feet. These wells are located in model cells which also contain the representation of the Caloosahatchee River; therefore, the simulated water levels are probably lower than observed levels due to cell-wide averaging of water levels which reflects the influence of the river. Cell-wide averaging effects are also noted in comparing observed and computed levels in the cell containing well L-1985, which also contains the Lee County Utilities Corkscrew wellfield, and well L-954, affected by a Florida Cities Water Company wellfield.

TABLE 5
WATER USE BY CATEGORY PER STRESS PERIOD
(Lee County Only)
(Reported as Cubic Feet Per Second)

Stress Period	Public Water Supply	Domestic Self Supply	Irrigation	Total
1 (Apr 85)	46.6	87.8	170.5	304.9
2 (May 85)	45.5	92.7	167.7	305.9
3 (Jun 85)	42.9	86.3	14.9	144.1
4 (Jul 85)	36.5	89.2	37.6	163.3
5 (Aug 85)	37.5	84.5	0.0	122.0
6 (Sep 85)	39.7	76.8	14.9	131.4
7 (Oct 85)	38.2	80.4	14.0	132.6
8 (Nov 85)	42.0	87.5	84.6	214.1
9 (Dec 85)	46.2	81.8	92.1	220.1
10 (Jan 86)	48.9	87.2	79.6	215.7
11 (Feb 86)	47.0	94.7	42.2	183.9
12 (Mar 86)	49.3	94.3	101.8	245.4
13 (Apr 86)	59.3	98.9	170.5	328.7
14 (May 86)	52.2	95.0	167.7	314.9
15 (Jun 86)	42.4	79.0	14.9	136.3
16 (Jul 86)	44.3	78.2	37.6	160.1
17 (Aug 86)	40.8	78.0	0.0	118.8
18 (Sep 86)	39.0	78.6	14.9	132.5
TOTALS, All Periods	798.3	1550.9	1225.5	3574.7

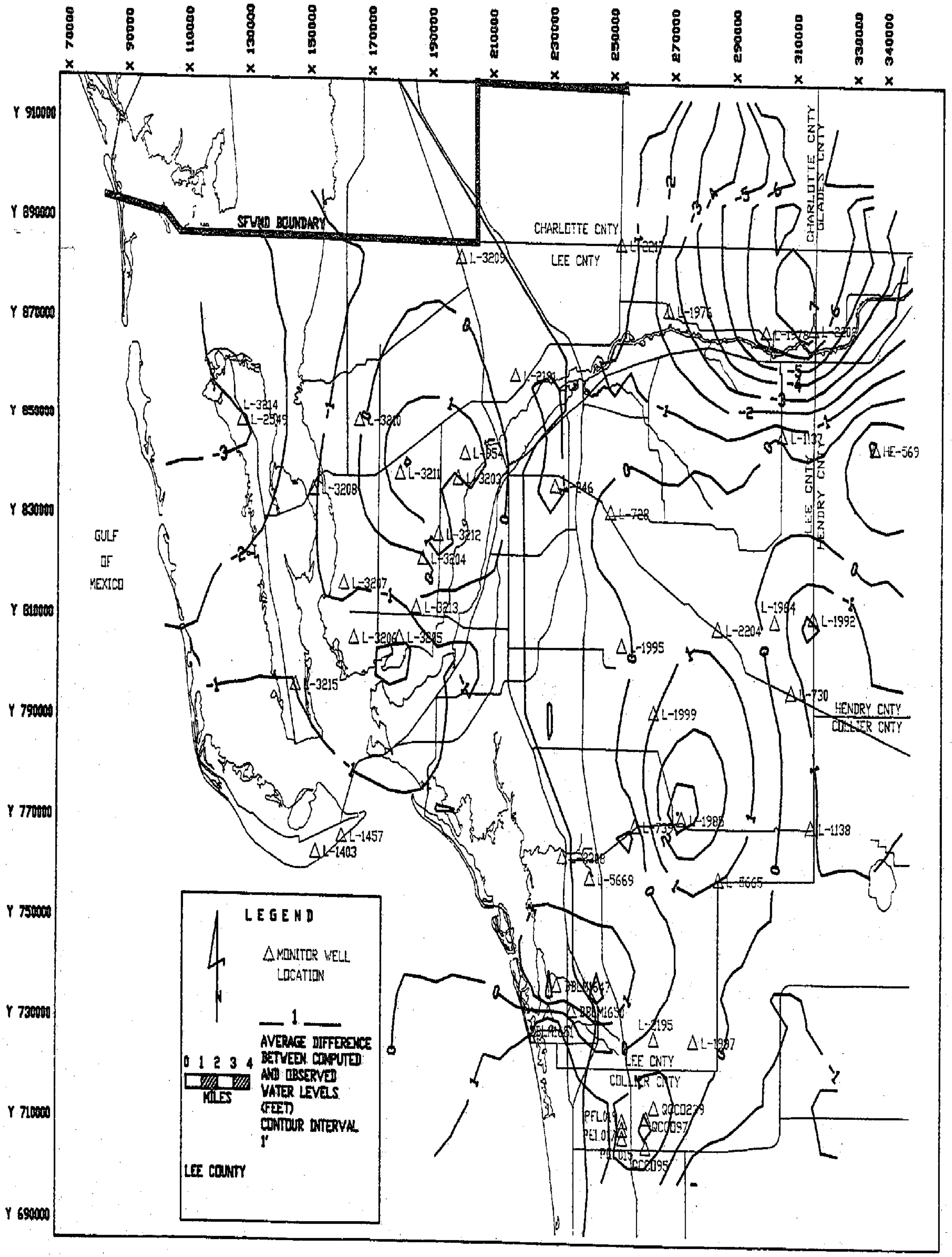


Figure 13. AVERAGE AGREEMENT OF OBSERVED AND COMPUTED WATER LEVELS, LAYER 1 (WATER TABLE AQUIFER)

Layer 2, the Lower Tamiami Aquifer: In the areas where this aquifer is present, its transmissivity in the model was initially set as discussed previously. Where the aquifer is absent, the layer in the model is represented by a hydraulic conductivity of 500 ft./day multiplied by a thickness of 1 foot, a negligible value which has no effect on the model results. As was the case with the bottom of layer 1, a transitional area to prevent sharp transmissivity changes is allowed. The best calibration for layer 2 was obtained by varying vertical conductance of the base of layer 2 within the range of 3.6×10^{-5} day^{-1} to 9.0×10^{-5} day^{-1}. Specific storage for the layer 2 was set to 1×10^{-6} ft.$^{-1}$. During the transient calibration, a uniform hydraulic conductivity value of 500 ft./day produced the best results. The agreement between observed and computed water levels is shown in Figure 14.

Layer 3, the Sandstone Aquifer: The initial transmissivity of this layer was also set as discussed previously, except for in the area of Cape Coral where the aquifer is missing, where 0.001 ft./day was used. During the calibration, the hydraulic conductivity in an area where CDM reported a value of 200 ft./day was gradually lowered to 100 ft./day. Based on the calibration runs, Vcont of the base of layer 3 was lowered to half its starting value, signifying a vertical hydraulic conductivity of 0.00017 ft./day. Specific storage was set to 1×10^{-6} ft.$^{-1}$ and remained unchanged. During calibration, unusually large drawdown was noted in the area of planning district 4. Adjustments of hydraulic parameters within acceptable ranges failed to rectify the problem. Inspection of land use from aerial photographs suggested that the problem might be an overestimation of water use for domestic self supply. Based on discussions with Lee County personnel (L. A. Pellicer & Roland Banks, personal communication, 1989), the self supply estimate was lowered to half its original value. After calibration, all observed and computed water levels were within the specified tolerance of four feet (Figure 15) except for wells L-1984 and L-1998, which correspond to cells containing the Green Meadows and Corkscrew wellfields. Here, cell-wide averaging affects computed water levels.

Layer 4, the Mid-Hawthorn Aquifer: During the calibration, the best match between simulated and observed water level fluctuations along both sides of the lower reach of the Caloosahatchee River occurred when transmissivity was doubled. Therefore an additional zone of higher hydraulic conductivity was added to the model in that area. In addition, a high value of 90 ft./day in the southern part of the model area was not used. Although a high transmissivity value is reported at an aquifer performance test near Bonita Springs, there is insufficient regional data to justify assuming an extensive highly transmissive area within the mid-Hawthorn aquifer. Because of the relatively low transmissivity and the large withdrawal stress on this layer, it is extremely sensitive to small changes in the vertical conductance between it and the underlying layer, and reasonable calibration could not be obtained using a single value of vertical hydraulic conductivity applied to confining bed thickness. This is because the confining bed between the mid-Hawthorn and lower Hawthorn aquifers is lithologically disparate, and actually contains localized water producing zones (Wedderburn, et al., 1982, Missimer & Associates, 1984). Therefore, the vertical conductance of the base of layer 4 was adjusted to produce the best match between simulated and observed water levels. Computed water levels are at or near the +/- five-foot agreement criterion in most wells (Figure 16). The exceptions are wells L-735 and L-1993 in which the computed and observed hydrographs are parallel but not in agreement. Near these wells, the aquifer both thins and dips rapidly to the southeast (Figure 2). This situation may isolate a portion of the aquifer from response to conditions to the north and west. Additional geologic and

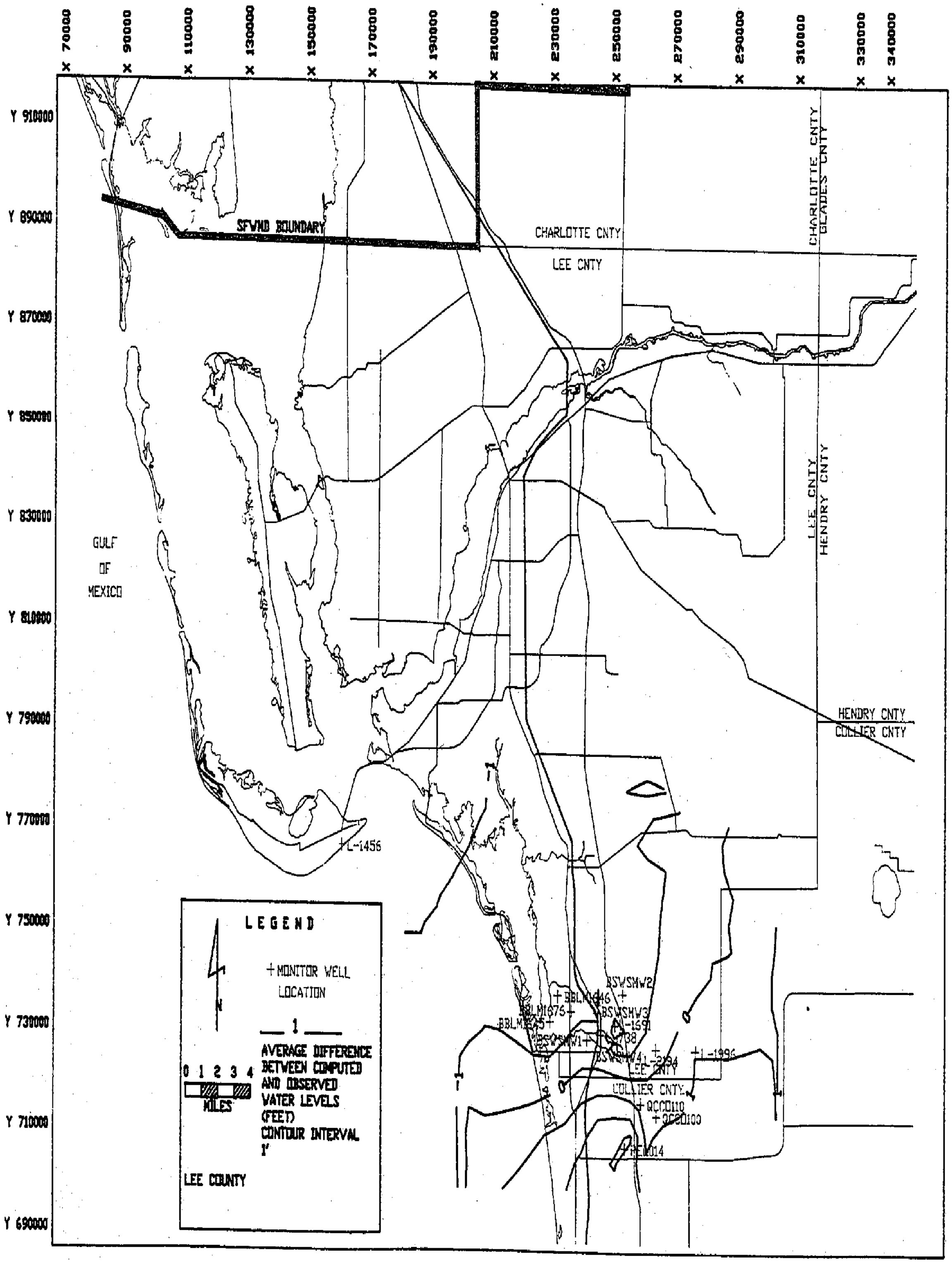


Figure 14. AVERAGE AGREEMENT OF OBSERVED AND COMPUTED WATER LEVELS, LAYER 2 (LOWER TAMIAMI AQUIFER)

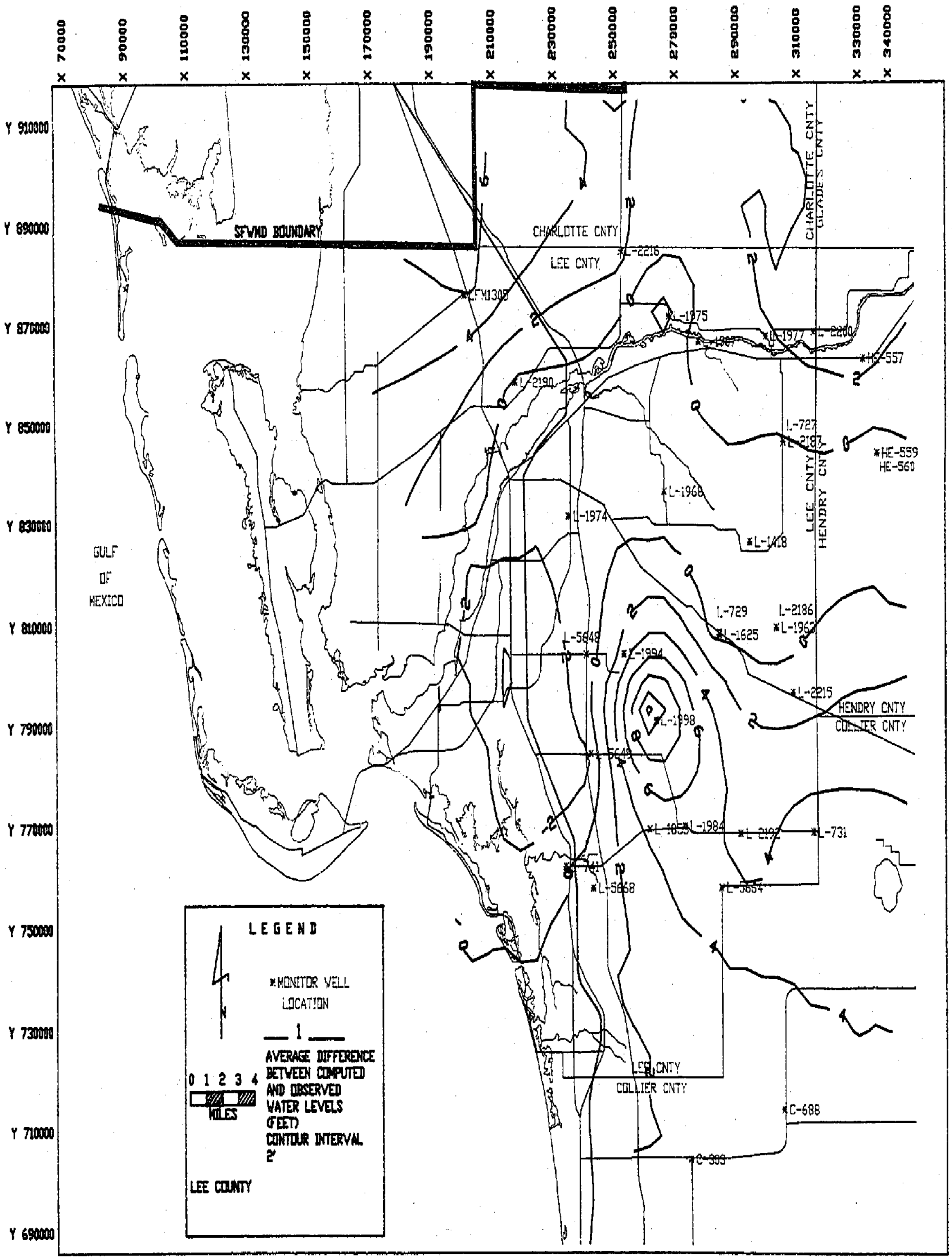


Figure 15. AVERAGE AGREEMENT OF OBSERVED AND COMPUTED WATER LEVELS, LAYER 3 (SANDSTONE AQUIFER)

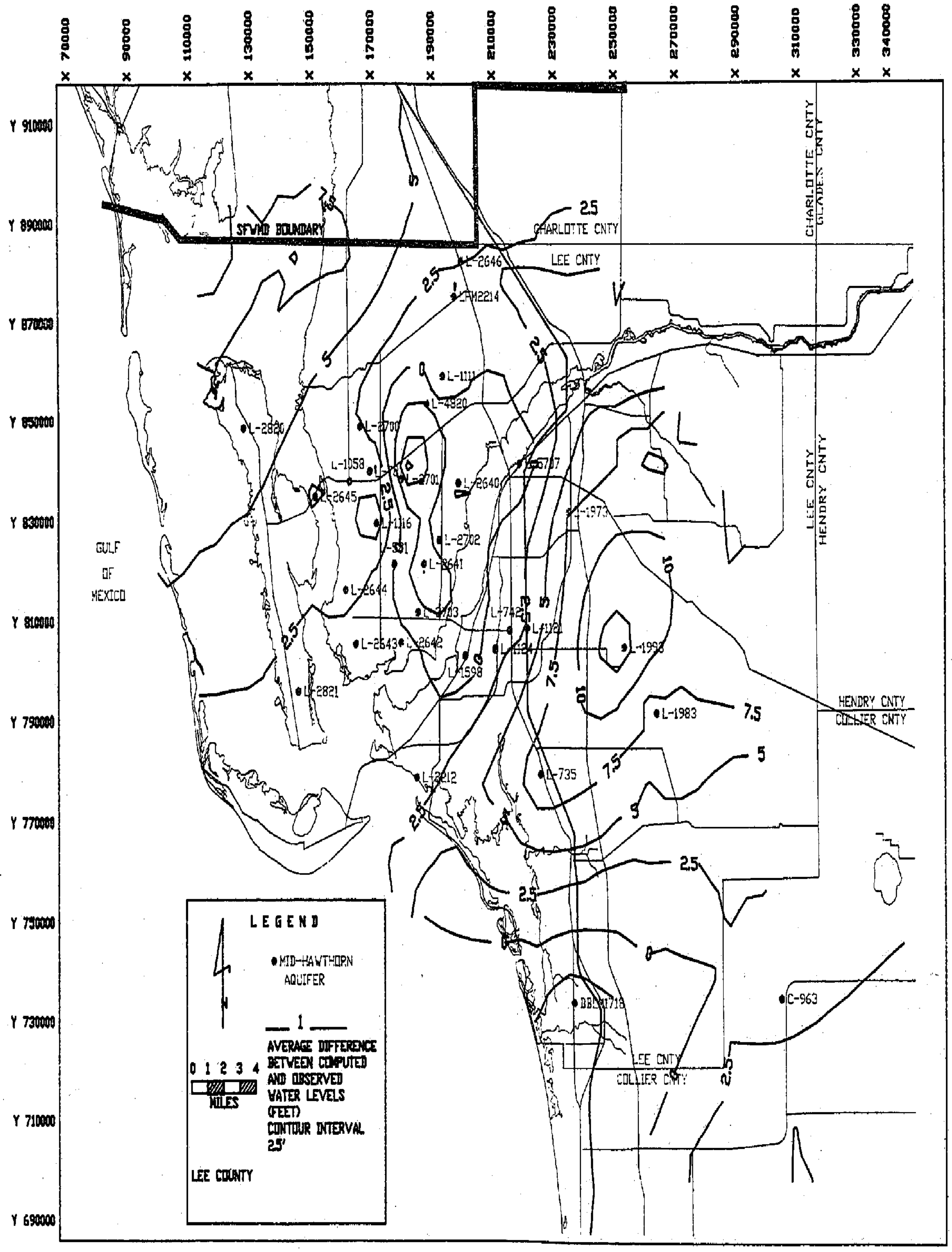


Figure 16. AVERAGE AGREEMENT OF OBSERVED AND COMPUTED WATER LEVELS, LAYER 4 (MID-HAWTHORN AQUIFER)

stratigraphic analysis will be required to fully explain and correct the lack of agreement of the model with observed data in the area.

Layer 5, the Lower Hawthorn Aquifer: Compared to the overlying aquifers, relatively little is known about the hydraulic characteristics of the lower Hawthorn, Suwannee, and deeper aquifers, and the degree to which they are interconnected. In calibrating the fifth layer, hydraulic conductivities were varied from 25 to 110 ft./day, which represents the range of transmissivities reported in aquifer performance tests. The layer is relatively insensitive to changes in hydraulic conductivity within these ranges, but the best match between observed and computed hydrographs occurred at a uniform hydraulic conductivity of 56 ft./day. Next, agreement of computed and observed heads was tested by varying the vertical conductance term for the boundary between this and the underlying layer. Lacking information of the thickness or character of confinement between the lower Hawthorn and Suwannee aquifers, uniform values of the vertical conductance term for this boundary were tested. Observed and computed levels matched closely in many wells with a conductance of 8×10^{-10} sec^{-1}, but in the vicinity of the Cape Coral wellfield, along parts of the Caloosahatchee River, and in northern Pine Island, much better results were obtained at half that value. Accordingly, a variable vertical conductance for the boundary between the lower Hawthorn and the upper Suwannee aquifers was developed. The agreement between observed and computed water levels is shown in Figure 17. Water levels in wells L-2525 and L-2528 are higher than computed levels. The most likely explanation for this is that the zones in which the wells are completed is somewhat isolated hydraulically from the main producing zones of the aquifer, which the model represents. Several of the City of Cape Coral monitor wells show some minor mismatch between computed and observed levels, probably reflecting cell-wide averaging effects, proximity of some monitor wells to production wells, and possible completion of both monitor and production wells in both the lower Hawthorn and Suwannee aquifers.

Layer 6, the Upper Producing Zone of the Suwannee Aquifer: Little is known of the characteristics of this aquifer separately at this time, other than that it is considered to be somewhat hydrologically similar to the lower Hawthorn aquifer. Therefore, the transmissivity was set to a uniform value of 10,368 $ft.^2$/day, storage to 0.0001, and vertical conductance to 8×10^{-10} sec^{-1}.

EXAMPLES OF RESULTS

Figures 18 through 22 show the simulated heads in layers 1 through 5 for the end of the dry season in April, 1966. The computed heads for the end of the wet season in September, 1986 are shown in figures 23 through 27.

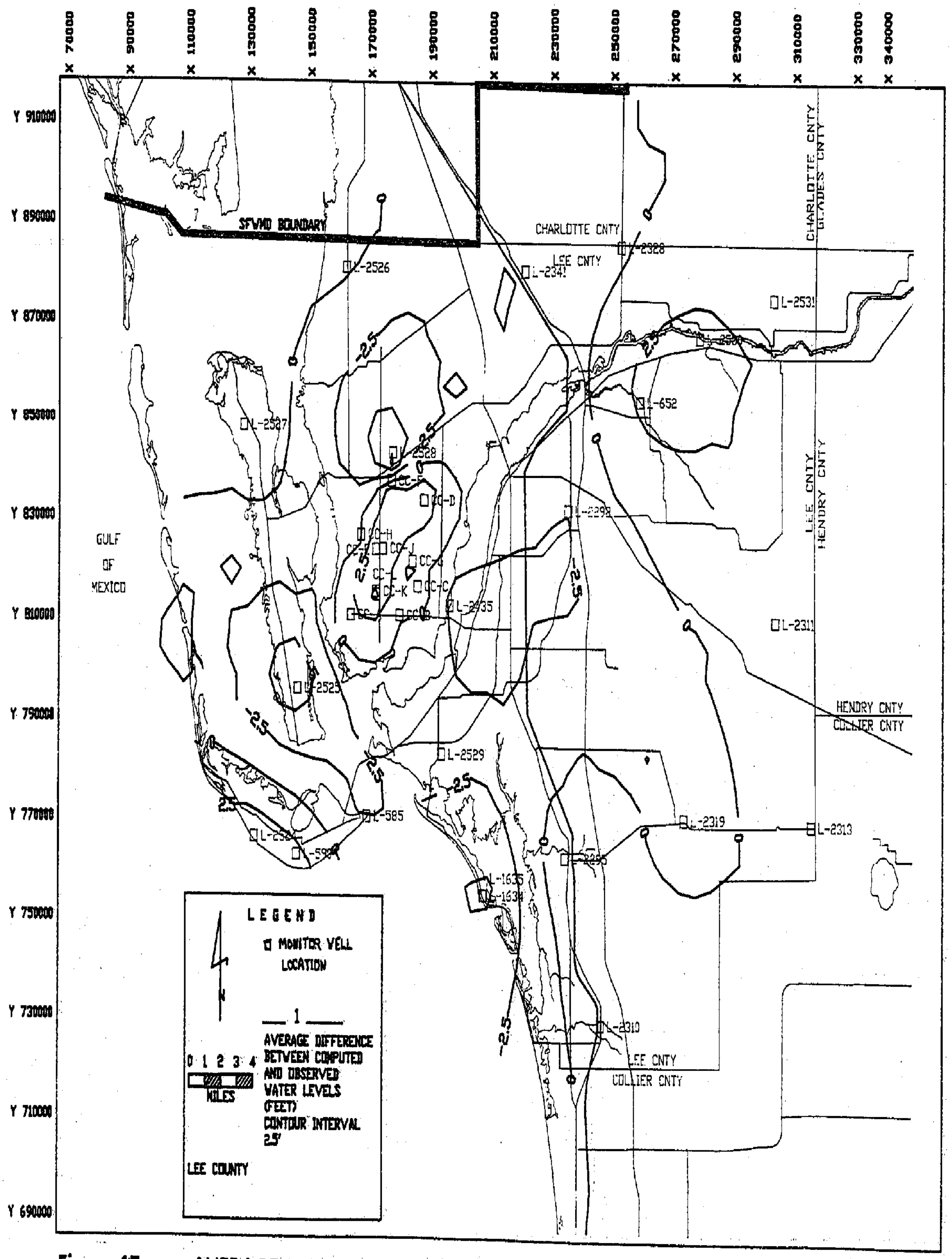


Figure 17. AVERAGE AGREEMENT OF OBSERVED AND COMPUTED WATER LEVELS, LAYER 5 (LOWER HAWTHORN AQUIFER)

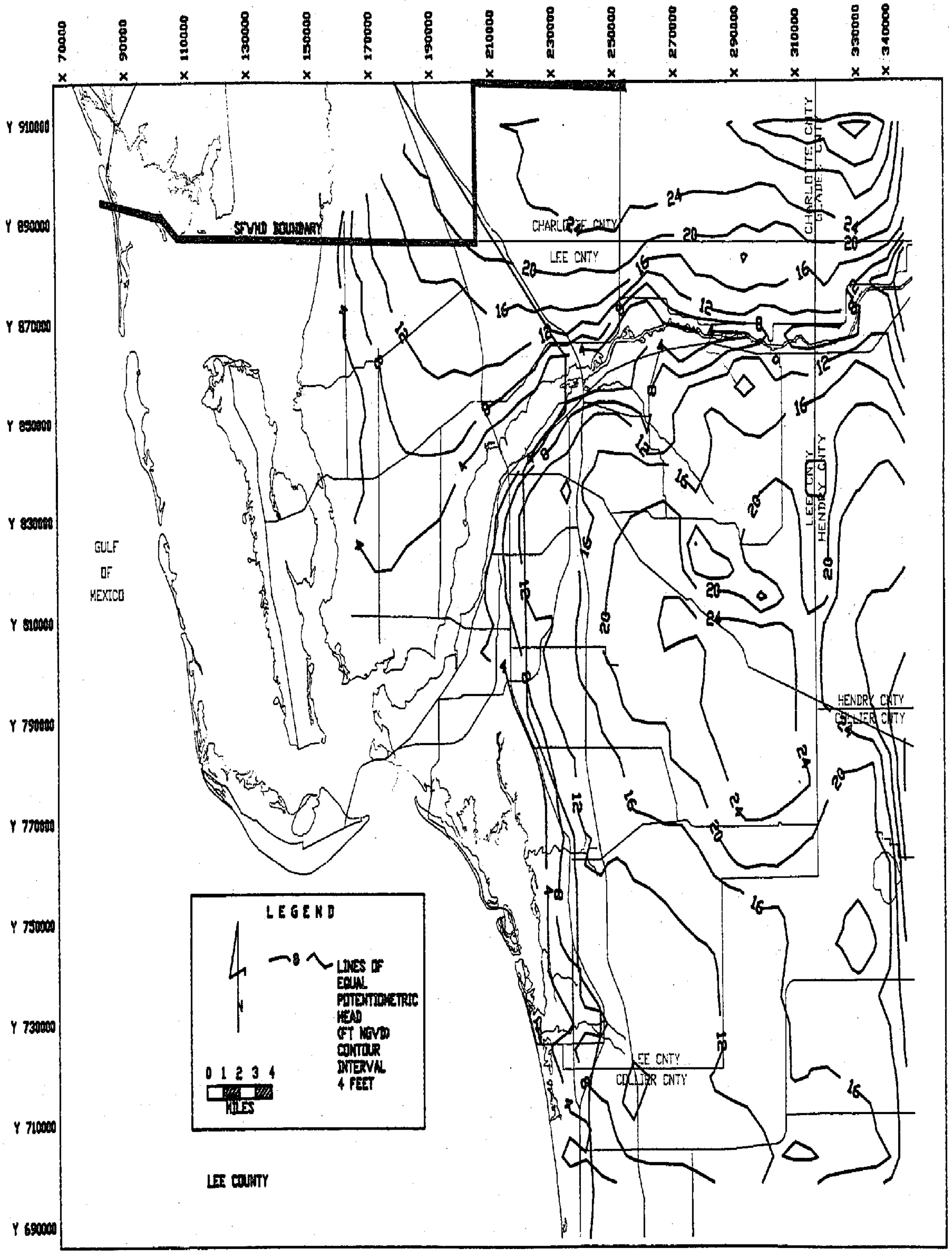


Figure 18. COMPUTED WATER LEVELS IN LAYER 1 (WATER TABLE AQUIFER), APRIL, 1986

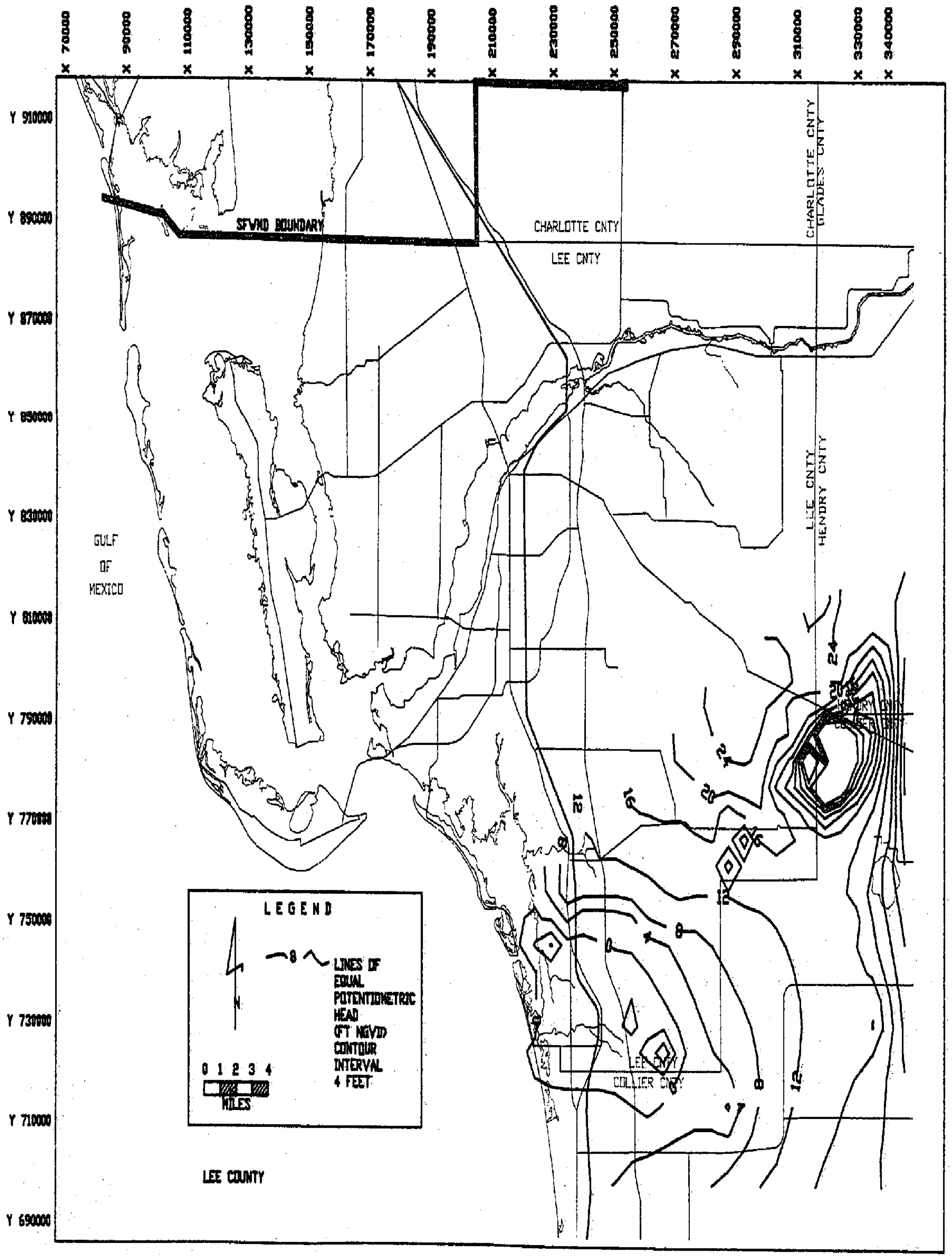


Figure 19. COMPUTED WATER LEVELS IN LAYER 2 (LOWER TAMIAMI AQUIFER), APRIL, 1986

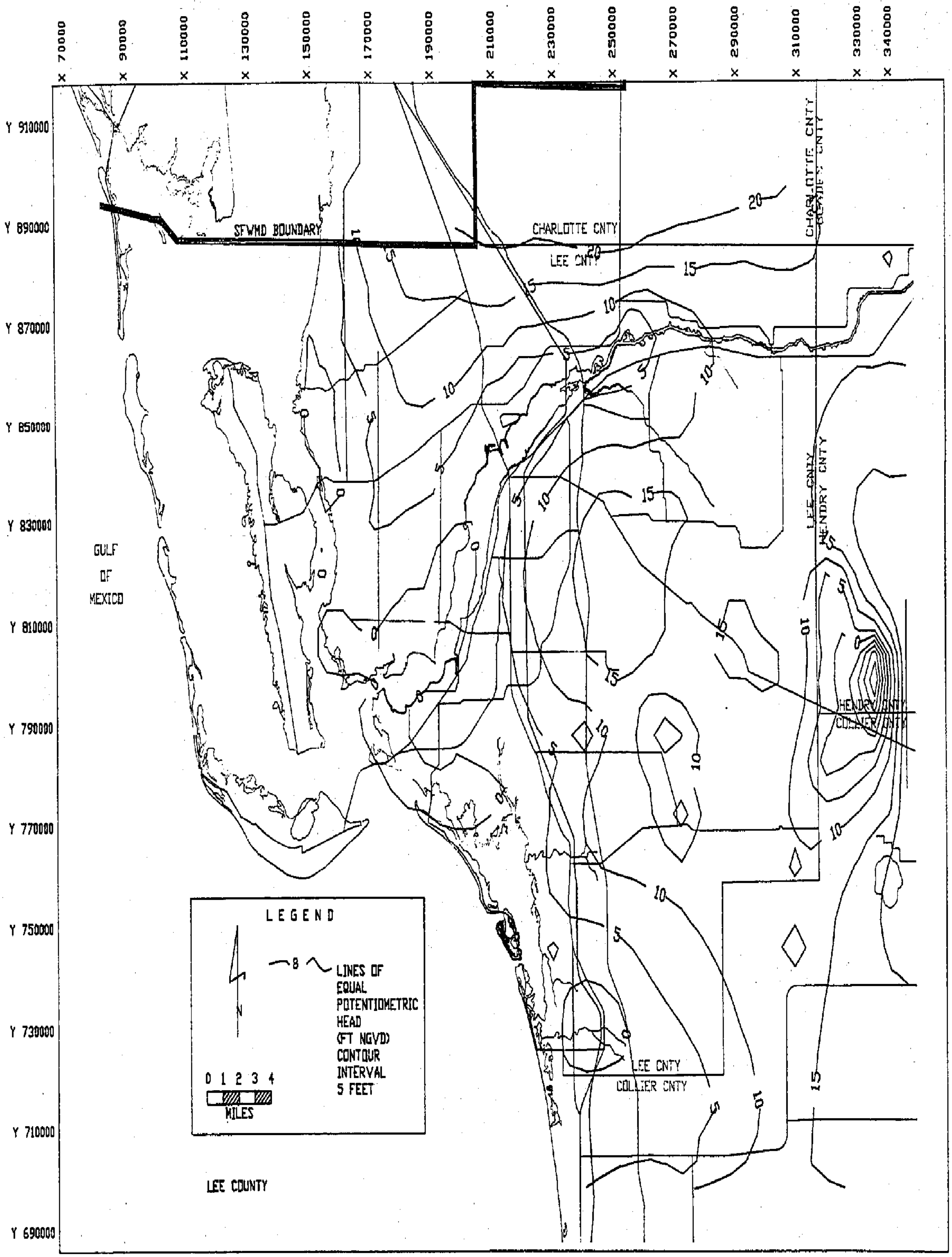


Figure 20. **COMPUTED WATER LEVELS IN LAYER 3 (SANDSTONE AQUIFER), APRIL, 1986**

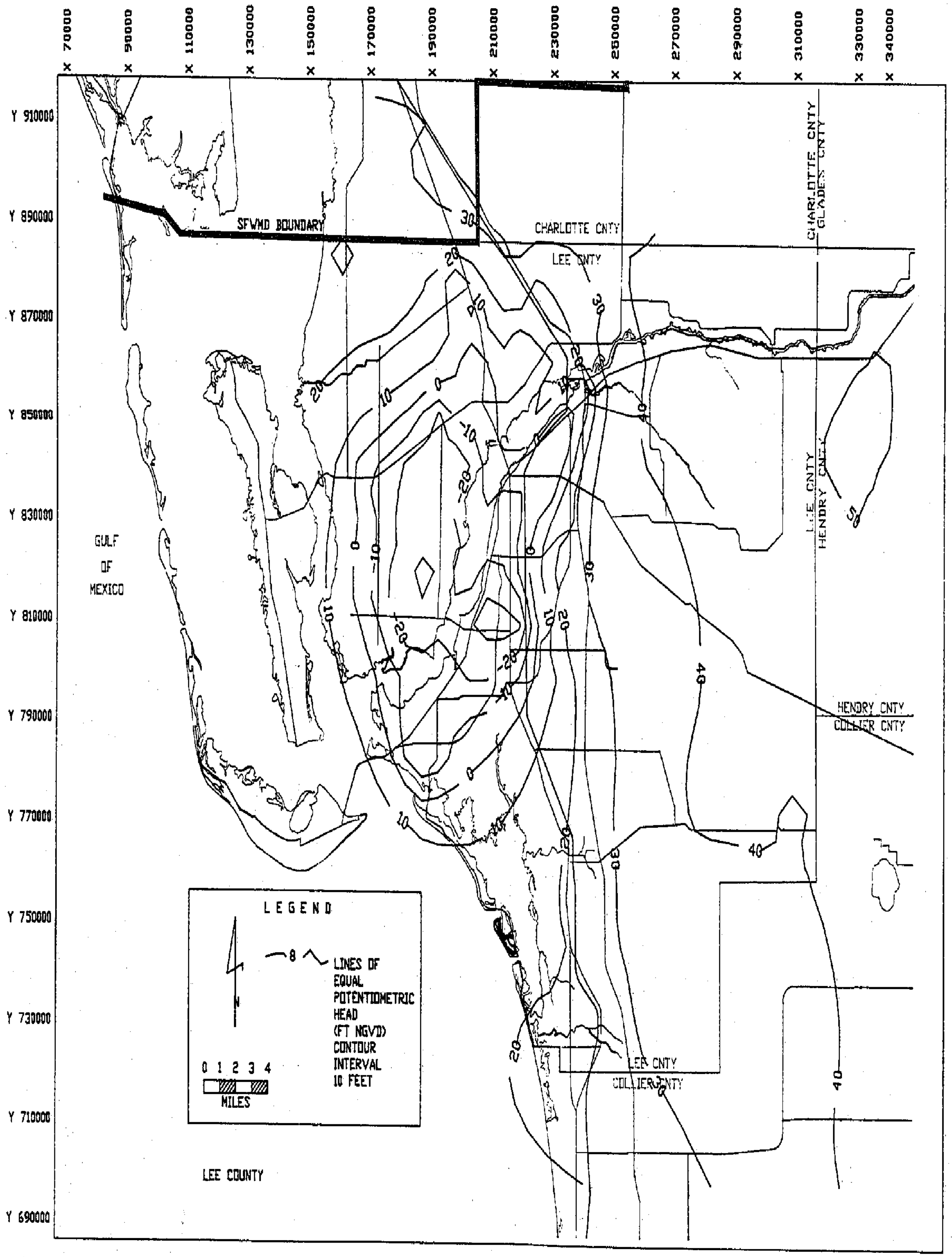


Figure 21. COMPUTED WATER LEVELS IN LAYER 4 (MID-HAWTHORN AQUIFER), APRIL, 1986

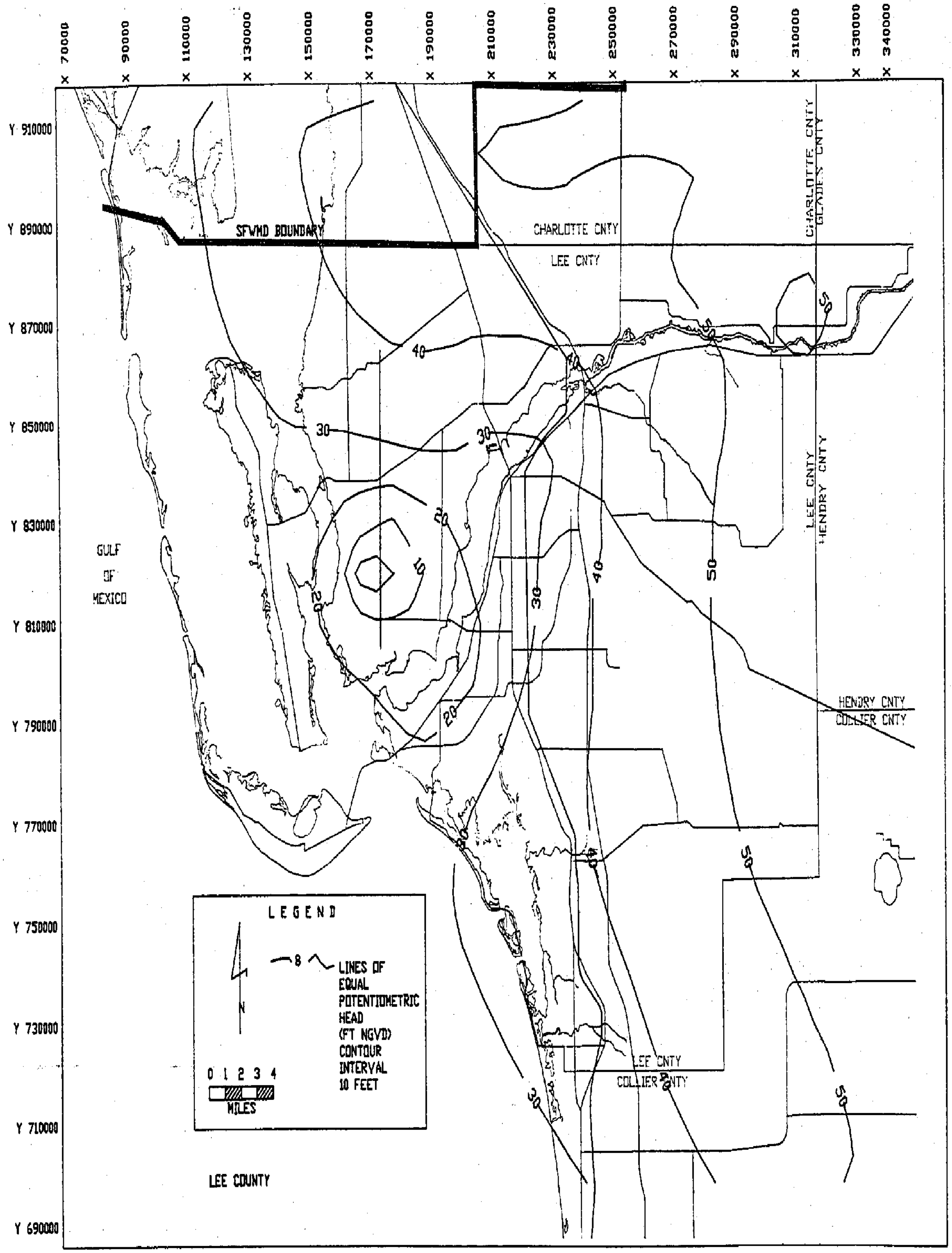


Figure 22. COMPUTED WATER LEVELS IN LAYER 5 (LOWER HAWTHORN AQUIFER), APRIL, 1986

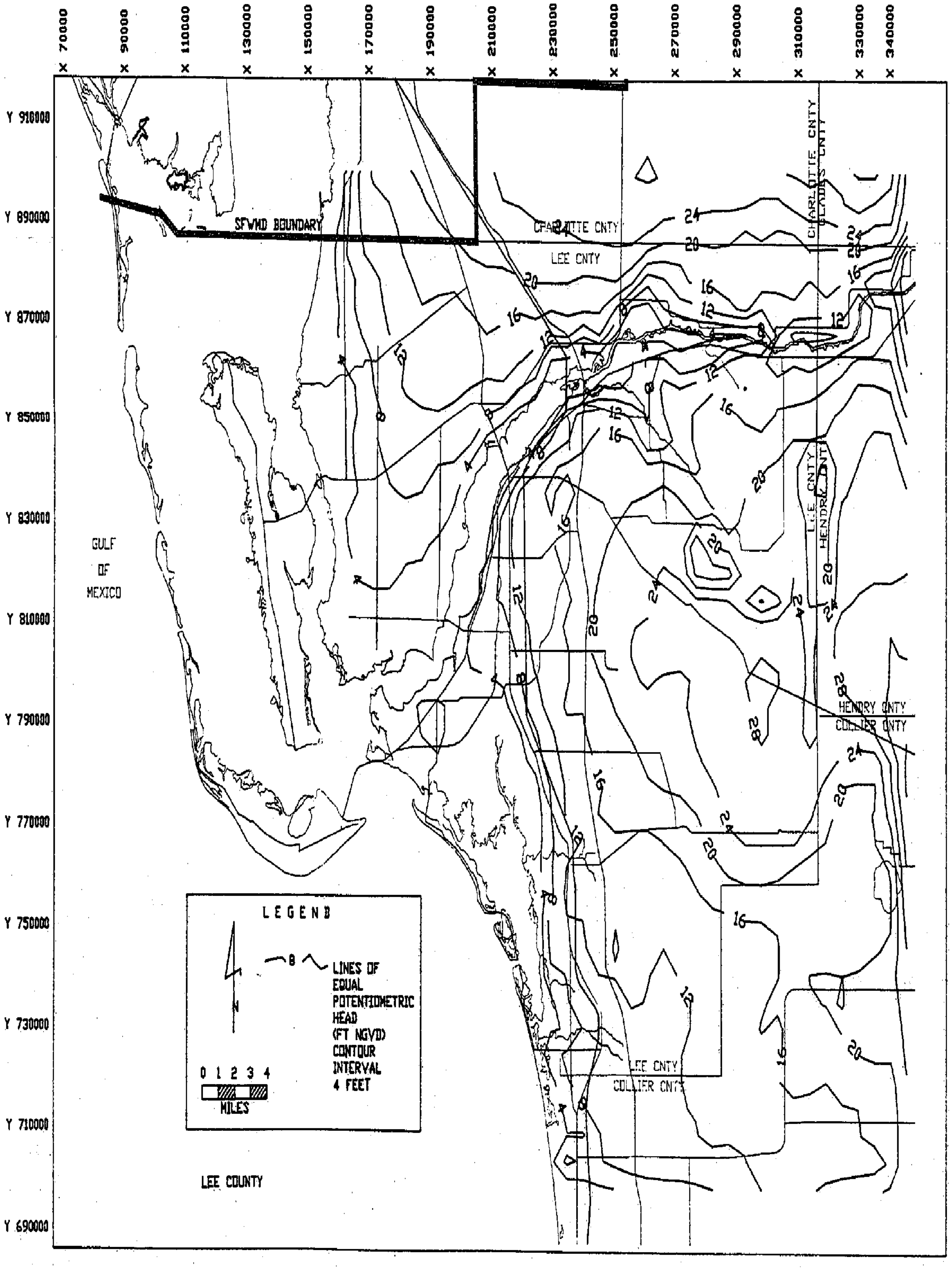


Figure 23. COMPUTED WATER LEVELS IN LAYER 1 (WATER TABLE AQUIFER), SEPTEMBER, 1986

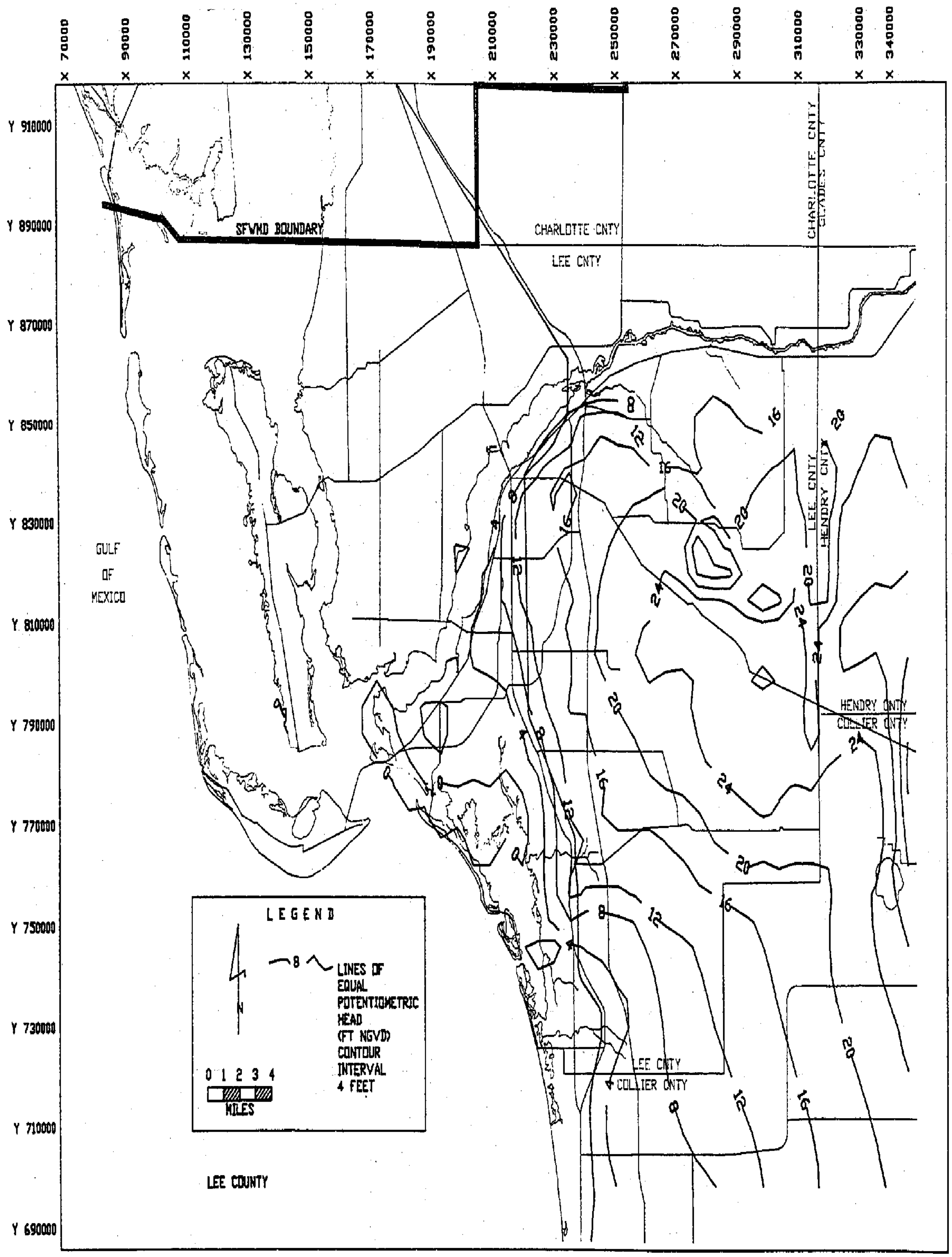


Figure 24. COMPUTED WATER LEVELS IN LAYER 2 (LOWER TAMIAMI AQUIFER), SEPTEMBER, 1986

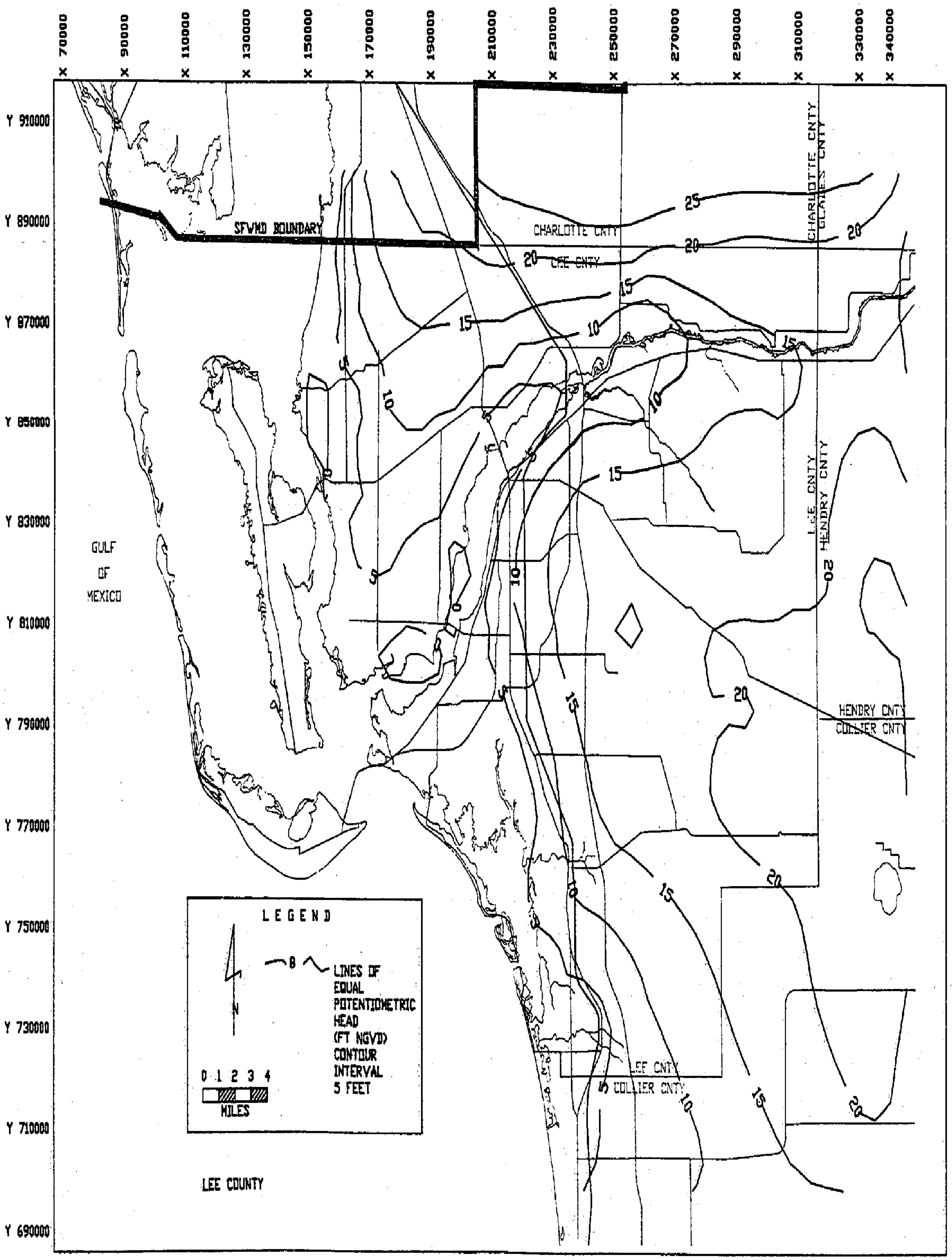


Figure 25. COMPUTED WATER LEVELS IN LAYER 3 (SANDSTONE AQUIFER), SEPTEMBER, 1986

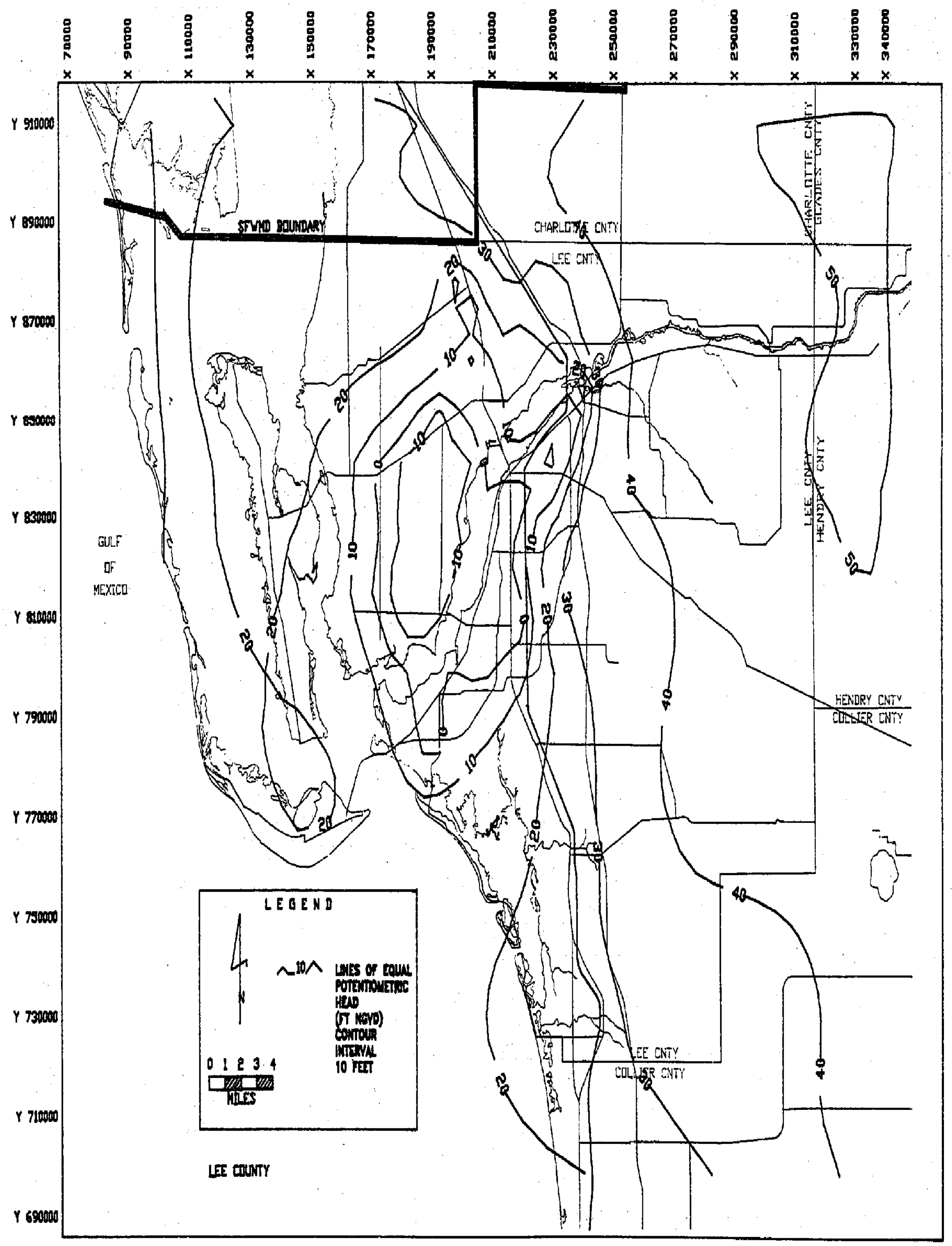


Figure 26. COMPUTED WATER LEVELS IN LAYER 4 (MID-HAWTHORN AQUIFER), SEPTEMBER, 1986

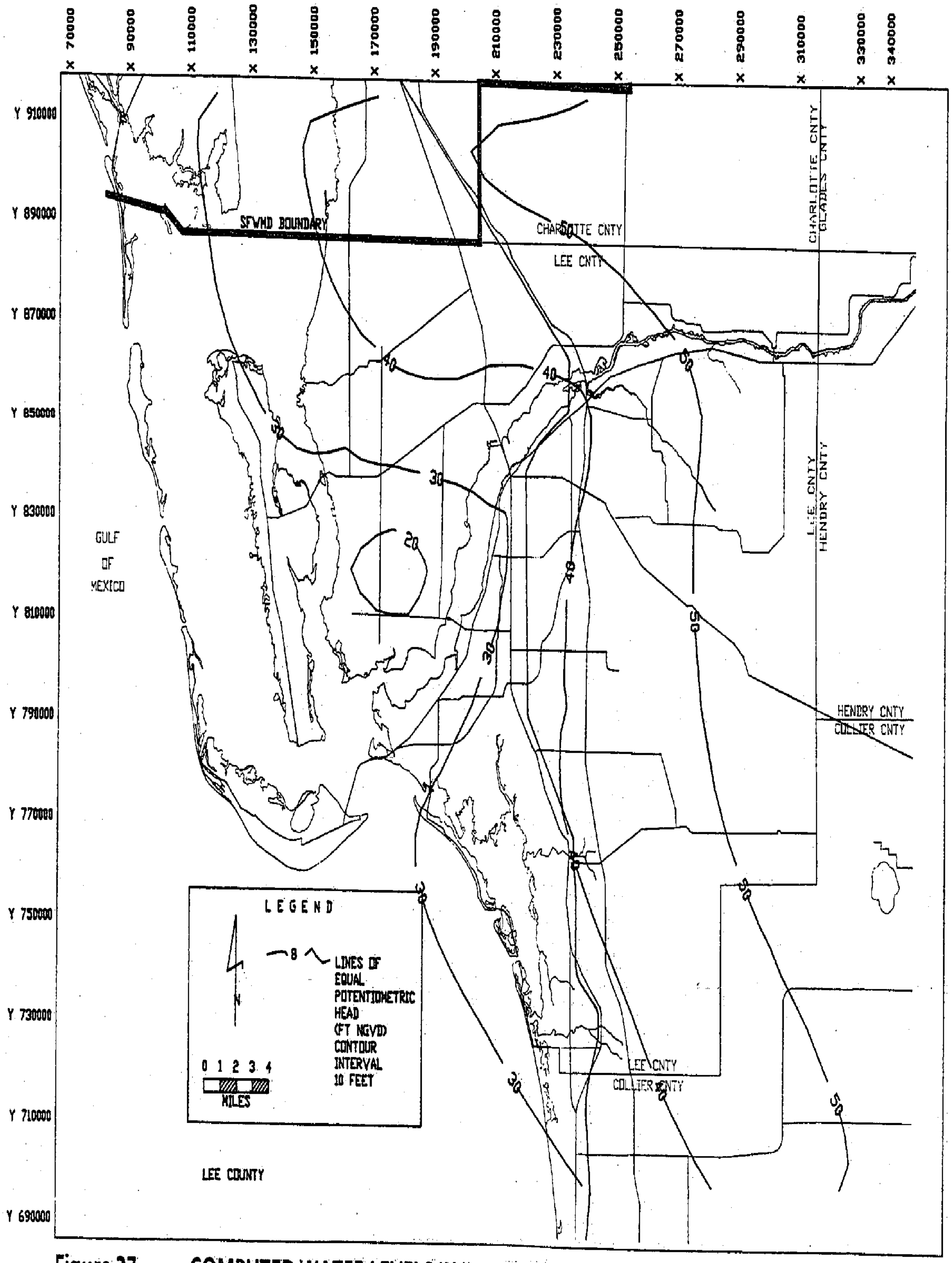


Figure 27. COMPUTED WATER LEVELS IN LAYER 5 (LOWER HAWTHORN AQUIFER), SEPTEMBER, 1986

SENSITIVITY TESTING

To test the dependency of model results on the parameter estimates used in the model, sensitivity tests were performed. The sensitivity of the model was tested first by varying hydraulic conductivity then vertical conductance each higher then lower than the calibration value by an order of magnitude. The results of these tests are presented in tables 6 through 10. Because layers 3, 4, and 5 each exhibited sensitivity to one or more of these changes, a second set of sensitivity tests were conducted by doubling then halving hydraulic conductivity then vertical conductance for each of the upper five layers, one at a time. The results of these tests are shown in Tables 11 through 15. In the tables for layers 2 through 5, the changes that occurred within the layer are presented, followed by changes in the overlying layer then the underlying layer. For layer 1, the changes within the layer is followed by the changes within layer 2 (where the lower Tamiami aquifer is present), then the changes in layer 3 (where it is not). The area of examination in layers 1, 3, 4, and 5 is restricted to column 7 through 42 and row 7 through 36, to eliminate the effects of the specified head boundaries. In layer 2, the area is bounded by row 30 through 36, which approximates the area where the lower Tamiami aquifer is present.

LAYER 1, THE WATER TABLE AQUIFER

On the average, simulated water levels in layers 1, 2, and 3 were not highly sensitive to vertical conductance beneath layer 1, or to increases in hydraulic conductivity. However, due to the variability in calculated transmissivity in the layer, particularly where it becomes separate from the underlying lower Tamiami aquifer layer, the steady-state model becomes unstable when hydraulic conductivity is reduced by more than 0.7 times the calibrated value. Because the projected stress on the aquifer which the layer represents is comparatively minor, this situation is not considered to be a problem. However, other users of the model or its derivatives may require greater stability and therefore may need to discretize the top layer into two or more layers.

LAYER 2, THE LOWER TAMIAMI AQUIFER

This layer was sensitive to decreasing the hydraulic conductivity by an order of magnitude. The underlying layer 3 was sensitive to order-of-magnitude decreases in both hydraulic conductivity in the second layer and vertical conductance below it.

LAYER 3, THE SANDSTONE AQUIFER

This layer is fairly sensitive to tenfold increases or decreases in hydraulic conductivity, and the underlying layer 4 is sensitive to any change in the vertical conductance between the layers. Otherwise, simulated water levels in layer 3 are relatively insensitive to twofold changes in hydraulic conductivity except in the vicinity of the Green Meadows wellfield, where they dropped 9 feet when hydraulic conductivity was halved.

LAYER 4, THE MID-HAWTHORN AQUIFER

Simulated water levels in this layer are sensitive to any changes in hydraulic conductivity and vertical conductance. This is due to the low transmissivity of the aquifer and the high stress on it in the western part of the county. Changes in hydraulic conductivity result in notable minimum and maximum water level

TABLE 6
HEAD CHANGES IN FEET IN LAYERS 1, 2 AND 3 RESULTING IN CONDUCTIVITY AND VERTICAL CONDUCTANCE CHANGES IN LAYER 1

	Maximum Increase in Water Level	Maximum Decline in Water Level	Average Head Change	Std. Dev
Change From Calibration Run In Layer 1				
Conductivity X 10	5.2	-5.7	-0.779	1.619
Conductivity / 10	-	-	-	-
Vcont X 10	0.1	-0.3	-0.007	0.037
Vcont / 10	0.2	-0.1	0.010	0.038
Change From Calibration Run In Underlying Layer 2				
Conductivity X 10	4.9	-5.6	-0.768	1.507
Conductivity / 10	-	-	-	-
Vcont X 10	8.2	-0.7	0.491	1.320
Vcont / 10	2.8	-9.8	-1.215	1.966
Change From Calibration Run In Underlying Layer 3				
Conductivity X 10	2.4	-3.5	-0.730	0.990
Conductivity / 10	-	-	-	-
Vcont X 10	5.3	-0.2	0.442	1.001
Vcont / 10	0.7	-5.2	-1.126	1.501

TABLE 7
HEAD CHANGES IN FEET IN LAYERS 1, 2 AND 3 RESULTING FROM CONDUCTIVITY AND VERTICAL CONDUCTANCE CHANGES IN LAYER 2

	Maximum Increase in Water Level	Maximum Decline in Water Level	Average Head Change	Std. Dev
Change From Calibration Run In Layer 2				
Conductivity X 10	5.1	-3.0	0.004	0.664
Conductivity / 10	4.2	-10.3	-0.020	0.947
Vcont X 10	2.2	-1.5	0.036	0.289
Vcont / 10	0.6	-2.2	-0.024	0.250
Change From Calibration Run In Overlying Layer 1				
Conductivity X 10	0.1	-0.3	-0.009	0.047
Conductivity / 10	0.1	-0.2	-0.002	0.046
Vcont X 10	0.1	-0.1	-0.002	0.023
Vcont / 10	0.1	-0.1	-0.005	0.026
Change From Calibration Run In Underlying Layer 3				
Conductivity X 10	2.1	-0.9	0.211	0.581
Conductivity / 10	0.7	-4.8	-0.346	0.991
Vcont X 10	3.2	-2.9	-0.282	0.927
Vcont / 10	3.7	-11.3	-0.970	2.993

TABLE 8
HEAD CHANGES IN FEET IN LAYERS 1, 2, 3 AND 4 RESULTING FROM CONDUCTIVITY AND VERTICAL CONDUCTANCE CHANGES IN LAYER 3

	Maximum Increase in Water Level	Maximum Decline in Water Level	Average Head Change	Std. Dev
Change From Calibration Run In Layer 3				
Conductivity X 10	8.9	-4.3	0.332	2.000
Conductivity / 10	5.5	-58.2	-0.093	2.917
Vcont X 10	4.0	-4.1	1.084	1.595
Vcont / 10	1.2	-2.3	-0.521	0.659
Change From Calibration Run In Overlying Layer 1				
Conductivity X 10	0.4	-0.2	0.006	0.056
Conductivity / 10	0.1	-0.3	0.001	0.044
Vcont X 10	0.3	-0.2	0.017	0.054
Vcont / 10	0.1	-0.1	-0.009	0.032
Change From Calibration Run In Overlying Layer 2				
Conductivity X 10	1.1	-1.0	0.138	0.329
Conductivity / 10	1.2	-1.5	-0.044	0.254
Vcont X 10	1.5	0.0	0.412	0.479
Vcont / 10	0.0	-0.8	-0.225	0.263
Change From Calibration Run In Underlying Layer 4				
Conductivity X 10	1.0	-1.1	0.048	0.301
Conductivity / 10	0.8	-1.1	0.008	0.203
Vcont X 10	8.6	-17.7	-9.211	6.320
Vcont / 10	11.8	-2.2	4.399	2.680

TABLE 9
HEAD CHANGES IN FEET IN LAYERS 3, 4 AND 5 RESULTING FROM CONDUCTIVITY AND VERTICAL CONDUCTANCE CHANGES IN LAYER 4

	Maximum Increase in Water Level	Maximum Decline in Water Level	Average Head Change	Std. Dev
Change From Calibration Run In Layer 4				
Conductivity X 10	22.8	-10.4	-1.398	6.363
Conductivity / 10	14.0	-49.4	0.467	6.132
Vcont X 10	33.7	2.2	10.579	6.908
Vcont / 10	-7.9	-87.1	-30.418	18.380
Change From Calibration Run In Overlying Layer 3				
Conductivity X 10	1.3	-0.6	-0.014	0.310
Conductivity / 10	0.7	-1.7	-0.002	0.243
Vcont X 10	2.5	0.0	0.495	0.472
Vcont / 10	0.0	-5.7	-1.335	1.164
Change From Calibration Run In Underlying Layer 5				
Conductivity X 10	4.6	-1.4	-0.012	1.185
Conductivity / 10	0.7	-2.3	0.020	0.470
Vcont X 10	0.5	-4.2	-0.956	0.845
Vcont / 10	9.5	0.7	2.674	2.122

TABLE 10
HEAD CHANGES IN FEET IN LAYERS 4, 5 AND 6 RESULTING FROM CONDUCTIVITY AND VERTICAL CONDUCTANCE CHANGES IN LAYER 5

	Maximum Increase in Water Level	Maximum Decline in Water Level	Average Head Change	Std. Dev
Change From Calibration Run In Layer 5				
Conductivity X 10	19.6	-5.4	-1.553	3.236
Conductivity / 10	2.8	-64.5	0.442	3.426
Vcont X 10	10.6	0.7	2.623	1.608
Vcont / 10	-3.9	-32.1	-15.493	7.098
Change From Calibration Run In Overlying Layer 4				
Conductivity X 10	6.1	-3.9	-0.840	2.062
Conductivity / 10	1.5	-8.2	0.123	1.358
Vcont X 10	5.7	0.6	2.063	1.249
Vcont / 10	-2.9	-26.1	-11.886	5.806
Change From Calibration Run In Underlying Layer 6				
Conductivity X 10	4.6	-2.5	-0.704	1.428
Conductivity / 10	1.4	-7.1	0.208	0.932
Vcont X 10	1.1	-4.9	-0.214	0.487
Vcont / 10	5.6	-0.0	1.333	1.221

TABLE 11
HEAD CHANGES IN FEET IN LAYERS 1, 2 AND 3 RESULTING IN CONDUCTIVITY AND VERTICAL CONDUCTANCE CHANGES IN LAYER 1

	Maximum Increase in Water Level	Maximum Decline in Water Level	Average Head Change	Std. Dev
Change From Calibration Run In Layer 1				
Conductivity Doubled	1.7	-2.0	0.120	0.433
Conductivity Halved	1.7	-1.2	0.013	0.259
Vcont Doubled	0.1	-0.1	0.004	0.022
Vcont Halved	0.1	-0.1	0.003	0.021
Change From Calibration Run In Underlying Layer 2				
Conductivity Doubled	0.6	-0.7	0.010	0.169
Conductivity Halved	0.6	-0.8	-0.021	0.160
Vcont Doubled	2.6	-0.3	0.628	0.852
Vcont Halved	0.3	-2.6	-0.694	0.874
Change From Calibration Run In Underlying Layer 3				
Conductivity Doubled	0.8	-1.0	-0.151	0.255
Conductivity Halved	0.7	-0.5	0.009	0.135
Vcont Doubled	0.8	-0.1	0.070	0.131
Vcont Halved	0.1	-1.2	-0.123	0.209

TABLE 12
HEAD CHANGES IN FEET IN LAYERS 1, 2 AND 3 RESULTING FROM CONDUCTIVITY AND VERTICAL CONDUCTANCE CHANGES IN LAYER 2

	Maximum Increase in Water Level	Maximum Decline in Water Level	Average Head Change	Std. Dev
Change From Calibration Run In Layer 2				
Conductivity Doubled	2.4	-0.9	0.088	0.432
Conductivity Halved	1.1	-3.0	-0.086	0.521
Vcont Doubled	0.9	-0.2	0.062	0.116
Vcont Halved	0.1	-0.8	-0.078	0.119
Change From Calibration Run In Overlying Layer 1				
Conductivity Doubled	0.1	-0.1	0.000	0.022
Conductivity Halved	0.1	-0.1	-0.003	0.026
Vcont Doubled	0.1	0.0	0.002	0.015
Vcont Halved	0.1	-0.1	0.002	0.015
Change From Calibration Run In Underlying Layer 3				
Conductivity Doubled	1.0	-0.2	0.118	0.252
Conductivity Halved	0.2	-1.3	-0.135	0.307
Vcont Doubled	1.5	-1.3	-0.113	0.451
Vcont Halved	1.4	-2.2	0.050	0.655

TABLE 13
HEAD CHANGES IN FEET IN LAYERS 1, 2, 3 AND 4 RESULTING FROM CONDUCTIVITY AND VERTICAL CONDUCTANCE CHANGES IN LAYER 3

	Maximum Increase in Water Level	Maximum Decline in Water Level	Average Head Change	Std. Dev
Change From Calibration Run In Layer 3				
Conductivity Doubled	5.1	-1.6	0.055	0.653
Conductivity Halved	1.9	-9.3	0.035	0.721
Vcont Doubled	1.2	-0.9	0.328	0.437
Vcont Halved	0.6	-1.0	-0.247	0.320
Change From Calibration Run In Overlying Layer 1				
Conductivity Doubled	0.1	-0.1	0.000	0.031
Conductivity Halved	0.1	-0.1	0.000	0.026
Vcont Doubled	0.1	-0.1	0.004	0.030
Vcont Halved	0.1	-0.1	-0.005	0.025
Change From Calibration Run In Overlying Layer 2				
Conductivity Doubled	0.4	-0.4	0.030	0.106
Conductivity Halved	0.5	-0.4	-0.020	0.095
Vcont Doubled	0.5	0.0	0.134	0.157
Vcont Halved	0.0	-0.4	-0.107	0.128
Change From Calibration Run In Underlying Layer 4				
Conductivity Doubled	0.3	-0.3	0.003	0.091
Conductivity Halved	0.3	-0.3	0.000	0.092
Vcont Doubled	2.1	-5.8	-2.765	1.763
Vcont Halved	5.3	-1.2	2.095	1.285

TABLE 14
HEAD CHANGES IN FEET IN LAYERS 3, 4 AND 5 RESULTING FROM CONDUCTIVITY AND VERTICAL CONDUCTANCE CHANGES IN LAYER 4

	Maximum Increase in Water Level	Maximum Decline in Water Level	Average Head Change	Std. Dev
Change From Calibration Run In Layer 4				
Conductivity Doubled	8.8	-3.9	-0.367	1.891
Conductivity Halved	3.8	-10.7	0.244	1.825
Vcont Doubled	15.6	1.3	5.244	3.266
Vcont Halved	-2.1	-22.9	-7.724	4.645
Change From Calibration Run In Overlying Layer 3				
Conductivity Doubled	0.4	-0.2	-0.004	0.094
Conductivity Halved	0.2	-0.4	0.000	0.086
Vcont Doubled	1.1	0.0	0.243	0.225
Vcont Halved	0.0	-1.6	-0.348	0.310
Change From Calibration Run In Underlying Layer 5				
Conductivity Doubled	1.3	-0.4	-0.010	0.301
Conductivity Halved	0.3	-1.0	0.009	0.220
Vcont Doubled	0.0	-1.9	-0.471	0.396
Vcont Halved	2.6	0.1	0.688	0.558

TABLE 15
HEAD CHANGES IN FEET IN LAYERS 4, 5 AND 6 RESULTING FROM CONDUCTIVITY AND VERTICAL CONDUCTANCE CHANGES IN LAYER 5

	Maximum Increase in Water Level	Maximum Decline in Water Level	Average Head Change	Std. Dev
Change From Calibration Run In Layer 5				
Conductivity Doubled	9.3	-1.7	-0.356	1.136
Conductivity Halved	1.4	-13.5	0.233	1.093
Vcont Doubled	4.6	0.4	1.418	0.817
Vcont Halved	0.8	-6.4	-2.571	1.338
Change From Calibration Run In Overlying Layer 4				
Conductivity Doubled	2.4	-1.1	-0.158	0.688
Conductivity Halved	0.8	-2.7	0.082	0.584
Vcont Doubled	2.9	0.3	1.109	0.650
Vcont Halved	-0.6	-4.7	-1.993	1.083
Change From Calibration Run In Underlying Layer 6				
Conductivity Doubled	2.0	-0.8	-0.156	0.478
Conductivity Halved	0.7	-2.1	0.106	0.407
Vcont Doubled	0.2	-1.6	-0.115	0.217
Vcont Halved	1.7	-0.1	0.219	0.289

changes although they do not produce large average changes. Changes in vertical conductance affect levels in the fourth layer significantly; doubling the vertical conductance raises average water levels more than five feet, while halving causes an average drop of almost eight feet. The net average effect of vertical conductance changes on adjacent layers is relatively minor. However, reducing the vertical conductance beneath the layer by an order of magnitude raises water levels in the underlying layer 5 by more than two and a half feet while levels in the overlying layer 3 drop an average of nearly one and a half feet.

LAYER 5, THE LOWER HAWTHORN AQUIFER

Layer 5 is relatively sensitive to changes in either hydraulic conductivity or underlying vertical conductance of an order of magnitude, particularly when either is lowered. Twofold changes in conductivity in layer 5 do not change average water levels notably, except in the Cape Coral wellfield area, where levels rise more than nine feet when conductivity is doubled and drop thirteen and a half feet when the parameter is halved.

ADDITIONAL SENSITIVITY TESTING

In addition to testing the sensitivity of the model to changes in hydraulic conductivity and vertical conductance, changes were also made to conditions which affect the unconfined uppermost layer of the model. When the evapotranspiration extinction depth was doubled, water levels in the top model layer dropped an average of just over one foot, with a maximum drop of about two and half feet. Halving the evapotranspiration rate raised water levels about a foot on the average, up to a maximum of three feet. Reducing recharge by half dropped water levels slightly less than a foot, while doubling it raised levels about two feet. Increasing river and canal conductance generally lowered water levels one to two feet in cells containing rivers and canals.

PREDICTIVE SIMULATIONS

Two steady-state predictive simulations were examined. In one, the effects which will result from the low projection of water use for the year 2010 presented in the JMM report (Table 16) are shown; the other displays the outcome of the high projection (Table 17) for that year. The criteria for determining the low and high water use estimates are given in Table 18. A volumetric budget of the 1985 scenario is shown in Table 19, along with budgets for the low (Table 20) and high (Table 21) predictive scenarios for comparison. In both simulations:

> Public water supply is withdrawn from existing facilities; possible development of new wells or wellfields is not considered or examined.
>
> Domestic self supply demand is increased from quantities used in the calibration simulations in areas where current development and level of demand are minimal or moderate, and added where development did not exist during the calibration period but is likely to occur, e.g., along highway corridors.

The results of the simulations were compared with 1985 conditions (Figures 28-32) and are discussed below.

LAYER 1, WATER TABLE AQUIFER

No major regional head loss which might induce salt water intrusion is noted in either simulation (Figures 33 and 34). There is practically no difference between the low and high water use simulation in this aquifer, except that cones of depression at the Fort Myers wellfield are larger in the high projection simulation. However, because of the regional scale of the model, it is not possible to predict localized occurrences of salt water intrusion. Similarly, the regional scale precludes determining localized drawdown impacts on surface water bodies and wetlands resulting from withdrawals from either the water table aquifer or from underlying aquifers recharged by it.

LAYER 2, LOWER TAMIAMI AQUIFER

Even in the low projection simulation (Figure 35), a regional trend toward water levels below sea level is noted in the Bonita Springs area. In the high water use simulation (Figure 36), the area where this occurs becomes extensive, and water levels along the coast become low enough that salt water intrusion is probable.

LAYER 3, SANDSTONE AQUIFER

Significant drawdowns are projected in both simulations in the sandstone aquifer (Figures 37 and 38).

In planning district 4, projected water levels fall below sea level along the Caloosahatchee River in both simulations. Estimates of future per capita water use may be high in this planning district (see calibration discussion). However, if declines of the order of magnitude shown do occur, induced recharge from the estuarine portion of the Caloosahatchee River may cause water quality degradation in the sandstone aquifer. (Text continues on page 103.)

TABLE 16
LOW ESTIMATES*, WATER DEMAND BY SOURCE: 2010

Planning District	Utility (gpd)	Private Wells					Effluent Water (gpd)
		Water Table Aquifer (gpd)	Lower Tamiami Aquifer (gpd)	Sandstone Aquifer (gpd)	Mid Hawthorn Aquifer (gpd)	Lower Hawthorn Aquifer (gpd)	
1	9,208,738	0	0	542,456	5,003,616	1,084,913	1,084,912
2	7,748,966	0	0	0	6,146,431	1,217,115	709,984
3	13,522,122	0	0	0	18,631,458	0	2,202,300
4	3,979,430	0	0	4,739,706	1,596,860	353,288	353,288
5	487,500	31,500	0	1,995,000	167,250	243,750	0
6	1,540,008	596,903	0	12,885,136	298,451	0	198,968
7	2,569,317	1,219,613	0	8,244,581	243,923	0	406,538
8	5,089,715	519,054	7,087,512	466,775	186,710	560,130	653,485
9	1,582,627	2,902,150	0	456,758	33,389	66,778	166,944
10	2,507,250	0	0	0	997,739	21,503	129,018
11	2,224,000	0	0	0	3,616,000	120,000	280,000
12	1,447,547	1,700,378	0	0	101,489	222,563	0
13	2,218,772	73,050	0	0	0	896,080	155,840
14	306,818	31,240	0	0	7,810	230,578	55,785
15	415,090	0	0	0	0	0	40,170
TOTALS	54,847,900	7,073,888	7,087,512	29,330,412	37,031,126	5,016,698	6,437,232

* Does not include golf course irrigation.

After JMM

TABLE 17
HIGH ESTIMATES*, WATER DEMAND BY SOURCE: 2010

		Private Wells					
Planning District	Utility (gpd)	Water Table Aquifer (gpd)	Lower Tamiami Aquifer (gpd)	Sandstone Aquifer (gpd)	Mid Hawthorn Aquifer (gpd)	Lower Hawthorn Aquifer (gpd)	Effluent Water (gpd)
1	17,142,000	0	0	1,084,900	9,981,200	2,169,800	2,169,825
2	15,457,000	0	0	0	14,403,000	2,921,100	1,703,961
3	27,529,000	0	0	0	42,064,000	0	5,285,520
4	6,712,500	0	0	7,899,500	2,628,500	565,260	565,260
5	738,750	56,250	0	2,793,800	243,750	292,500	0
6	2,546,800	955,000	0	21,568,000	477,500	0	318,348
7	4,406.863	1,951,400	0	13,740,988	390,300	0	650,460
8	9,428,855	1,026,905	13,816,540	933,550	373,420	1,120,260	1,306,970
9	3,004,988	5,575,922	0	901,496	66,778	133,555	333,888
10	3,666,262	0	0	0	2,935,800	21,503	0
11	4,512,000	0	0	0	8,128,000	288,000	672,000
12	2,350,260	2,149,954	0	0	129,086	267,075	0
13	3,258,030	73,050	0	0	0	896,080	155,840
14	480,681	55,785	0	0	13,946	230,578	55,785
15	562,380	0	0	0	0	0	40,170
TOTALS	101,796,369	11,844,266	13,816,540	48,922,234	81,835,280	8,905,711	13,258,027

* Does not include golf course irrigation.

After JMM

TABLE 18. CRITERIA FOR WATER USE ESTIMATES

High estimates are based on the following criteria[a].

- 125 gallons per person per day (gpcd) for domestic[b];
- The following values for lawn irrigation:

Planning District	Planning District	Planning District
1: 250 gpcd	6: 200 gpcd	11: 300 gpcd
2: 300 gpcd	7: 200 gpcd	12: 150 gpcd
3: 300 gpcd	8: 250 gpcd	13: 100 gpcd
4: 200 gpcd	9: 250 gpcd	14: 100 gpcd
5: 150 gpcd	10: 100 gpcd	15: 100 gpcd

Low values are based on the following criteria:

- 70 gpcd for domestic use (IFAS, Water Management in the Home, date unknown);
- The following values for lawn irrigation:

Planning District	Planning District	Planning District
1: 125 gpcd	6: 125 gpcd	11: 125 gpcd
2: 125 gpcd	7: 125 gpcd	12: 125 gpcd
3: 125 gpcd	8: 125 gpcd	13: 100 gpcd
4: 125 gpcd	9: 125 gpcd	14: 100 gpcd
5: 125 gpcd	10: 100 gpcd	15: 100 gpcd

[a] Source: Lee County Division of Environmental Services.
[b] Includes commercial and industrial use.

After JMM

TABLE 19

VOLUMETRIC BUDGET FOR ENTIRE MODEL
1985 CONDITIONS

RATES (Cubic Feet per Second)

```
       IN

          STORAGE =        0.
    CONSTANT HEAD =    211.60
            WELLS =        0.
           DRAINS =        0.
         RECHARGE =    3546.1
               ET =        0.
    RIVER LEAKAGE =    2.1237
         TOTAL IN =    3759.9

      OUT

          STORAGE =        0.
    CONSTANT HEAD =    331.08
            WELLS =    379.58
           DRAINS =    174.04
         RECHARGE =        0.
               ET =    2788.5
    RIVER LEAKAGE =    86.620
        TOTAL OUT =    3759.8


         IN - OUT =   0.30029E-01
PERCENT DISCREPANCY =   0.00
```

TABLE 20

VOLUMETRIC BUDGET FOR ENTIRE MODEL
LOW WATER USE PROJECTION FOR 2010

```
      RATES (Cubic Feet per Second)

         IN

            STORAGE =         0.
      CONSTANT HEAD =     228.82
              WELLS =         0.
             DRAINS =         0.
           RECHARGE =     3546.1
                 ET =         0.
      RIVER LEAKAGE =     2.1743
           TOTAL IN =     3777.1

        OUT

            STORAGE =         0.
      CONSTANT HEAD =     328.44
              WELLS =     449.81
             DRAINS =     170.32
           RECHARGE =         0.
                 ET =     2742.5
      RIVER LEAKAGE =     86.073
          TOTAL OUT =     3777.1

           IN - OUT =   0.10742E-01
PERCENT DISCREPANCY =   0.00
```

TABLE 21

VOLUMETRIC BUDGET FOR ENTIRE MODEL
HIGH WATER USE PROJECTION FOR 2010

```
      RATES (Cubic Feet per Second)


        IN

          STORAGE =        0.
    CONSTANT HEAD =    312.28
            WELLS =        0.
           DRAINS =        0.
         RECHARGE =    3543.3
               ET =        0.
    RIVER LEAKAGE =    2.2822
         TOTAL IN =    3857.9

       OUT

          STORAGE =        0.
    CONSTANT HEAD =    319.60
            WELLS =    614.17
           DRAINS =    165.50
         RECHARGE =        0.
               ET =    2673.6
    RIVER LEAKAGE =    84.988
        TOTAL OUT =    3857.9

         IN - OUT =   0.10742E-01
PERCENT DISCREPANCY =   0.00
```

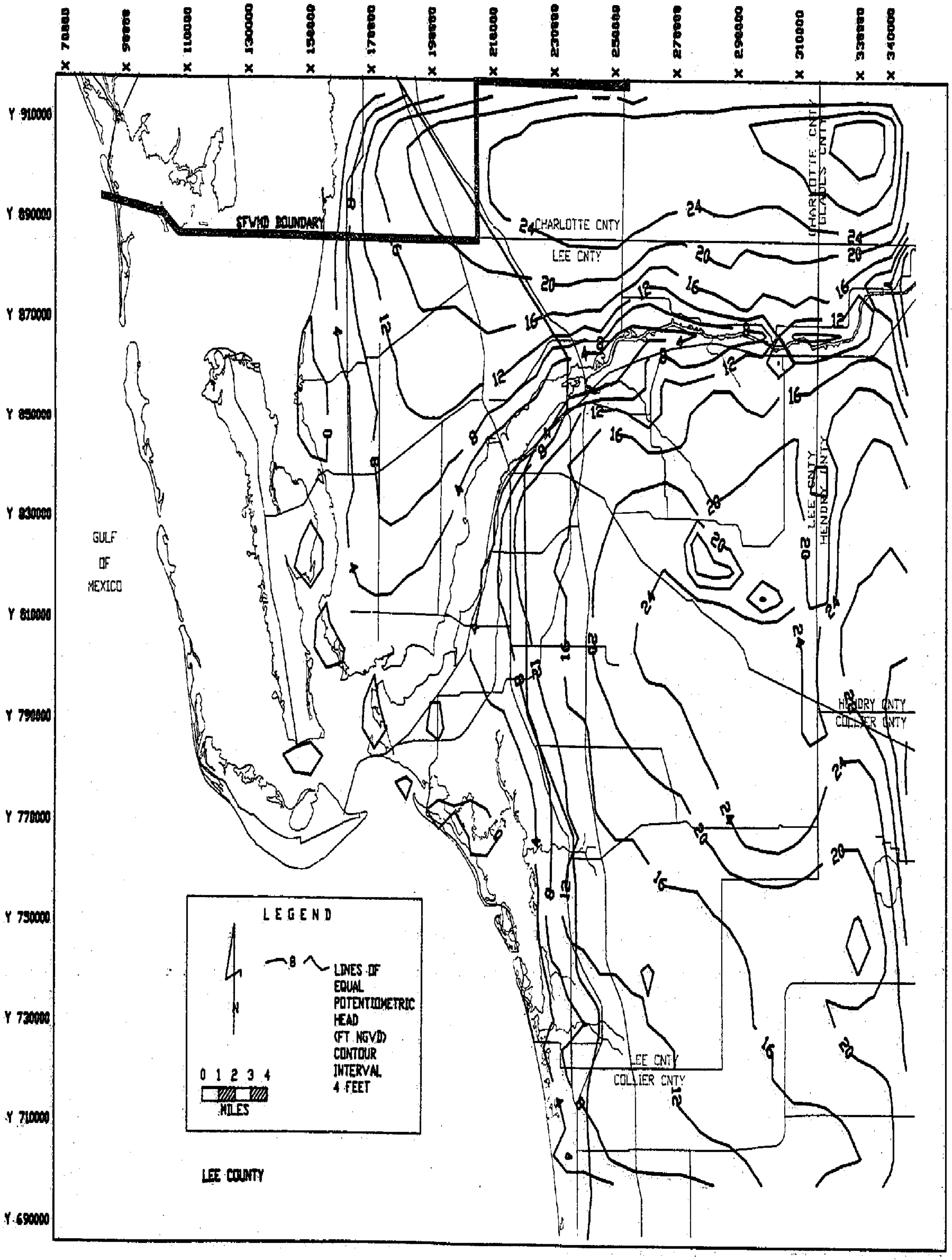


Figure 28 A. GENERALIZED CONDITIONS IN LAYER 1 (WATER TABLE AQUIFER), 1985: HEADS

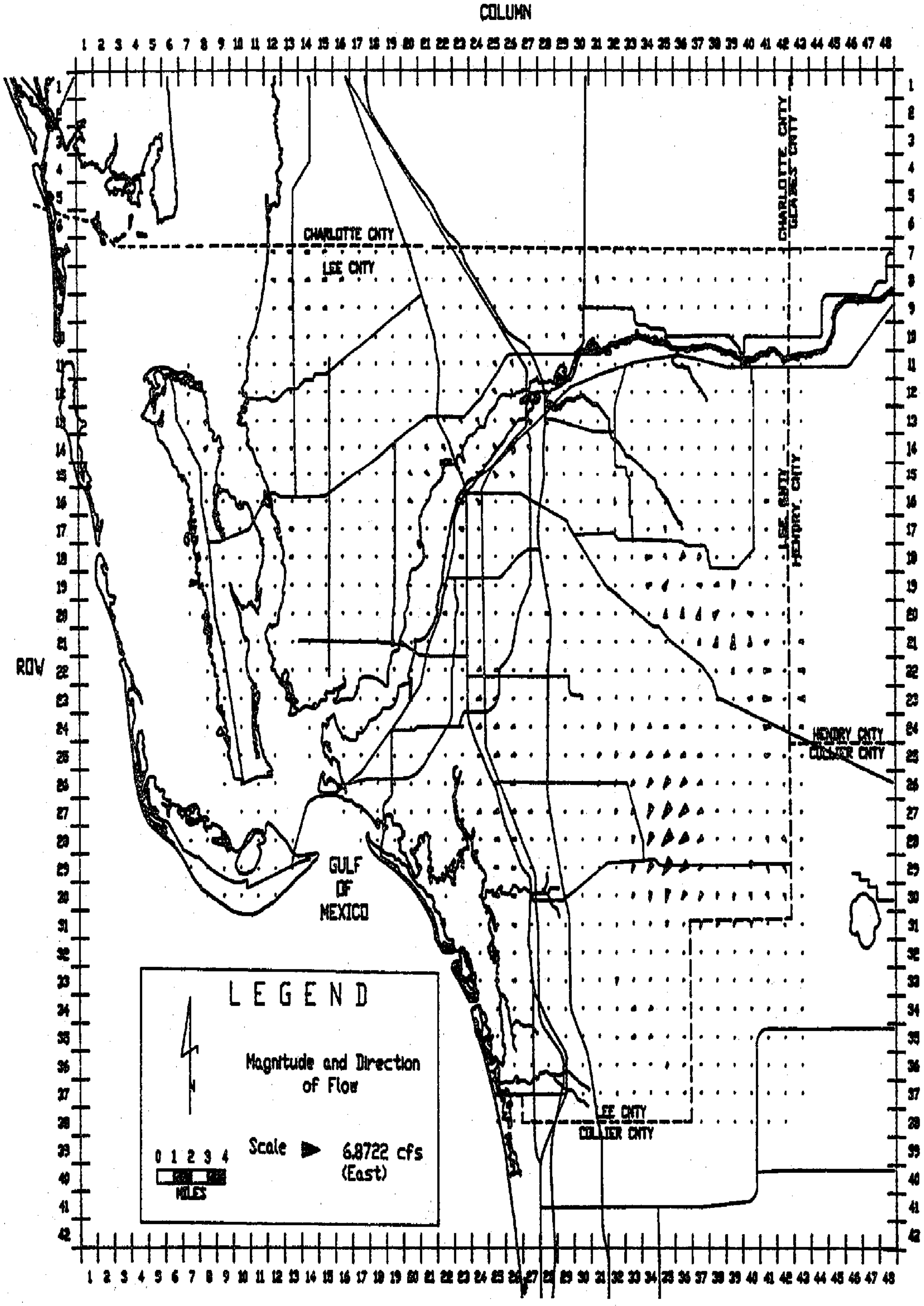


Figure 28 B. GENERALIZED CONDITIONS IN LAYER 1 (WATER TABLE AQUIFER), 1985: MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

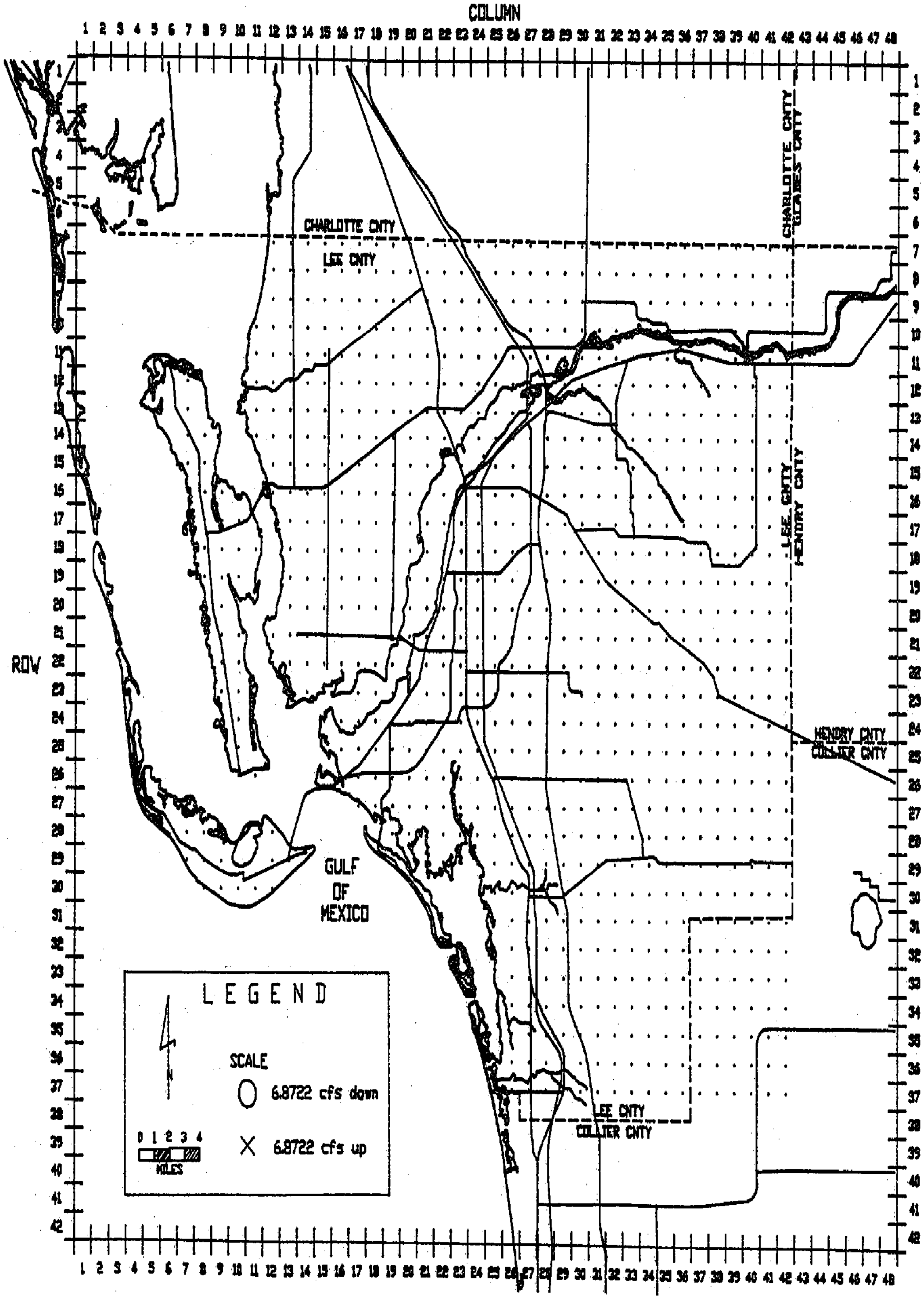


Figure 28 C. GENERALIZED CONDITIONS IN LAYER 1 (WATER TABLE AQUIFER), 1985: MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 1 AND LAYER 2

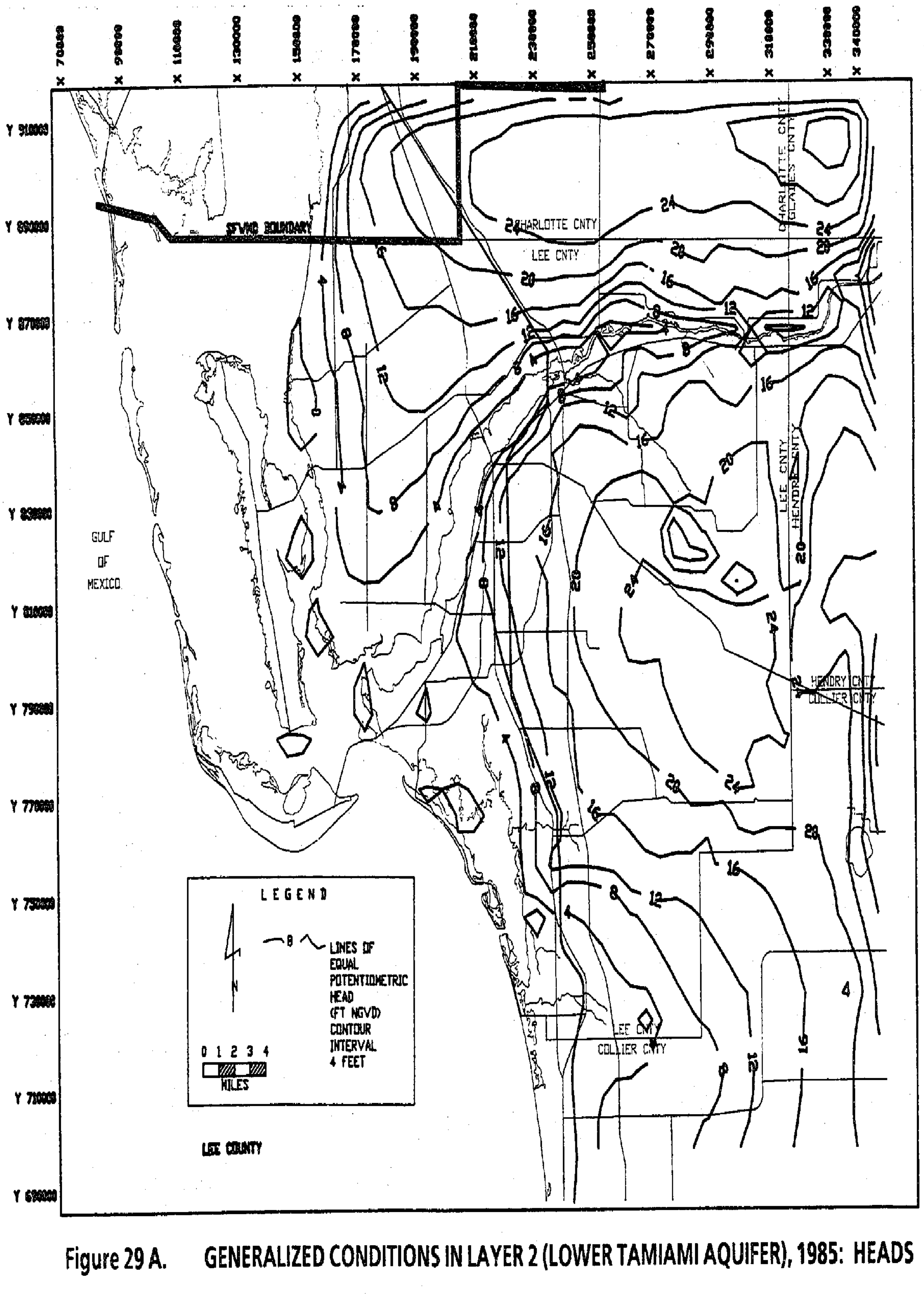


Figure 29 A. GENERALIZED CONDITIONS IN LAYER 2 (LOWER TAMIAMI AQUIFER), 1985: HEADS

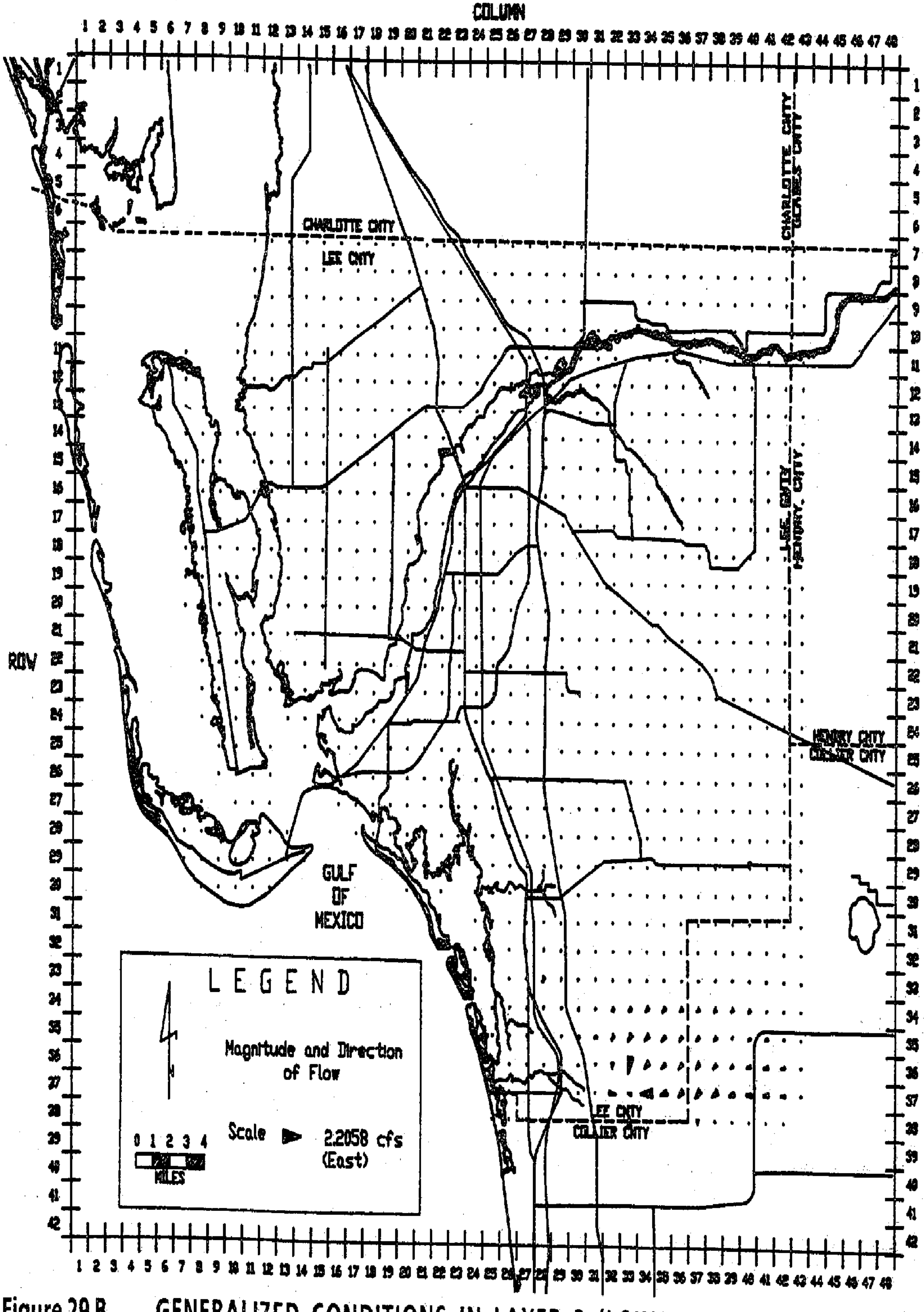


Figure 29 B. GENERALIZED CONDITIONS IN LAYER 2 (LOWER TAMIAMI AQUIFER), 1985: MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

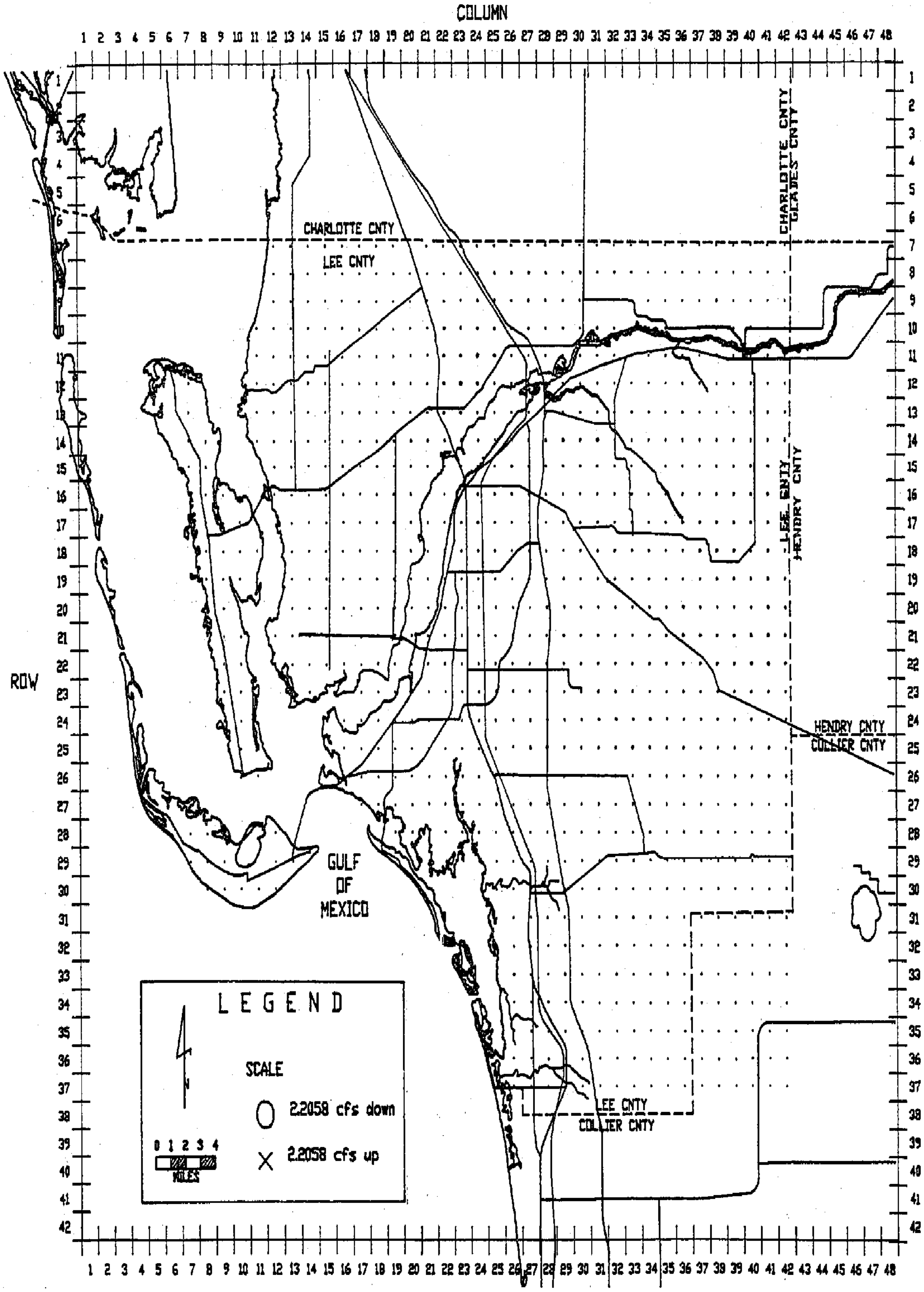


Figure 29 C. GENERALIZED CONDITIONS IN LAYER 2 (LOWER TAMIAMI AQUIFER), 1985: MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 2 AND LAYER 3

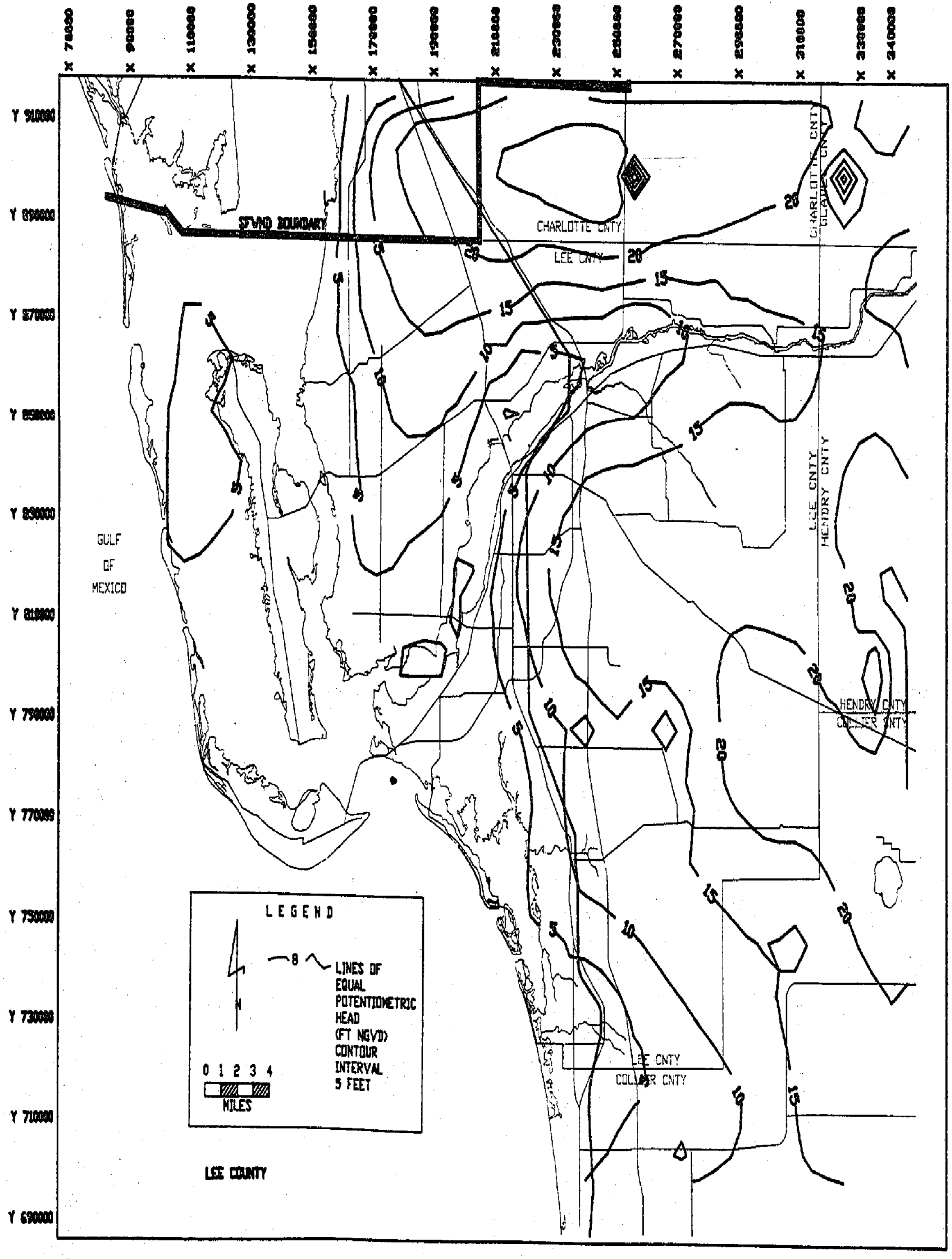


Figure 30 A. GENERALIZED CONDITIONS IN LAYER 3 (SANDSTONE AQUIFER), 1985: HEADS

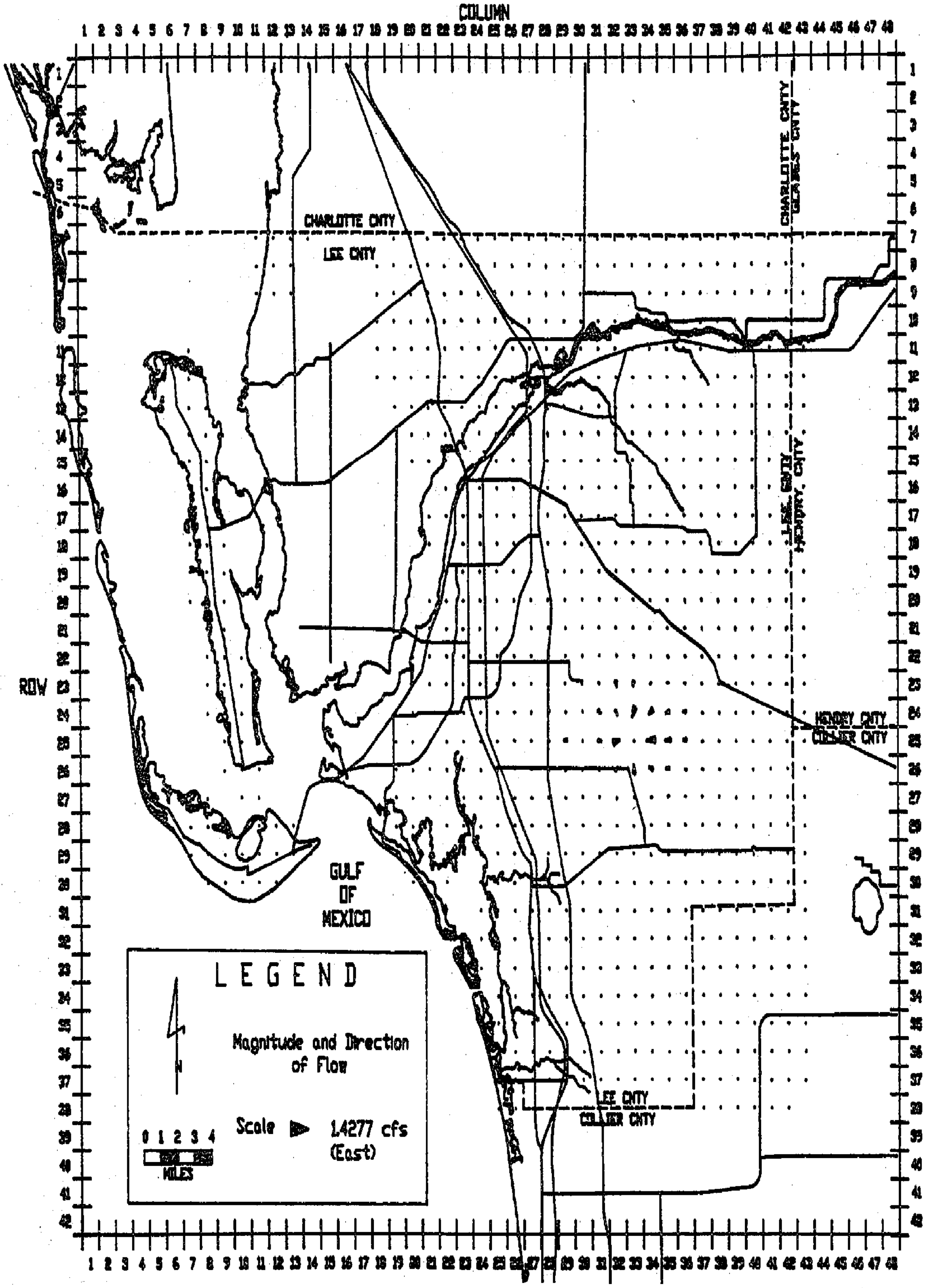


Figure 30 B. GENERALIZED CONDITIONS IN LAYER 3 (SANDSTONE AQUIFER), 1985: MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

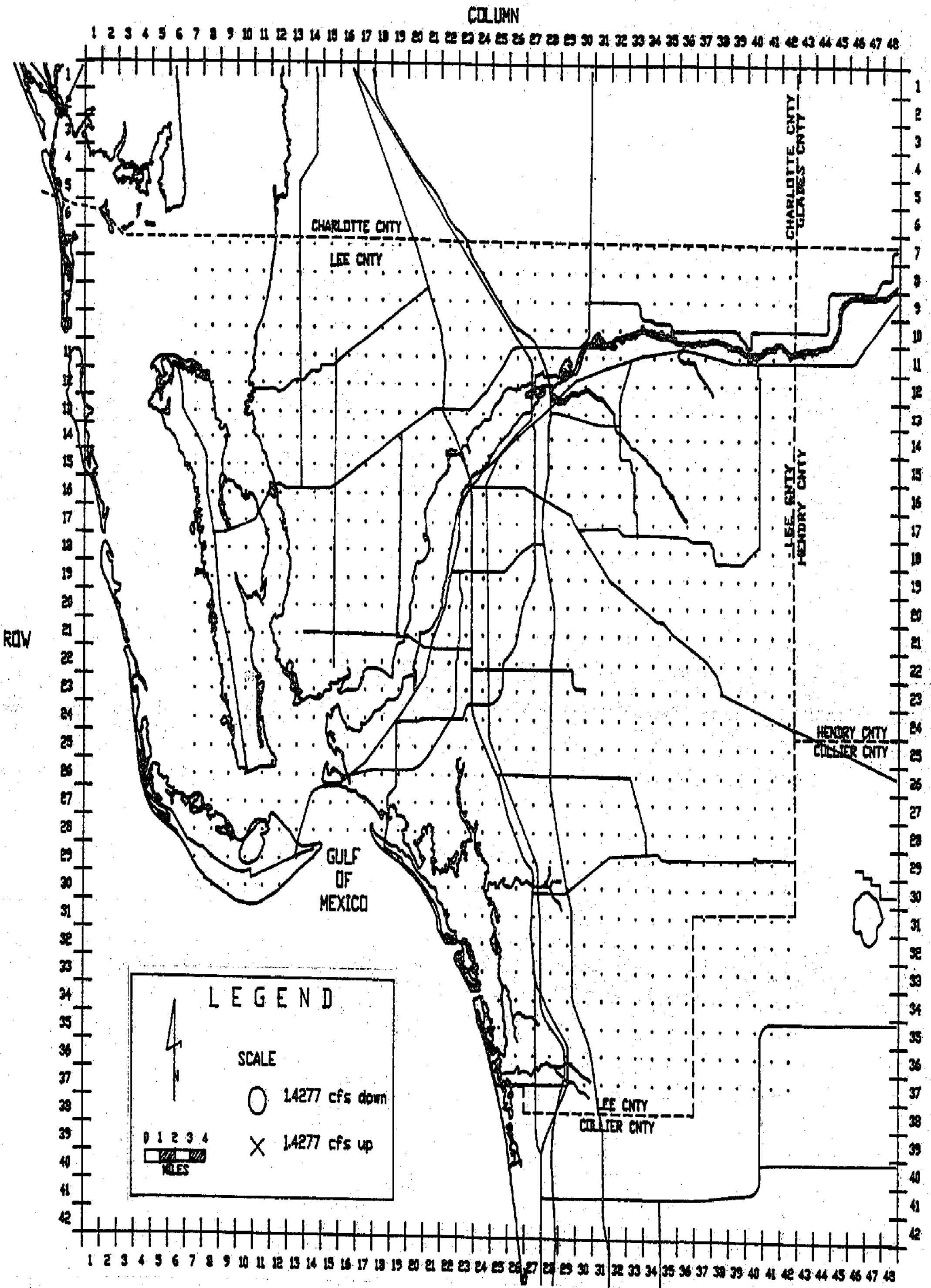


Figure 30 C. GENERALIZED CONDITIONS IN LAYER 3 (SANDSTONE AQUIFER), 1985: MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 3 AND LAYER 4

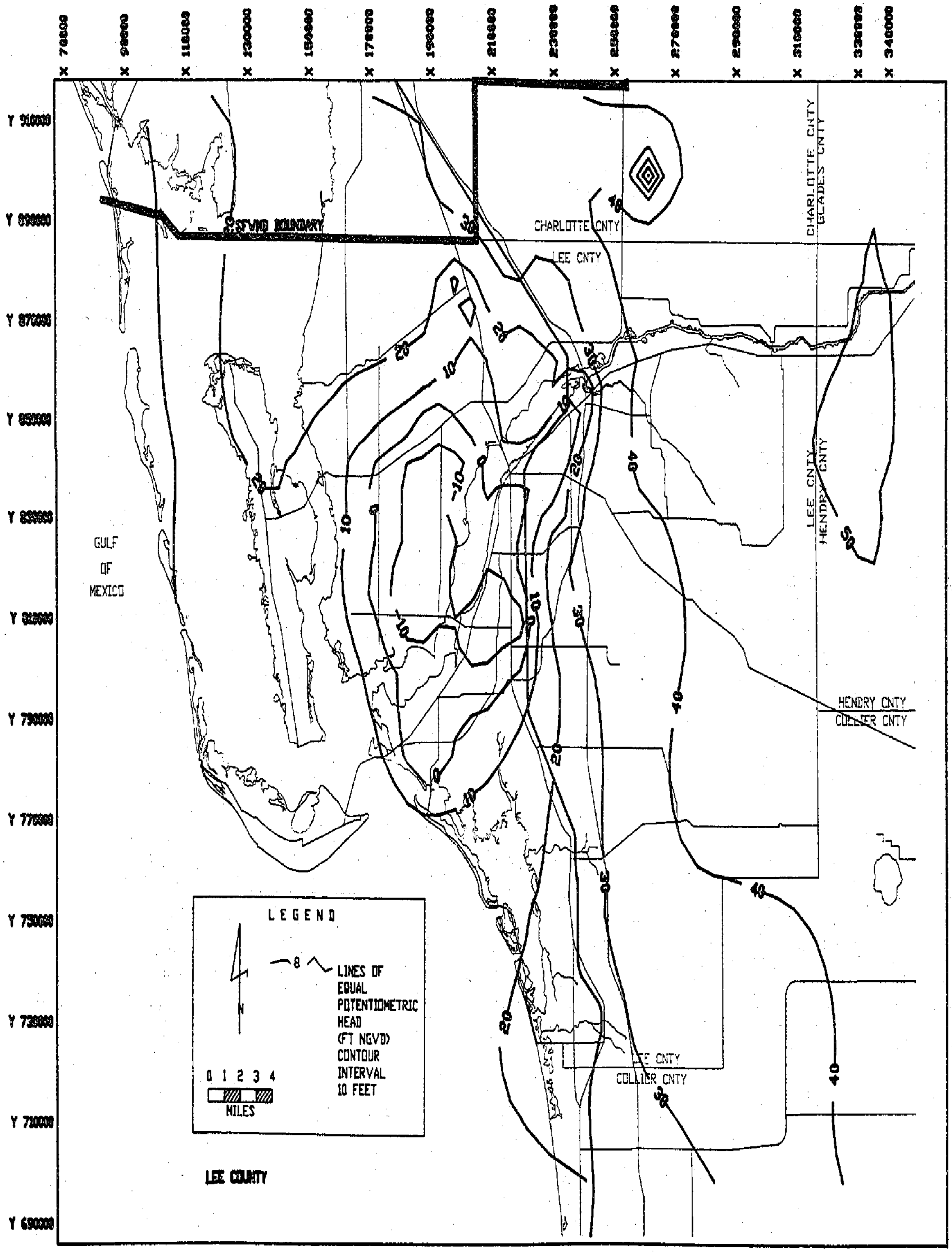


Figure 31 A. GENERALIZED CONDITIONS IN LAYER 4 (MID-HAWTHORN AQUIFER), 1985: HEADS

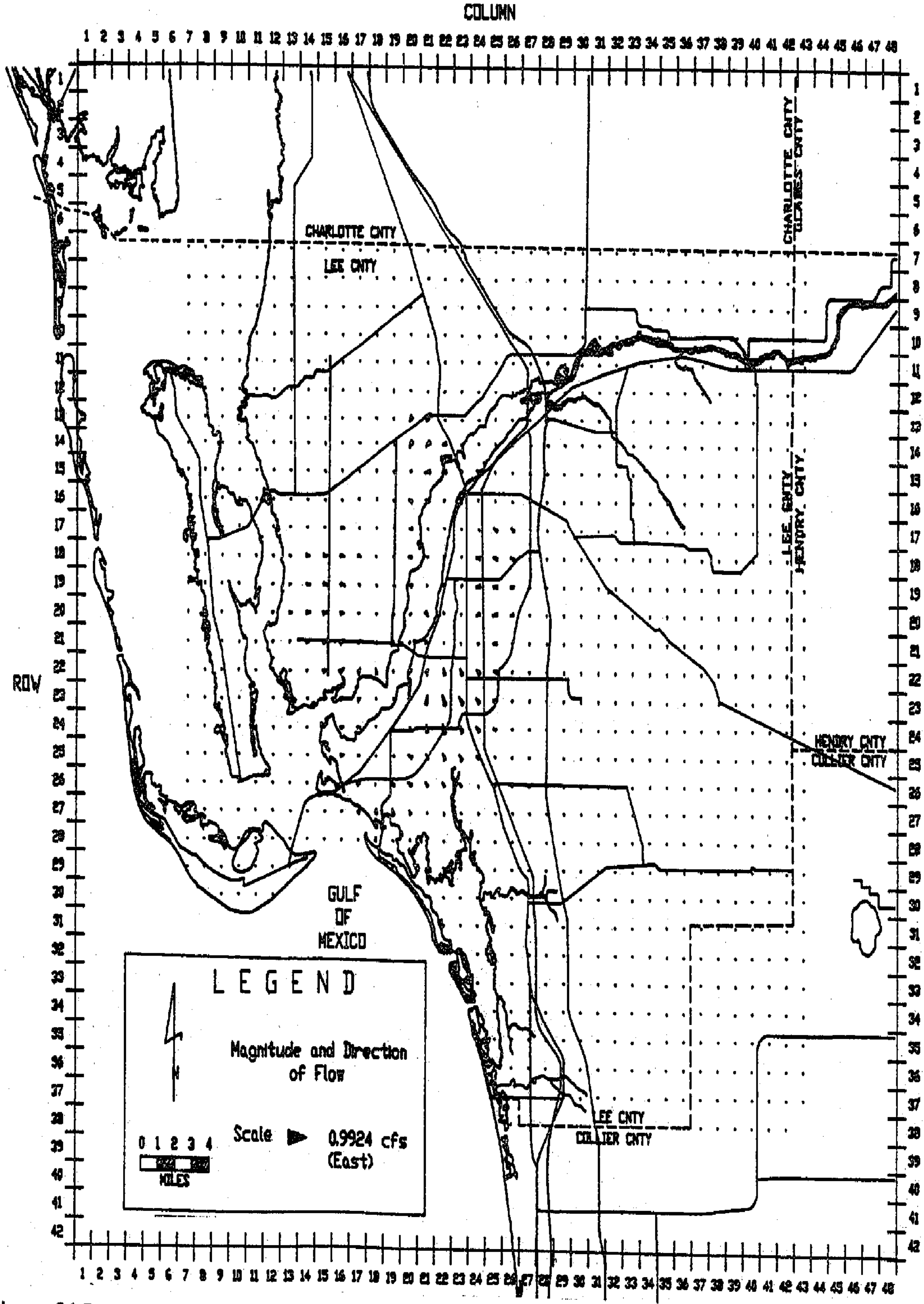


Figure 31 B. GENERALIZED CONDITIONS IN LAYER 4 (MID-HAWTHORN AQUIFER), 1985: MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

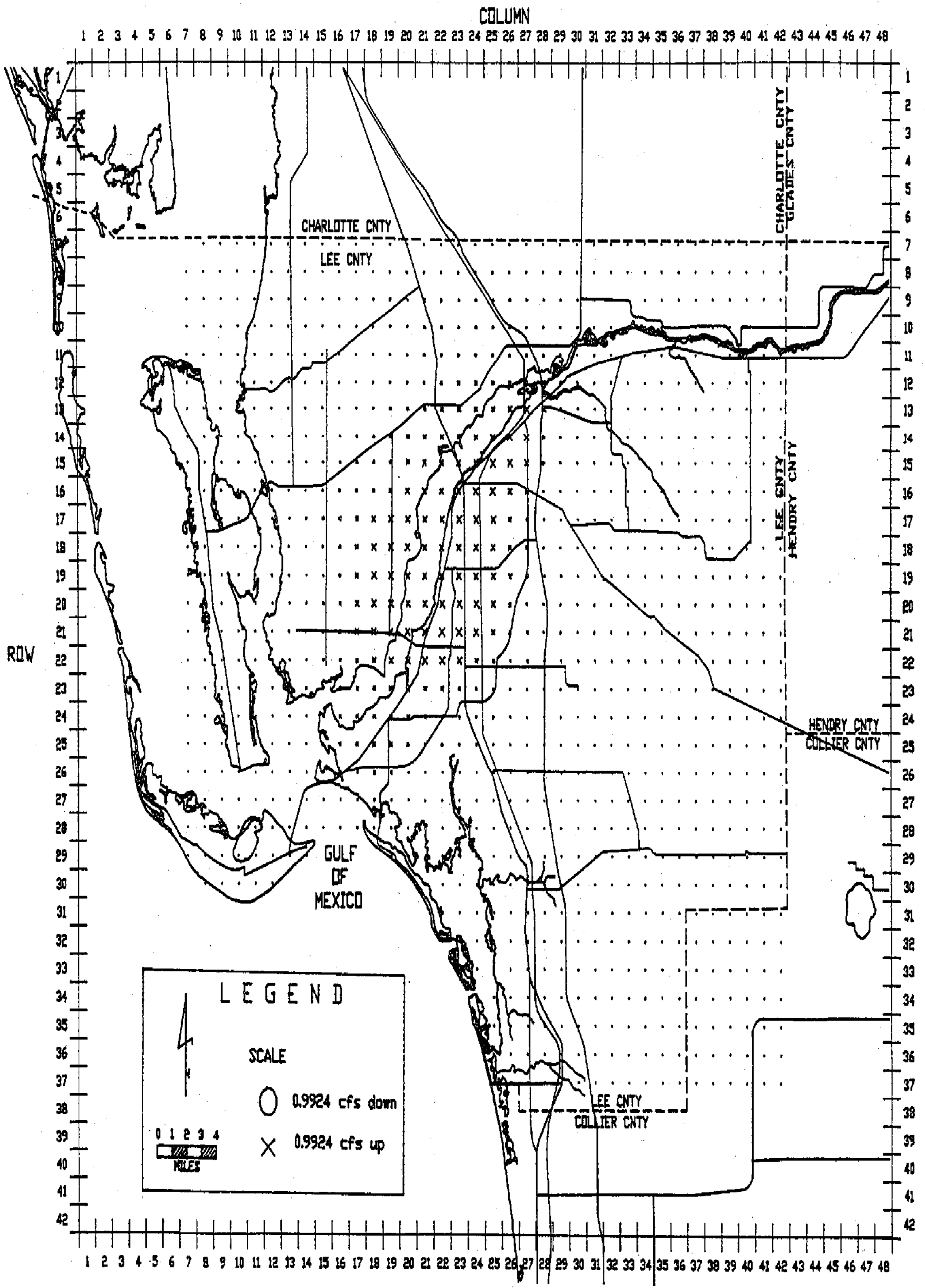


Figure 31 C. GENERALIZED CONDITIONS IN LAYER 4 (MID-HAWTHORN AQUIFER), 1985: MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 4 AND LAYER 5

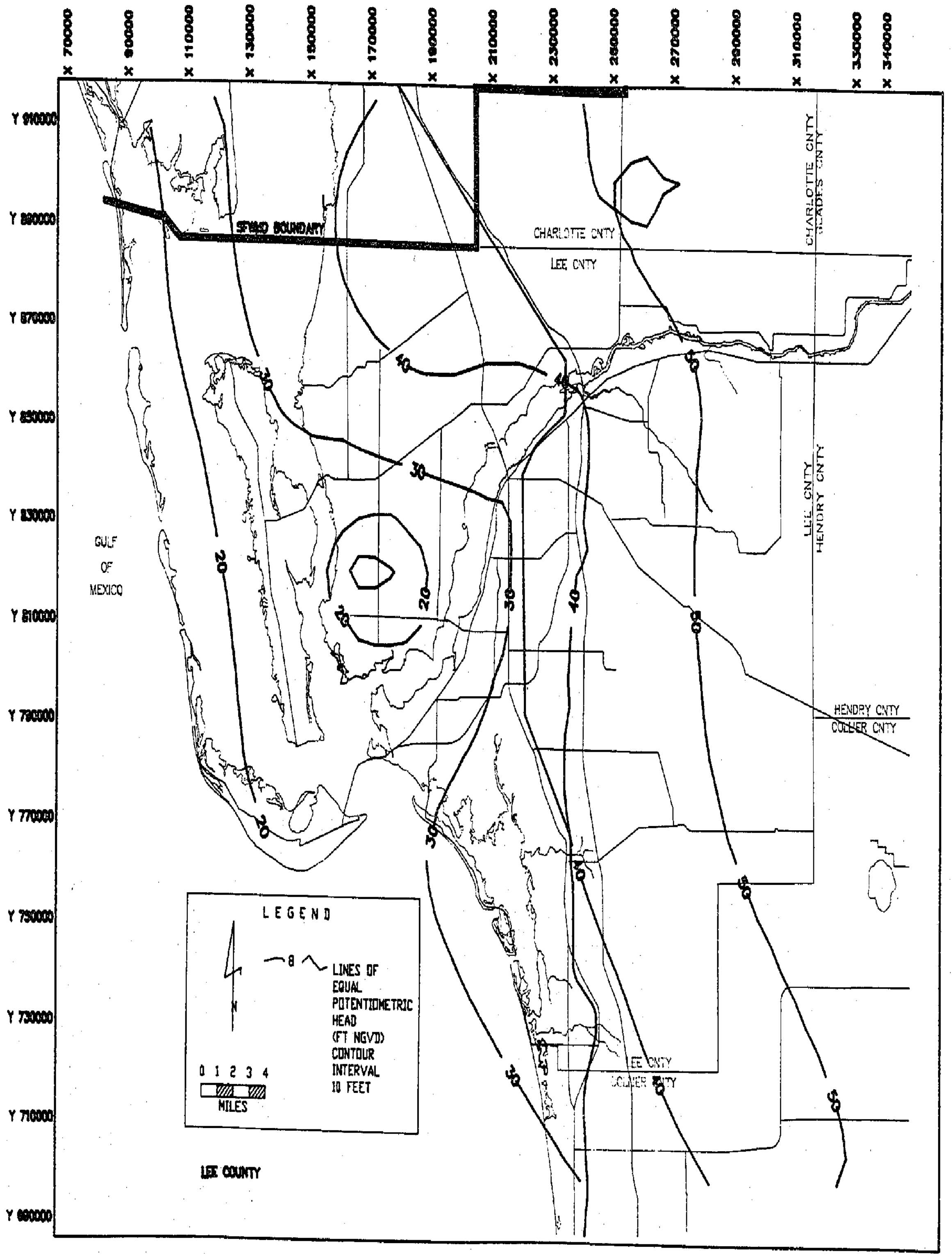


Figure 32 A. GENERALIZED CONDITIONS IN LAYER 5 (LOWER HAWTHORN AQUIFER), 1985: HEADS

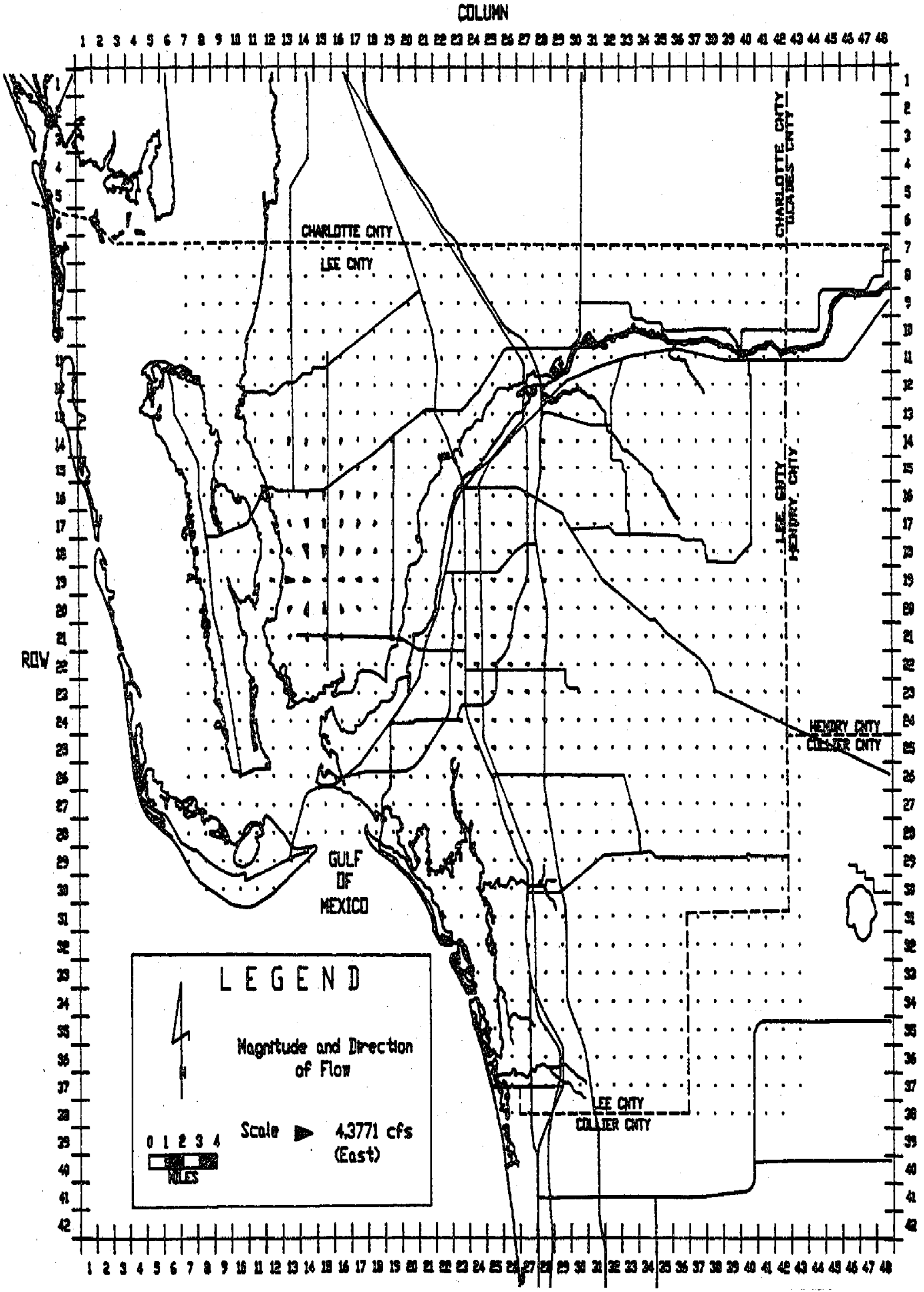


Figure 32 B. GENERALIZED CONDITIONS IN LAYER 5 (LOWER HAWTHORN AQUIFER), 1985: MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

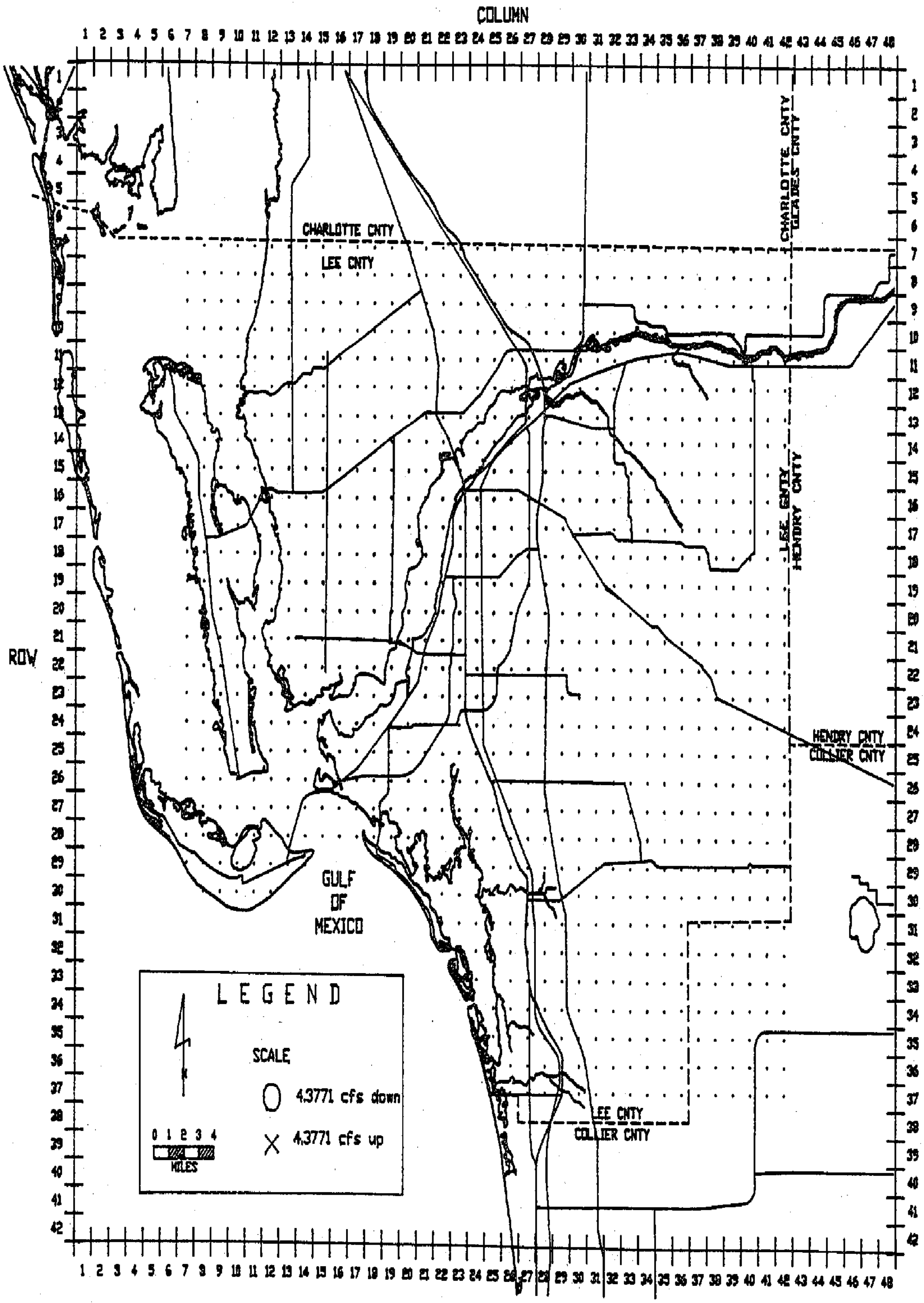


Figure 32 C. GENERALIZED CONDITIONS IN LAYER 5 (LOWER HAWTHORN AQUIFER), 1985: MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 5 AND LAYER 6

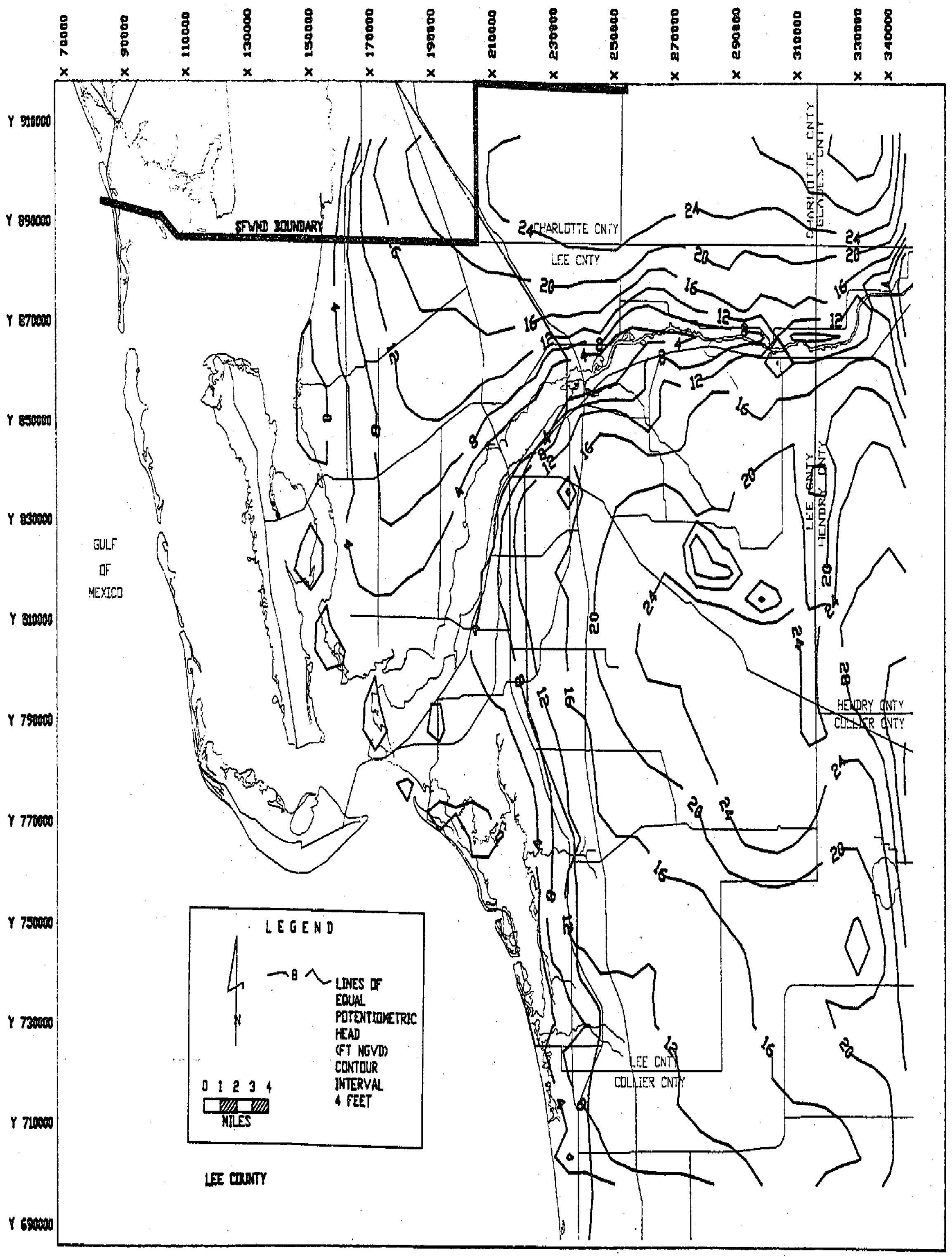


Figure 33 A. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 1 (WATER TABLE AQUIFER): HEADS

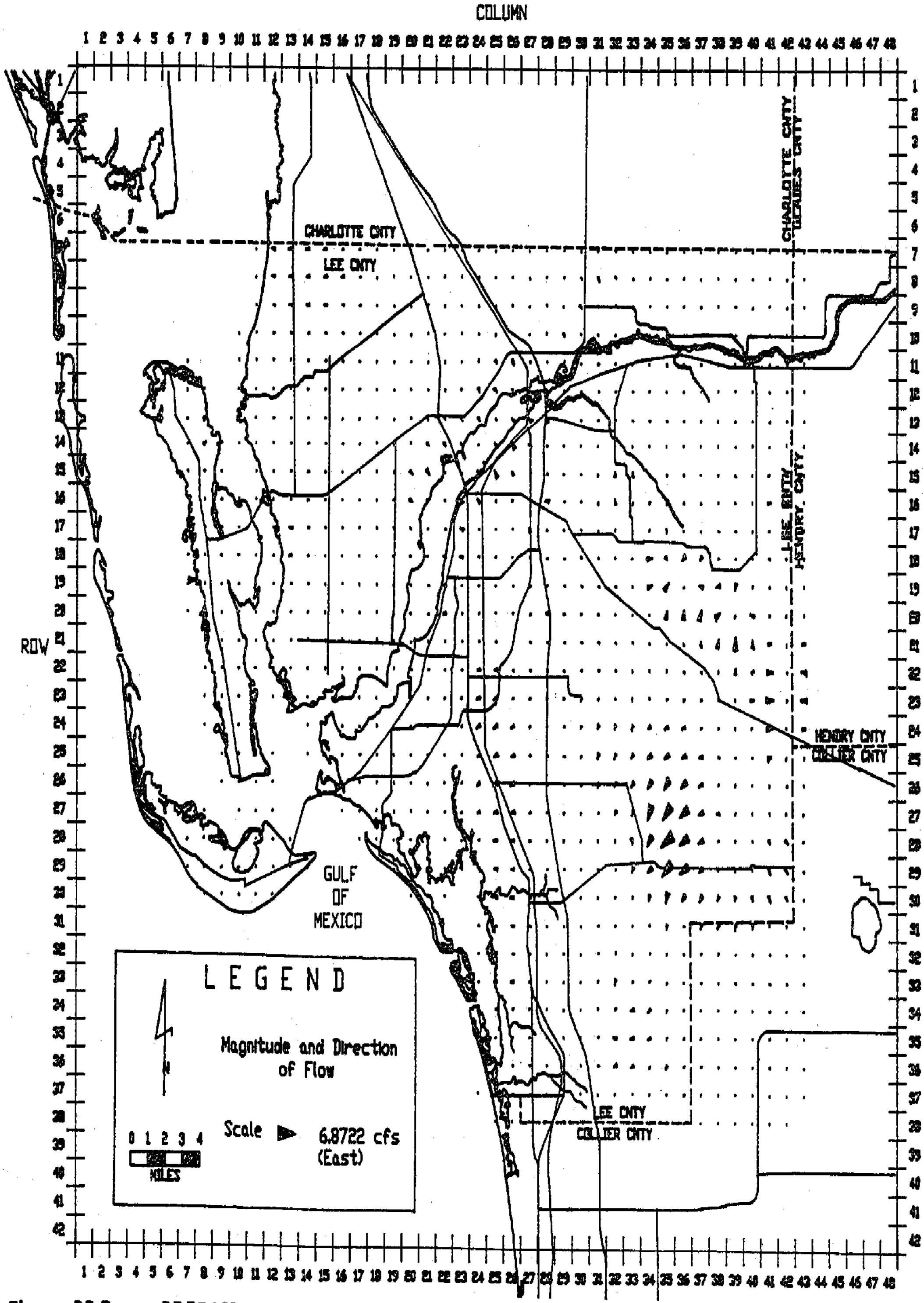


Figure 33 B. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 1 (WATER TABLE AQUIFER): MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

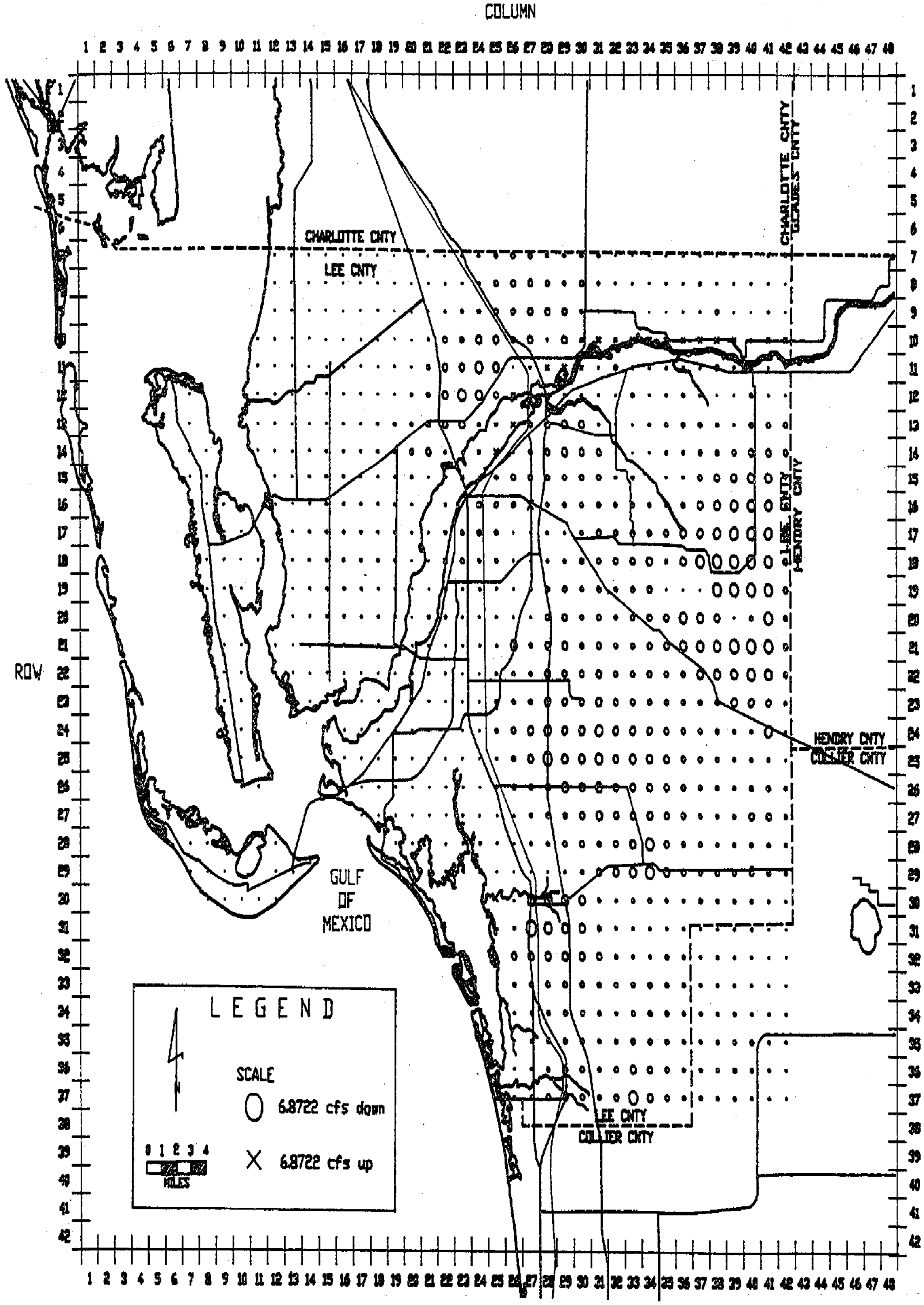


Figure 33 C. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 1 (WATER TABLE AQUIFER): MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 1 AND LAYER 2

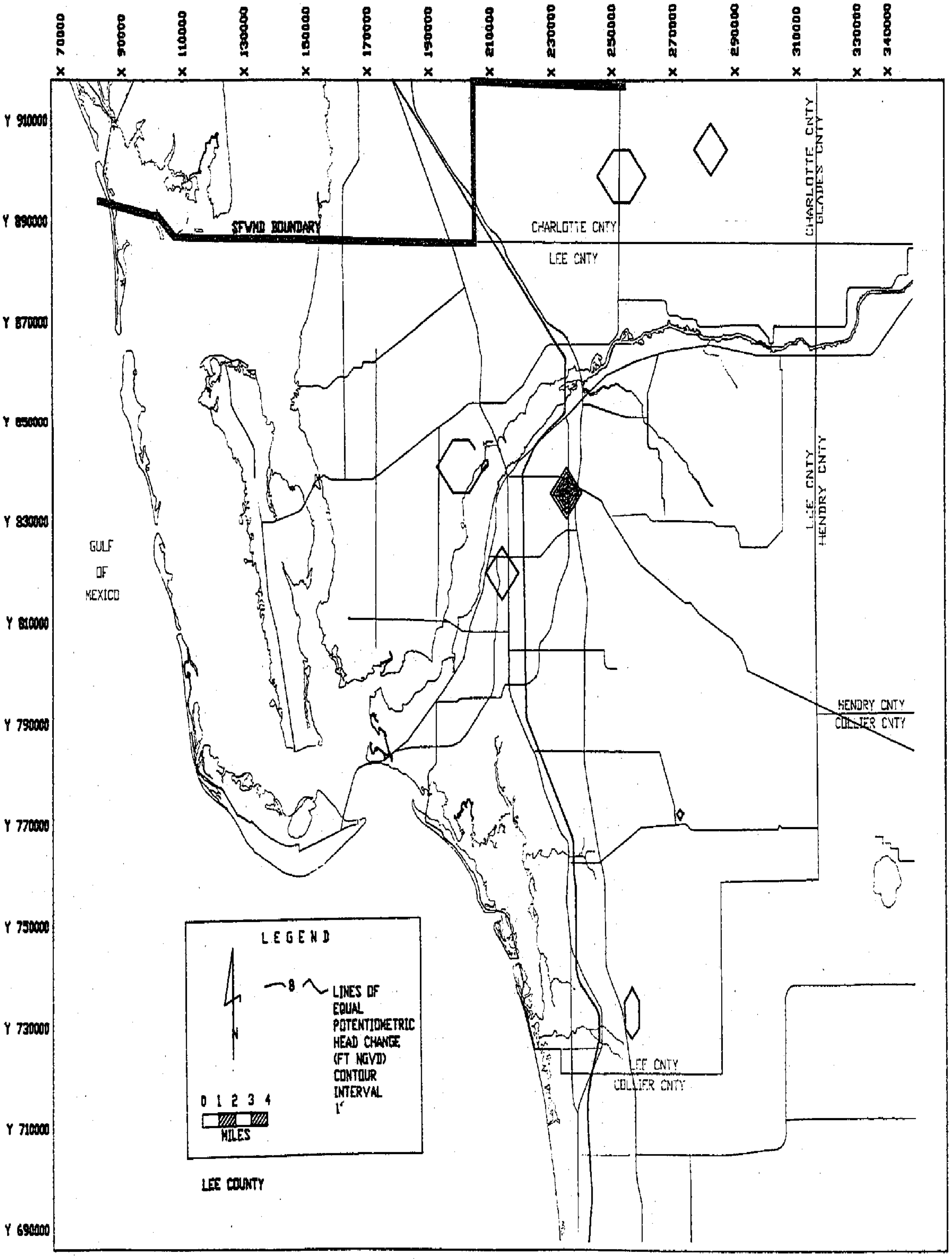


Figure 33 D. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 1 (WATER TABLE AQUIFER): CHANGE FROM 1985 CONDITIONS

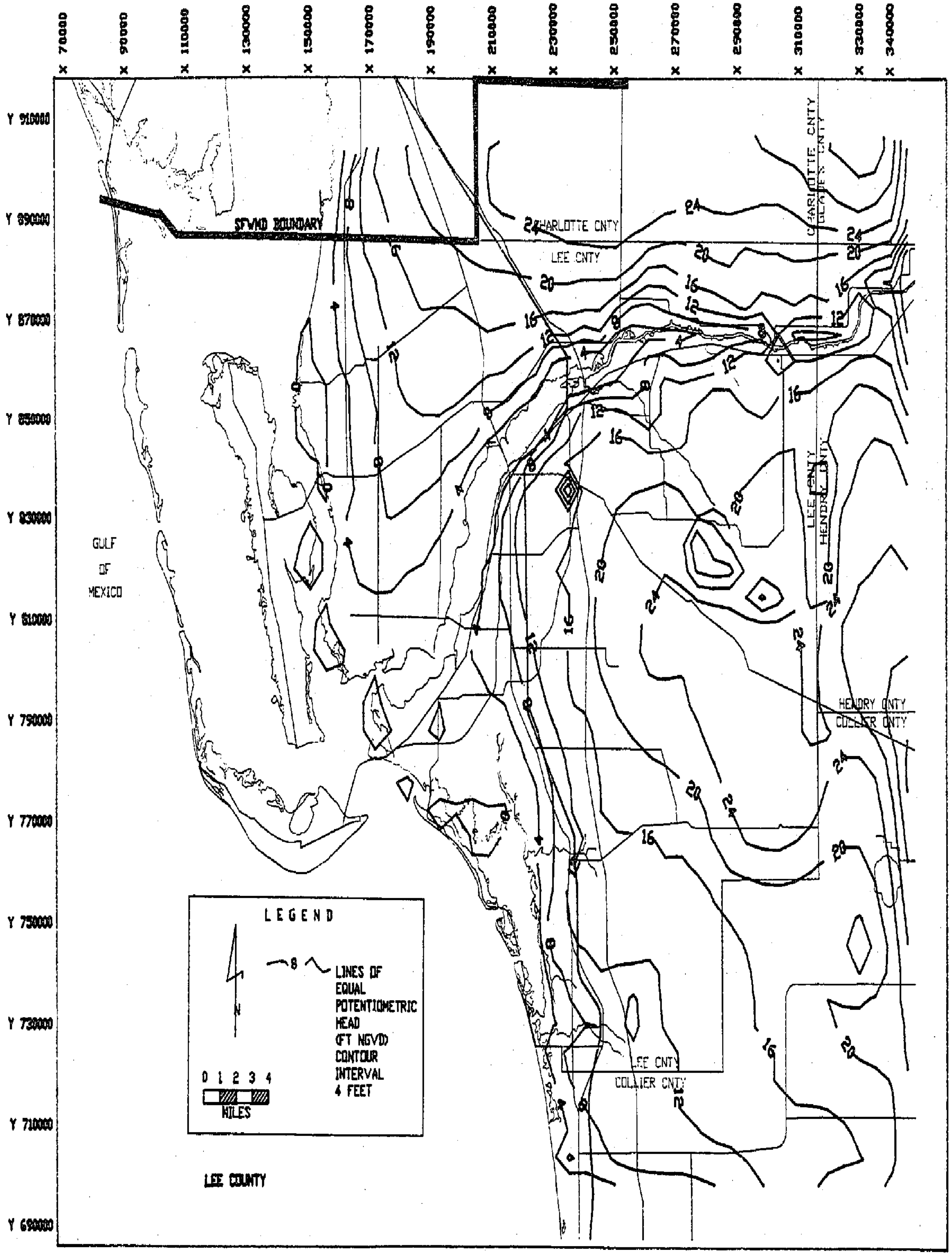


Figure 34 A. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 1 (WATER TABLE AQUIFER): HEADS

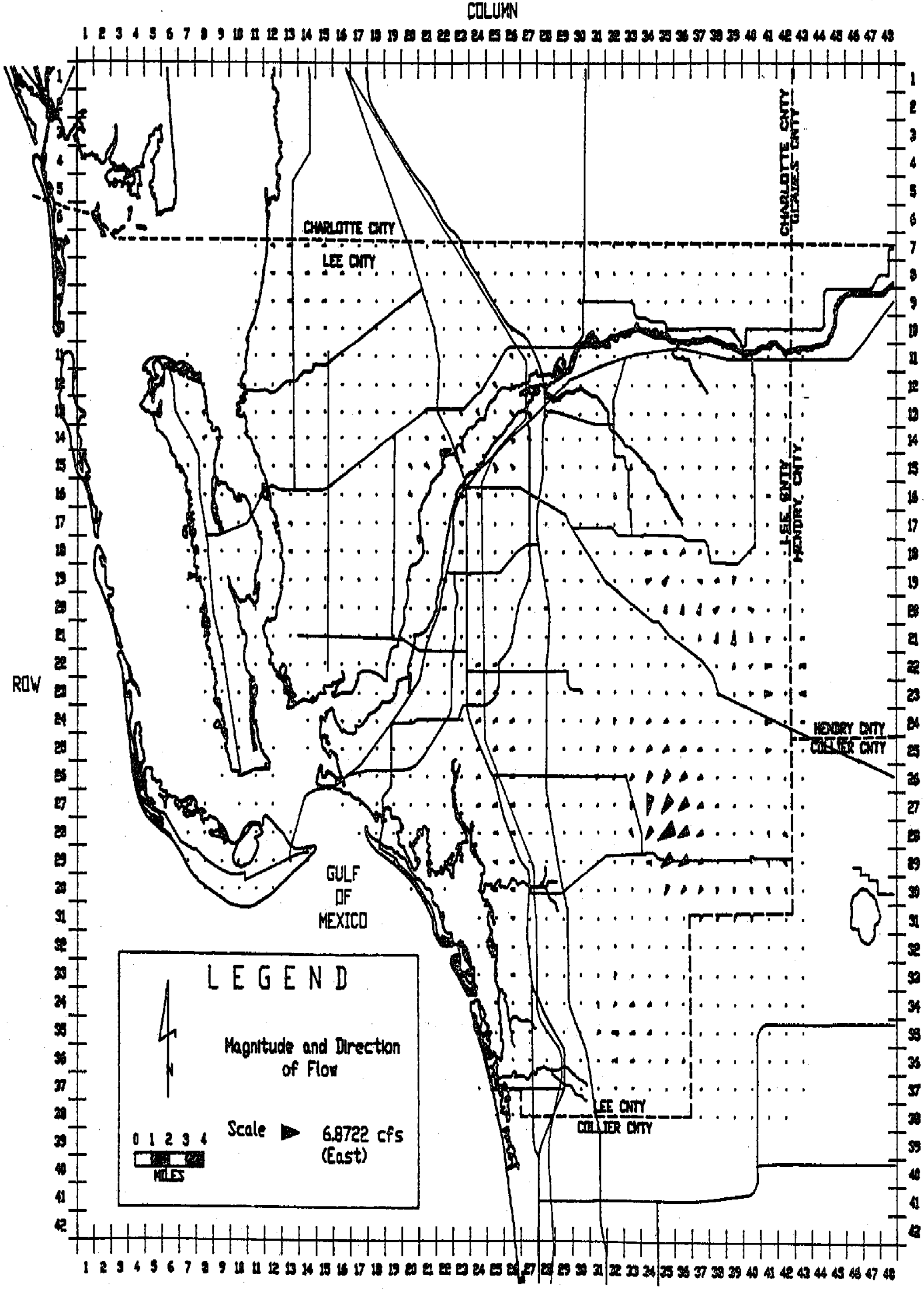


Figure 34 B. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 1 (WATER TABLE AQUIFER): MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

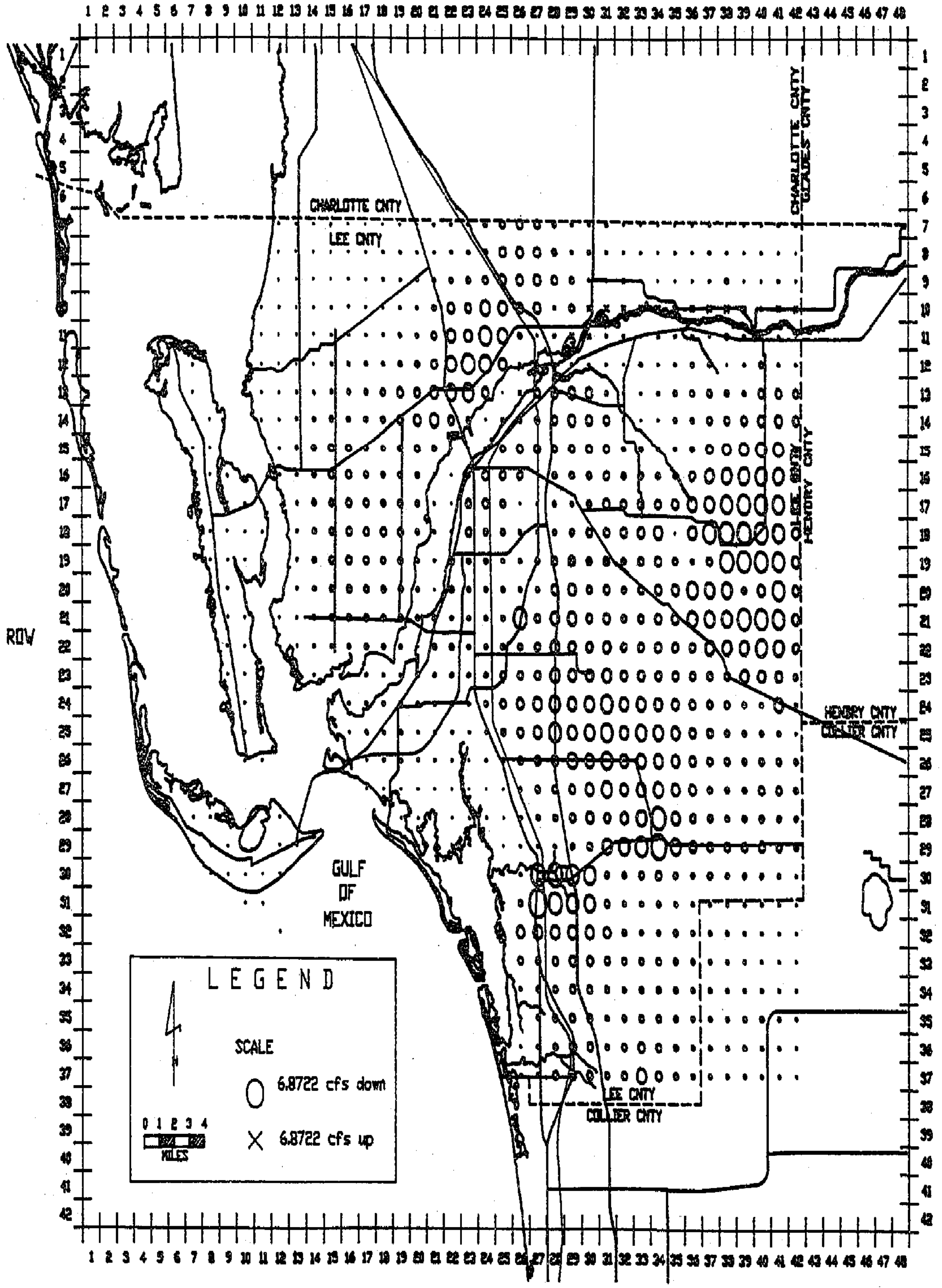


Figure 34 C. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 1 (WATER TABLE AQUIFER): MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 1 AND LAYER 2

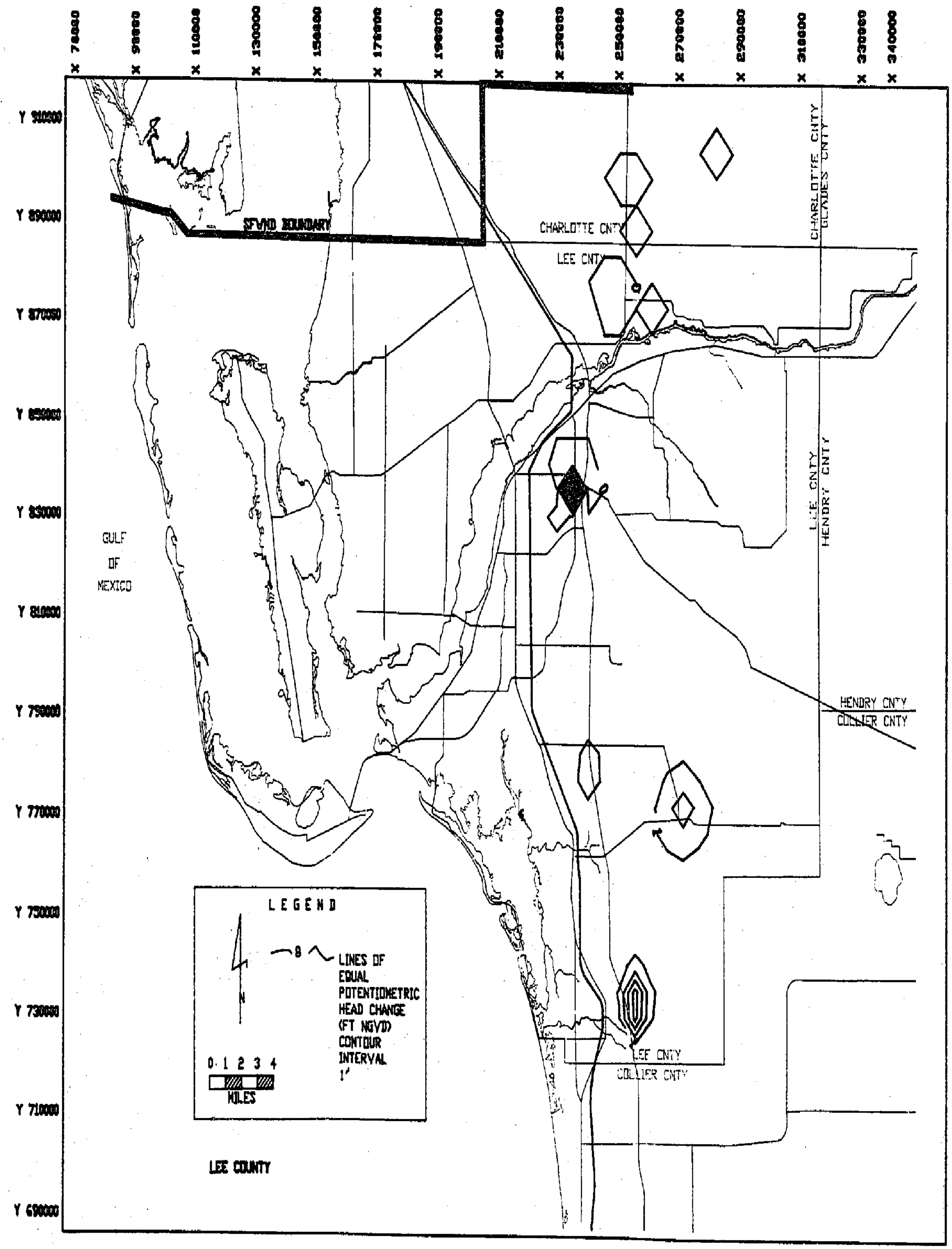


Figure 34 D. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 1 (WATER TABLE AQUIFER): CHANGE FROM 1985 CONDITIONS

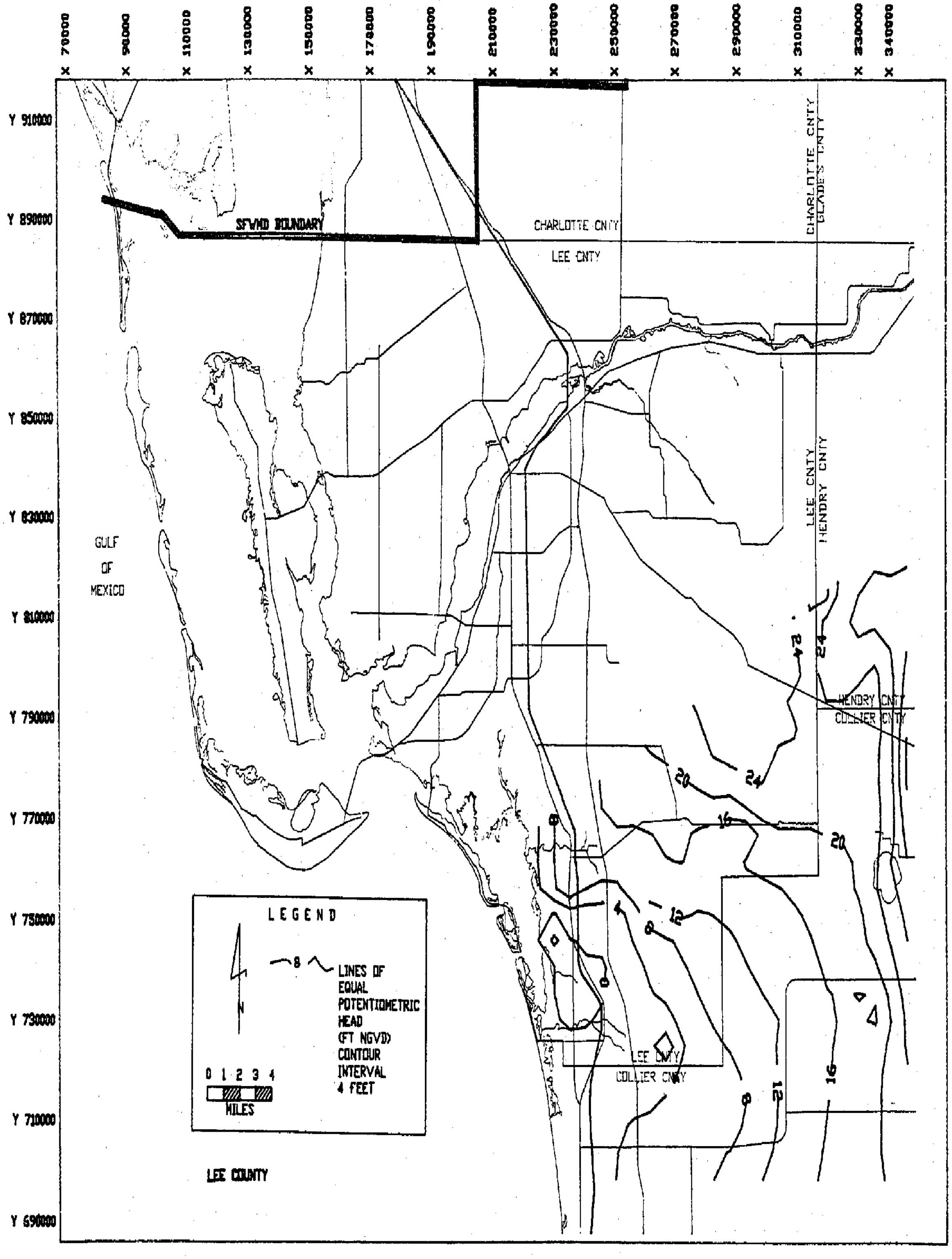


Figure 35 A. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 2 (LOWER TAMIAMI AQUIFER): HEADS

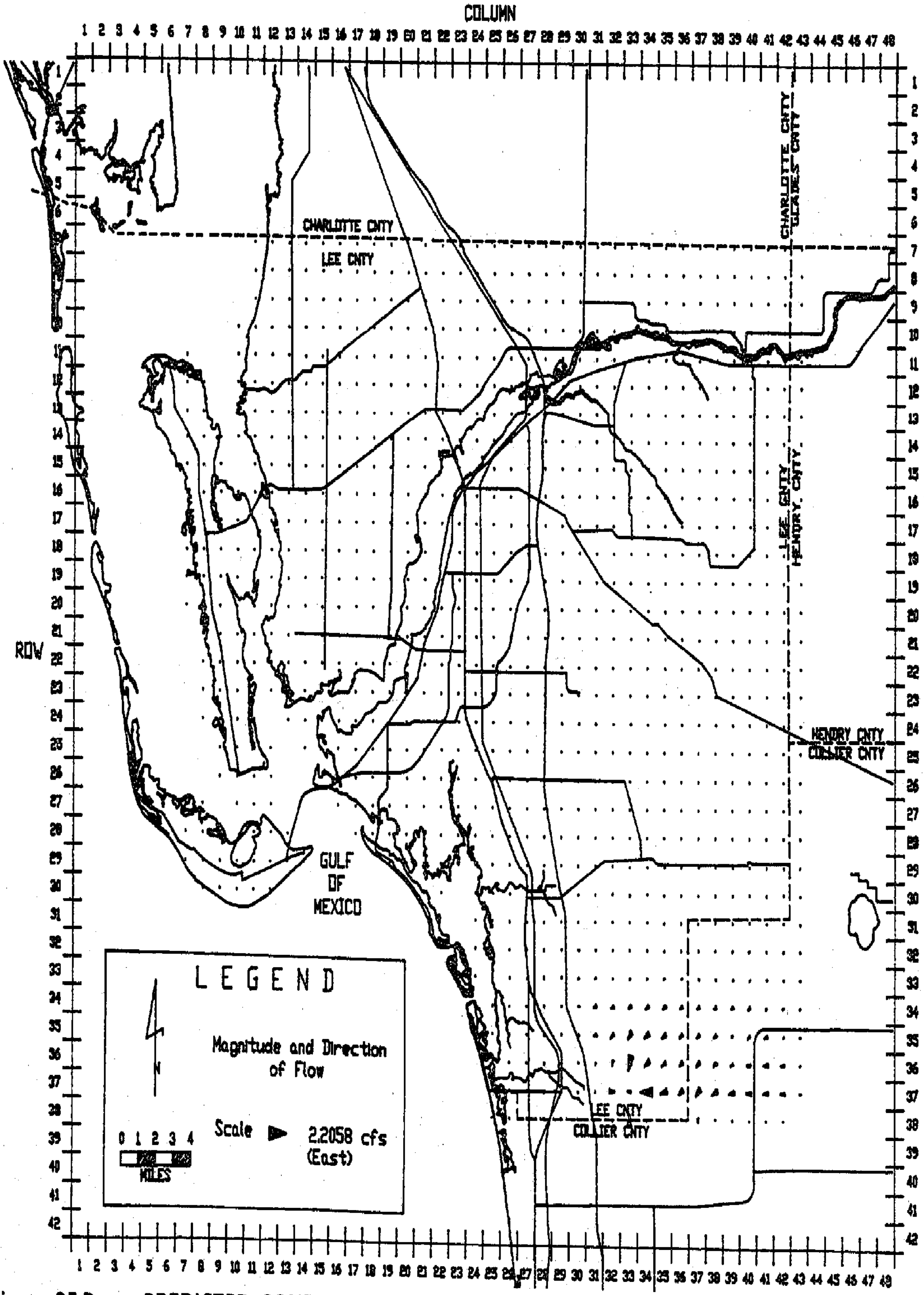


Figure 35 B. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 2 (LOWER TAMIAMI AQUIFER): MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

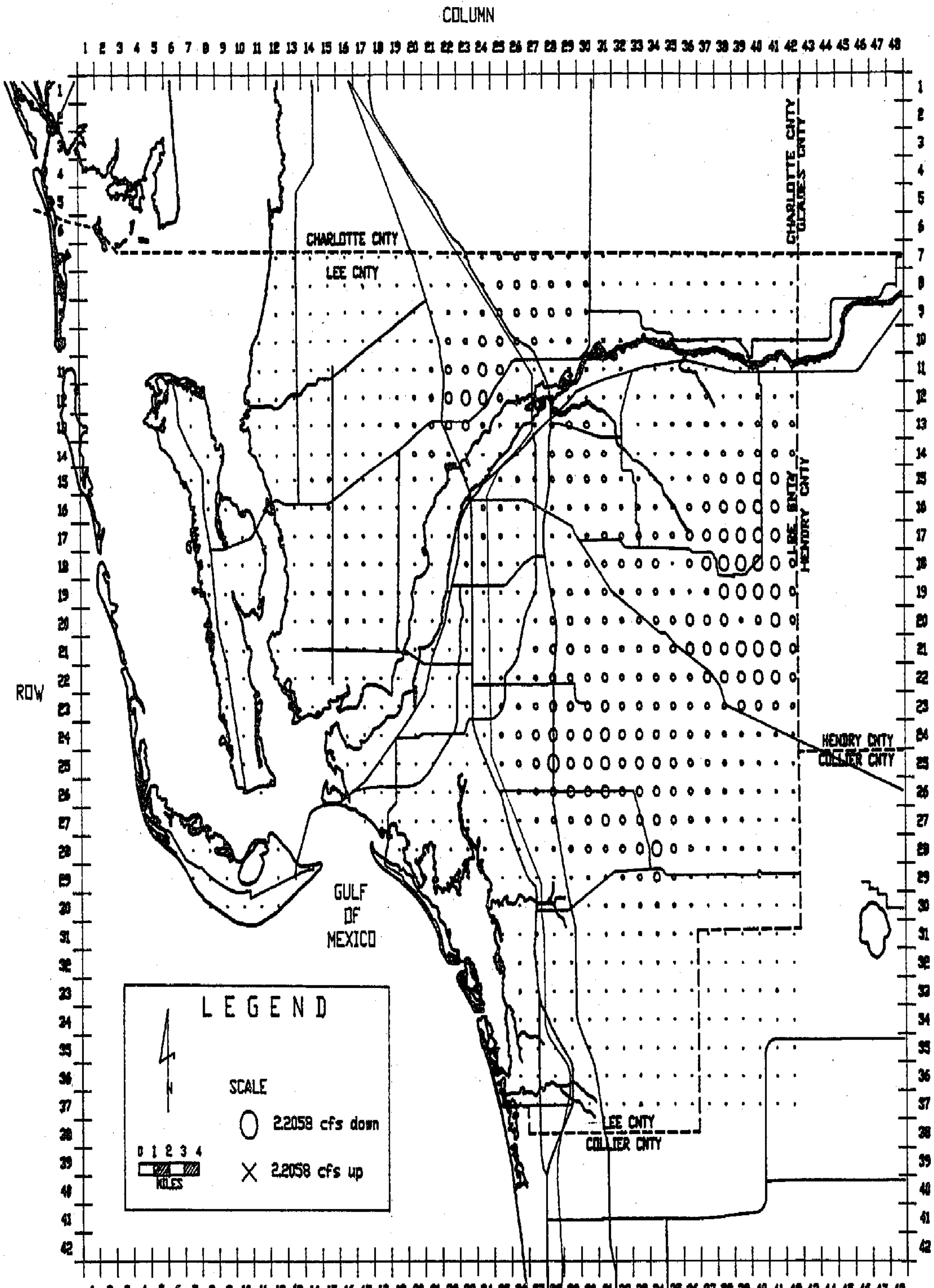


Figure 35 C. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 2 (LOWER TAMIAMI AQUIFER): MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 2 AND LAYER 3

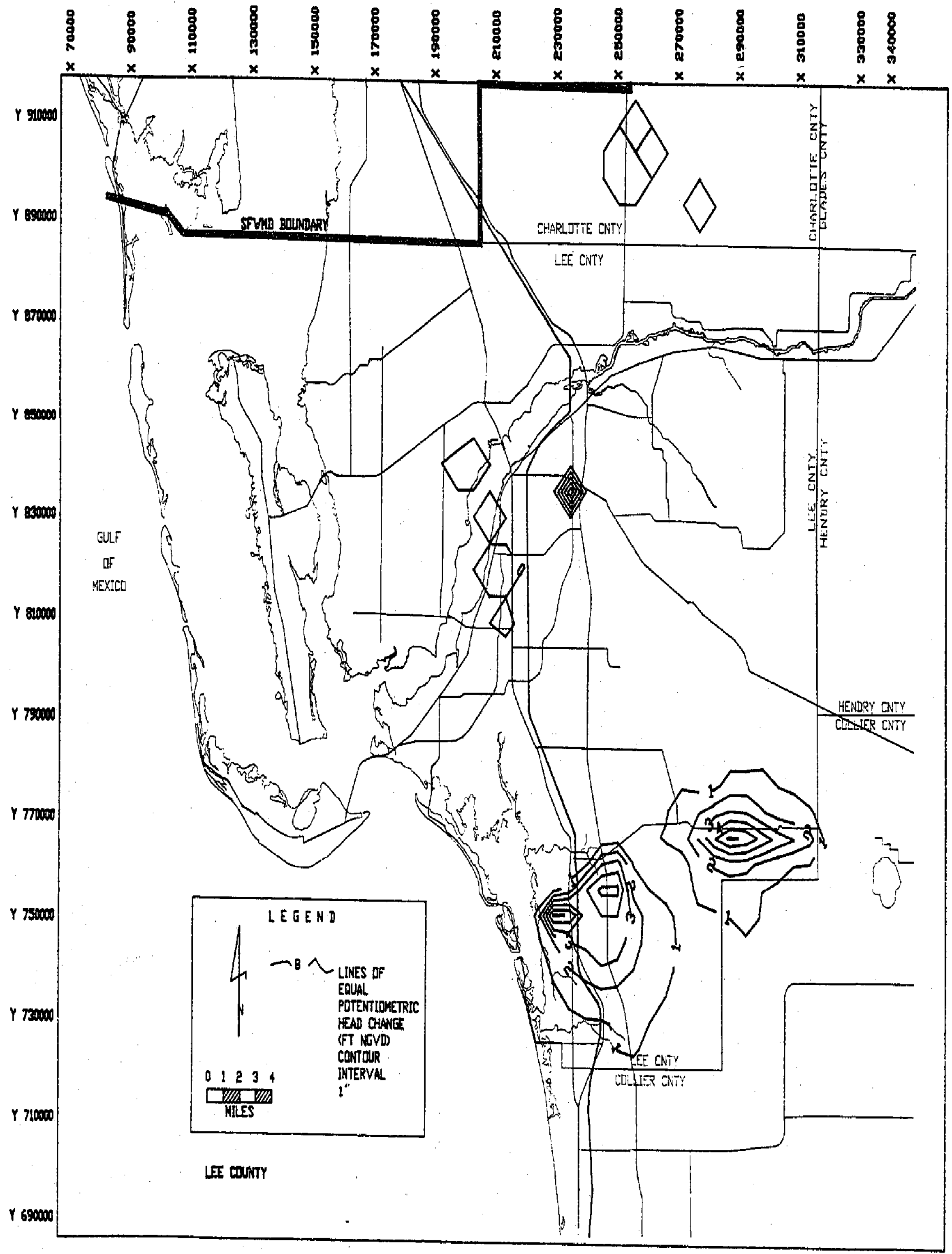


Figure 35 D. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 2 (LOWER TAMIAMI AQUIFER): CHANGE FROM 1985 CONDITIONS

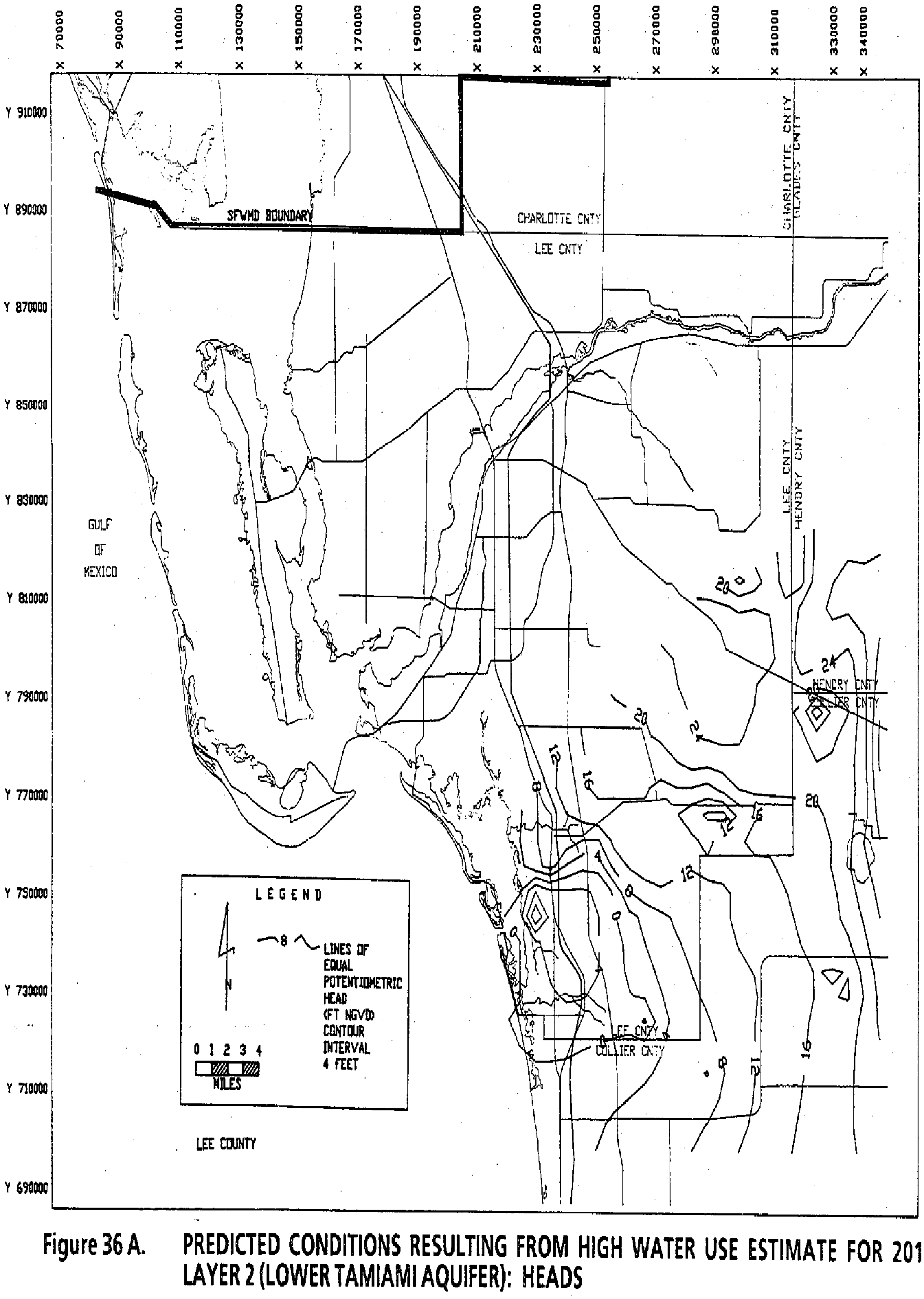


Figure 36 A. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 2 (LOWER TAMIAMI AQUIFER): HEADS

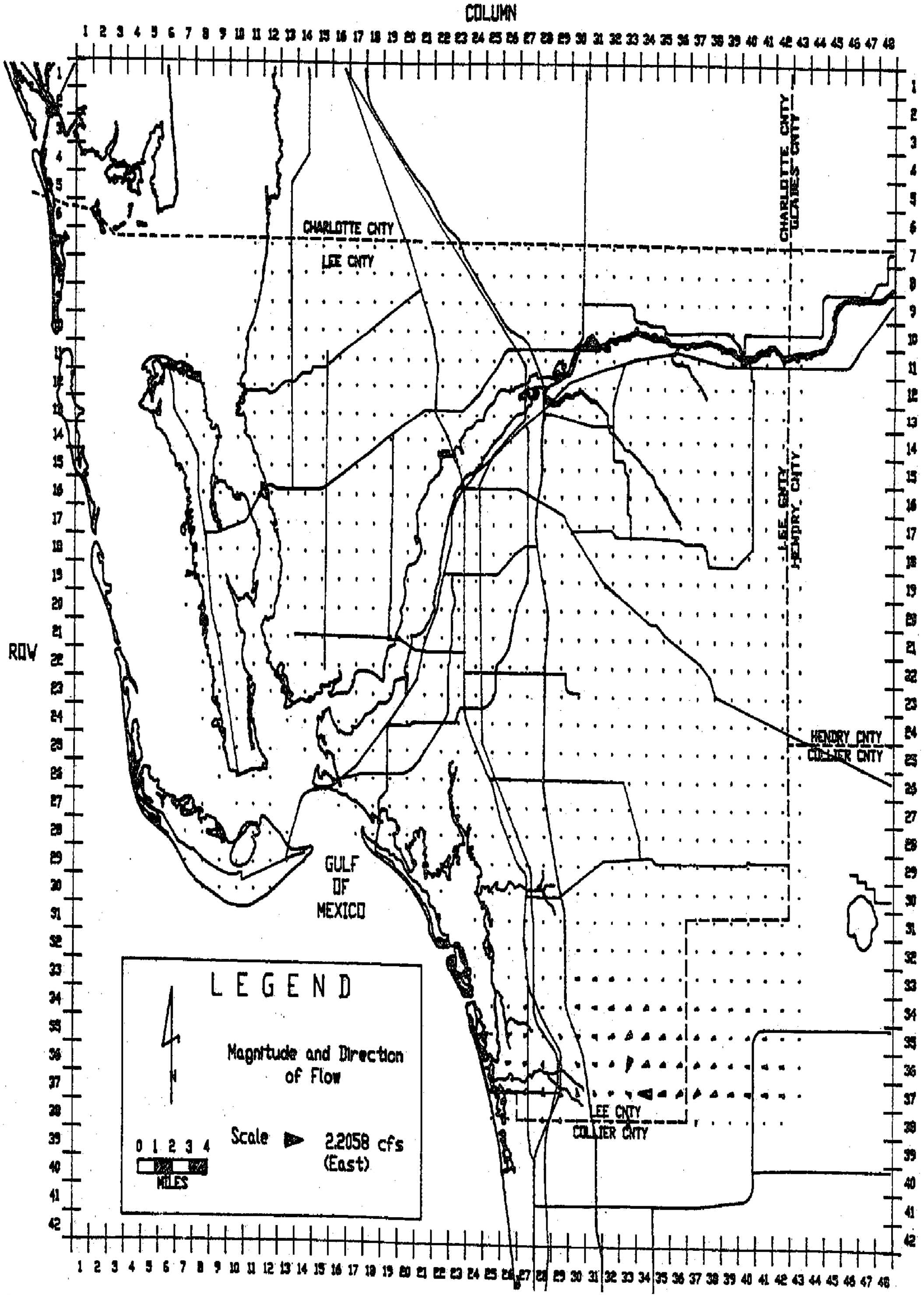


Figure 36 B. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 2 (LOWER TAMIAMI AQUIFER): MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

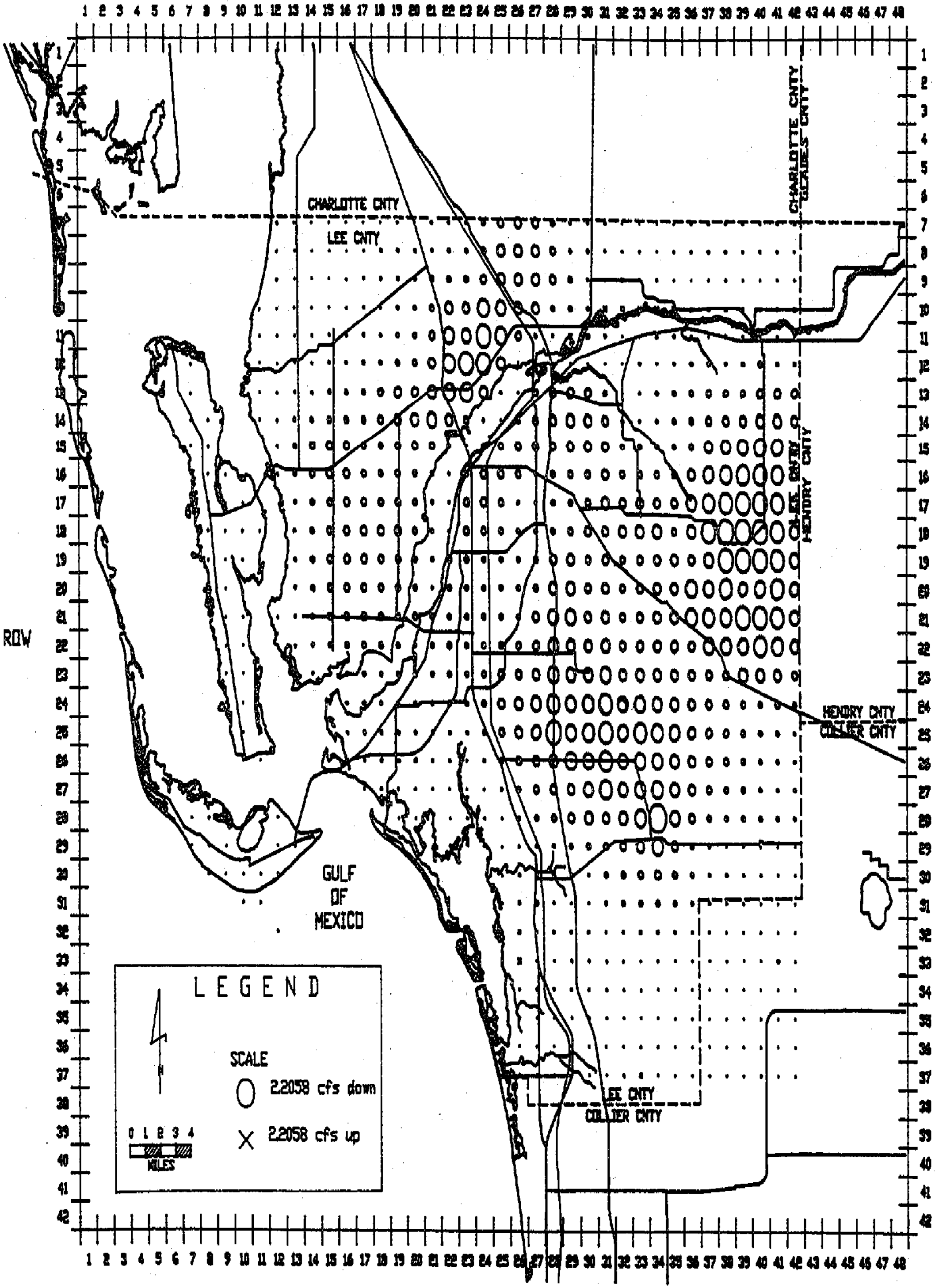


Figure 36 C. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 2 (LOWER TAMIAMI AQUIFER): MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 2 AND LAYER 3
]

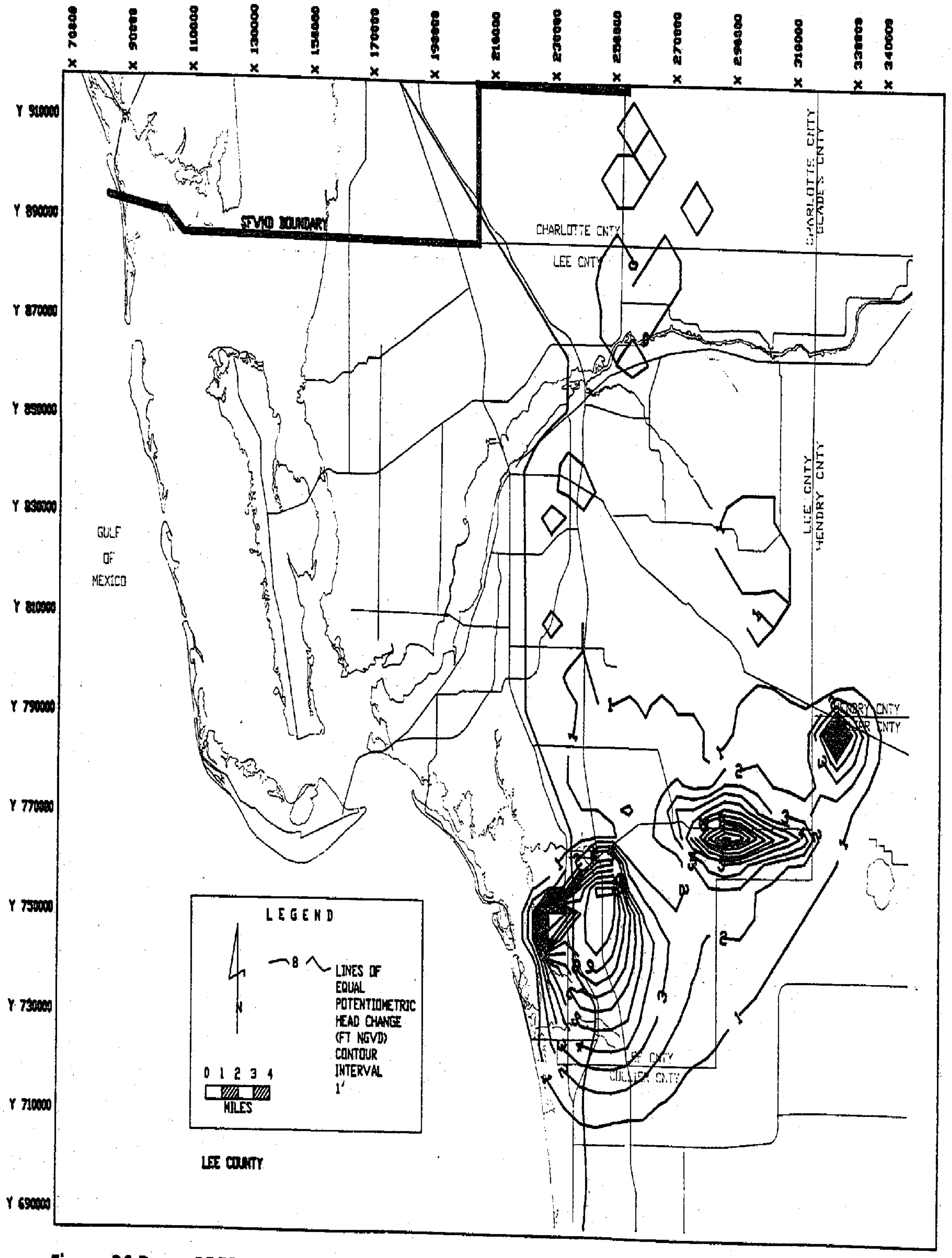


Figure 36 D. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 2 (LOWER TAMIAMI AQUIFER): CHANGE FROM 1985 CONDITIONS

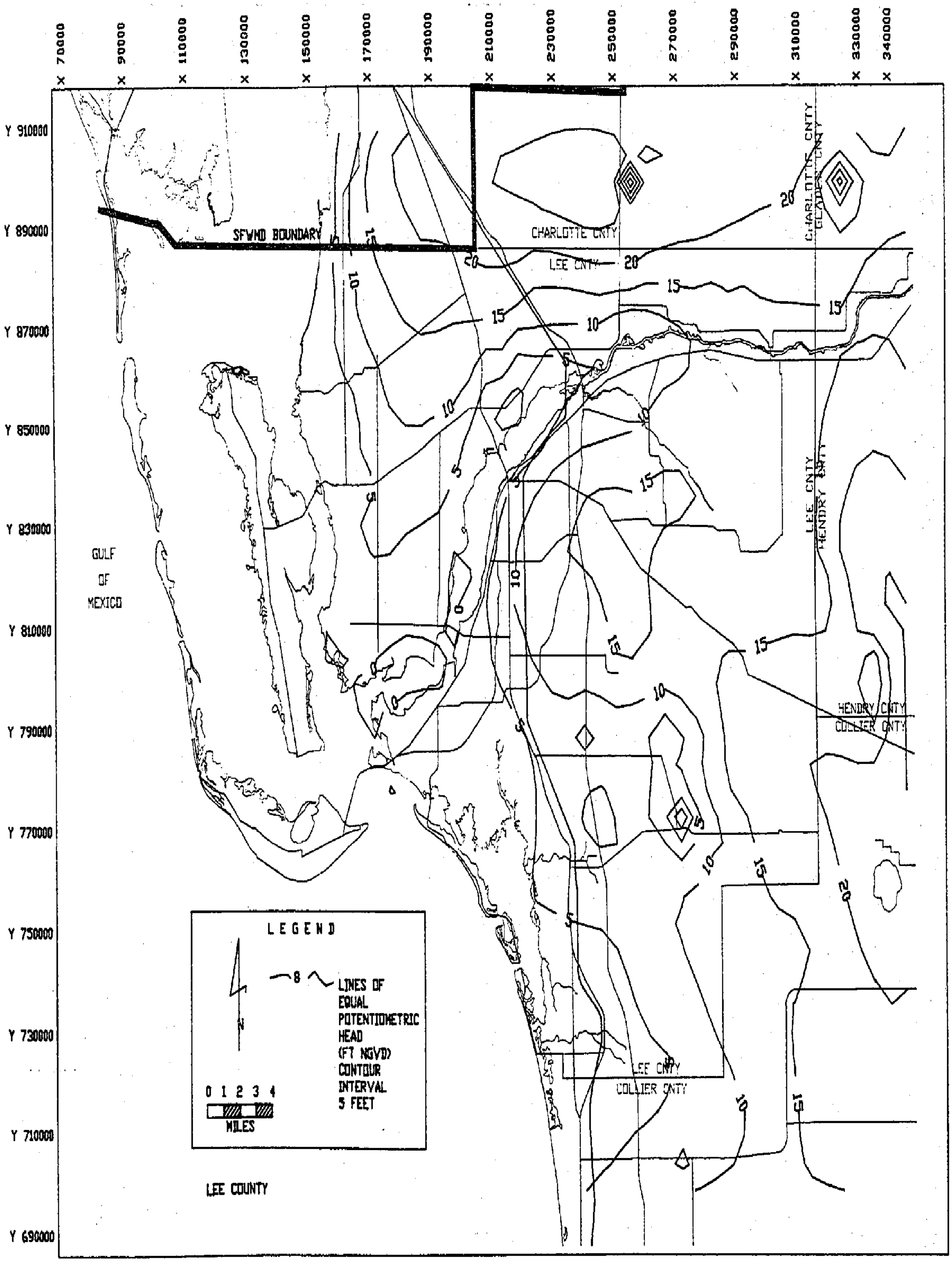


Figure 37 A. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 3 (SANDSTONE AQUIFER): HEADS

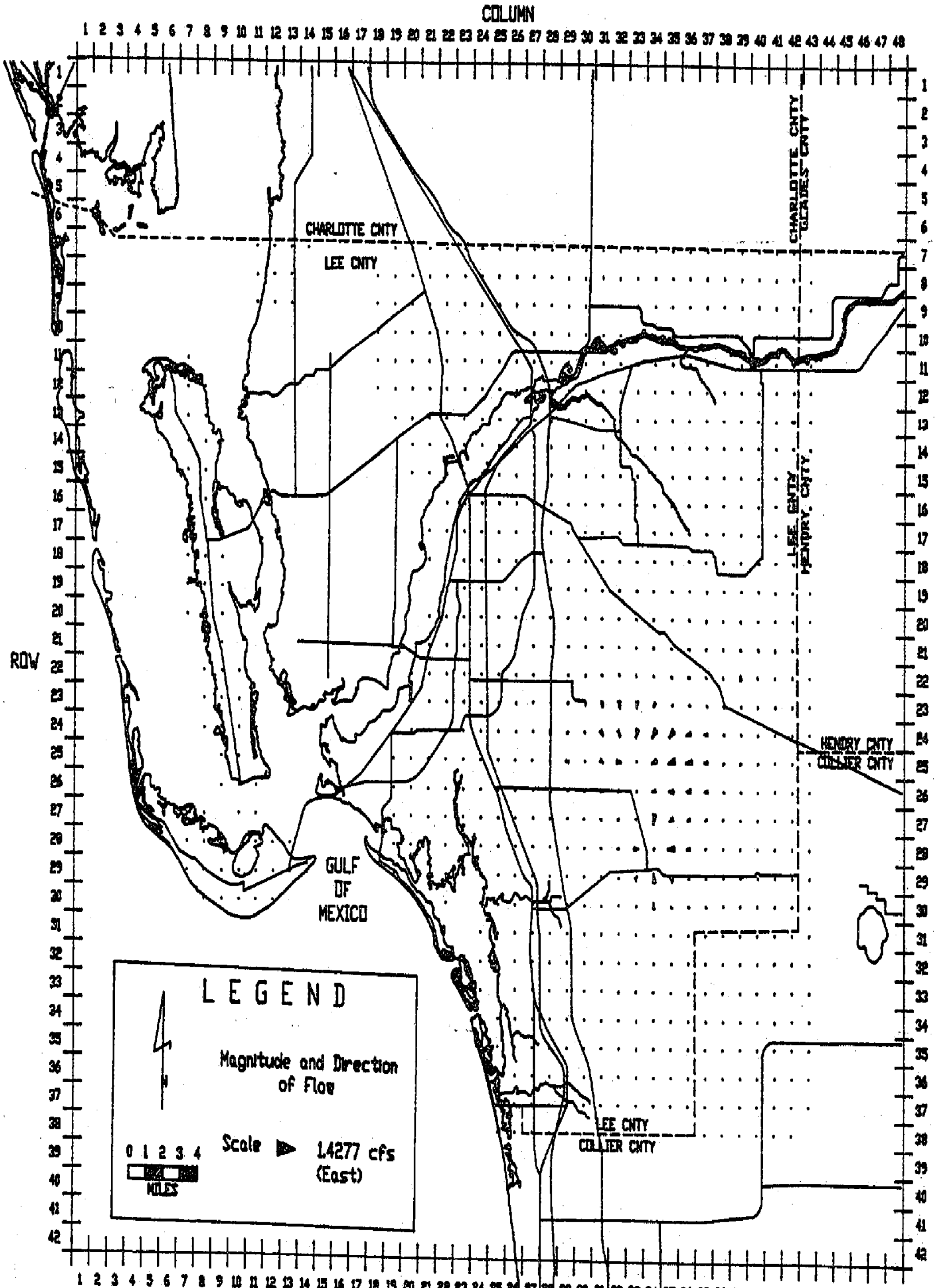


Figure 37 B. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 3 (SANDSTONE AQUIFER): MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

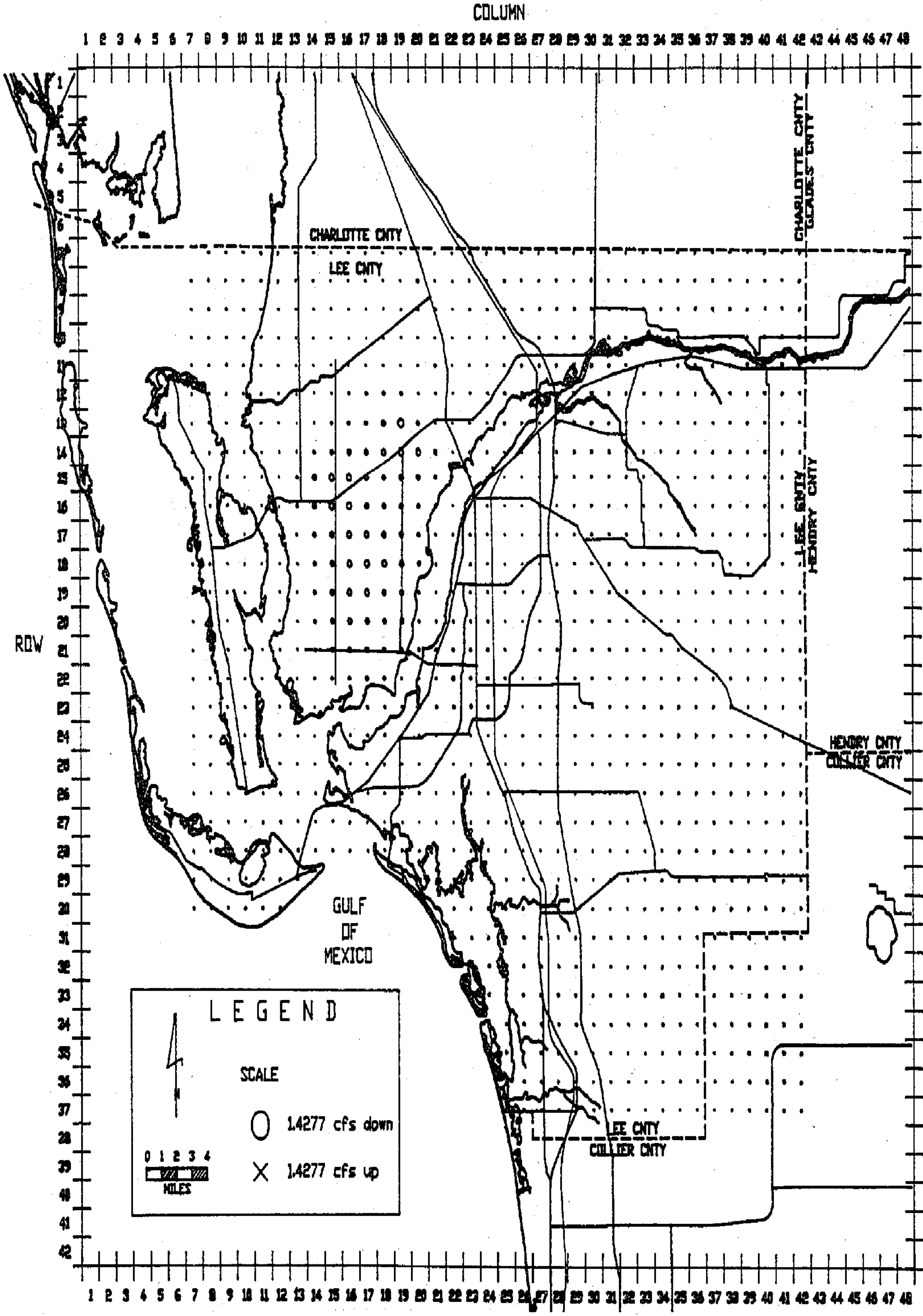


Figure 37 C. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 3 (SANDSTONE AQUIFER): MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 3 AND LAYER 4

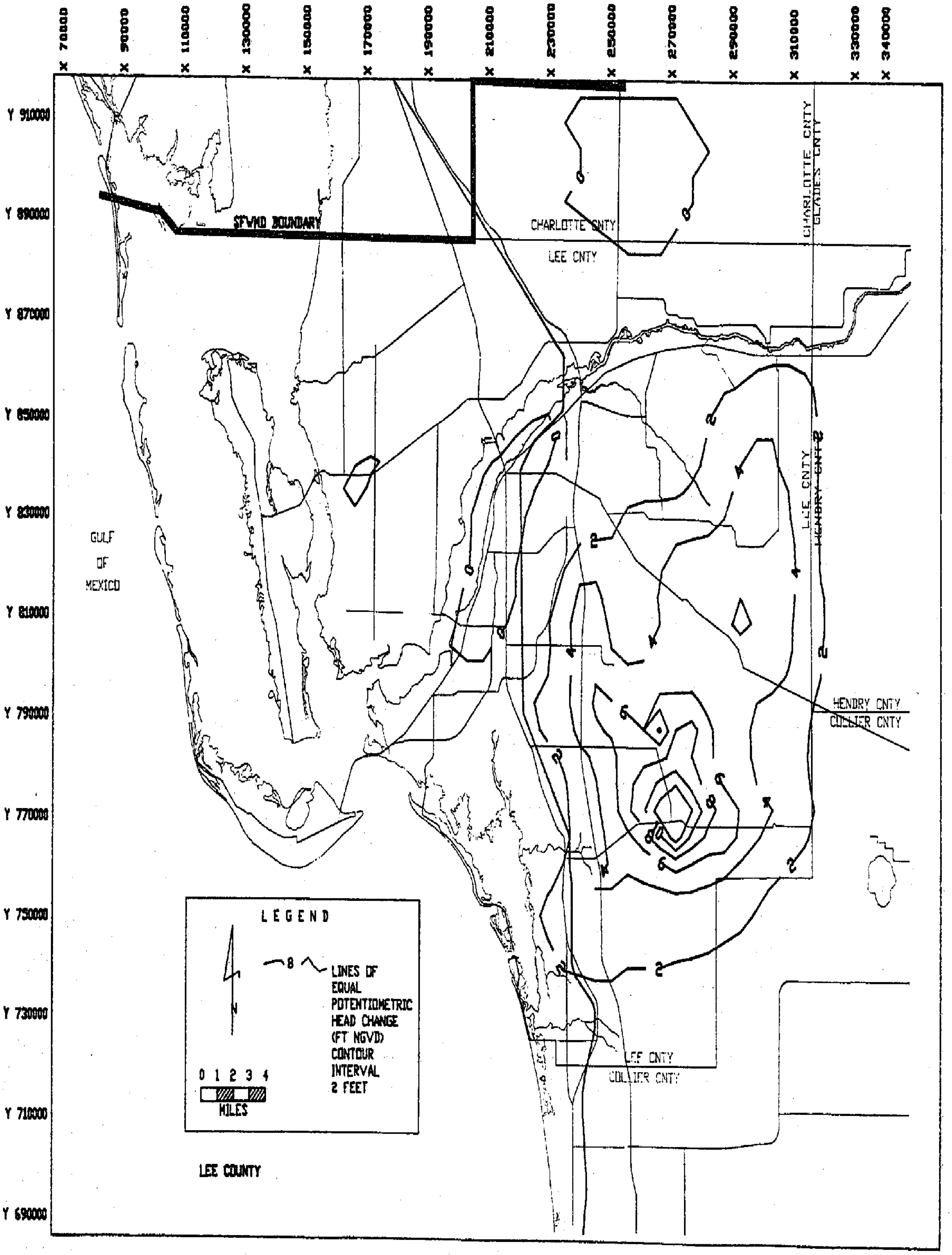


Figure 37 D. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 3 (SANDSTONE AQUIFER): CHANGE FROM 1985 CONDITIONS

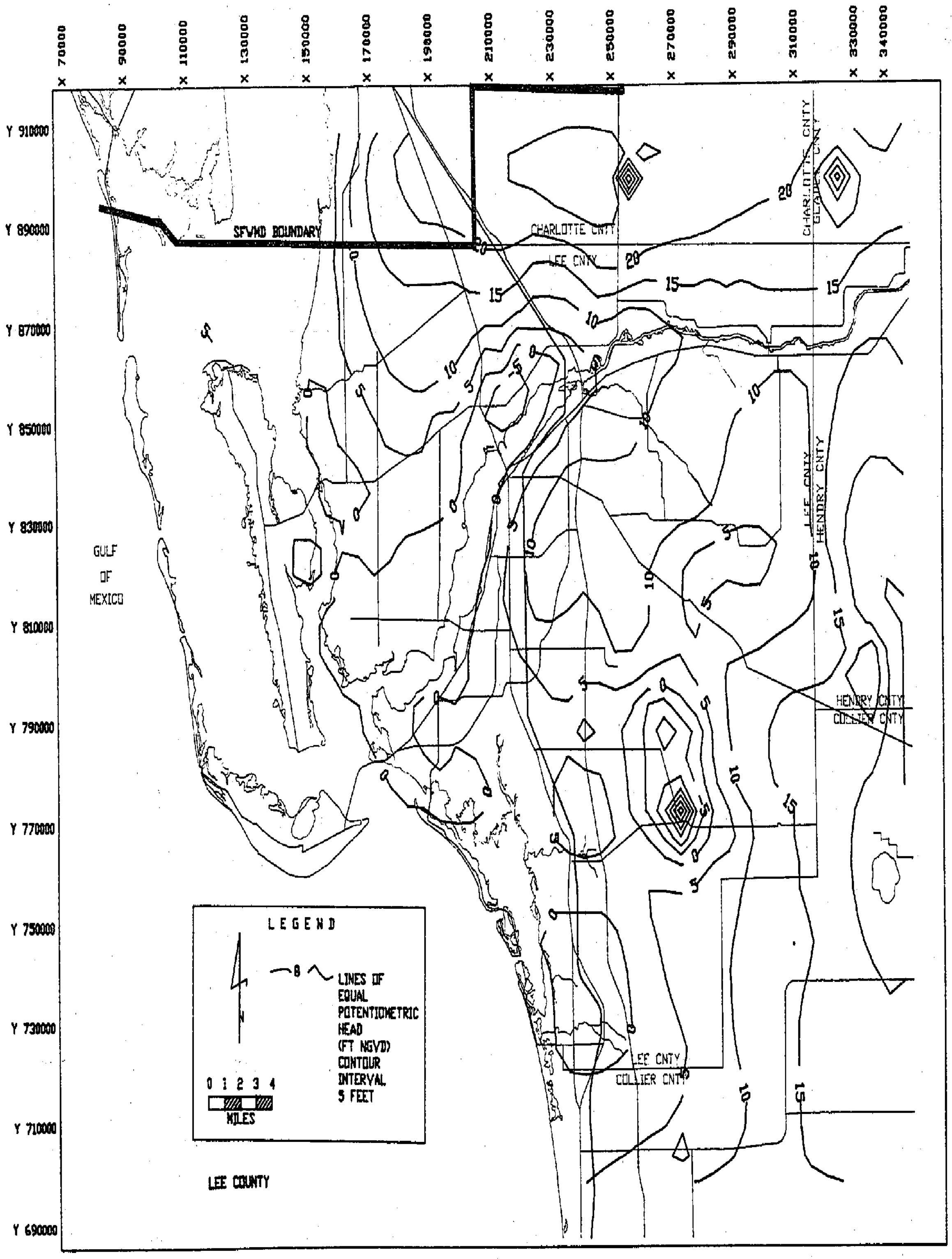


Figure 38 A. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 3 (SANDSTONE AQUIFER): HEADS

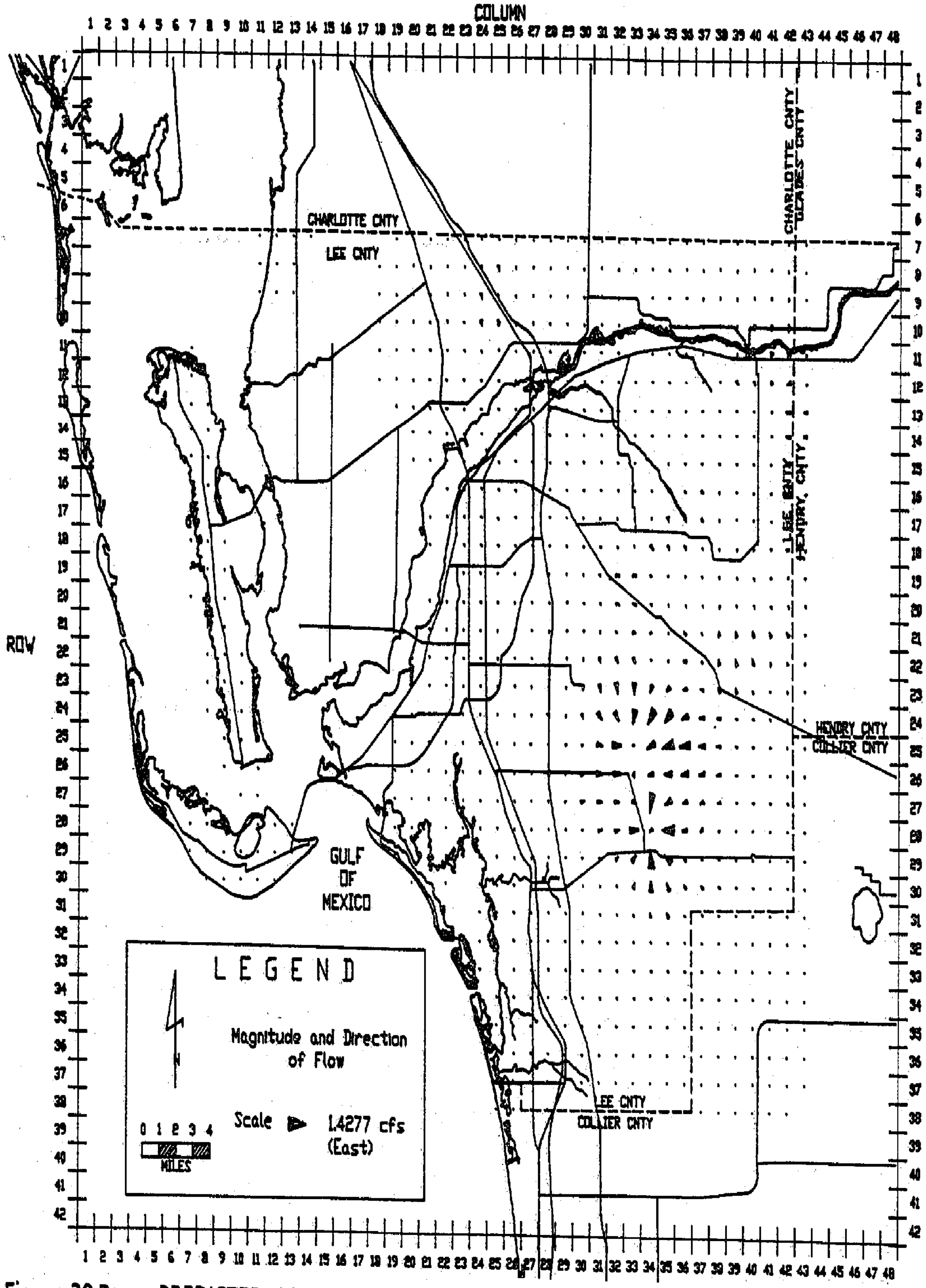


Figure 38 B. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 3 (SANDSTONE AQUIFER): MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

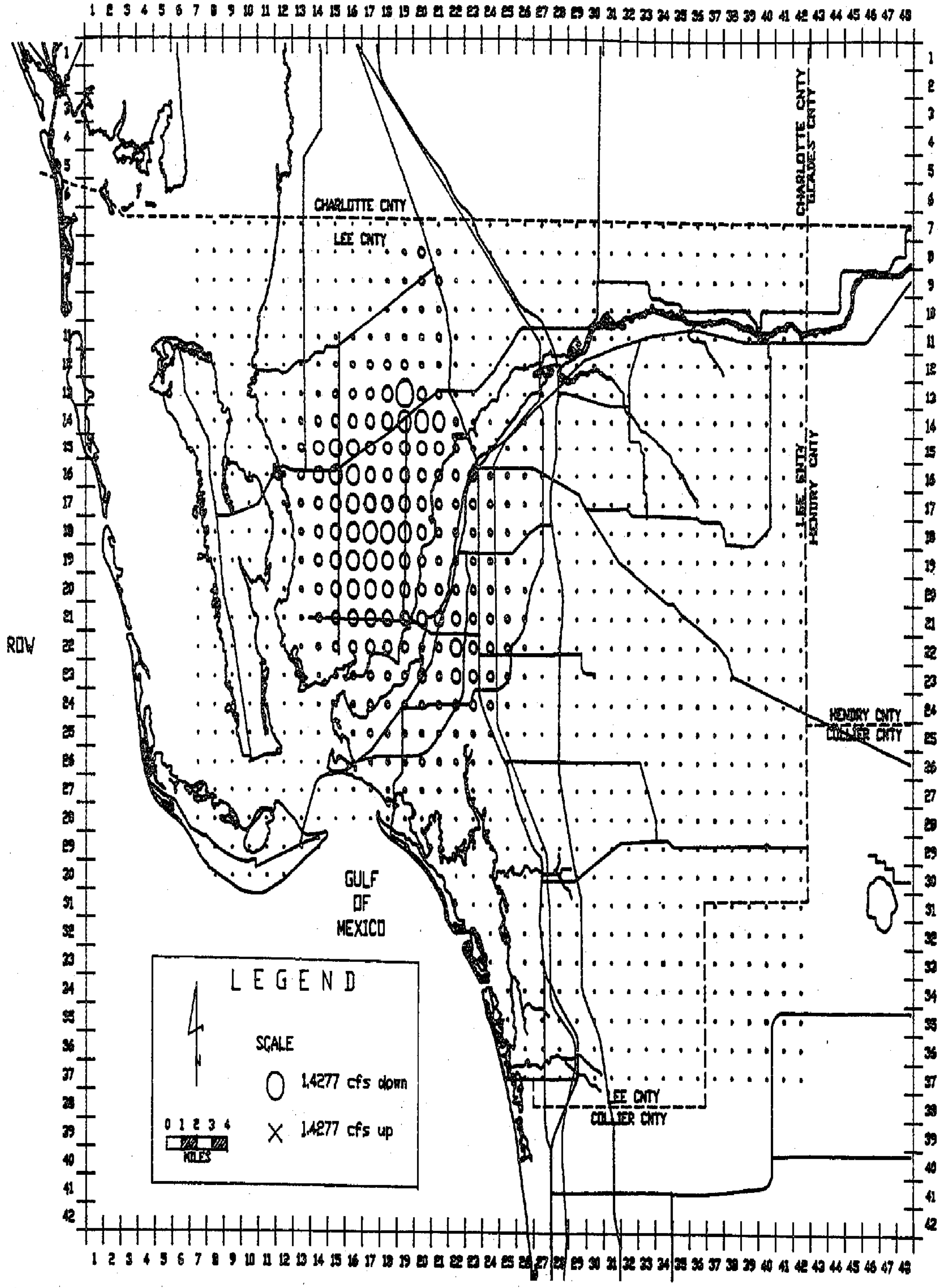


Figure 38 C. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 3 (SANDSTONE AQUIFER): MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 3 AND LAYER 4

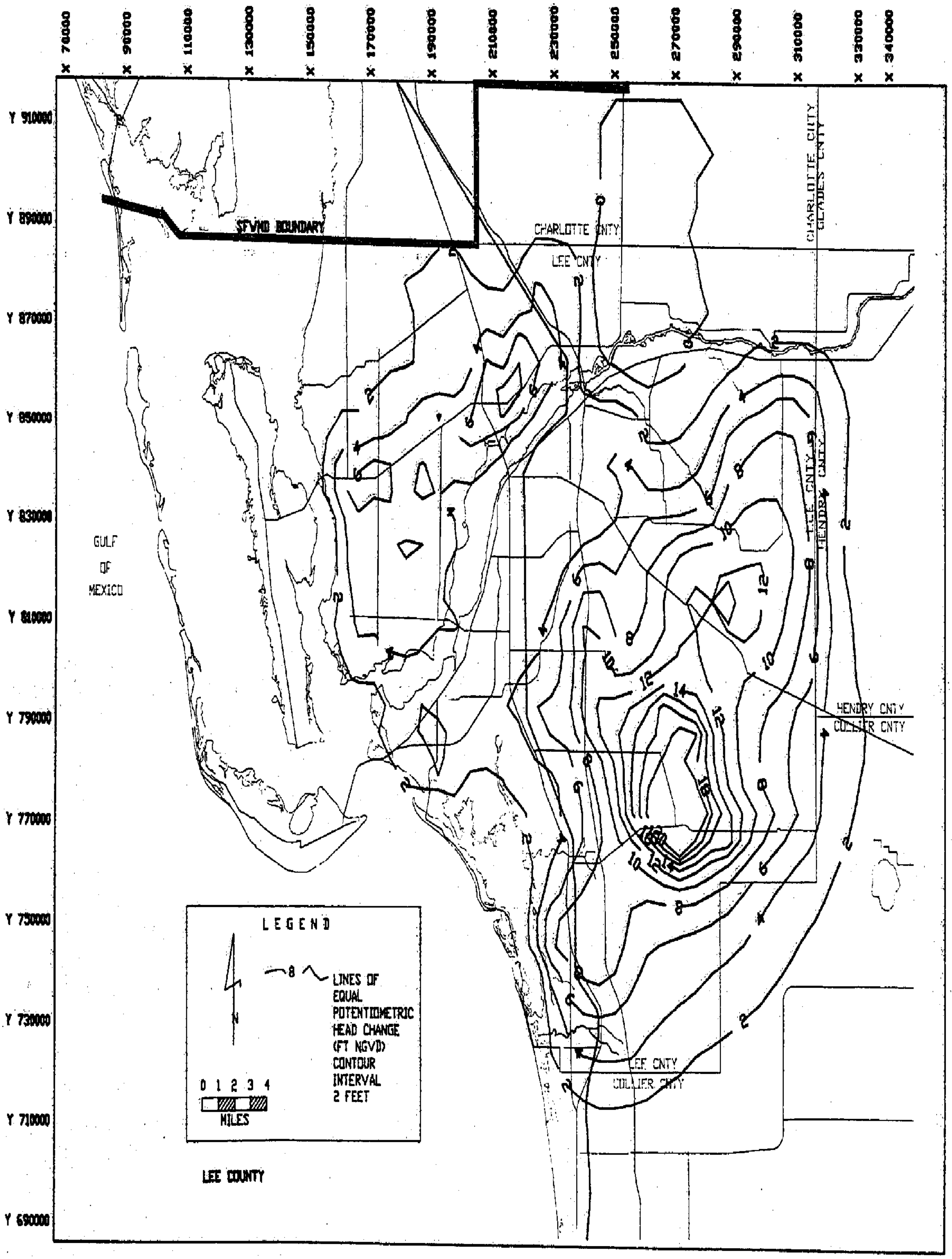


Figure 38 D. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 3 (SANDSTONE AQUIFER): CHANGE FROM 1985 CONDITIONS

The second area of drawdown is in the vicinity of the Green Meadows and Corkscrew wellfields. Distribution of discharge for both simulations is based on the capacities of existing wells rather than on current or expected future wellfield operation plans. If the sandstone aquifer wells in these wellfields continue to be used in their traditional role of backup and dry season supply, the water levels will not be as low as those shown.

The third area of drawdown occurs over much of planning districts 6 and 7 where significant growth in domestic self supply water use from the sandstone aquifer is expected. This results in a regional drop in water levels from the Green Meadows wellfield to the Caloosahatchee River. This regional water level depression interrupts the current pattern of inflow recharge. The lowering of water levels will begin to induce downward recharge from the water table aquifer. Therefore, land use practices on the water table aquifer could well have long term and regional effects on the sandstone aquifer. Additionally the water levels associated with the high projected water use will preclude the widespread use of suction lift pumps on domestic self supply wells; positive displacement pumps will be a necessity.

LAYER 4, MID HAWTHORN AQUIFER

In the low water use projection (Figure 39), a moderate cone of depression persists around Cape Coral and south Fort Myers. Because the projection reflects an average condition, the dry season water levels will be lower, and seasonal water management strategies may need to be implemented occasionally if it becomes apparent that low seasonal levels are creating short-term immediate problems which threaten the resource. The high projected water use (Figure 40) shows water levels in Cape Coral falling below 100 feet below sea level, which would result in dewatering of the aquifer in the area bounded by Chiquita Boulevard, State Road 78, Del Prado Parkway, and the Caloosahatchee River. Whether this would lead to aquifer compaction or sinkhole formation is not known.

LAYER 5, LOWER HAWTHORN AQUIFER

In both simulations (Figures 41 and 42), a regional cone of depression around the Cape Coral, Pine Island and Sanibel wellfields is noted; the difference between the two is the extent and depth of the cone. The impacts of either condition, as well as any other potential development of the lower Hawthorn or other parts of the upper Floridan Aquifer System are primarily economic. If declining water levels cause regional degradation of water quality, then rising costs for desalination treatment processes can be expected, and larger users may have to mitigate the loss of free flow in the wells of other users.

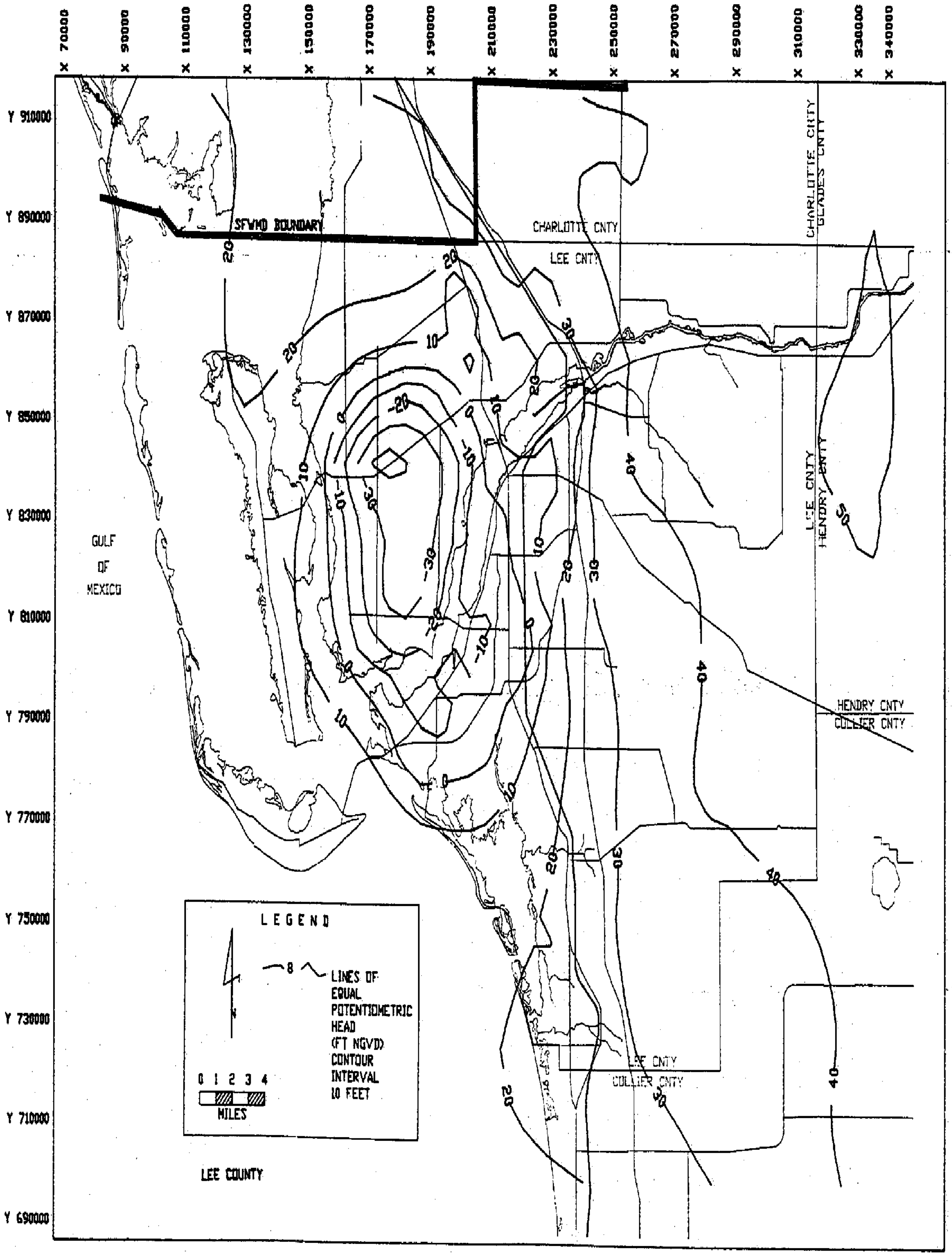


Figure 39 A. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 4 (MID-HAWTHORN AQUIFER): HEADS

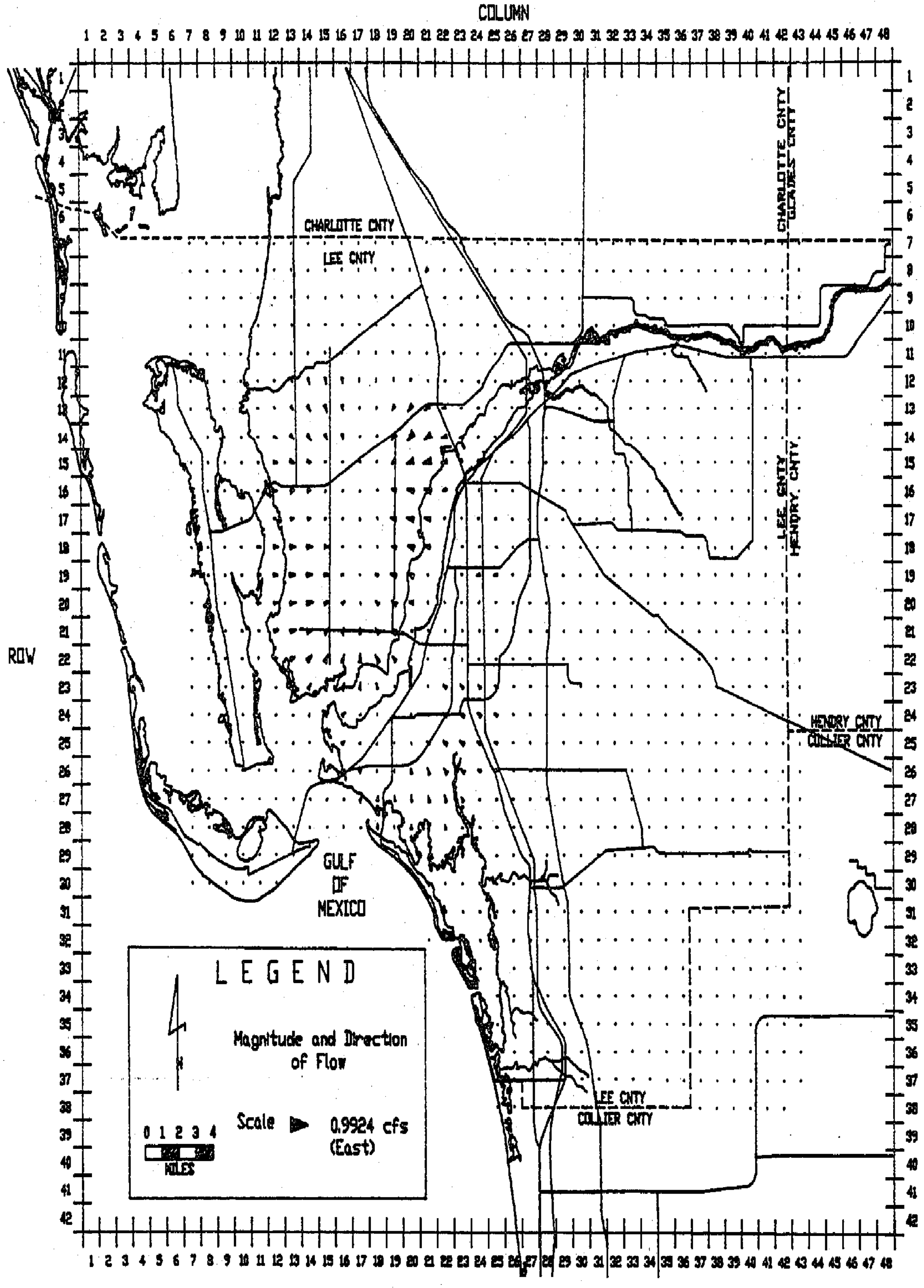


Figure 39 B. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 4 (MID-HAWTHORN AQUIFER): MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

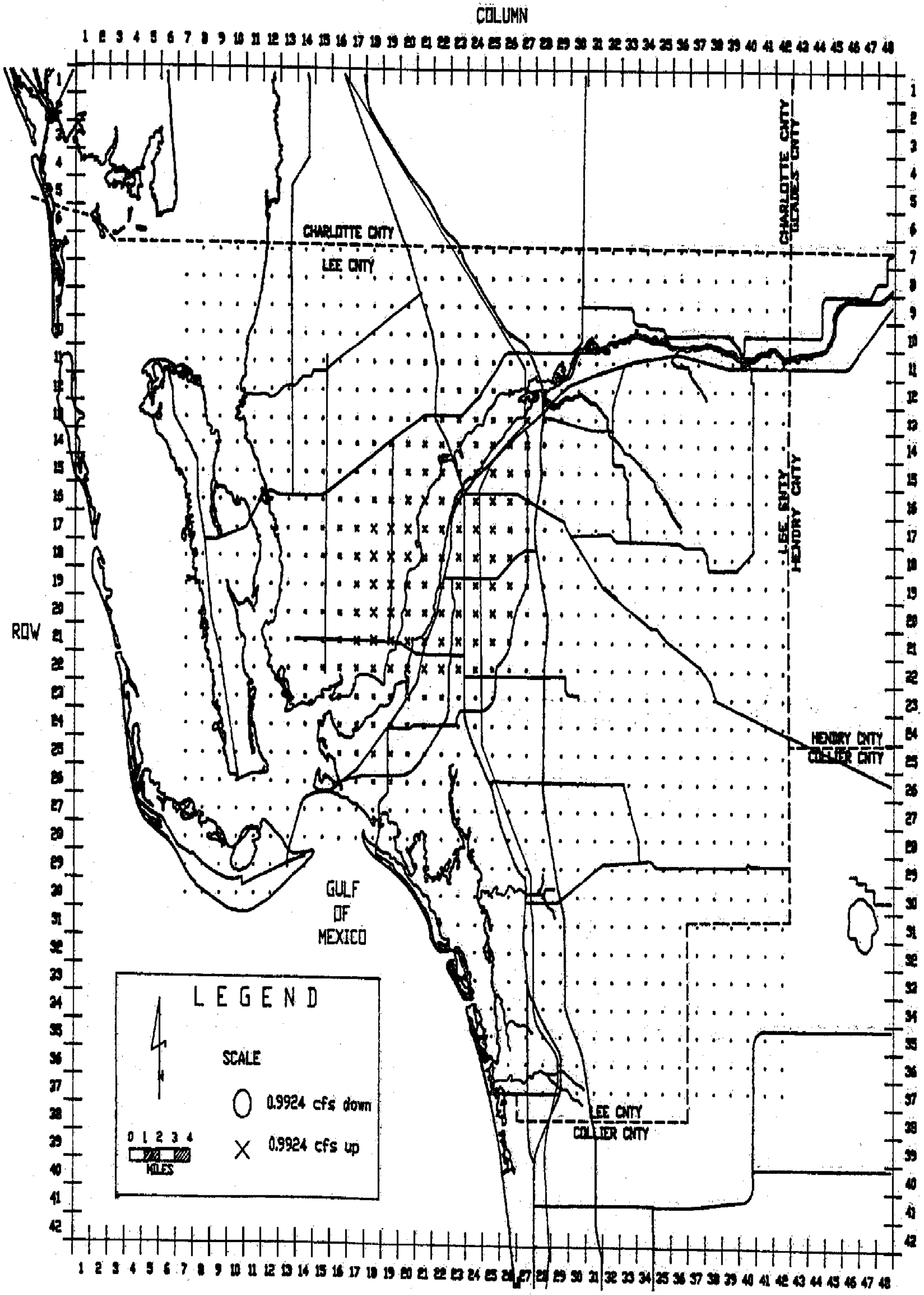


Figure 39 C. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 4 (MID-HAWTHORN AQUIFER): MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 4 AND LAYER 5

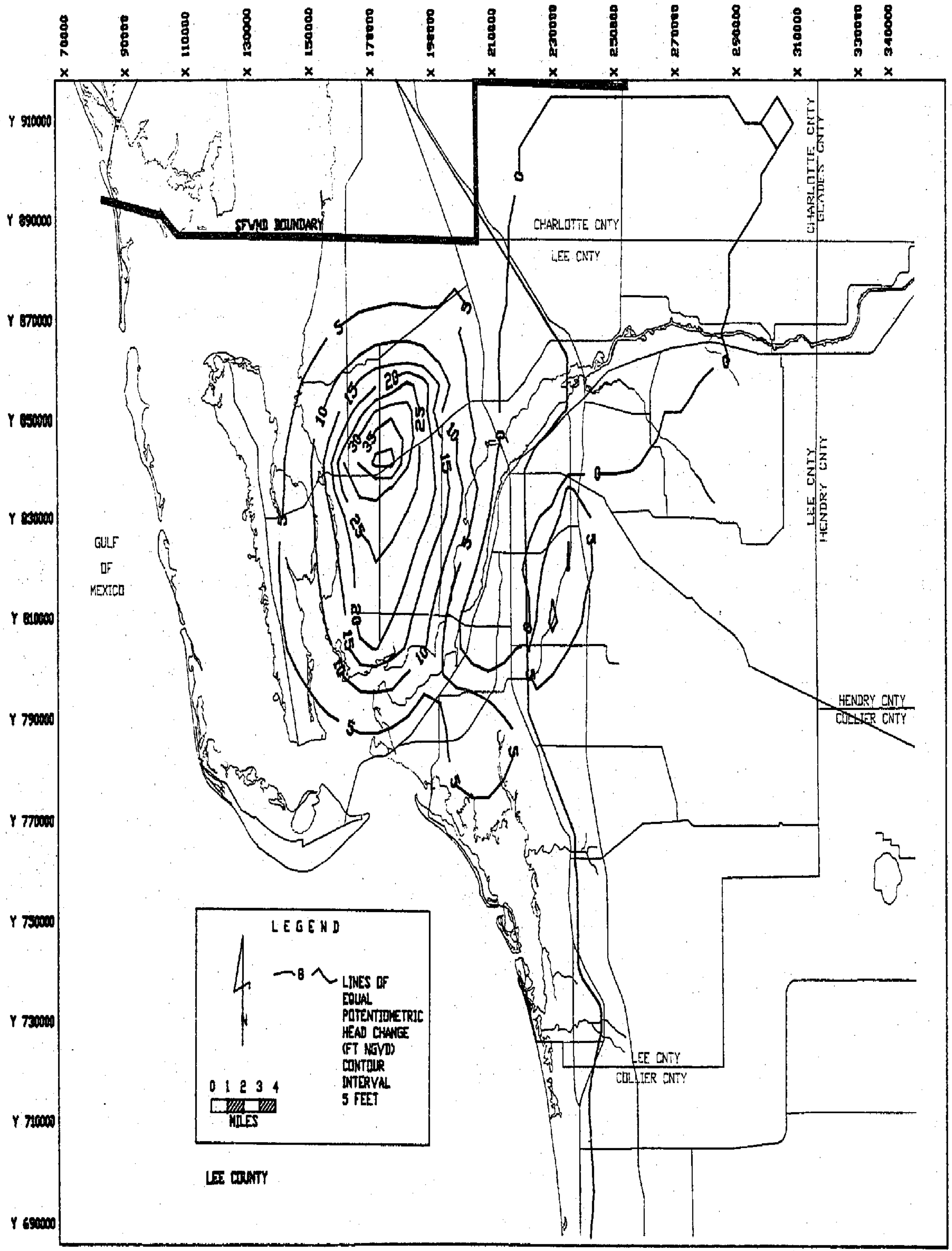


Figure 39 D. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 4 (MID-HAWTHORN AQUIFER): CHANGE FROM 1985 CONDITIONS

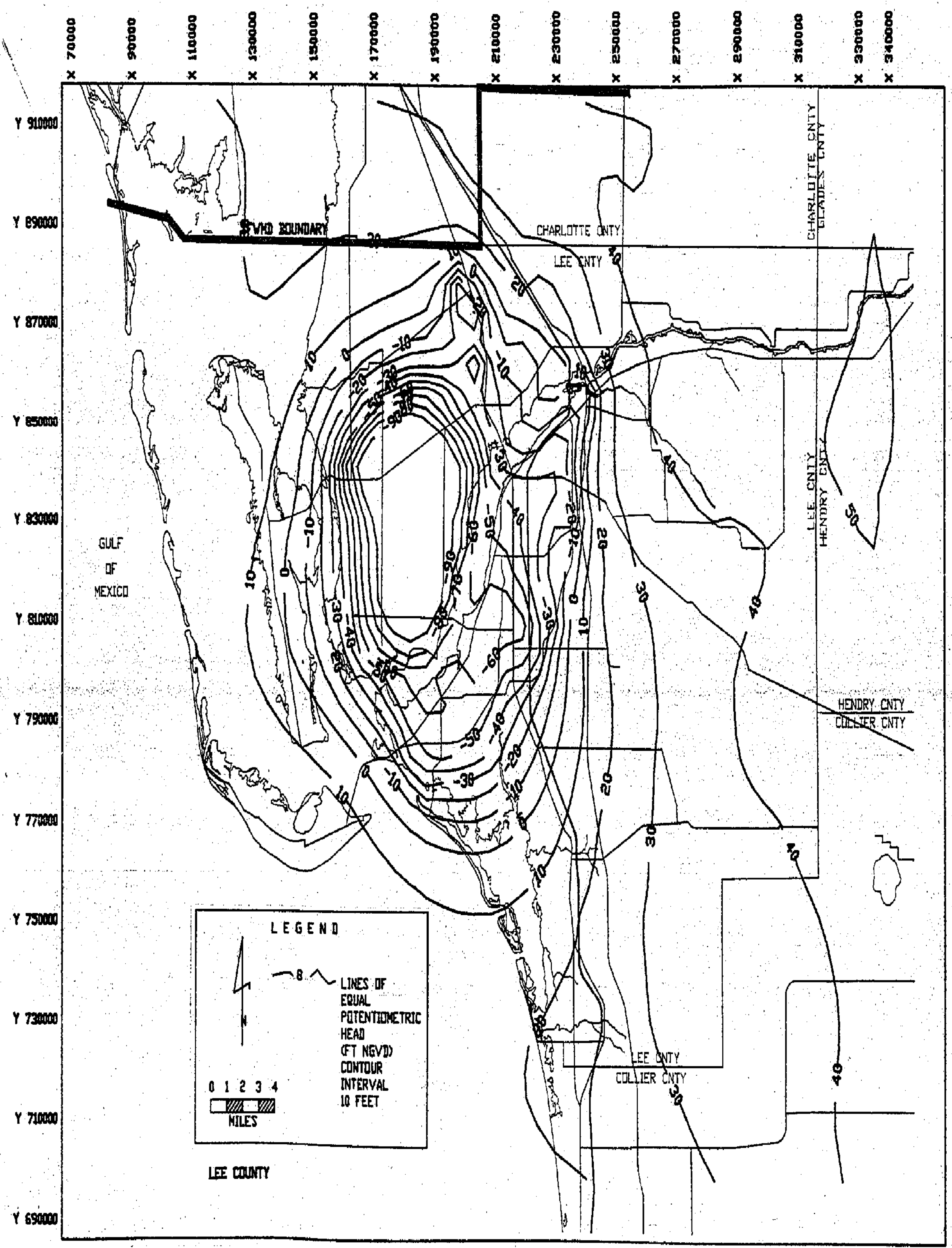


Figure 40 A. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 4 (MID-HAWTHORN AQUIFER): HEADS

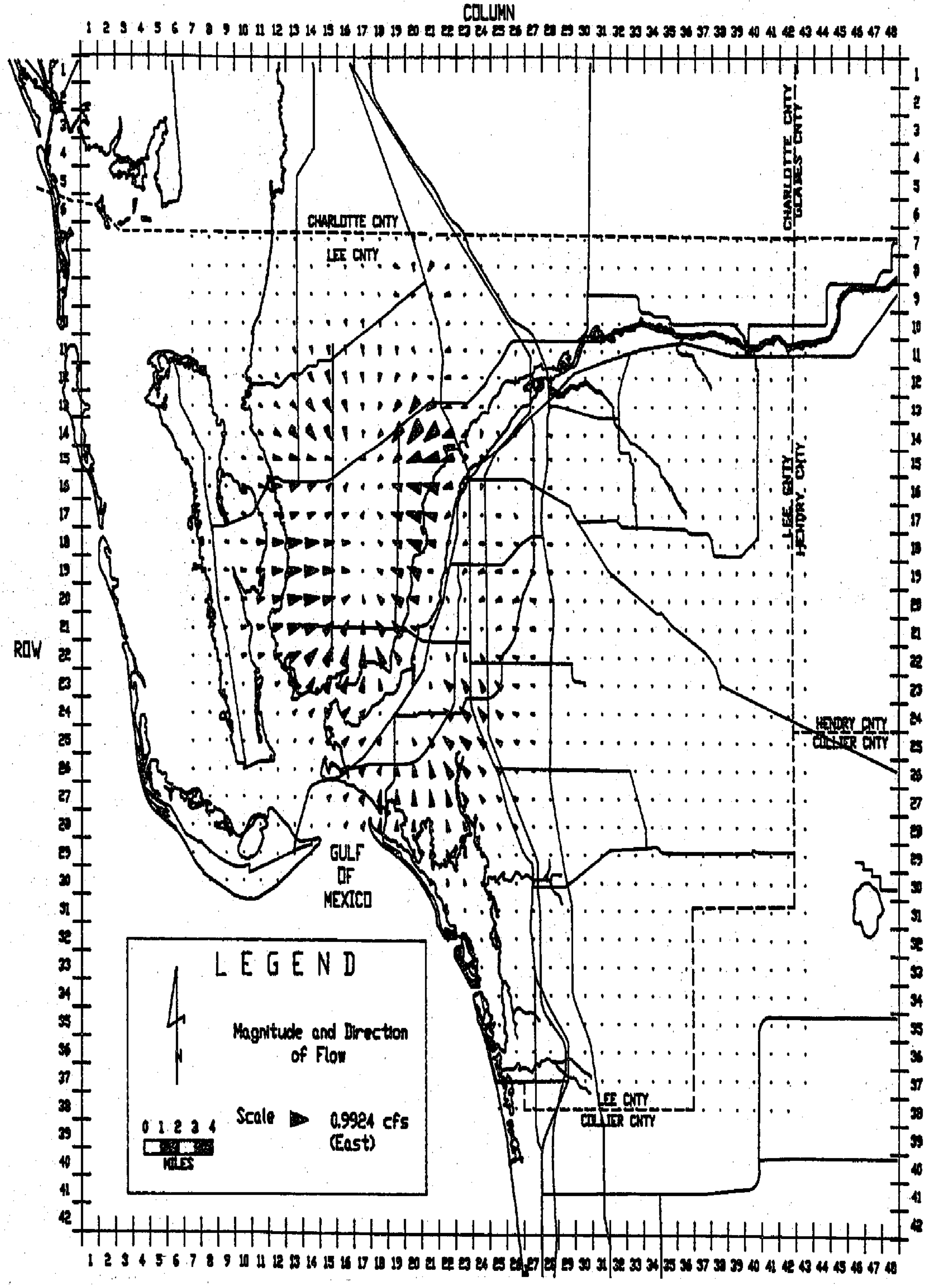


Figure 40 B. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 4 (MID-HAWTHORN AQUIFER): MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

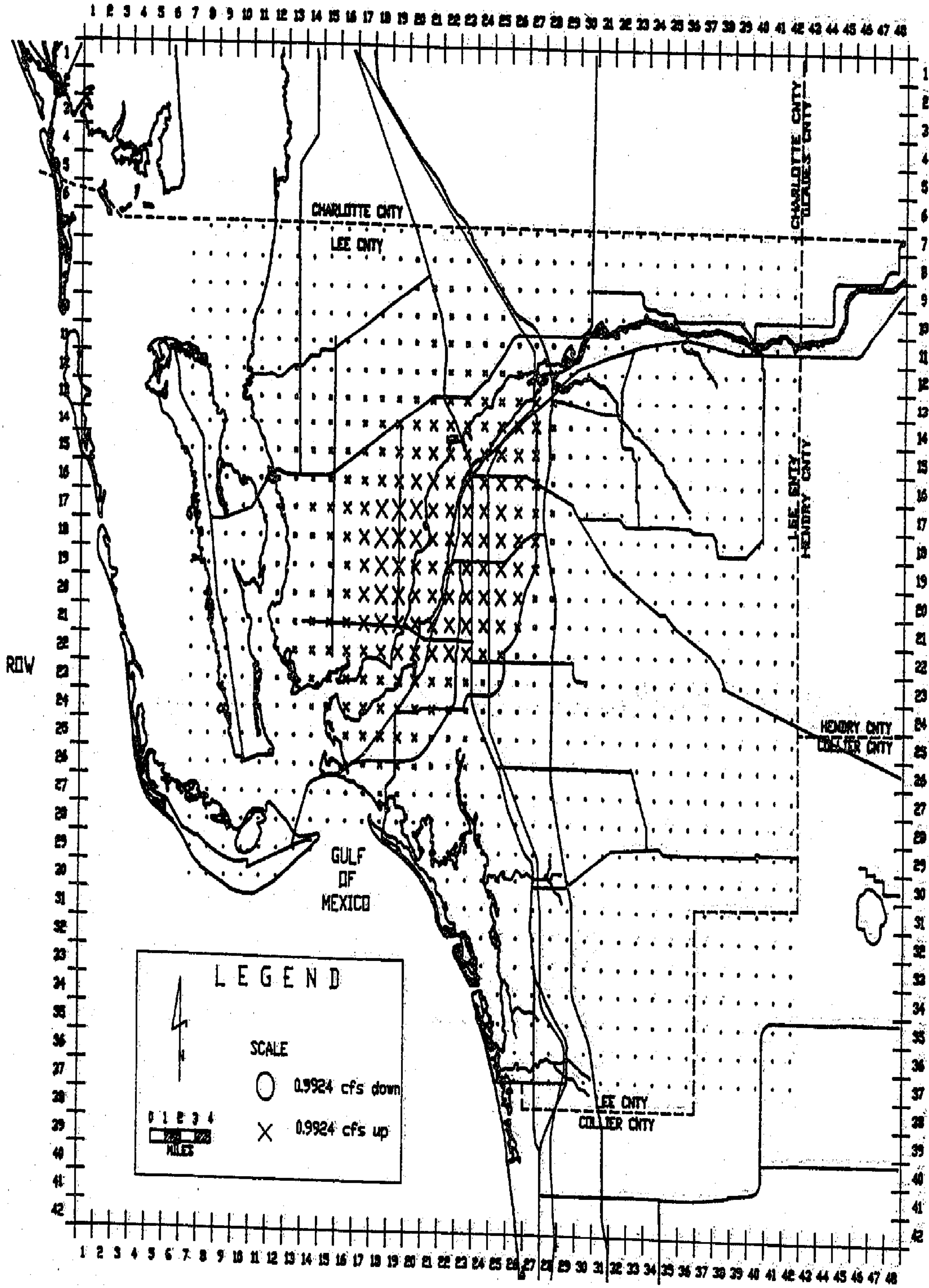


Figure 40 C. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 4 (MID-HAWTHORN AQUIFER): MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 4 AND LAYER 5

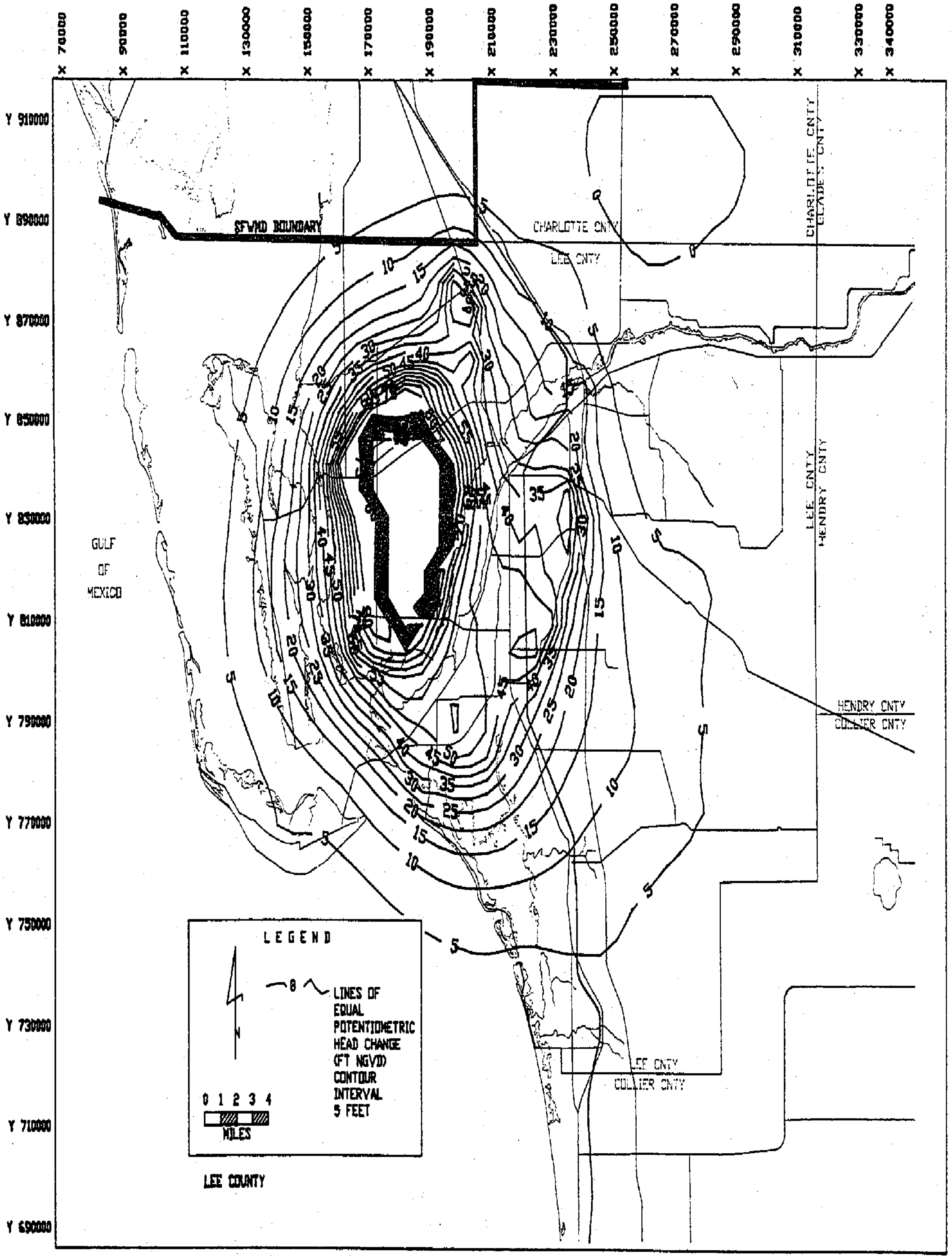


Figure 40 D. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 4 (MID-HAWTHORN AQUIFER): CHANGE FROM 1985 CONDITIONS

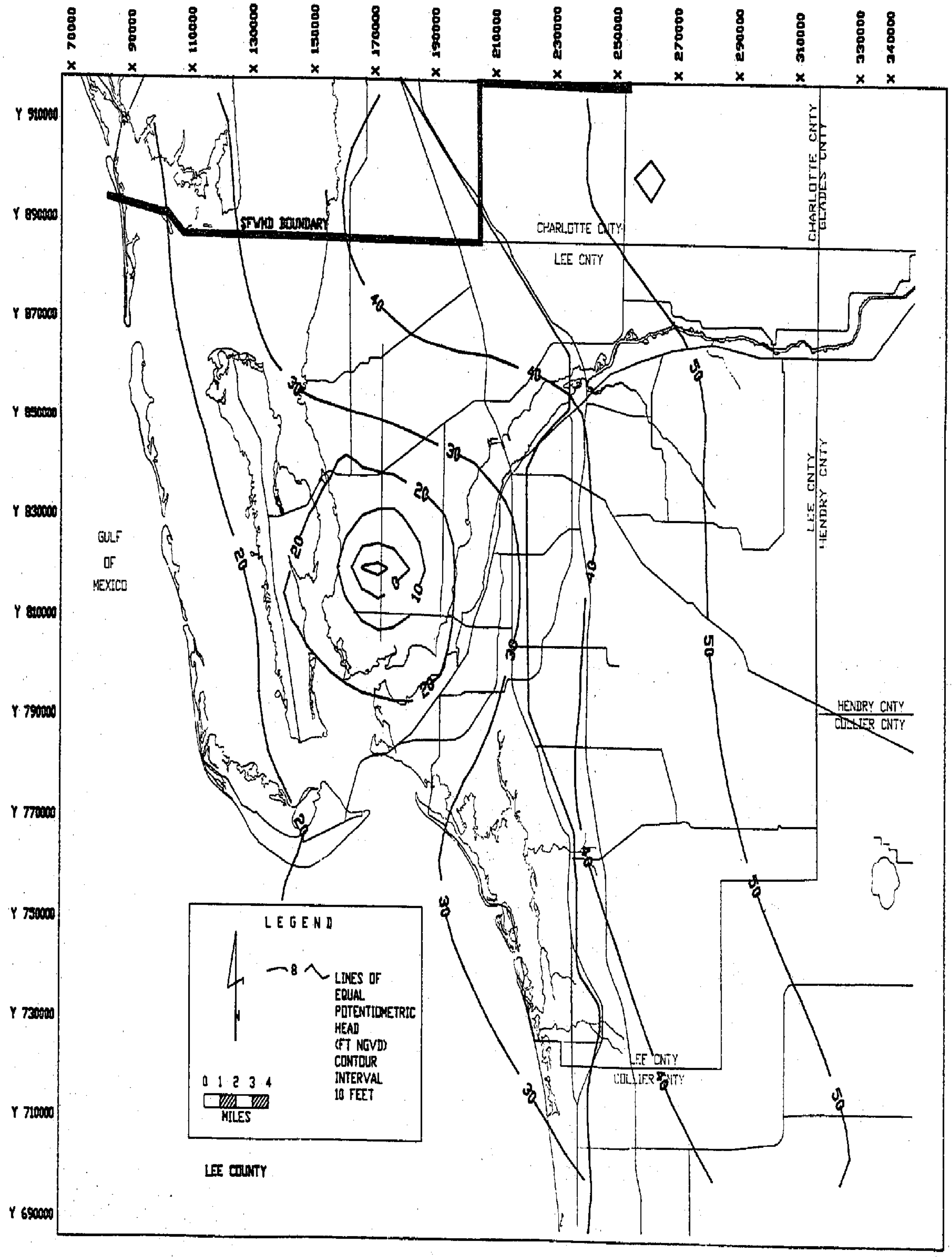


Figure 41 A. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 5 (LOWER HAWTHORN AQUIFER): HEADS

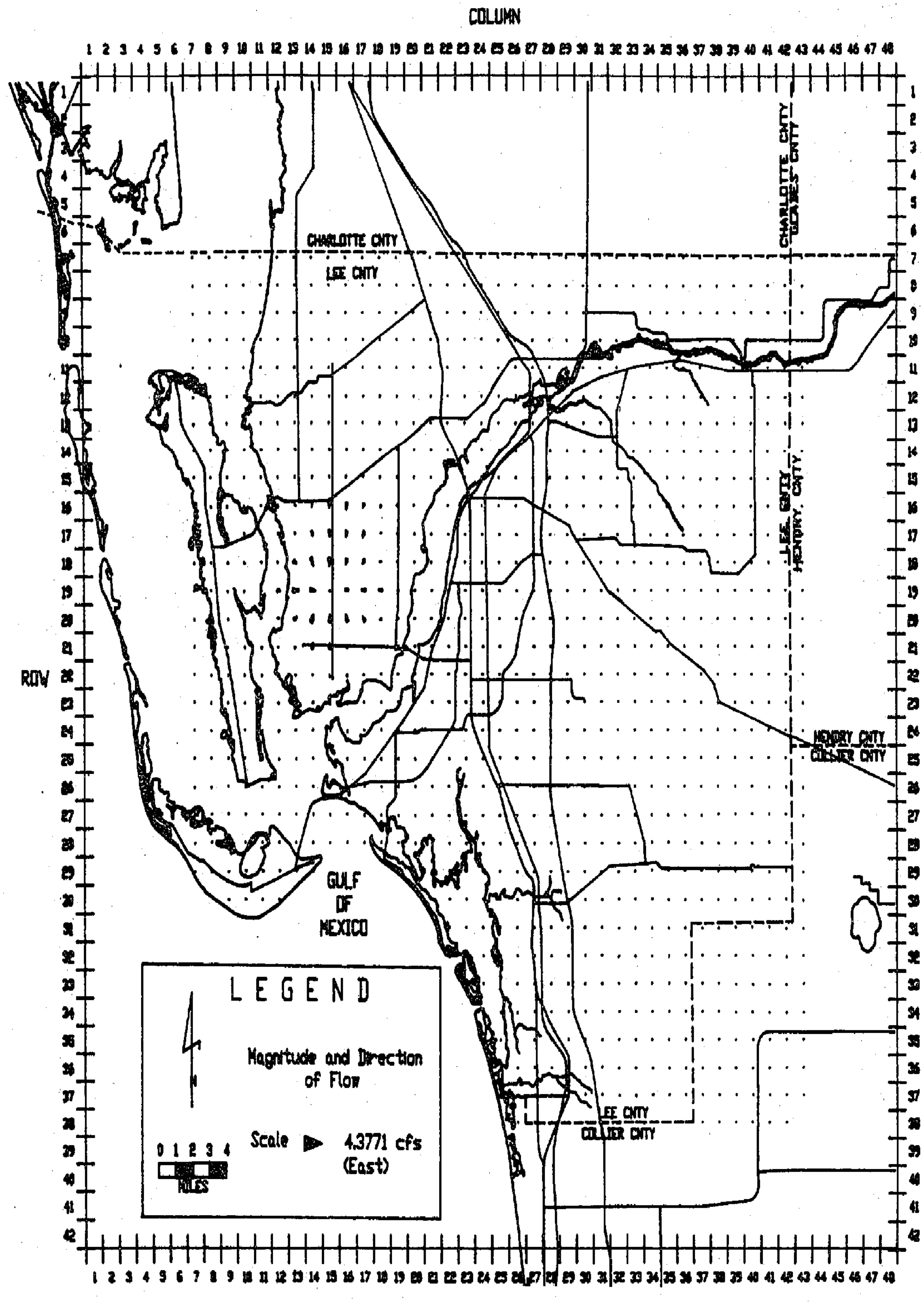


Figure 41 B. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 5 (LOWER HAWTHORN AQUIFER): MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

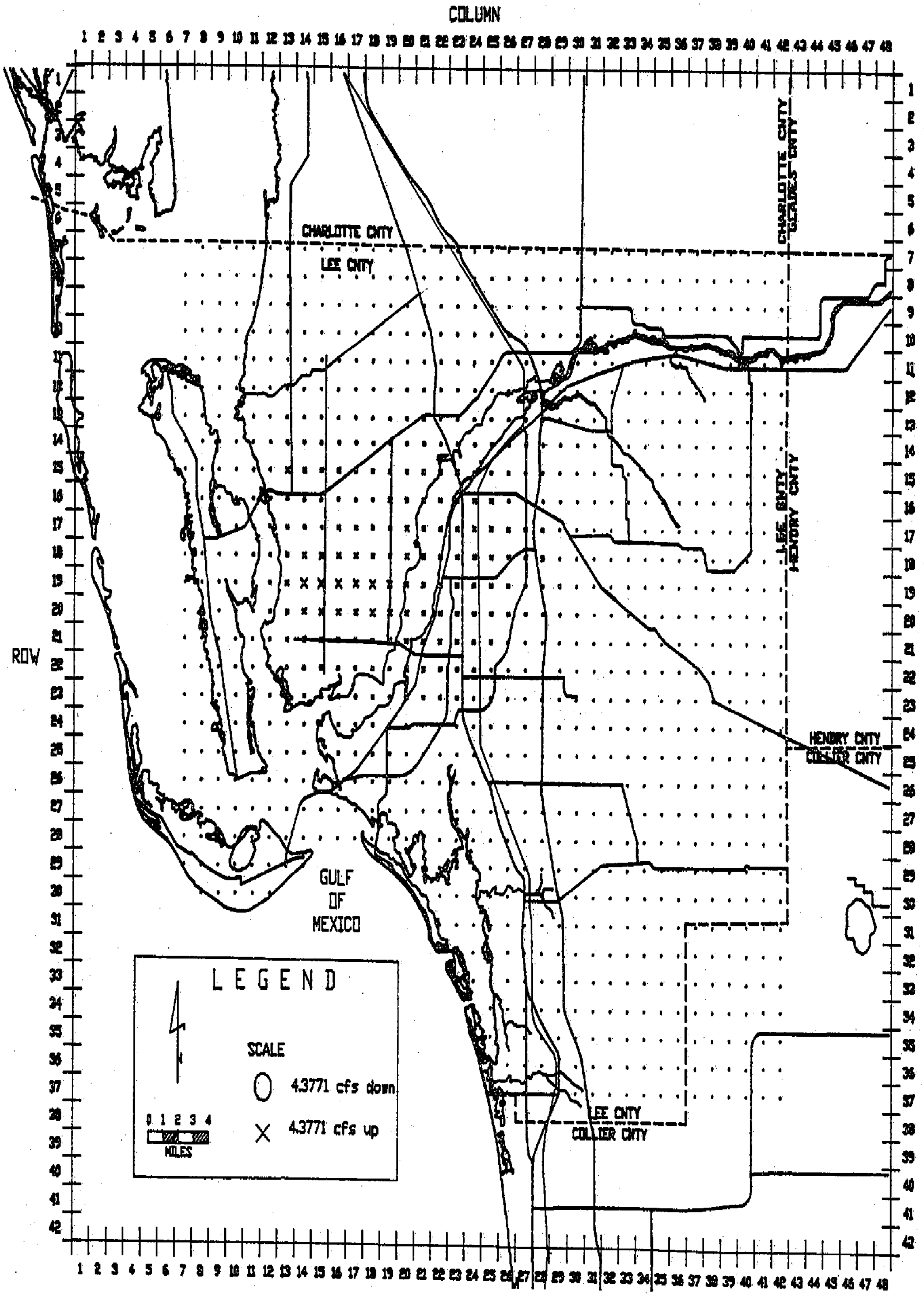


Figure 41 C. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 5 (LOWER HAWTHORN AQUIFER): MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 5 AND LAYER 6

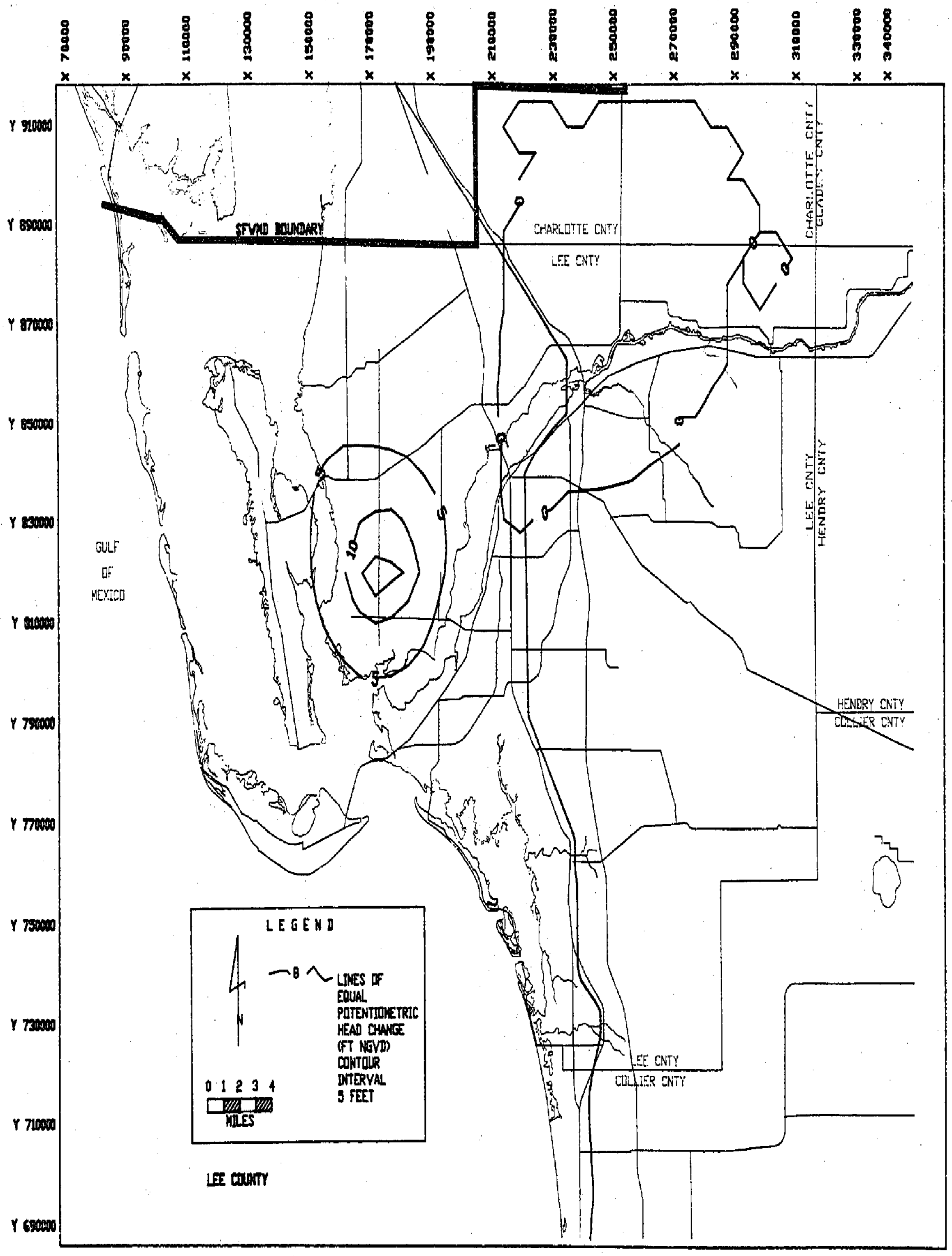


Figure 41 D. PREDICTED CONDITIONS RESULTING FROM LOW WATER USE ESTIMATE FOR 2010, LAYER 5 (LOWER HAWTHORN AQUIFER): CHANGE FROM 1985 CONDITIONS

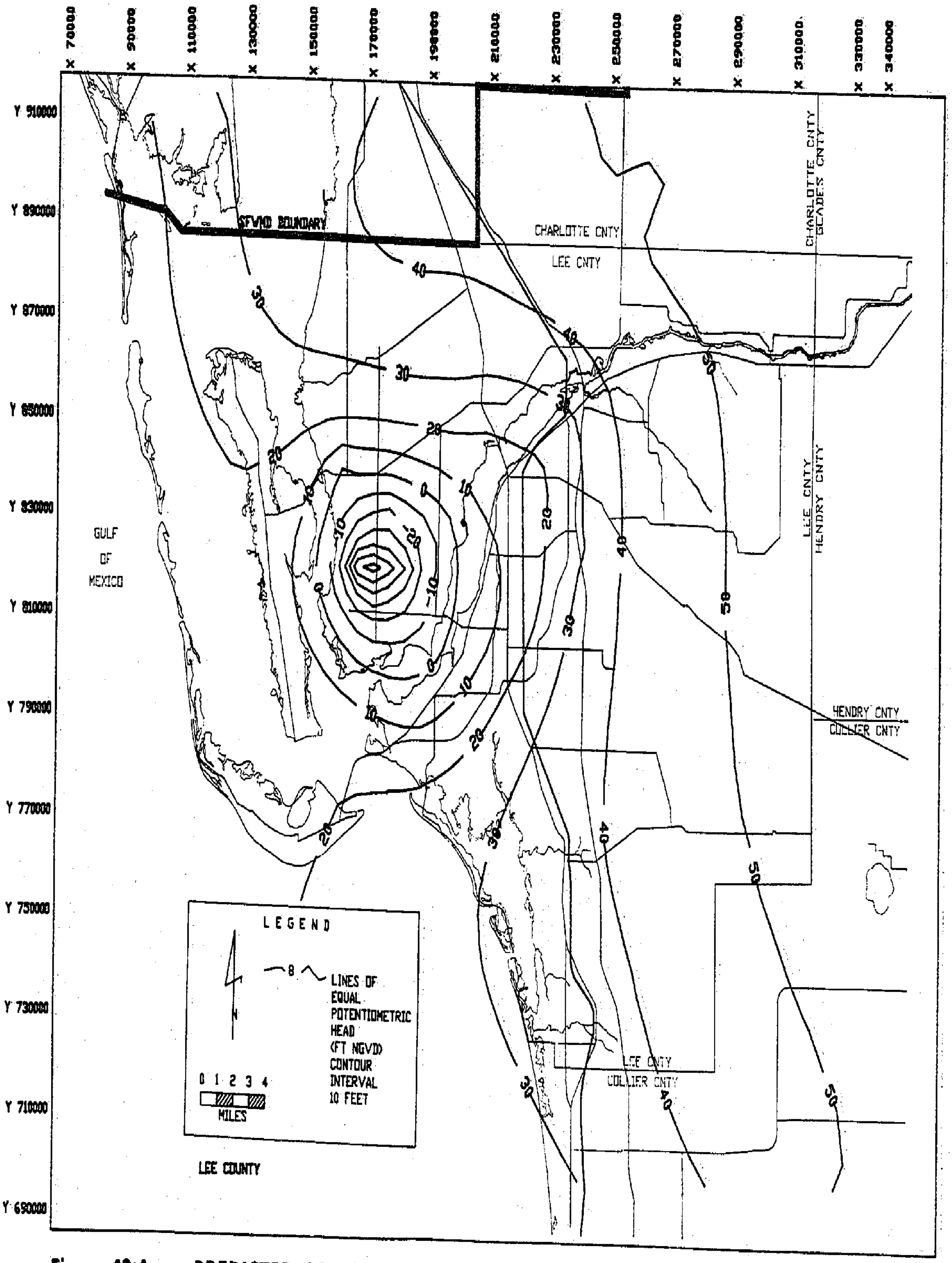


Figure 42 A. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 5 (LOWER HAWTHORN AQUIFER): HEADS

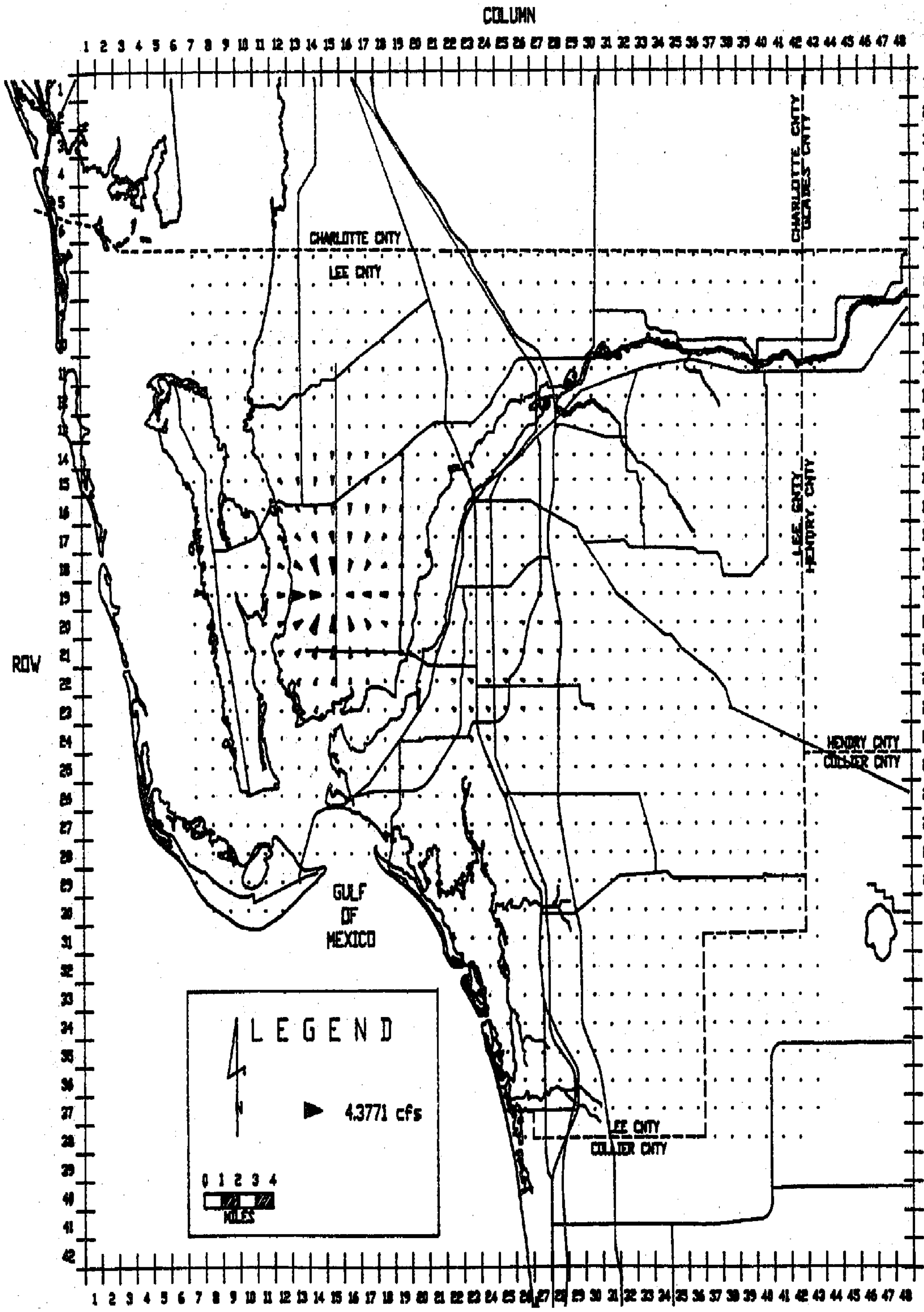


Figure 42 B. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 5 (LOWER HAWTHORN AQUIFER): MAGNITUDE AND DIRECTION OF HORIZONTAL FLOW WITHIN THE LAYER

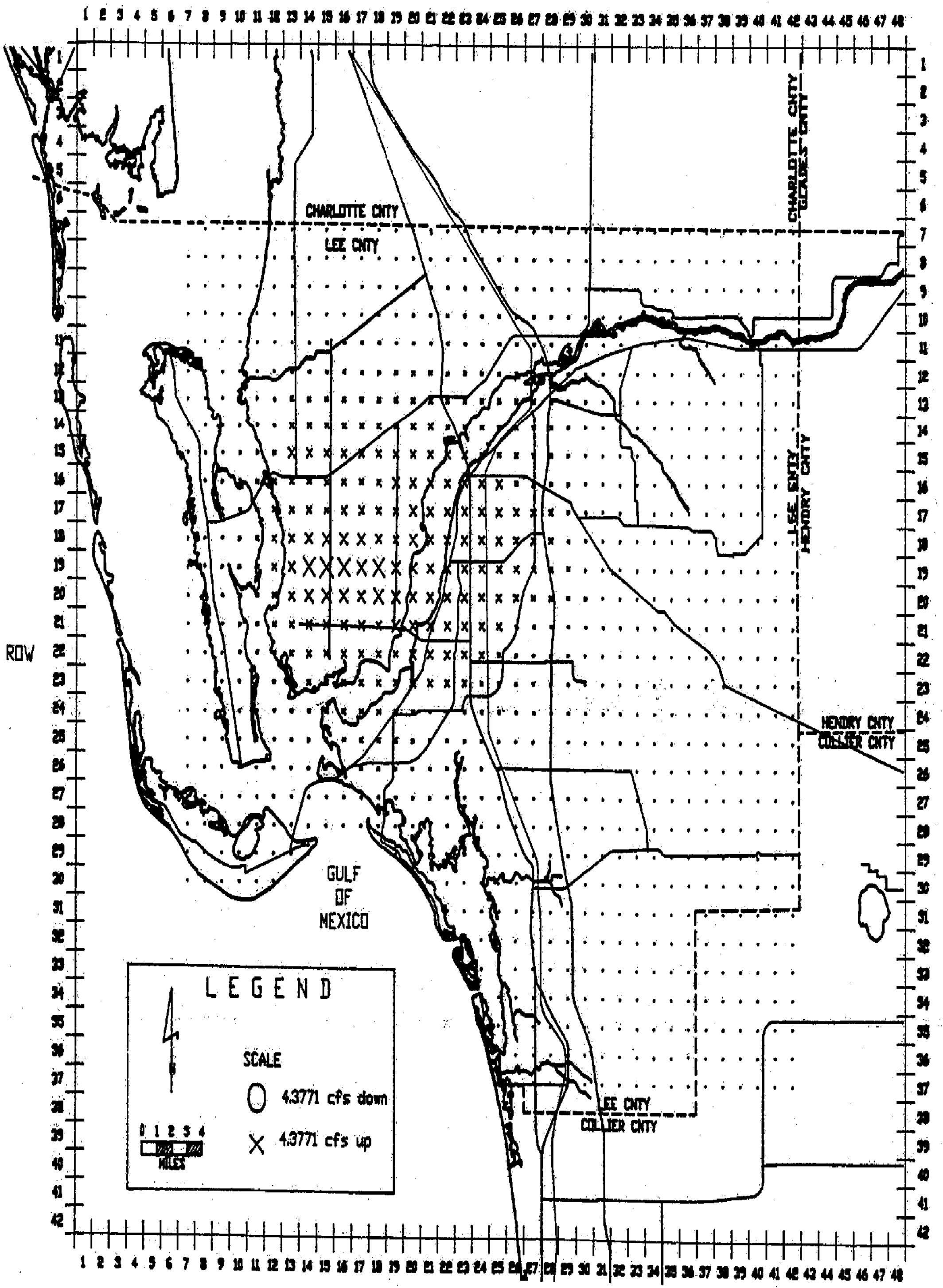


Figure 42 C. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 5 (LOWER HAWTHORN AQUIFER): MAGNITUDE OF VERTICAL FLOW BETWEEN LAYER 5 AND LAYER 6

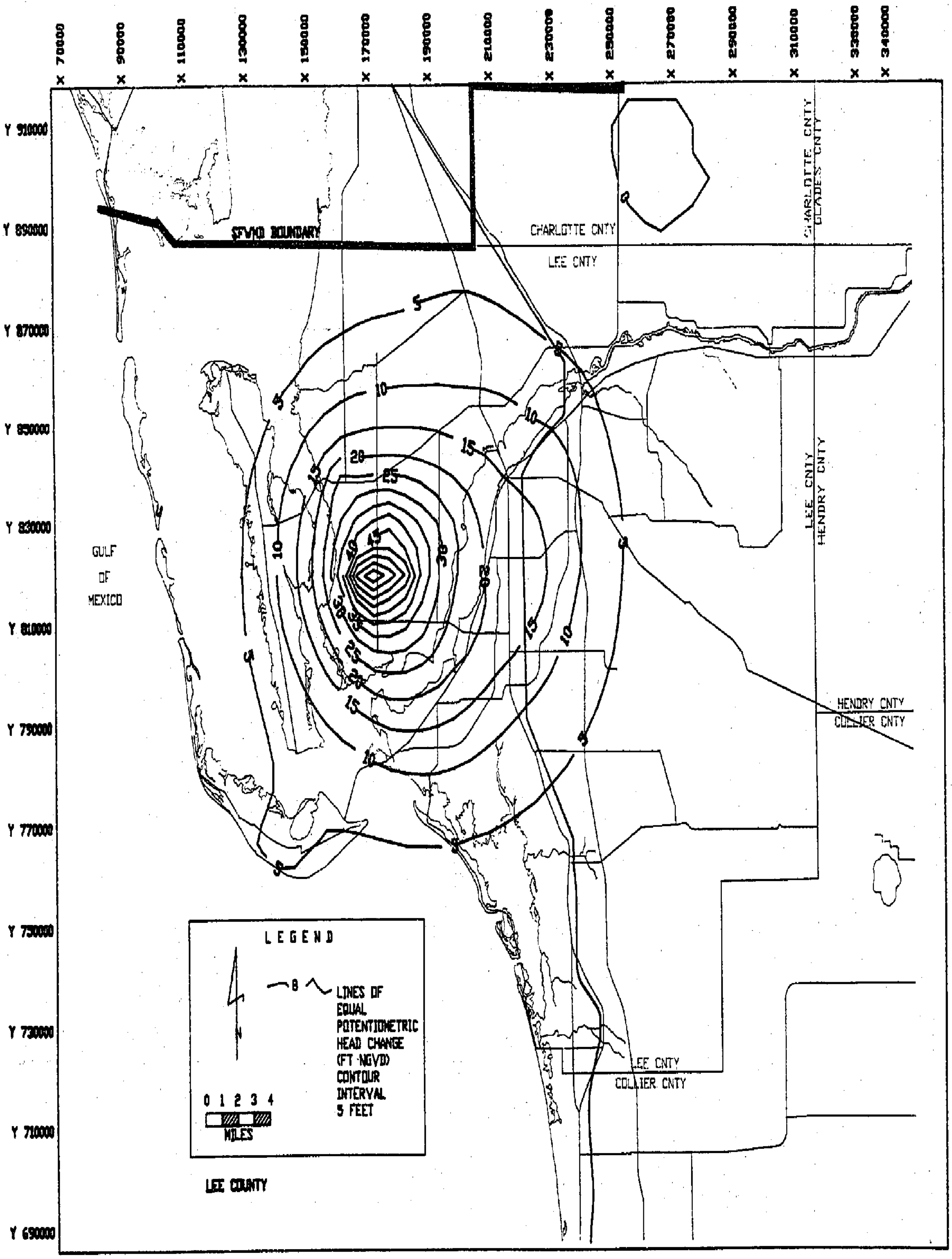


Figure 42 D. PREDICTED CONDITIONS RESULTING FROM HIGH WATER USE ESTIMATE FOR 2010, LAYER 5 (LOWER HAWTHORN AQUIFER): CHANGE FROM 1985 CONDITIONS

CONCLUSIONS AND RECOMMENDATIONS

1. Levels of stress of the magnitude estimated in the high water use projection from the JMM report will cause dewatering of the mid-Hawthorn aquifer in parts of Cape Coral. Strict management of the development of the aquifer in that area is a necessity.

2. The model suggests that there is a permanent trend toward water levels falling below sea level in the lower Tamiami aquifer in the Bonita Springs area. Strict management of the aquifer in that area to prevent or minimize salt-water intrusion is a necessity.

3. Growth in planning districts 6 and 7 will create significant increases in use for domestic self supply from the sandstone aquifer, causing a regional lowering of water levels in that aquifer, which in turn increases downward recharge from the water table aquifer. Considering this situation, careful land use planning is recommended in these districts.

4. The flow model suggests that the water table aquifer appears to be a good source of water supply where water quality is acceptable. The regional nature of the model, however, precludes in-depth determination of effects of water supply development on wetlands. This must be accomplished by site-specific models of viable areas, with the regional model providing the boundary conditions.

5. The upper aquifers of the Floridan Aquifer System appear to be good sources of water supply through desalination treatment. However, long-term development plans for these aquifers should address the degree of interconnection among them and analyze possible trends in water quality deterioration, including economic considerations. In addition, a more comprehensive regional monitoring well network will need to accompany significant development of these aquifers.

6. Generally, the model suggests that water supply in Lee County is ample, in certain areas and aquifers, to meet the low water use demands projected for the year 2010. However, 2010 is only a 20-year projection horizon, and growth in Lee County can reasonably be expected to continue well past that time. In order to meet the water demands of that growth, water conservation measures such as those presented in the JMM report and the Lee County Infrastructure Task Force (ITF) report need to be initiated, or continued and intensified.

7. Because domestic self supply is such a large and widespread type of water use in Lee County, estimates of that type of use need to be refined and made as accurate as possible in order to enhance the accuracy and reliability of the model. This would include determining areas where all domestic use is self-supplied and areas where internal use is furnished by utilities and external use is self-supplied.

8. Irrigation water use is also a large water use in Lee County, the amount of which is not well quantified. Compliance with water use permit limiting conditions requiring the reporting of irrigation water use should be stressed.

9. The model should continue to be used in the issuance of permits for water use and planning processes for regional problems. Where a finer scale site specific model is needed, the regional model could be used to provide the boundary conditions. The model should be refined and updated as additional data becomes available. In doing this, emphasis should be placed on improving confidence in the parameters to which the model is most sensitive which includes vertical conductance, and on refining assumptions based on minimal information such as the hydrologic nature of the lower Hawthorn and Suwannee aquifers and confining beds.

10. An interface should be developed as soon as possible with the Hendry County flow model currently under development. This will provide the refinement to boundary conditions in the sandstone aquifer needed to evaluate the potential of the aquifer in Lee County, and a means to evaluate the implications of development of that aquifer in Hendry County to water availability in Lee County.

11. An interface should also be developed with the Collier County flow model after it is developed and tested. This combination will be important for water shortage and water use management for the Bonita Springs area.

12. To insure accurate and error-free interpretation of information obtained from monitoring systems operated under requirement of District water use permits, reporting standards are recommended. All water levels should be furnished as feet NGVD; all salinity measurements should be reported as mg/l chloride.

REFERENCES

Bear, J. and A. Verruijt, 1987. Modeling Groundwater Flow and Pollution. D. Reidel Publishing Company, Dordecht, Holland.

Black, Crow and Eidness, Inc., 1976. Engineering Report, Results of Drilling and Testing, Floridan Aquifer Water Supply Wells for the City of Cape Coral, Florida.

Blaney, H. F. and W. D. Criddle, 1950. Determining Water Requirements in Irrigated Areas from Climatological and Irrigation Data. U.S. Dept. of Agriculture, Soil Conservation Service, Tech. Paper 96.

Bouwer, H., 1978. Groundwater Hydrology. McGraw-Hill.

Burns, W. S., and R. F. Bower, 1988. Ground Water Availability Assessment for the Surficial Aquifer on Pine Island, Lee County, Florida. SFWMD Technical Publication 88-13.

Burns, W. S., 1983. Well Plugging Applications to the Inter-Aquifer Migration of Saline Groundwater in Lee County, Florida. SFWMD Technical Publication 83-8.

Camp Dresser & McKee Inc, 1987. Final Report, Wellfield Protection Zone Modeling, Lee County, Florida.

Driscoll, F. G., 1986. Groundwater and Wells. Johnson Division.

Duerr, A. D., J. D. Hunn, B. R. Lewelling, and J. T. Trommer, 1988. Geohydrology and 1985 Water Withdrawals of the Aquifer Systems in Southwest Florida, With Emphasis on the Intermediate Aquifer System. U. S. Geological Survey, Water-Resources Investigations Report 87-4259

Evans, M. W., and A. C. Hine, 1988. Late Miocene to Quaternary Seismic and Lithologic Sequence Stratigraphy in the Charlotte Harbor Area: Southwest Florida.

Geraghty and Miller, Inc., 1981. Lee County Water Master Plan, Lee County, Florida.

Johnson Engineering, Inc., 1972. Water Management in Lee County.

Knapp, M. S., W. S. Burns, T. S. Sharp, and G. Shih, 1984. Preliminary Water Resource Assessment of the Mid and Lower Hawthorn Aquifers in Western Lee County, Florida. SFWMD Technical Publication 84-10

Knapp, M. S., W. S. Burns, and T. S. Sharp, 1986. Preliminary Assessment of the Groundwater Resources of Western Collier County, Florida. SFWMD Technical Publication 86-1.

Linsley, R. K., M. A. Kohler, and J. L. H. Paulhus, 1982. Hydrology for Engineers. McGraw-Hill.

REFERENCES (Continued)

Lohman, S. W., et al., 1972. Definitions Of Selected Ground-water Terms - Revisions and Conceptual Refinements. U.S. Geological Survey Water Supply Paper 1988.

Maxwell, J., 1976. The Effects of Alder Conversion on Streamflow. Siuslaw National Forest, NW Forest Sciences Lab, Corvallis, OR.

McDonald, M. G., and A. W. Harbaugh, 1988. A Modular Three-Dimensional Finite-Difference Ground-Water Flow Model. Techniques of Water-Resources Investigations of the United States Geological Survey, Book 6, Chapter A1.

Missimer and Associates, Inc., 1978. Hydrologic Investigation of the Hawthorn Aquifer System in the Northwest Area, Sanibel, Florida.

Missimer and Associates, Inc., 1979. Hydrologic Investigation of the Hawthorn and Suwannee Aquifer Systems in the Central Area, Sanibel, Florida.

Missimer and Associates, Inc., 1981. Groundwater Resources of the Bonita Bay Development, Lee County, Florida.

Missimer and Associates, Inc., 1984. Hydrogeology of the Lower Part of the Hawthorn Aquifer System, Cape Coral, Florida.

Missimer and Associates, Inc., 1985. Hydrogeologic Investigation of the Hawthorn and Suwannee Aquifer Systems at the Wellfield Cluster Site B, Sanibel Island, Florida.

Missimer and Associates, Inc., 1986. Cape Coral Reverse Osmosis Wellfield Final Construction Report and Operation and Maintenance Recommendations.

Montgomery, James M., Consulting Engineers, Inc., 1988. Lee County Water Resources Management Project.

Painter, B. D., 1984. A Three-Dimensional Hydrologic Model of Lee County, Florida. Unpublished Thesis, Ohio University.

Post, Buckley, Schuh & Jernigan, Inc., 1986. Engineering Report, Deep-Injection Exploratory/Monitor Well, North Fort Myers Utility, Inc.

Shaw, J. E., and S. M. Trost, 1984. Hydrogeology of the Kissimmee Planning Area, South Florida Water Management District. SFWMD Technical Publication 84-1.

Shine, Mary-Jo, D. G. J. Padgett, and W. M. Barfknecht, 1989. Ground Water Resource Assessment of Eastern Palm Beach County, Florida. SFWMD Technical Publication 89-4.

Smajstrla, A. G., 1986. Agricultural Field Scale Irrigation Requirements Simulation (AFSIRS) Model, Version 3.8 Agricultural Engineering Department, University of Florida, Gainesville, FL.

REFERENCES (Continued)

Smith, K. R., and K. M. Adams, 1988. Ground Water Resource Assessment of Hendry County, Florida. SFWMD Technical Publication 88-12.

Soil Conservation Service (SCS), 1982. Florida Irrigation Guide. USDA, SCS, Gainesville, FL.

South Florida Water Management District, 1985. Management of Water Use-Permit Information Manual Volume III. West Palm Beach, FL.

Sutcliffe, H., Jr., 1975. Appraisal of the Water Resources of Charlotte County, Florida. Florida Bureau of Geology Report of Investigations No. 78.

Swank, W. T. and J. E. Douglass, 1974. Streamflow Greatly Reduced by Converting Deciduous Hardwood Stands to Pine. Science 185: 857-859 pp.

Viessman, W., J. W. Knapp, G. L. Lewis and T. E. Harbaugh, 1977. Introduction to Hydrology. A Dun-Donnelley Publisher, New York.

Wedderburn, L. A., M. S. Knapp, D. P. Waltz, and W. S. Burns, 1982. Hydrogeologic Reconnaissance of Lee County, Florida. SFWMD Technical Publication 82-1.

APPENDIX A

LIST OF FIGURES - APPENDIX A

LIST OF FIGURES - APPENDIX A
(Continued)

LIST OF FIGURES - APPENDIX A
(Continued)

LIST OF TABLES - APPENDIX A

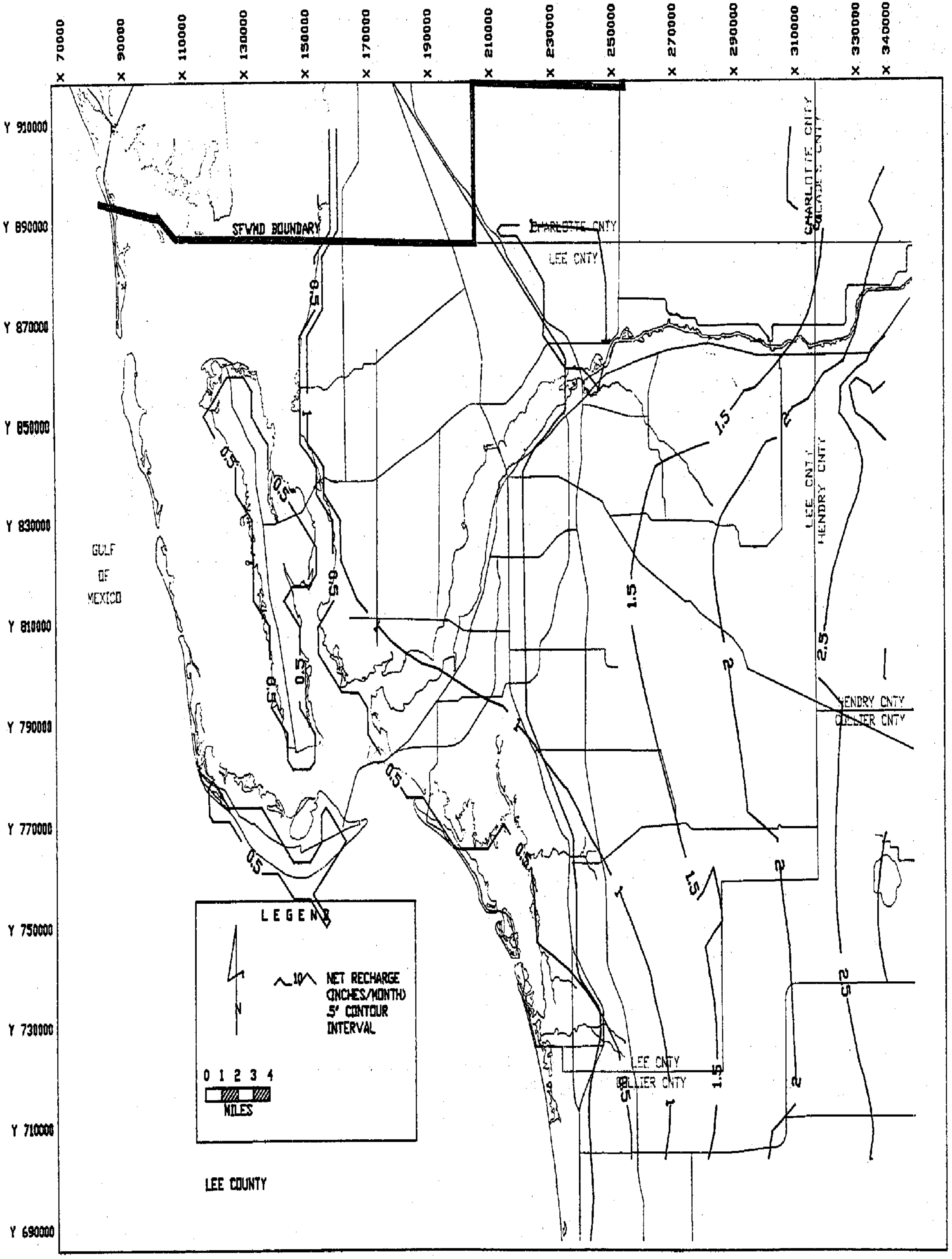


Figure A-1. NET RECHARGE (INCHES), APRIL, 1985

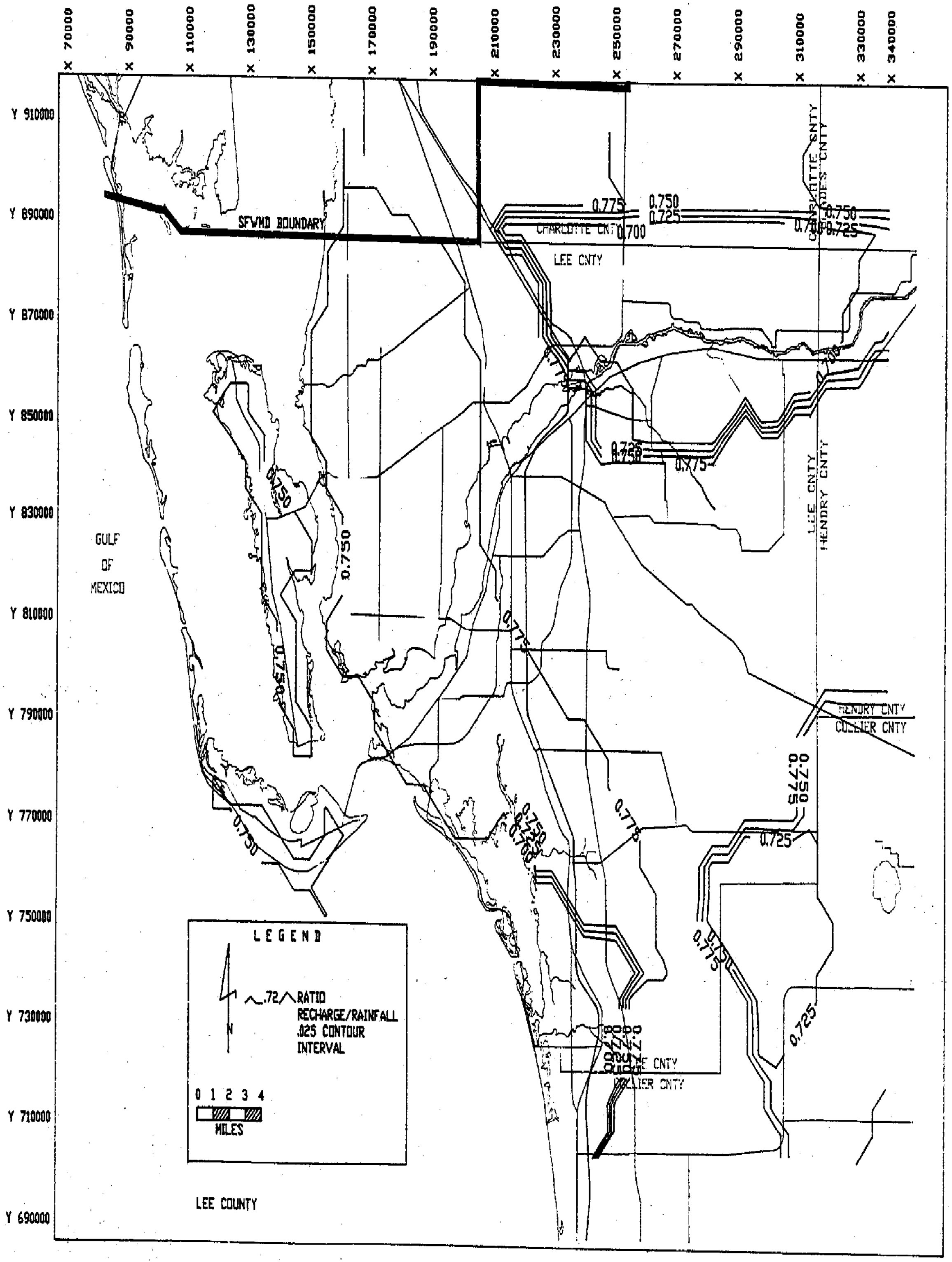


Figure A-2. RATIO OF NET RECHARGE TO TOTAL RAINFALL, APRIL, 1985

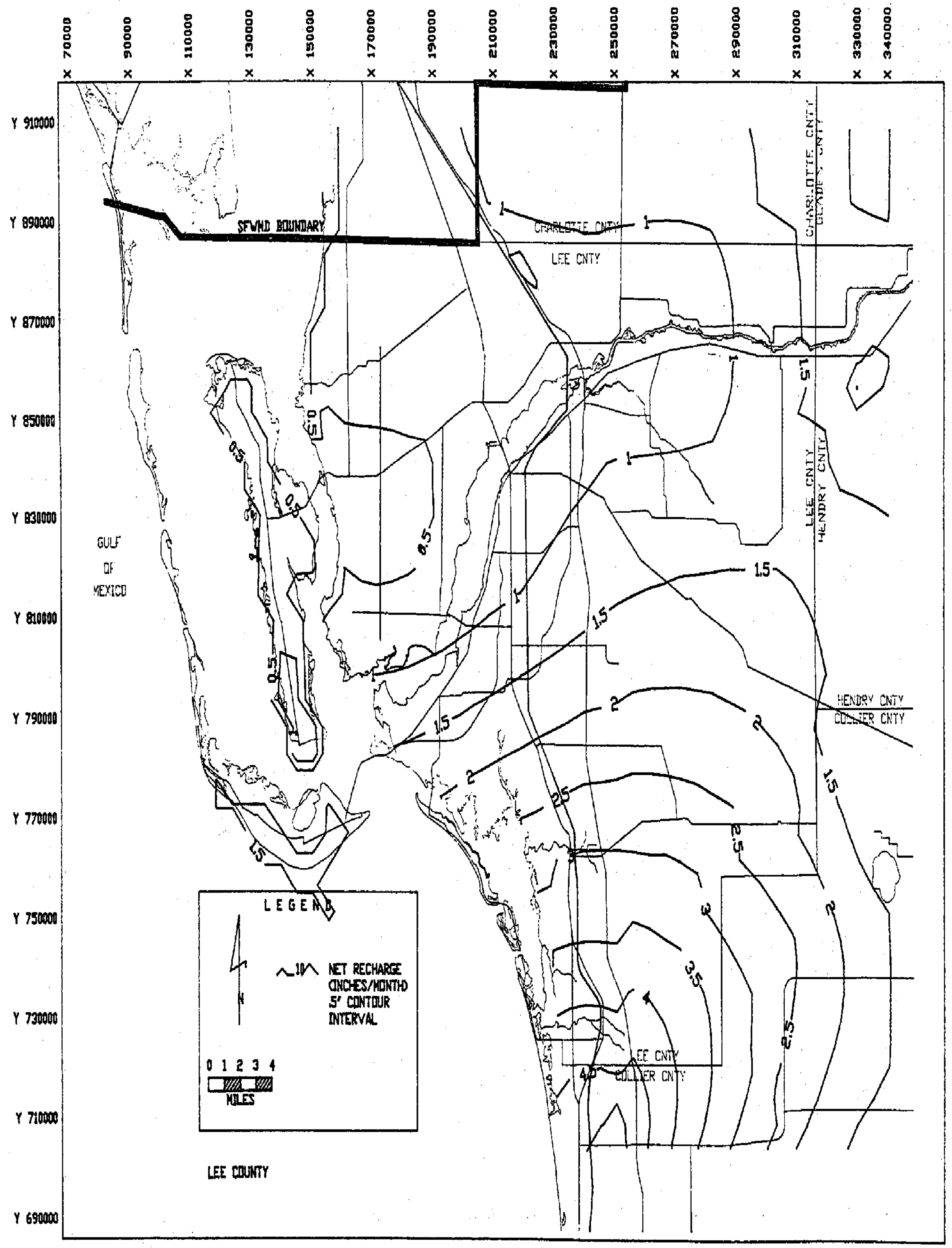
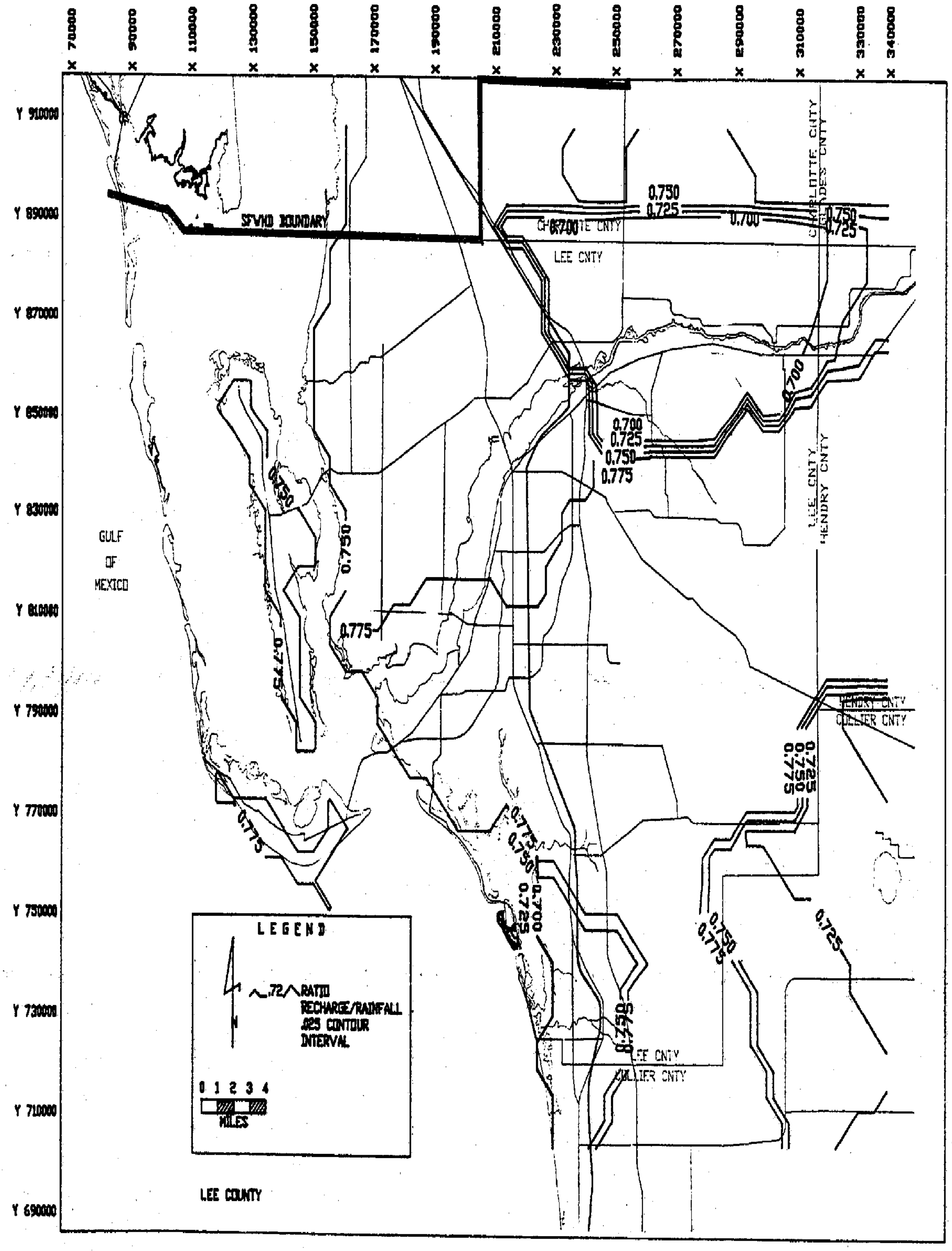


Figure A-3. NET RECHARGE (INCHES), MAY, 1985



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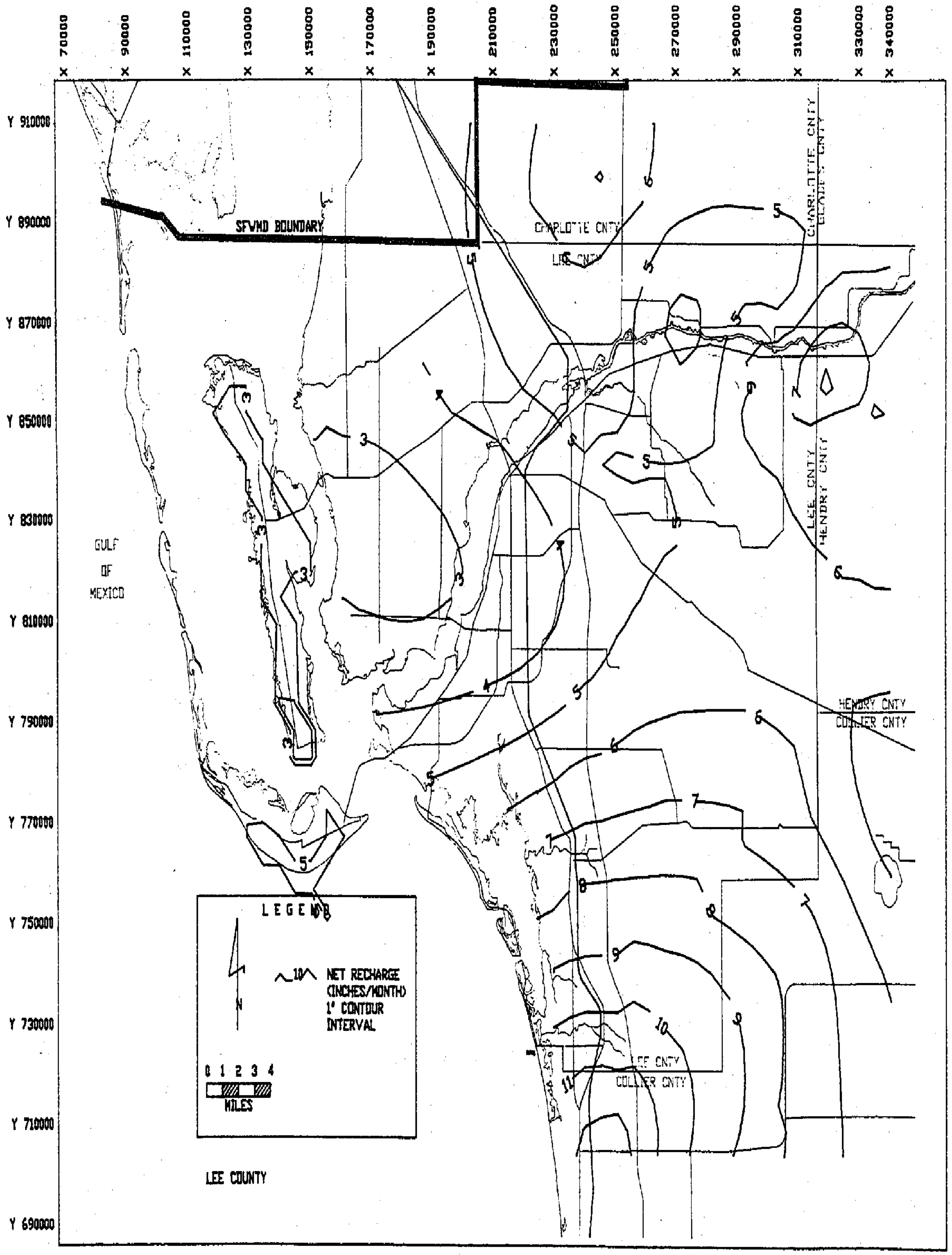
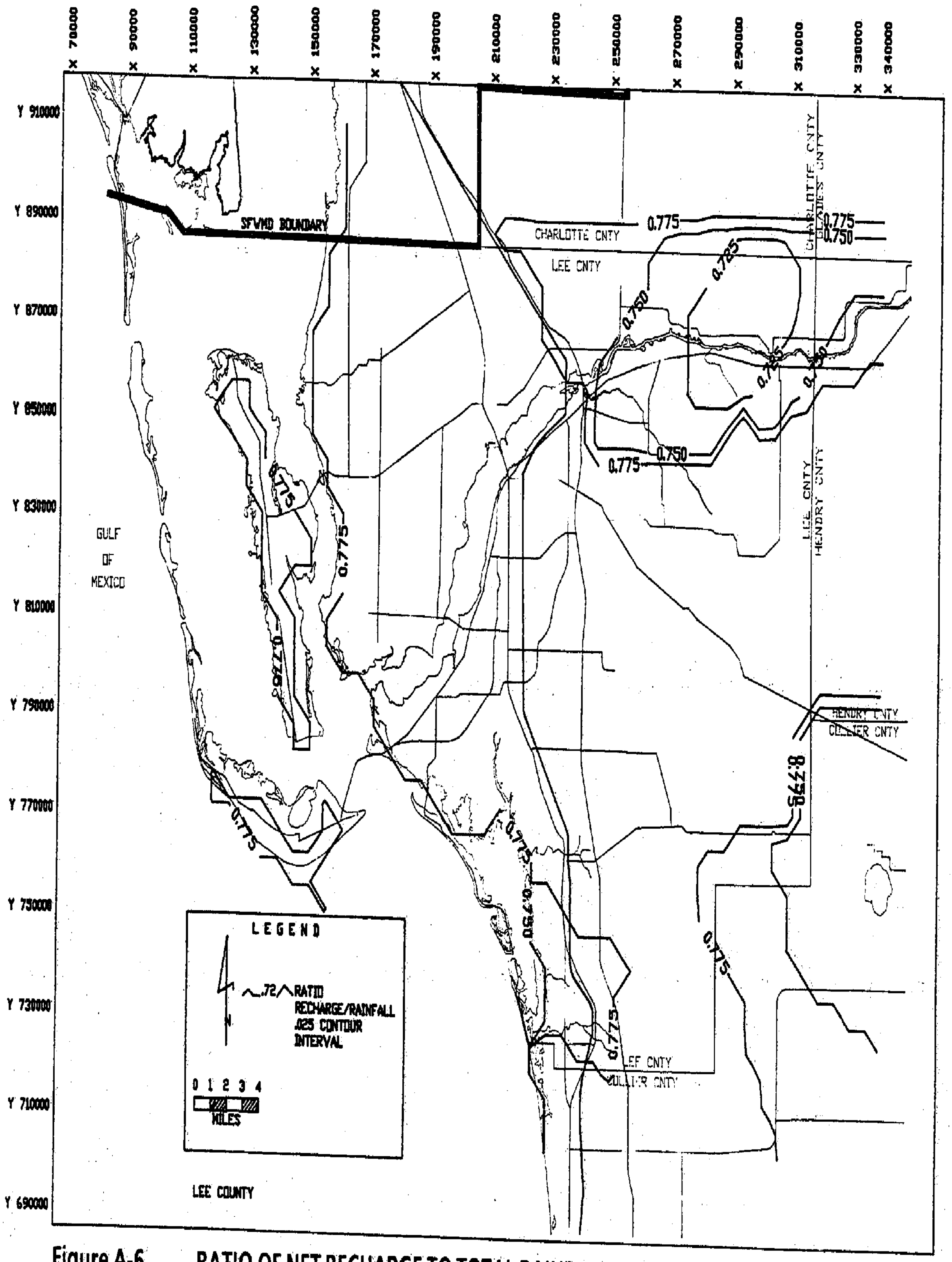


Figure A-5. NET RECHARGE (INCHES), JUNE, 1985



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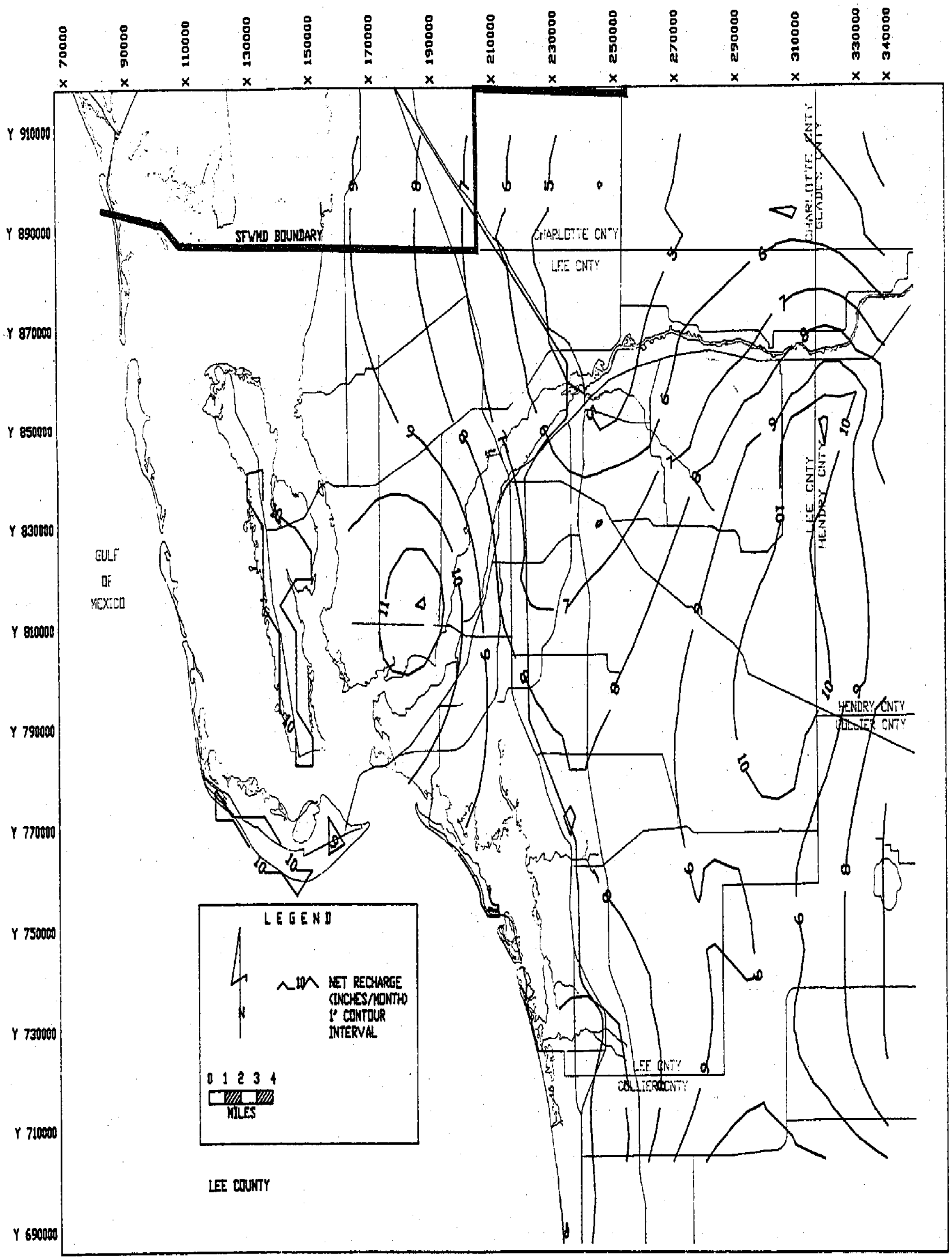


Figure A-7. NET RECHARGE (INCHES), JULY, 1985

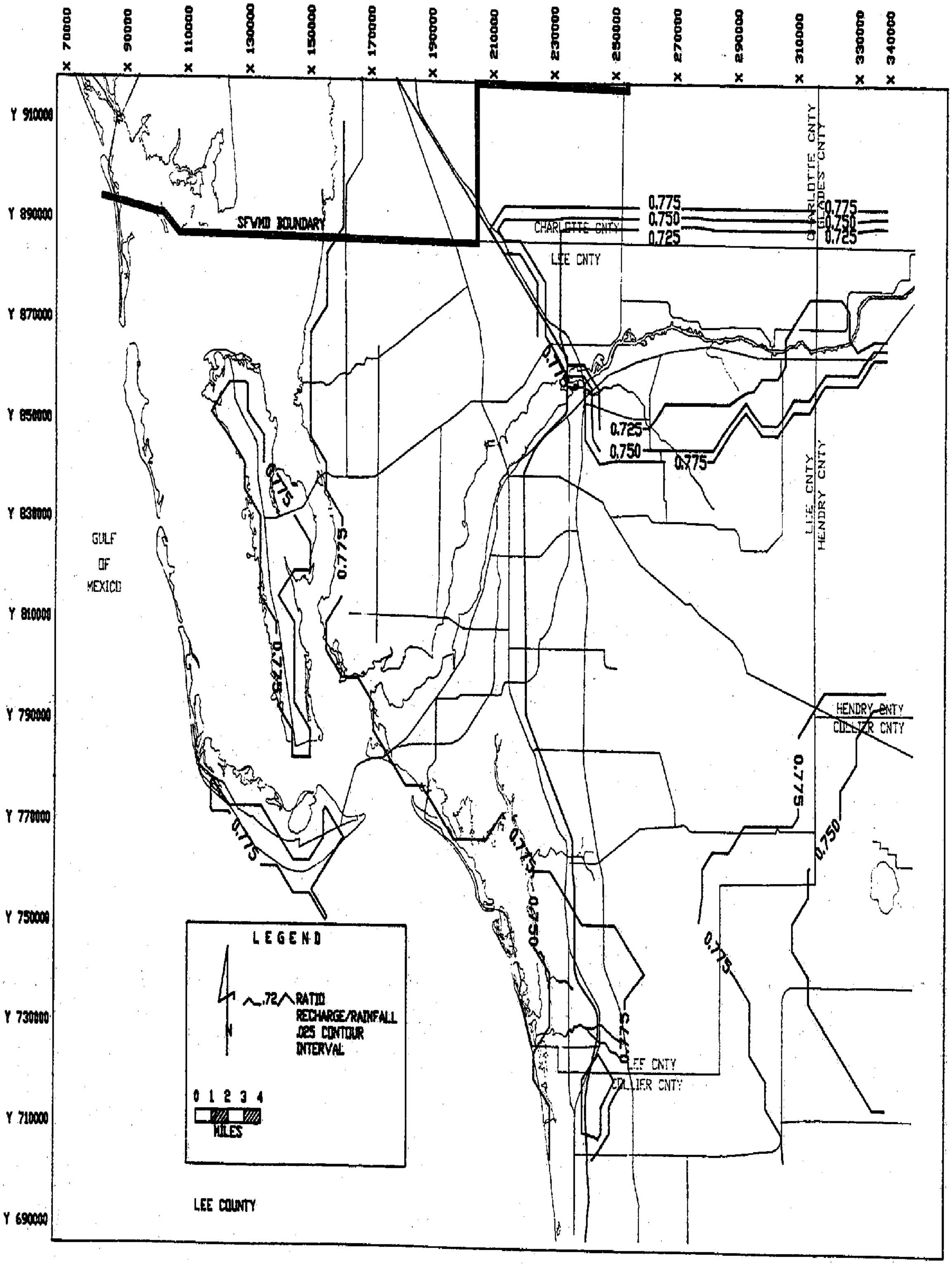


Figure A-8. RATIO OF NET RECHARGE TO TOTAL RAINFALL, JULY, 1985

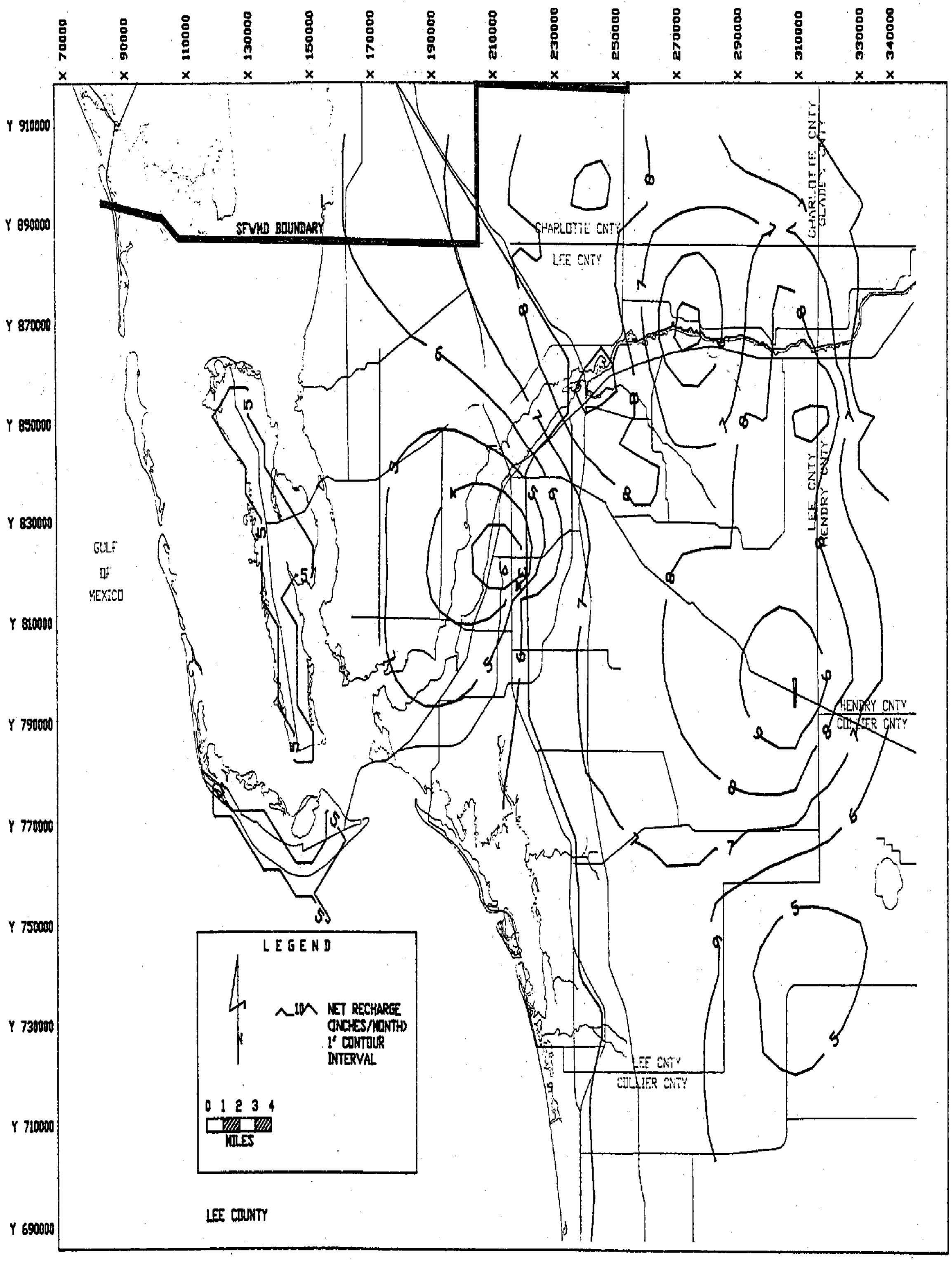


Figure A-9. NET RECHARGE (INCHES), AUGUST, 1985

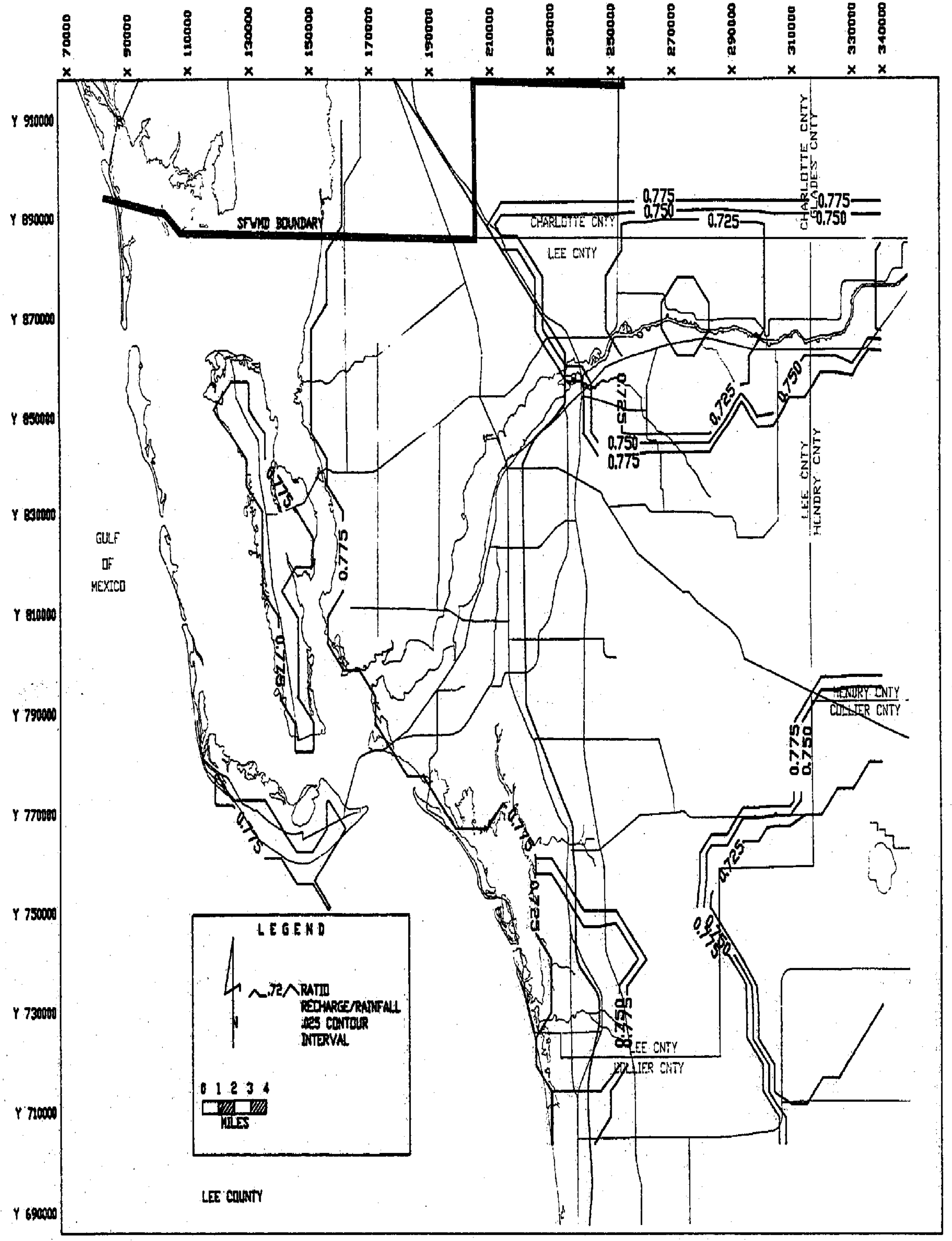


Figure A-10. RATIO OF NET RECHARGE TO TOTAL RAINFALL, AUGUST, 1985

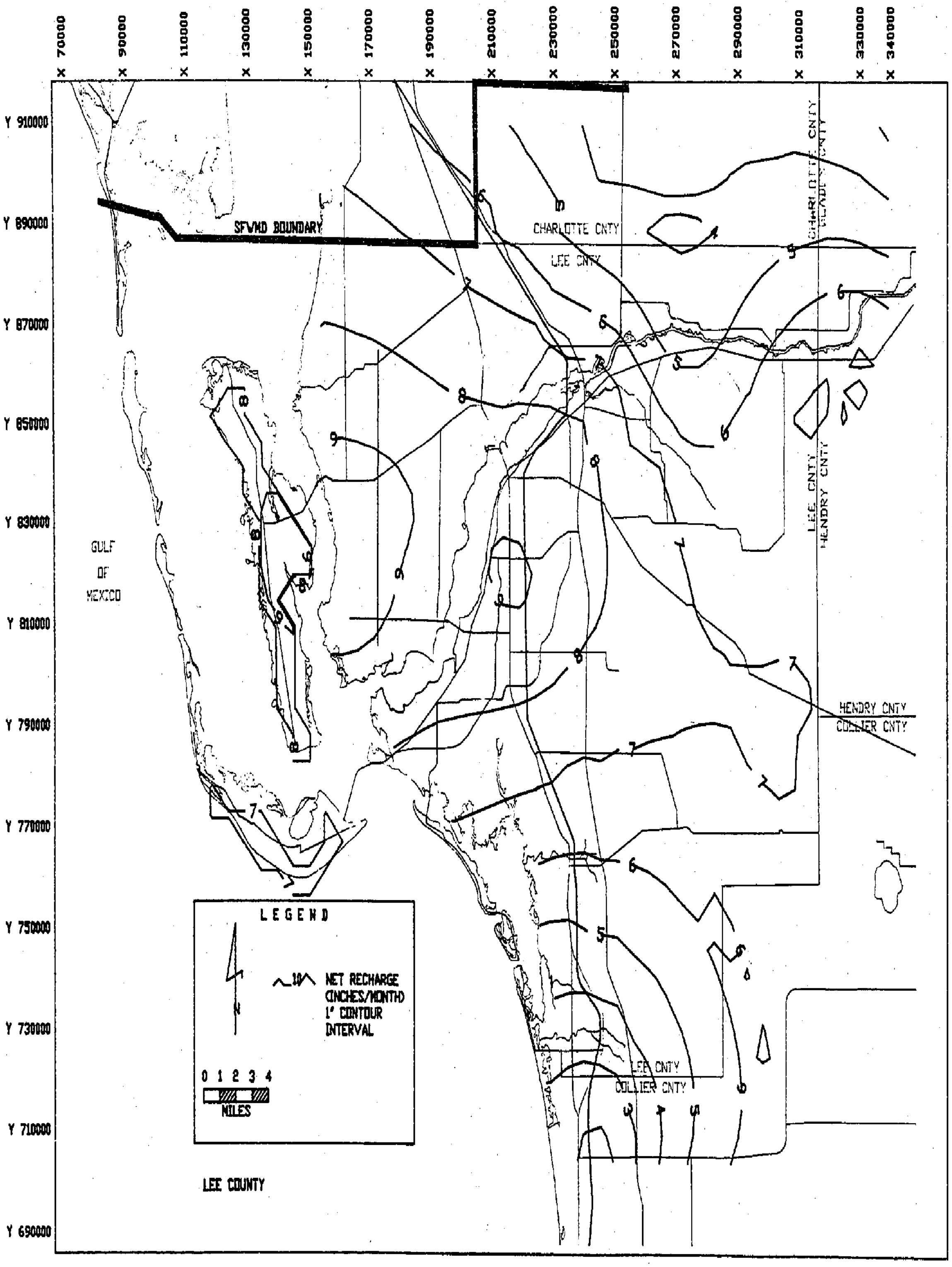


Figure A-11. NET RECHARGE (INCHES), SEPTEMBER, 1985

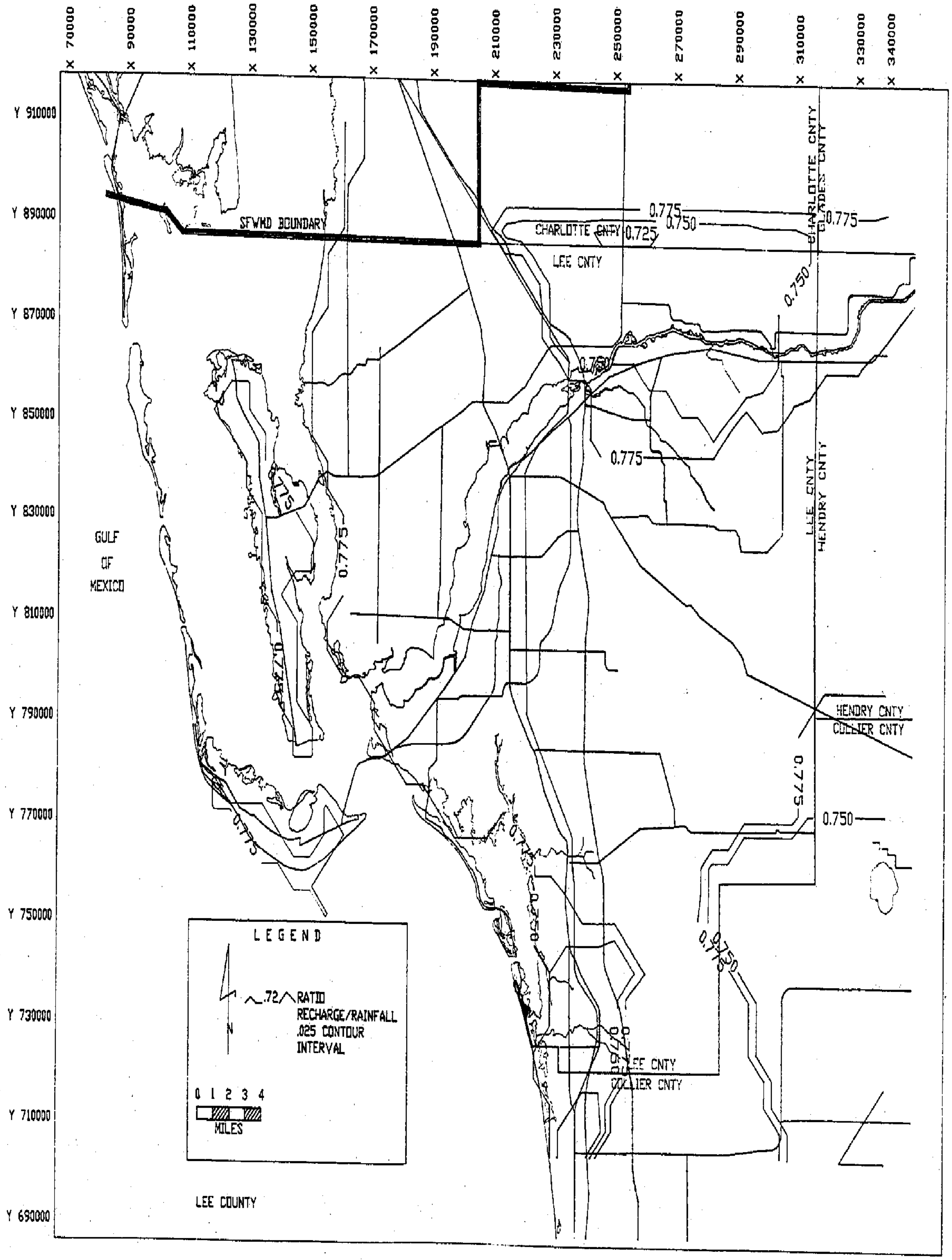


Figure A-12. RATIO OF NET RECHARGE TO TOTAL RAINFALL, SEPTEMBER, 1985

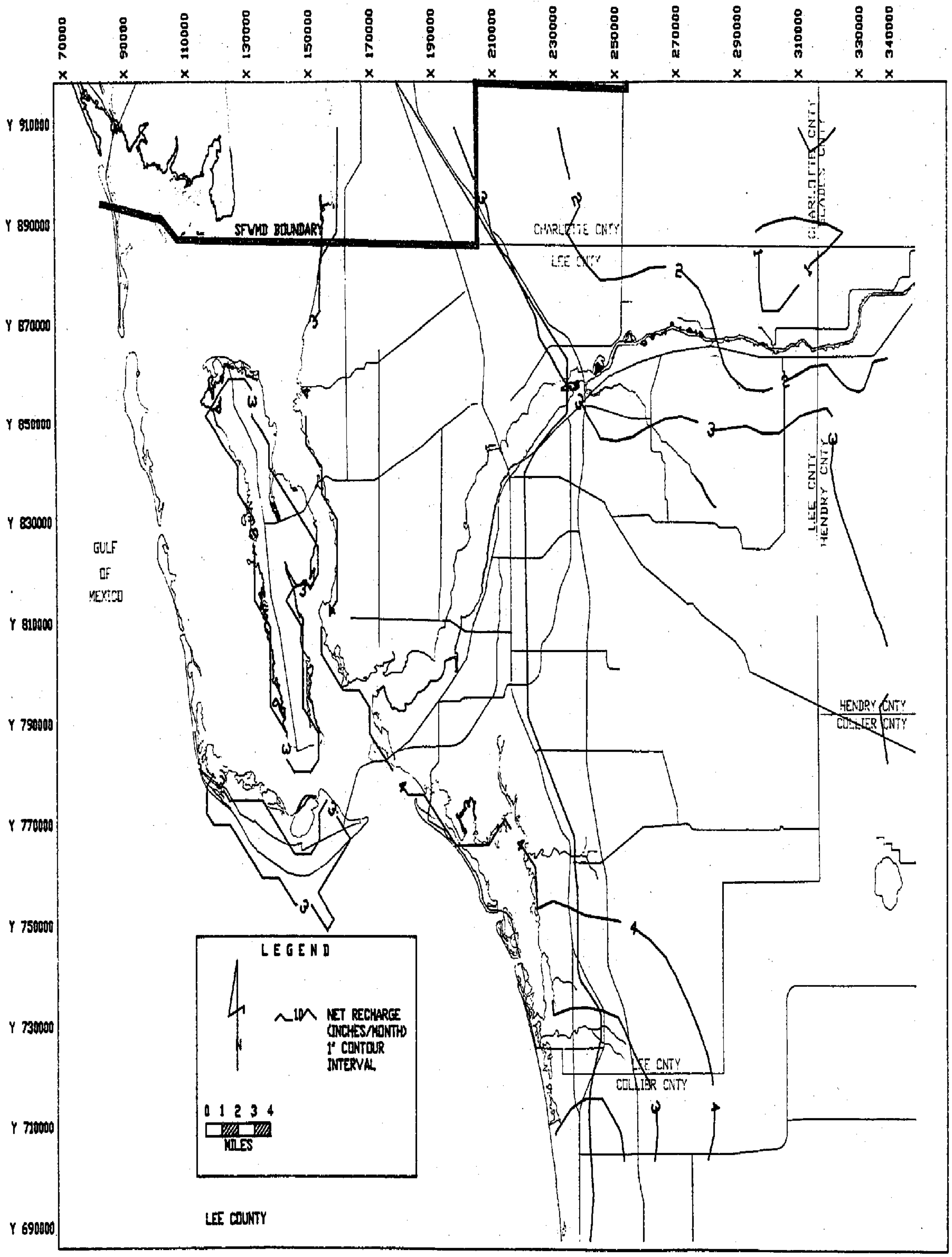
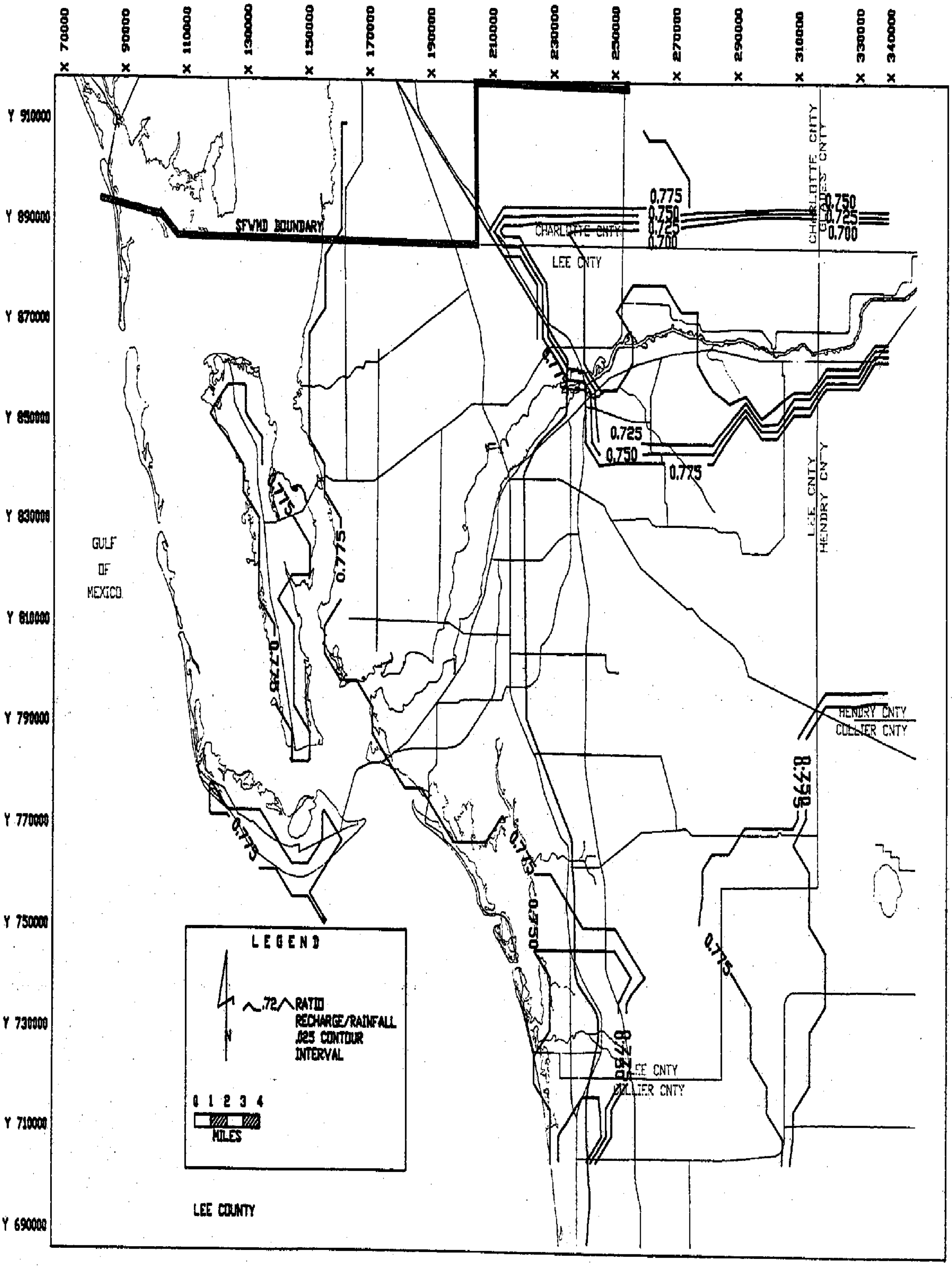


Figure A-13. NET RECHARGE (INCHES), OCTOBER, 1985



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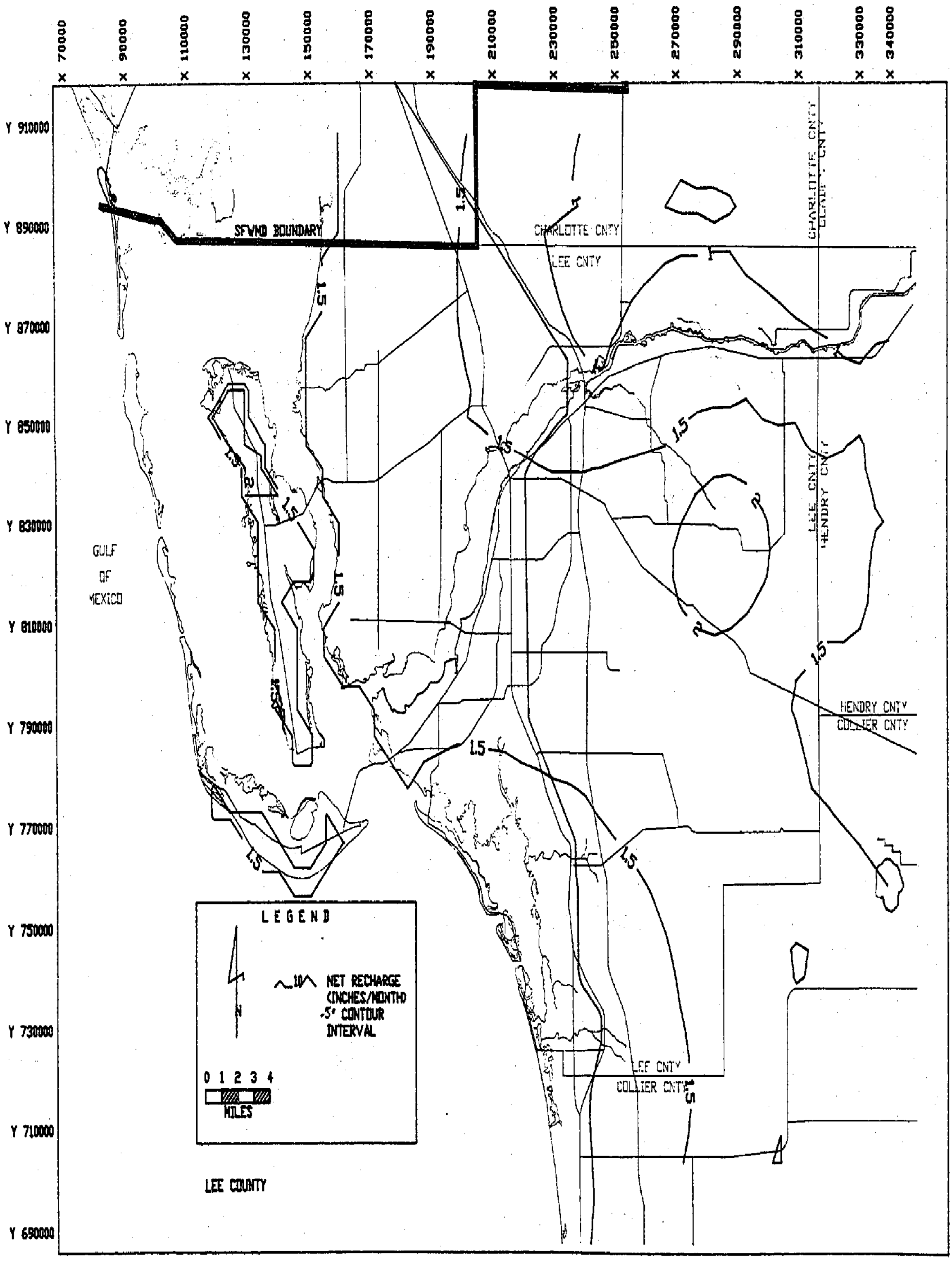

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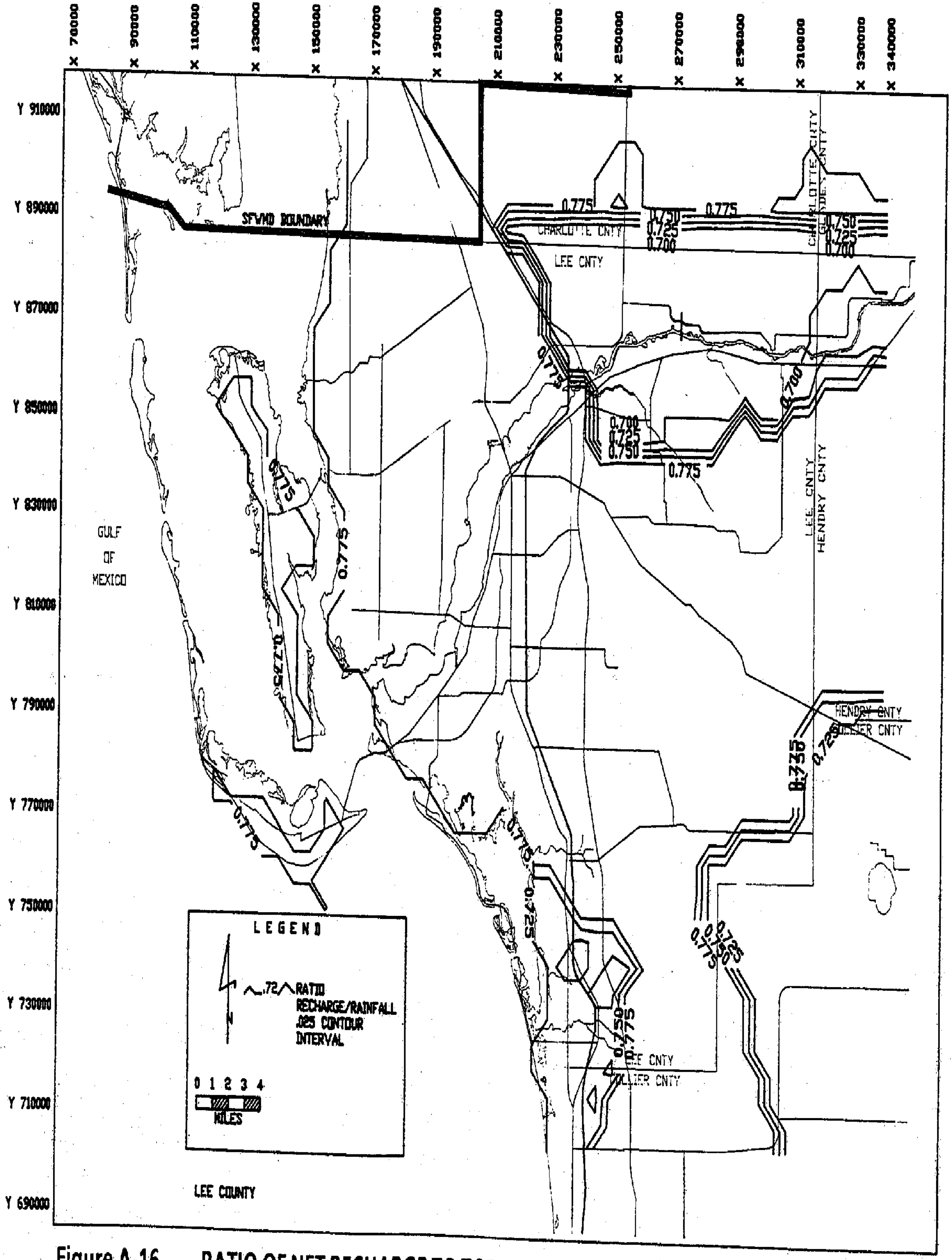

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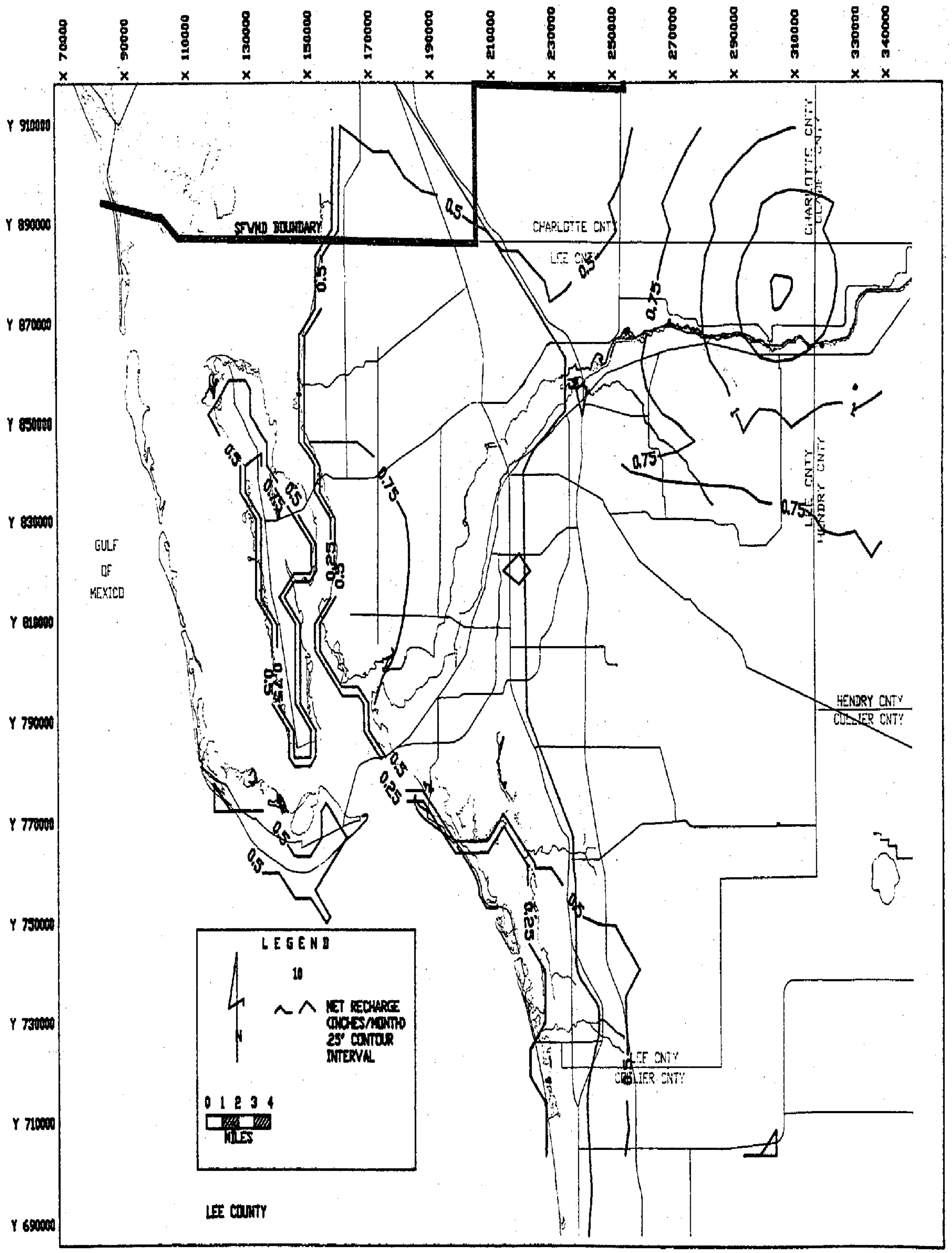
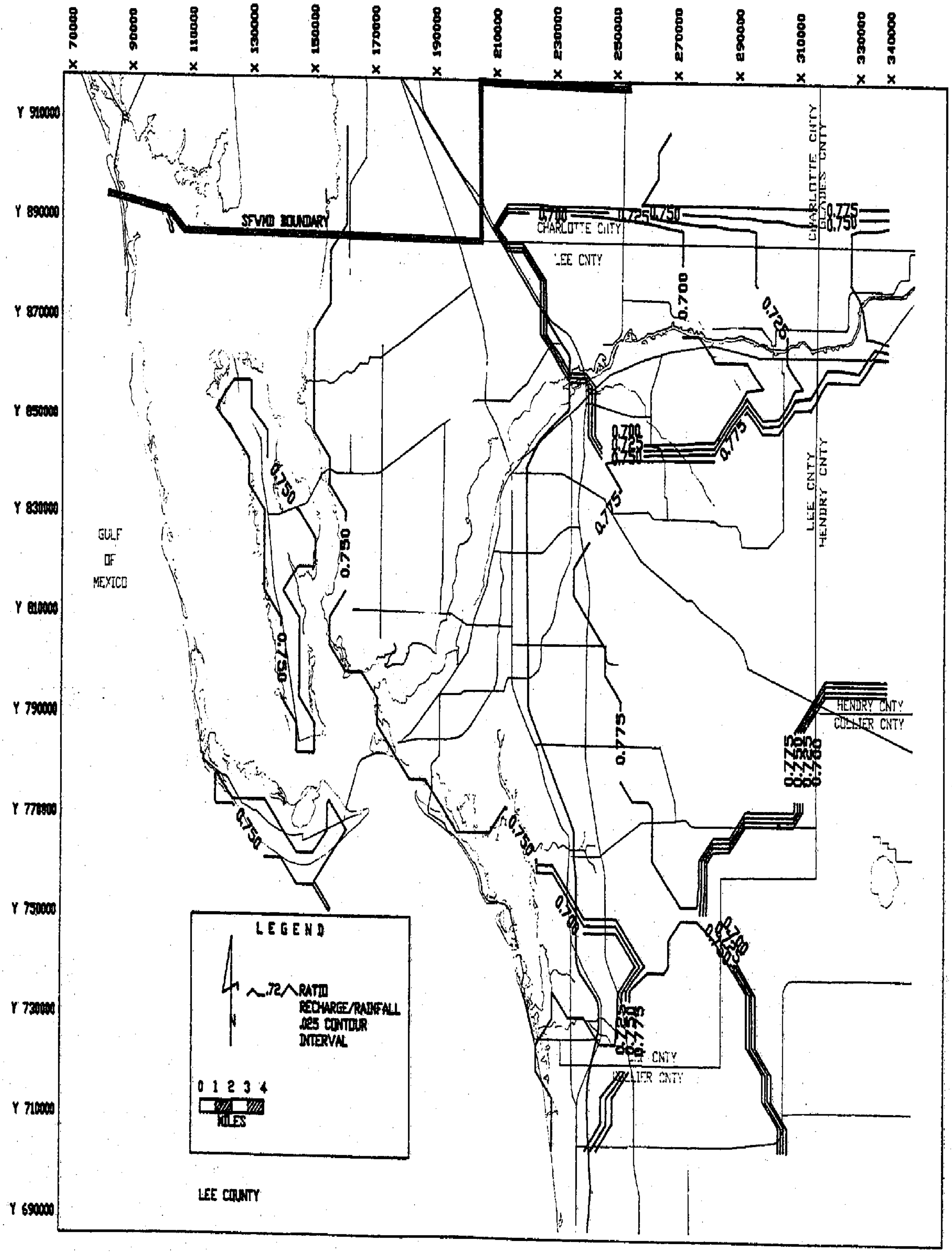


Figure A-17. NET RECHARGE (INCHES), DECEMBER, 1985



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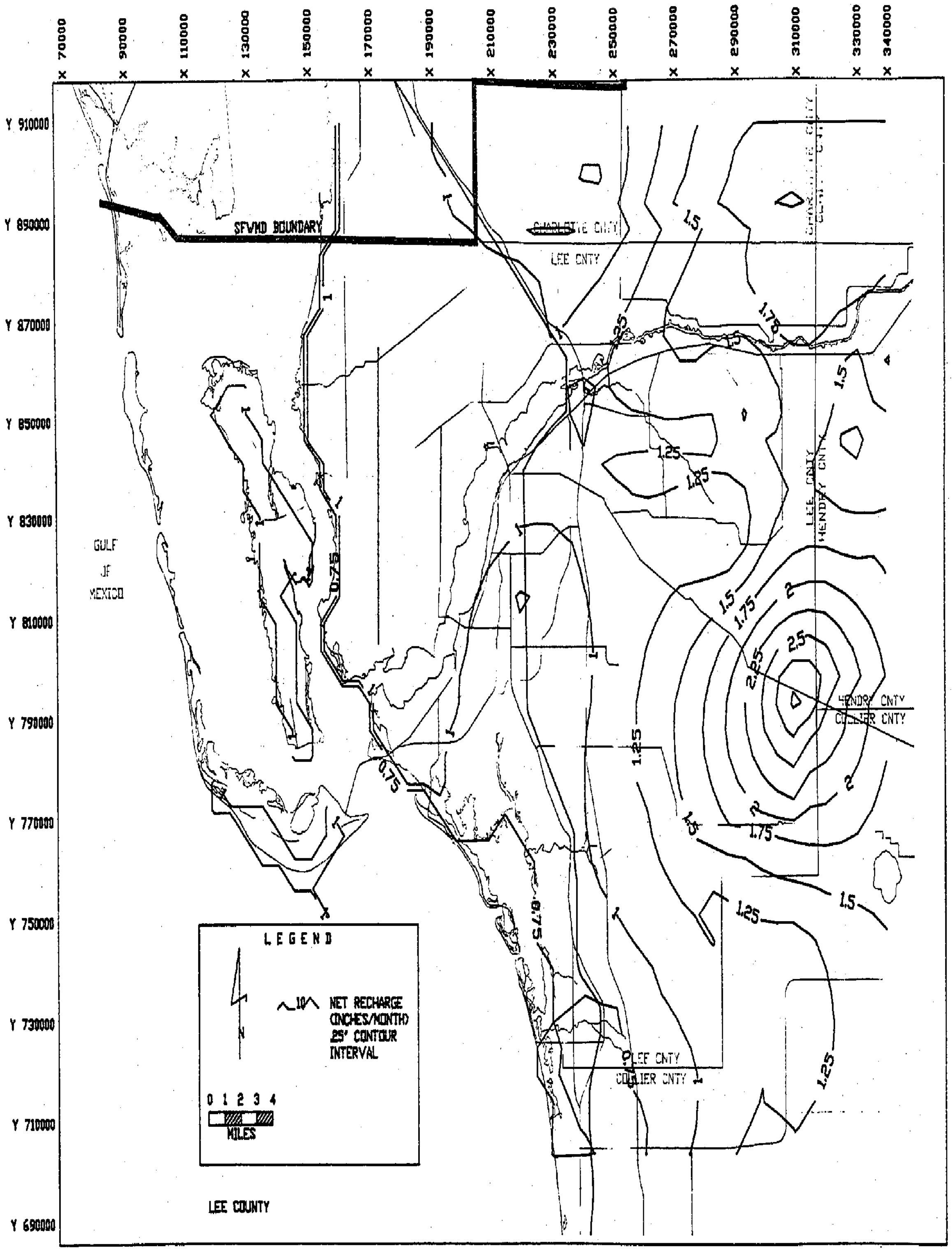
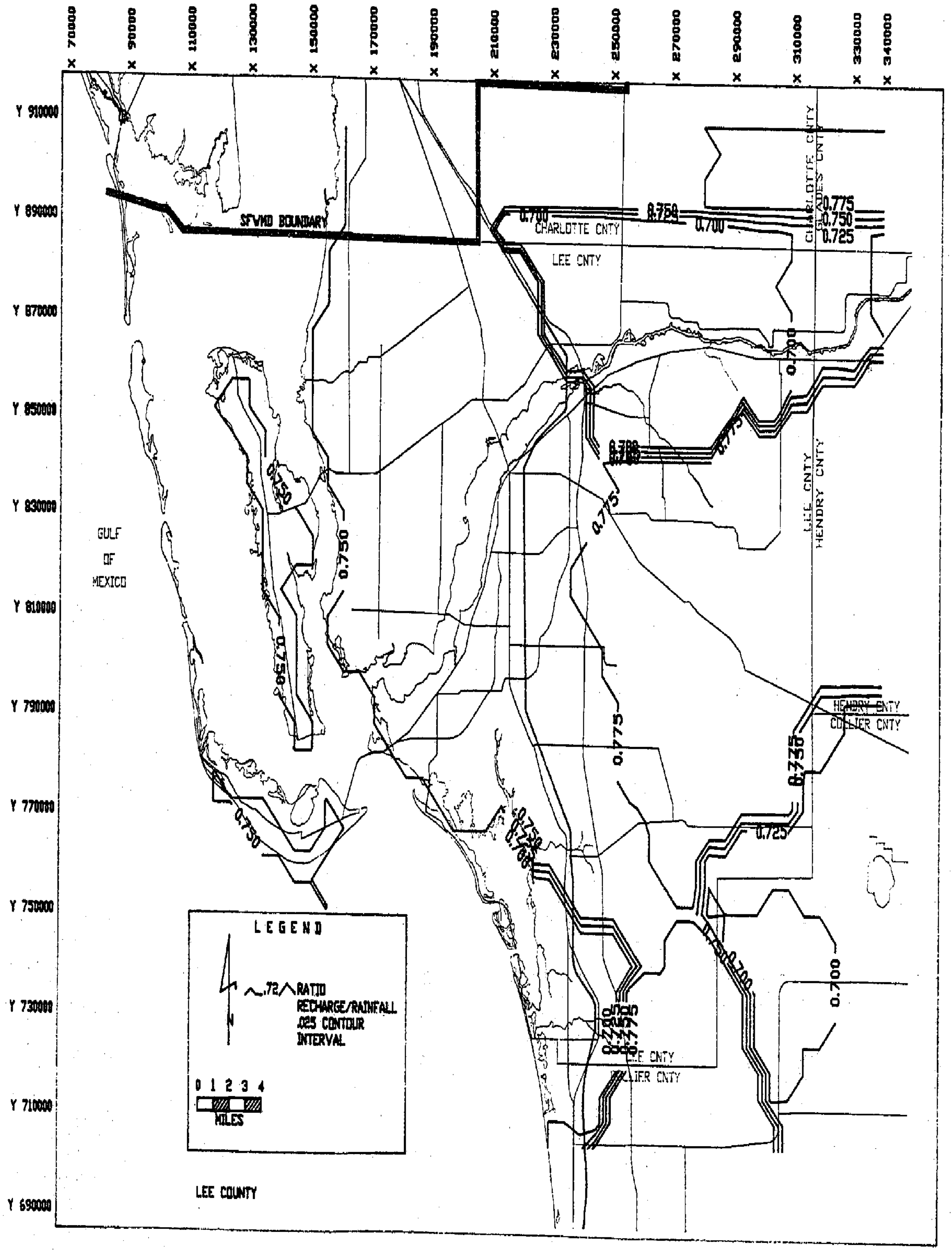


Figure A-19. NET RECHARGE (INCHES), JANUARY, 1986



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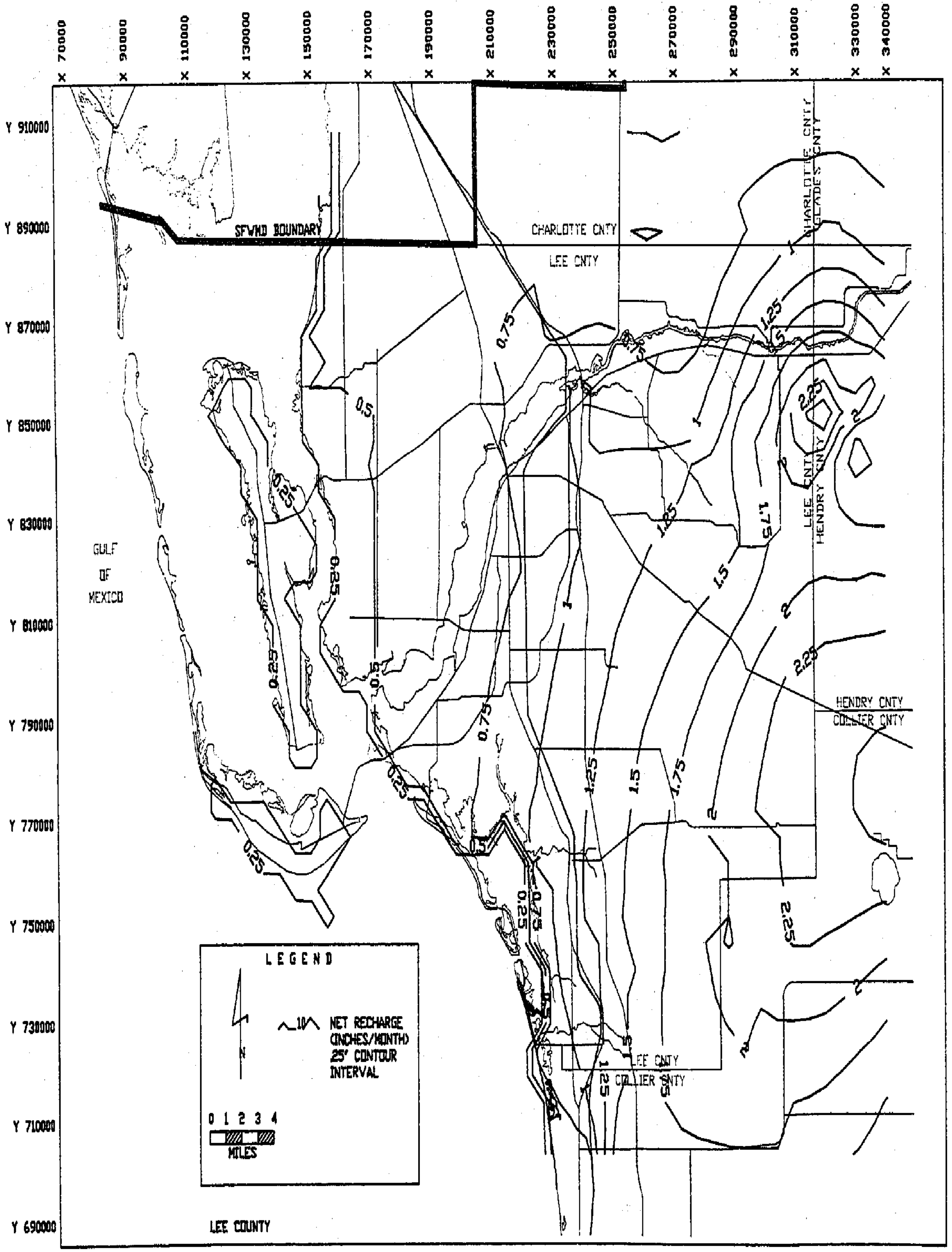
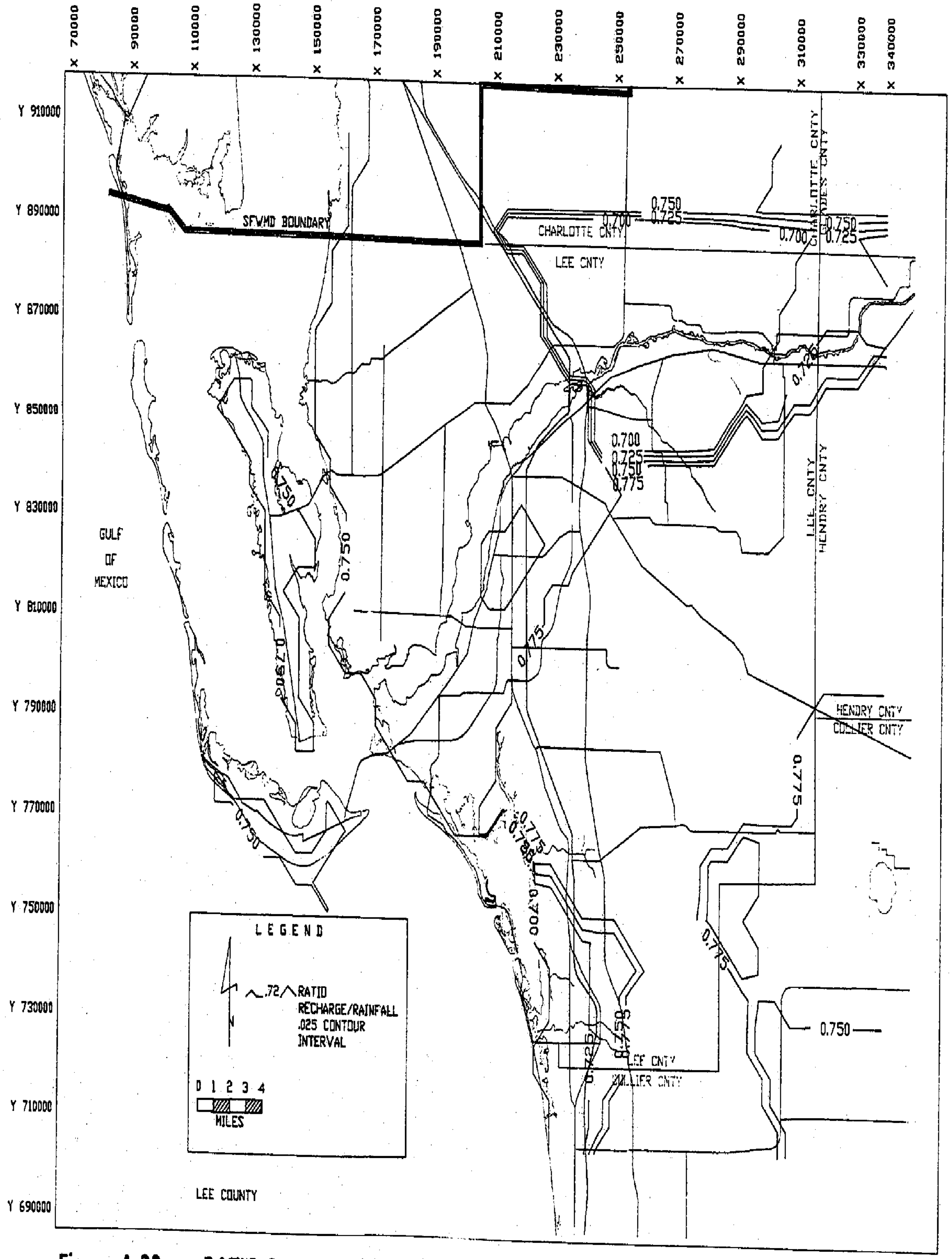


Figure A-21. NET RECHARGE (INCHES), FEBRUARY, 1986



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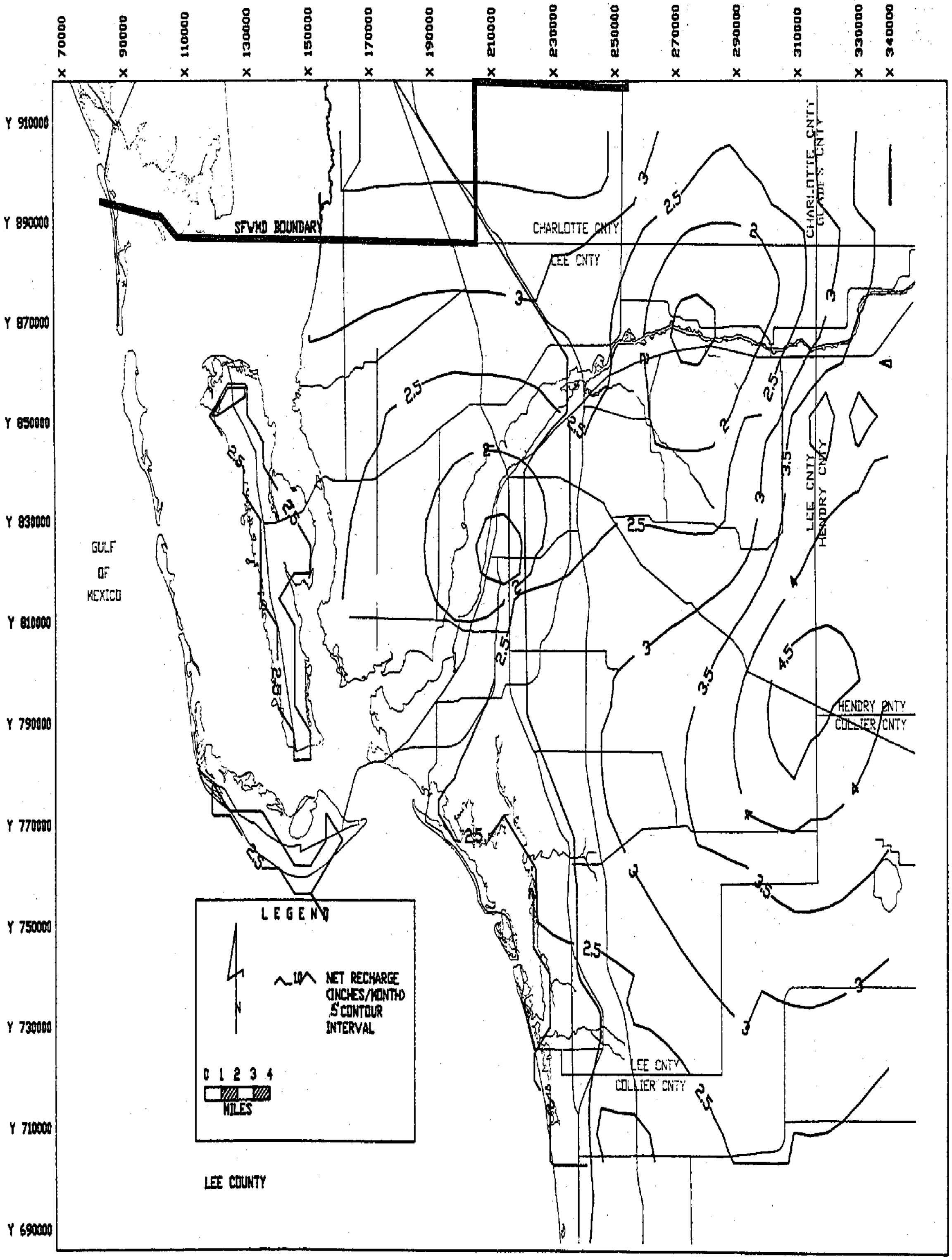

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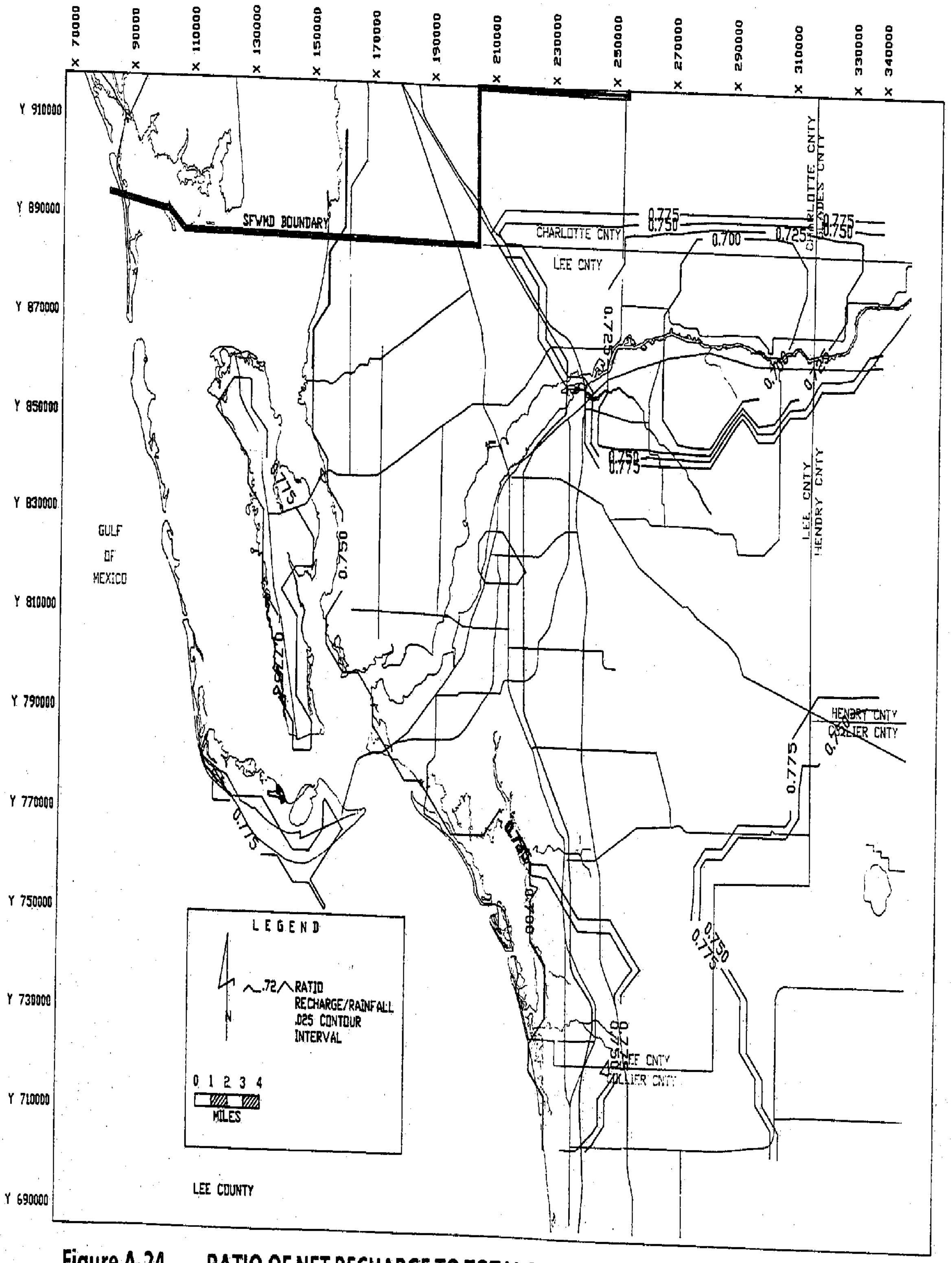

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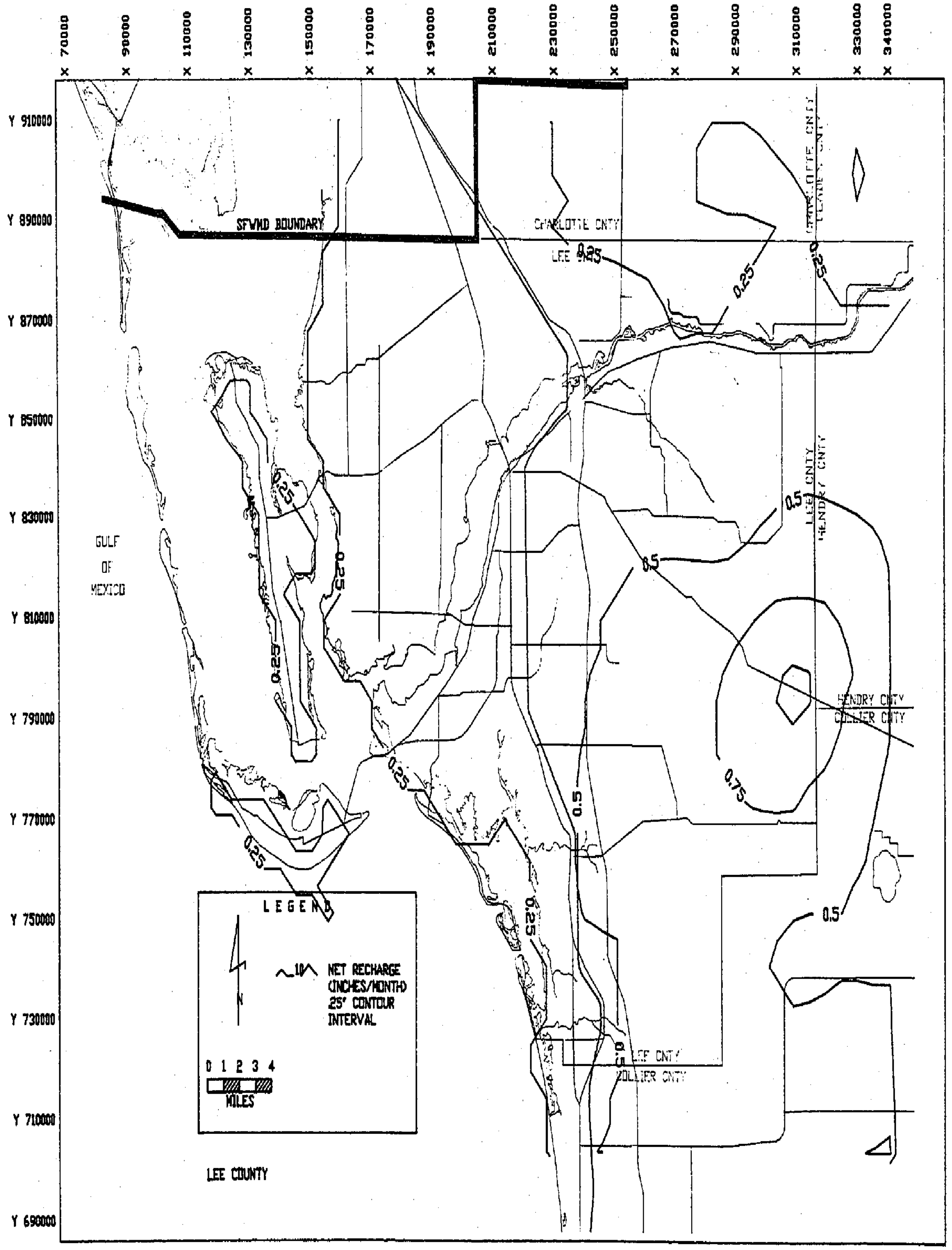

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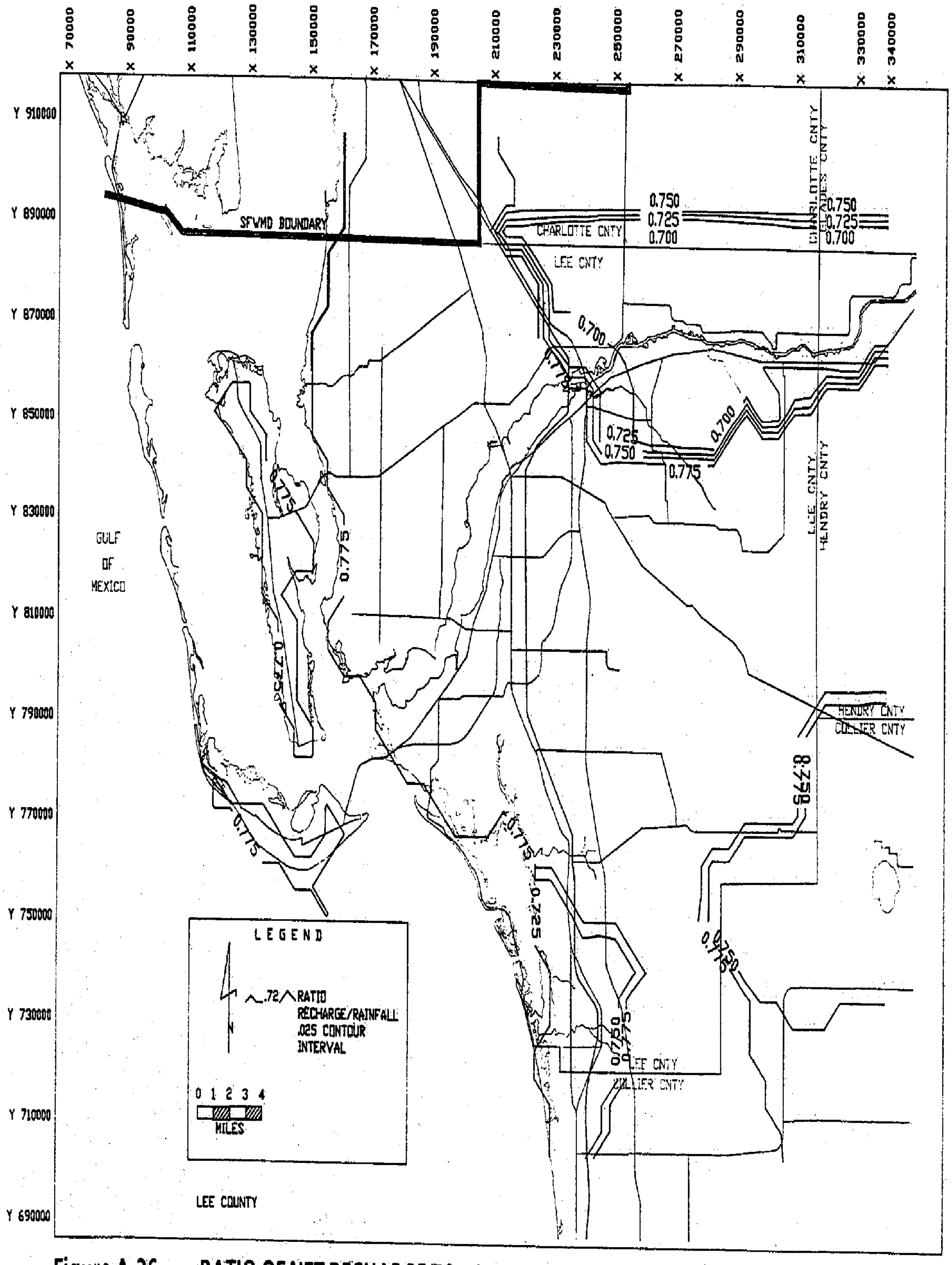

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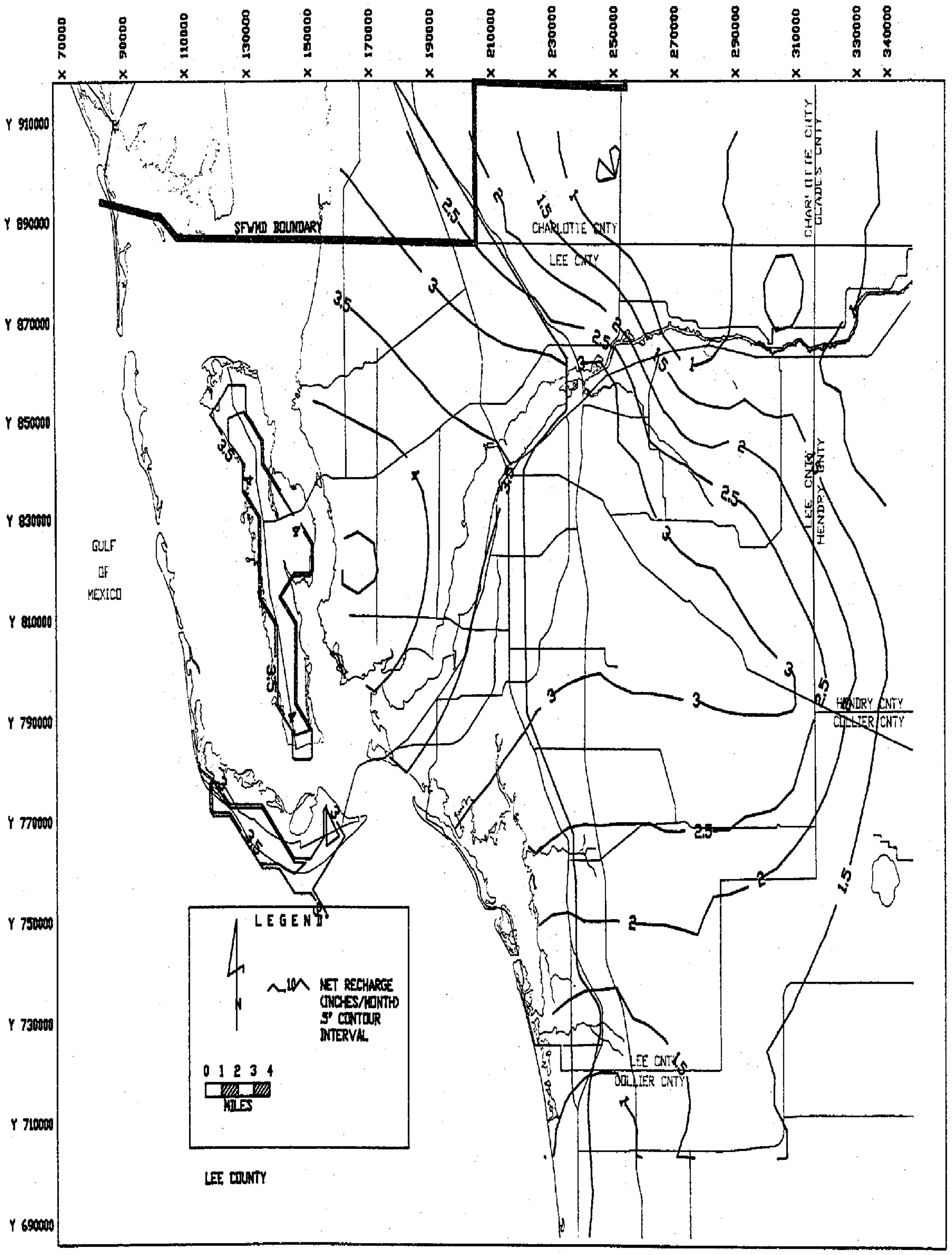

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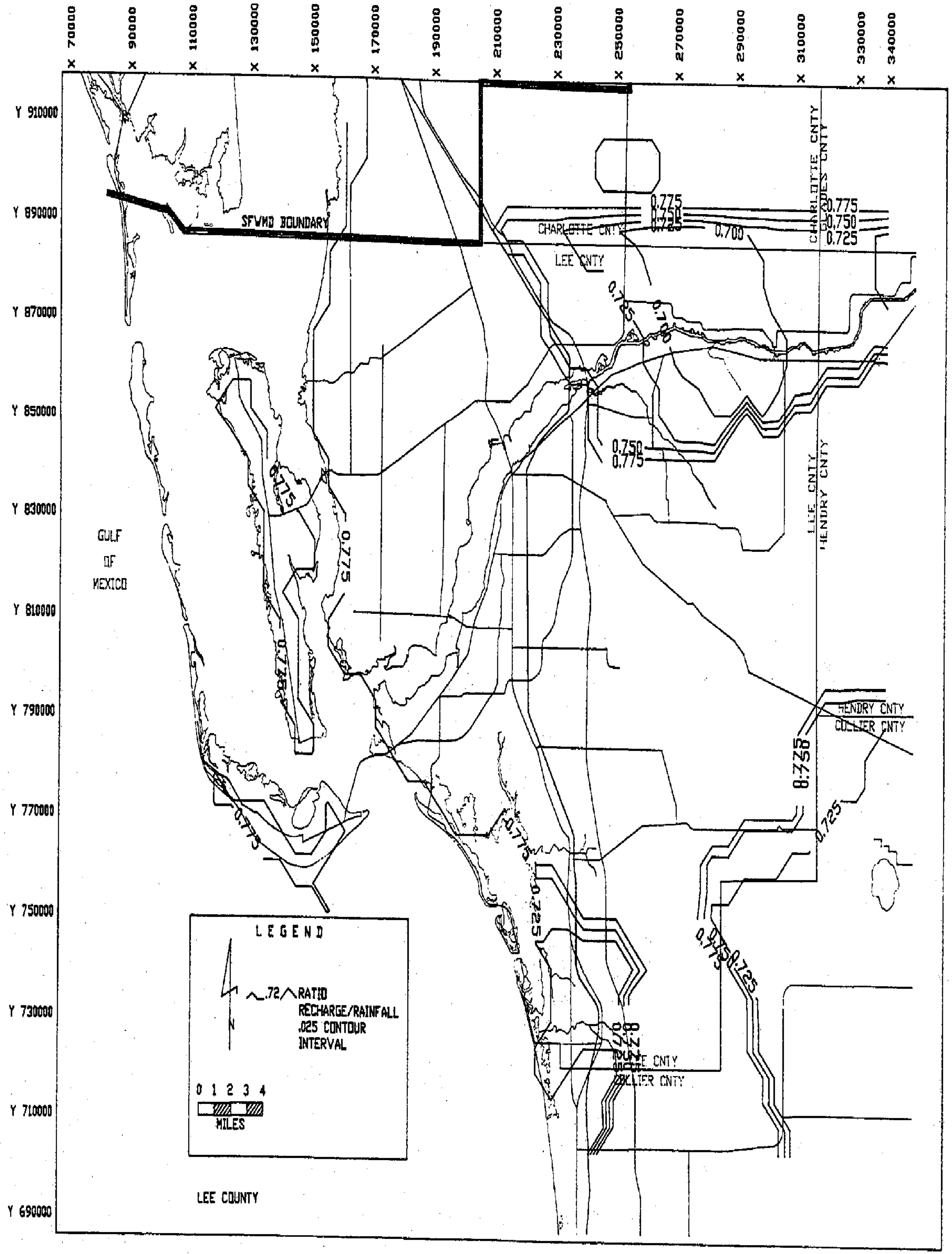

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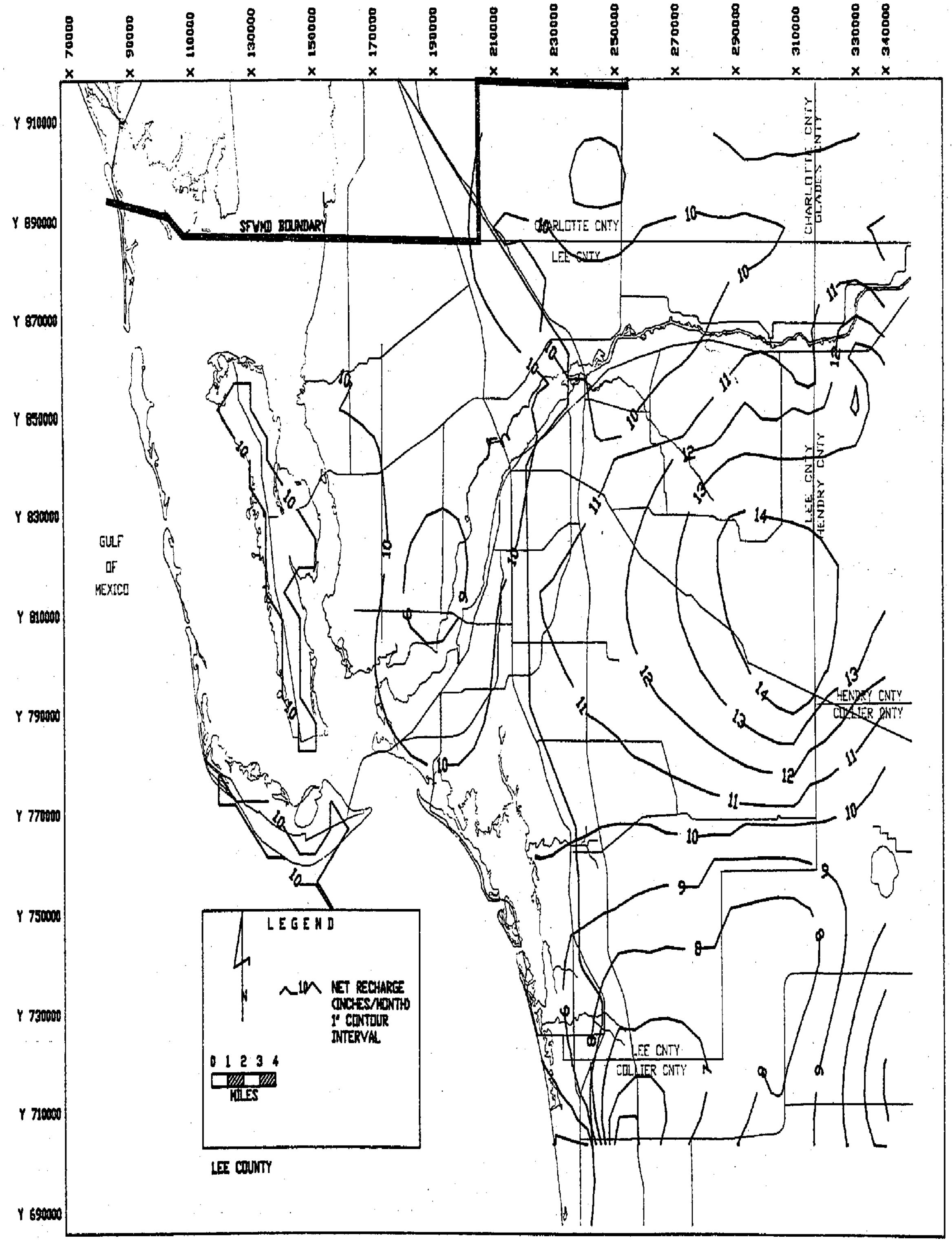

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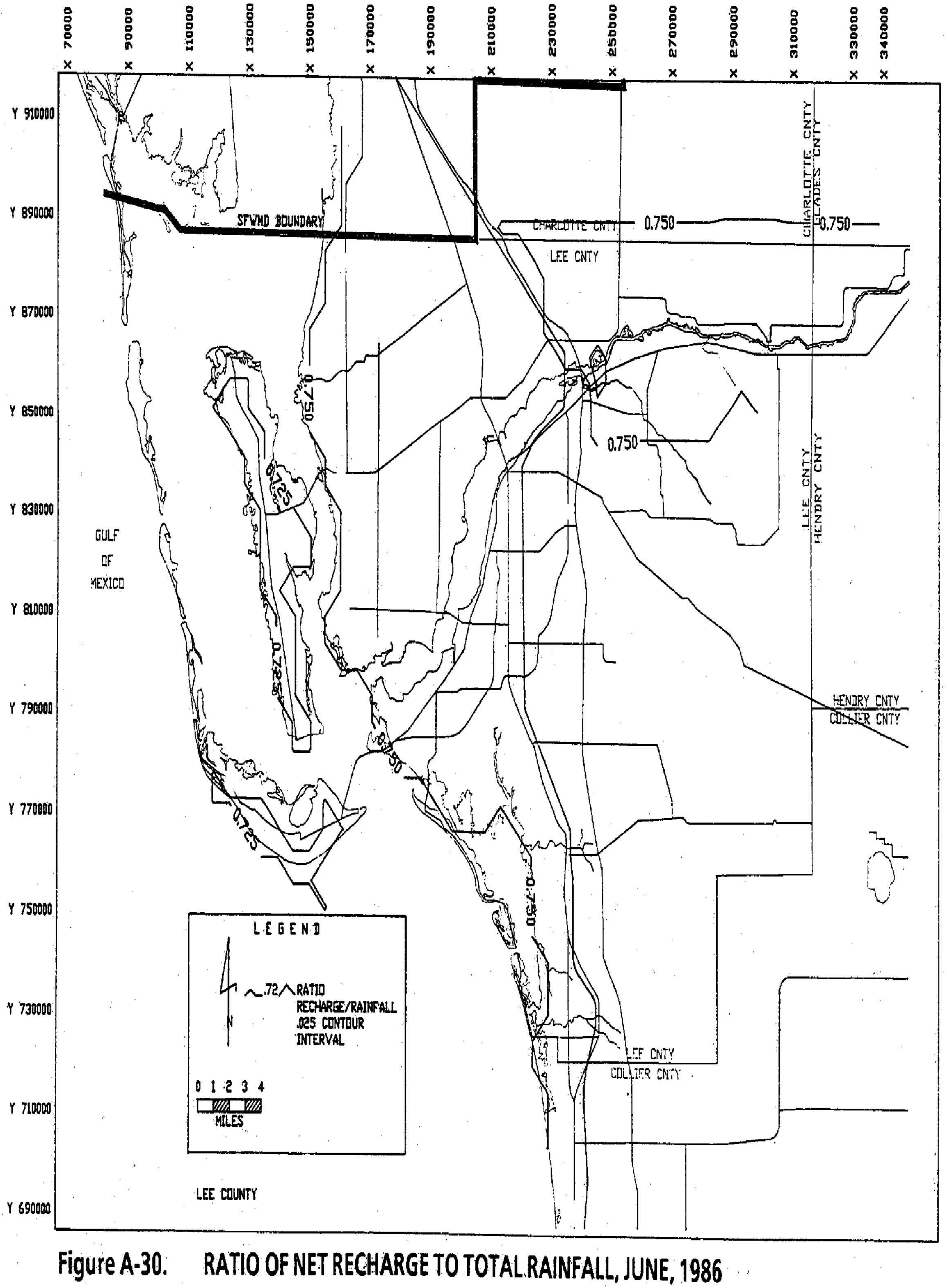

Figure A-30. RATIO OF NET RECHARGE TO TOTAL RAINFALL, JUNE, 1986

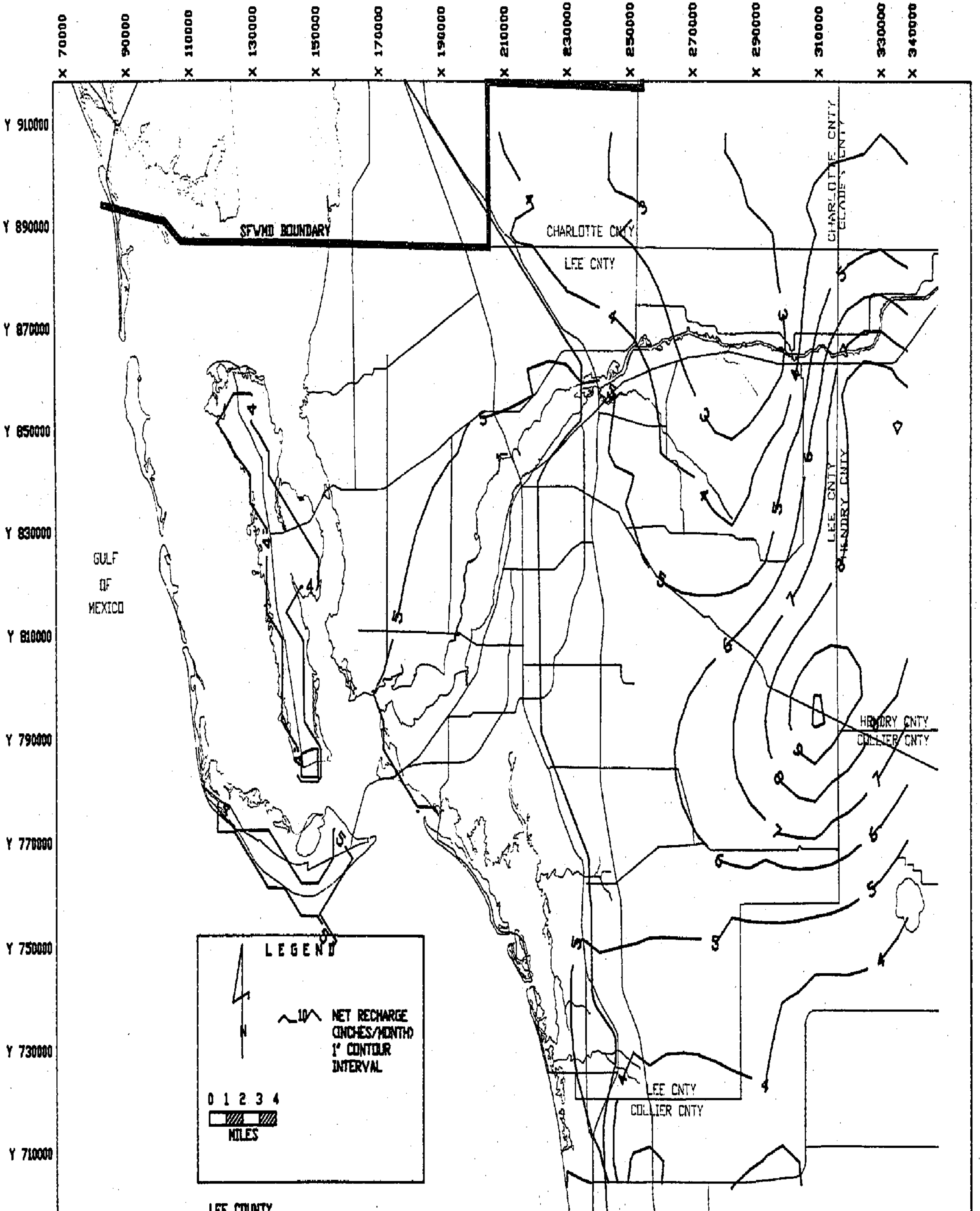

Figure A-31. NET RECHARGE (INCHES), JULY, 1986

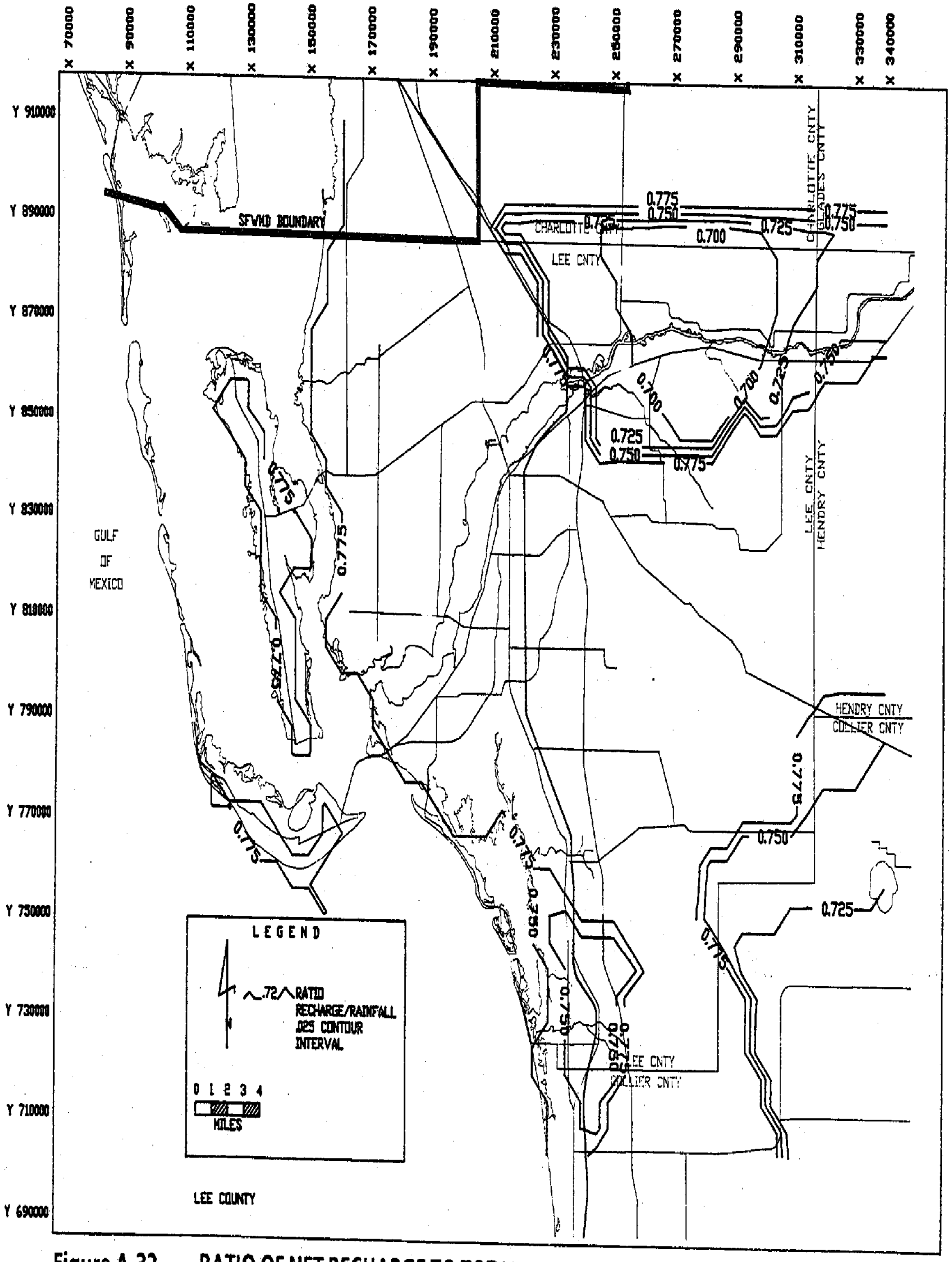

Figure A-32. RATIO OF NET RECHARGE TO TOTAL RAINFALL, JULY, 1986

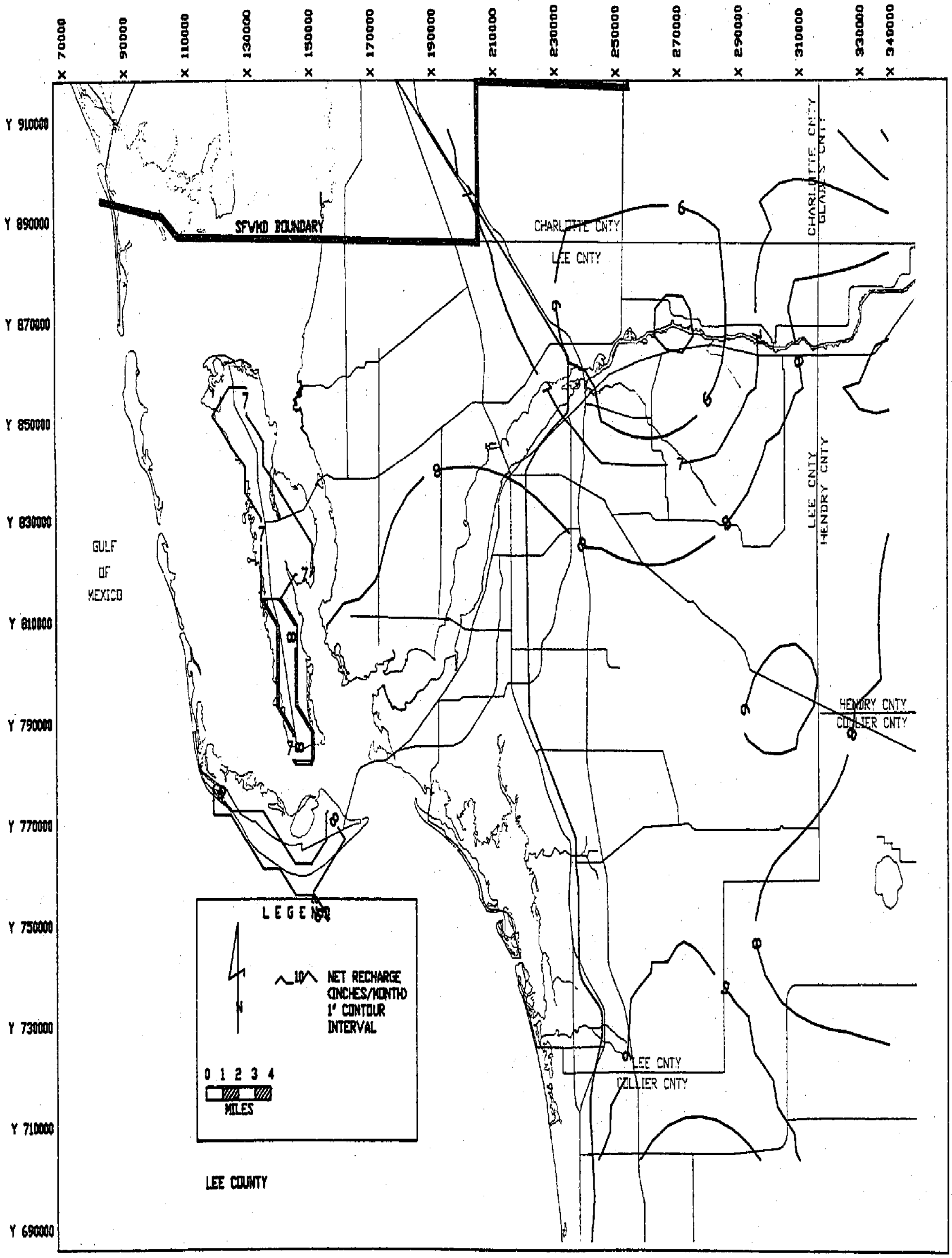

Figure A-33. NET RECHARGE (INCHES), AUGUST, 1986

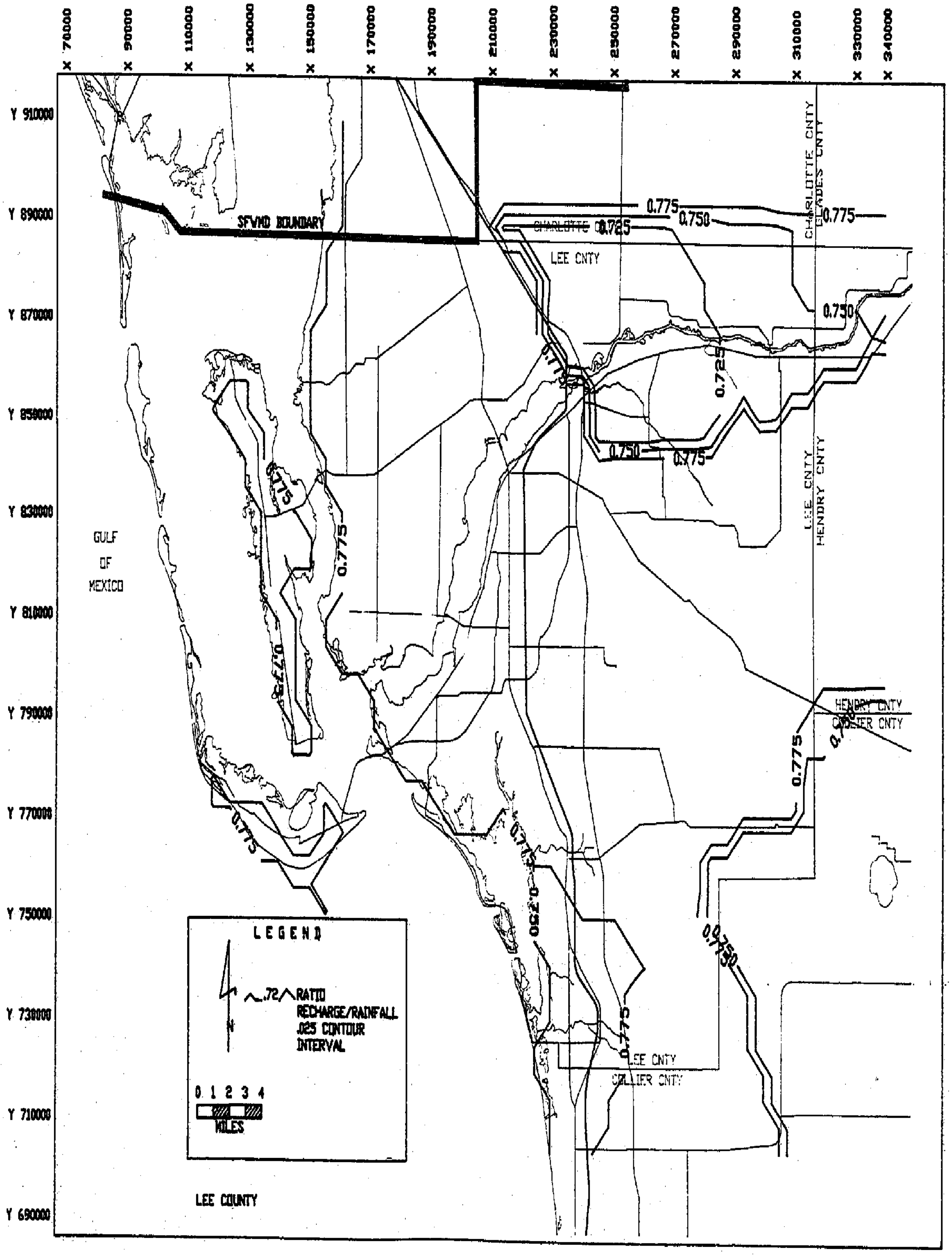

Figure A-34. RATIO OF NET RECHARGE TO TOTAL RAINFALL, AUGUST, 1986

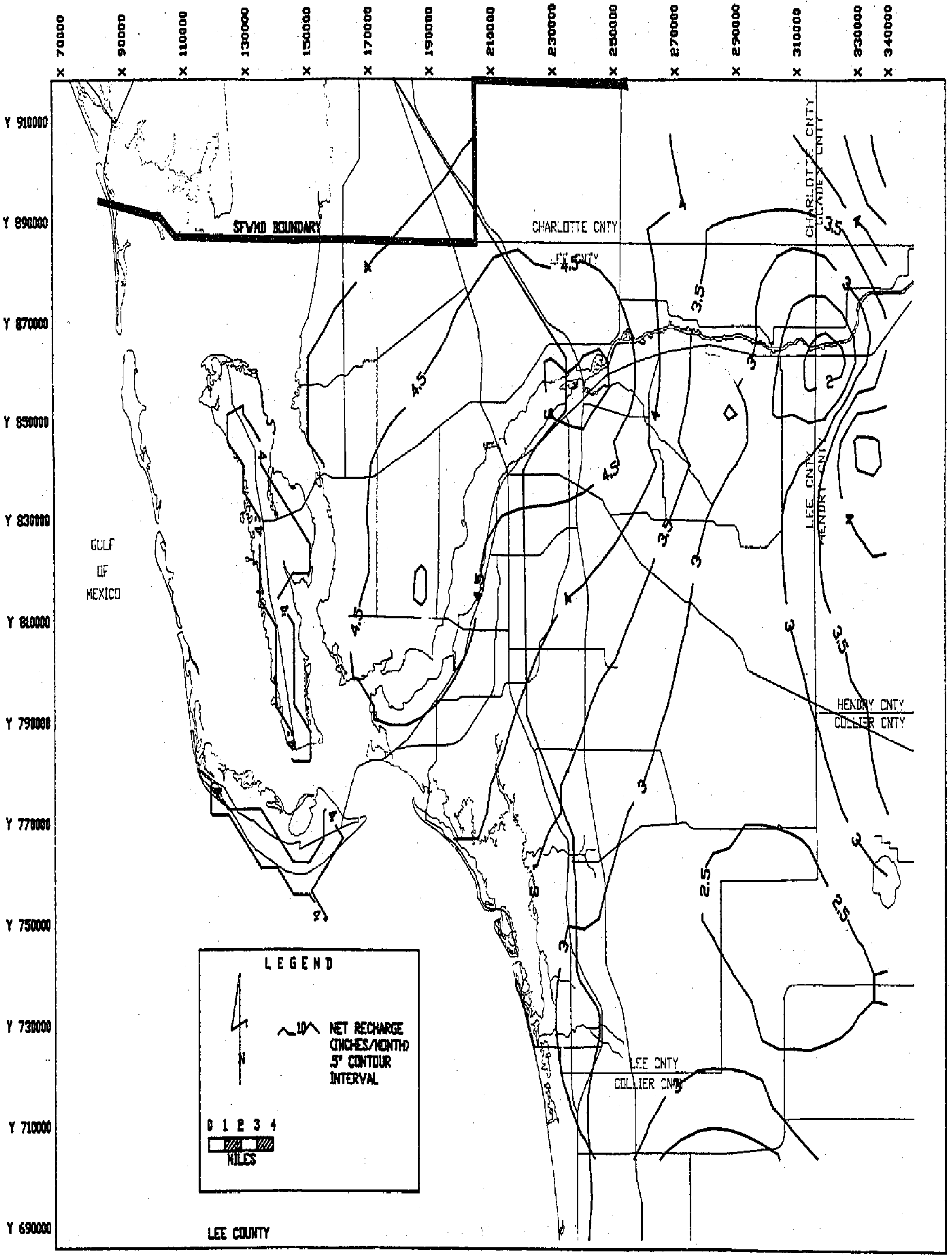

Figure A-35. NET RECHARGE (INCHES), SEPTEMBER, 1986

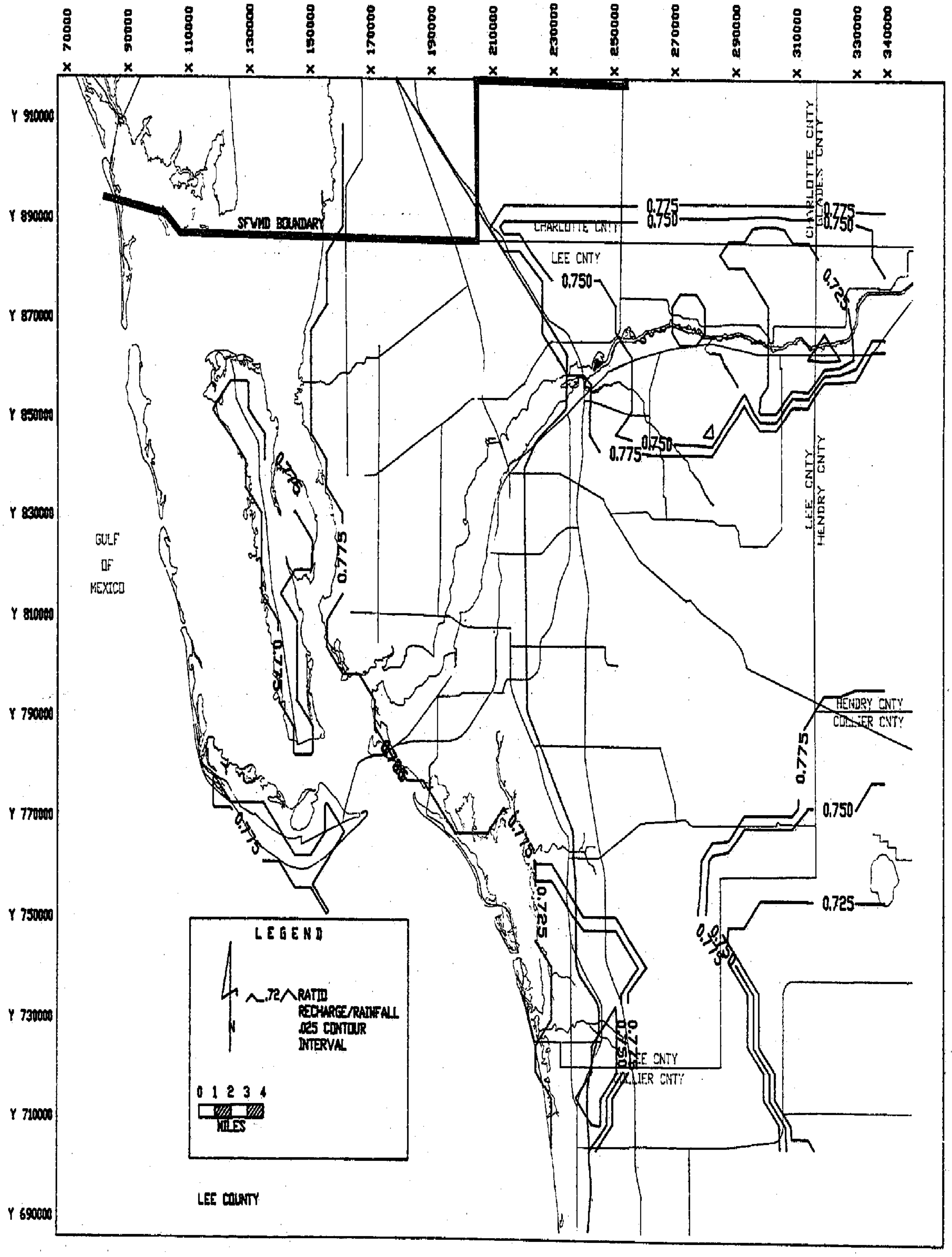

Figure A-36. RATIO OF NET RECHARGE TO TOTAL RAINFALL, SEPTEMBER, 1986

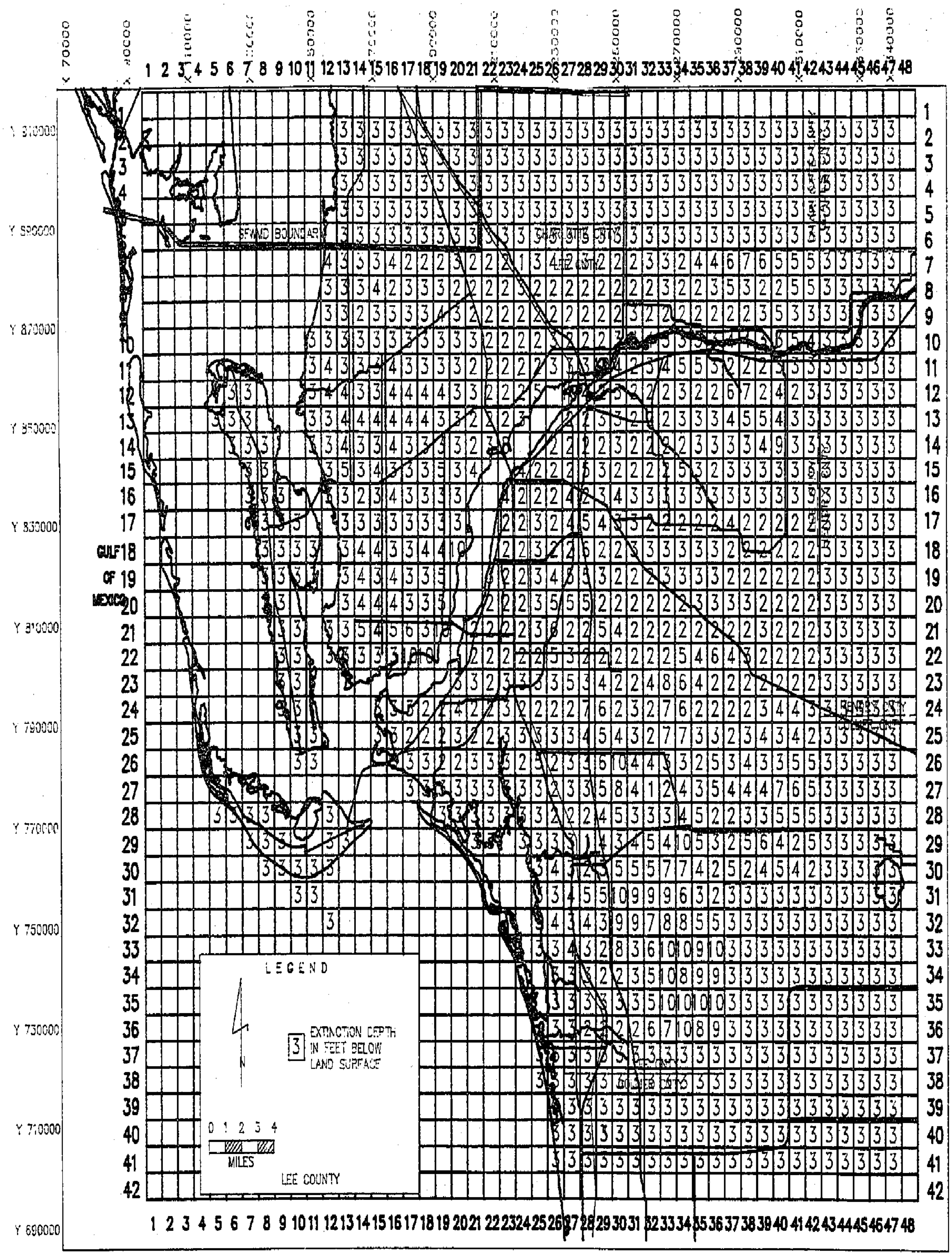

Figure A-37. EVAPOTRANSPIRATION EXTINCTION DEPTH

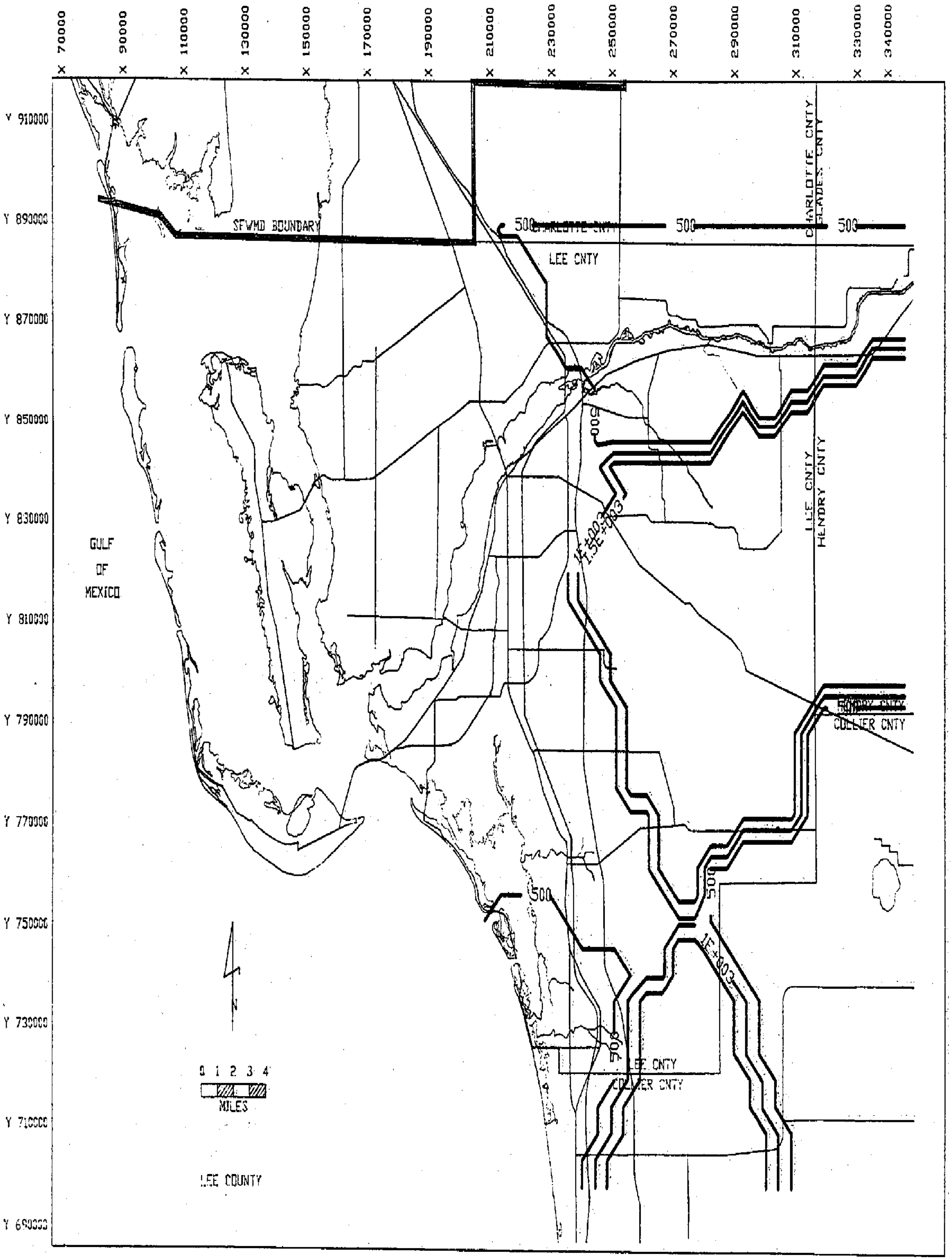

Figure A-38. HYDRAULIC CONDUCTIVITY OF LAYER 1 (WATER TABLE AQUIFER) IN FT/DAY

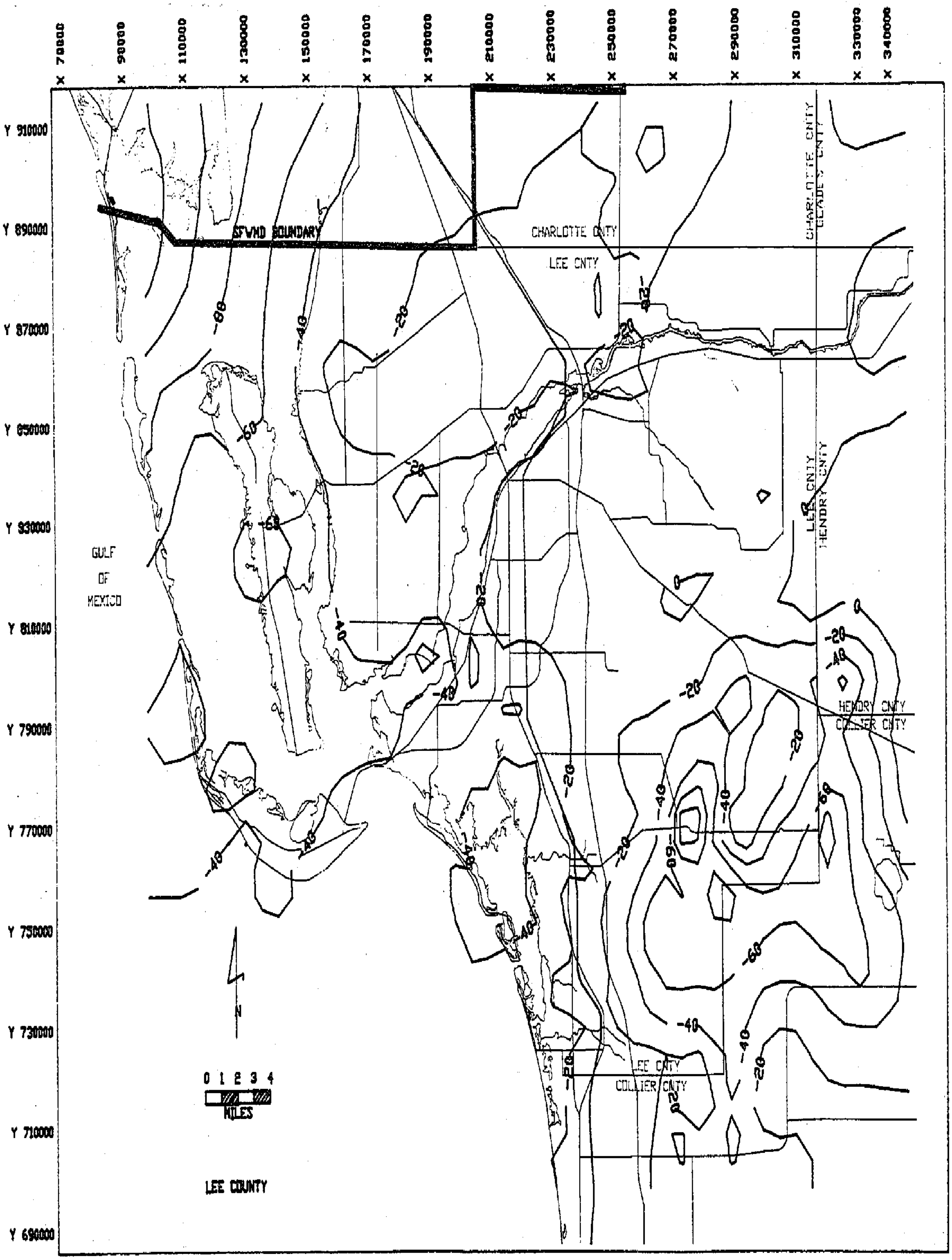

Figure A-39. BOTTOM ELEVATION OF LAYER 1 (WATER TABLE AQUIFER) IN FEET NGVD

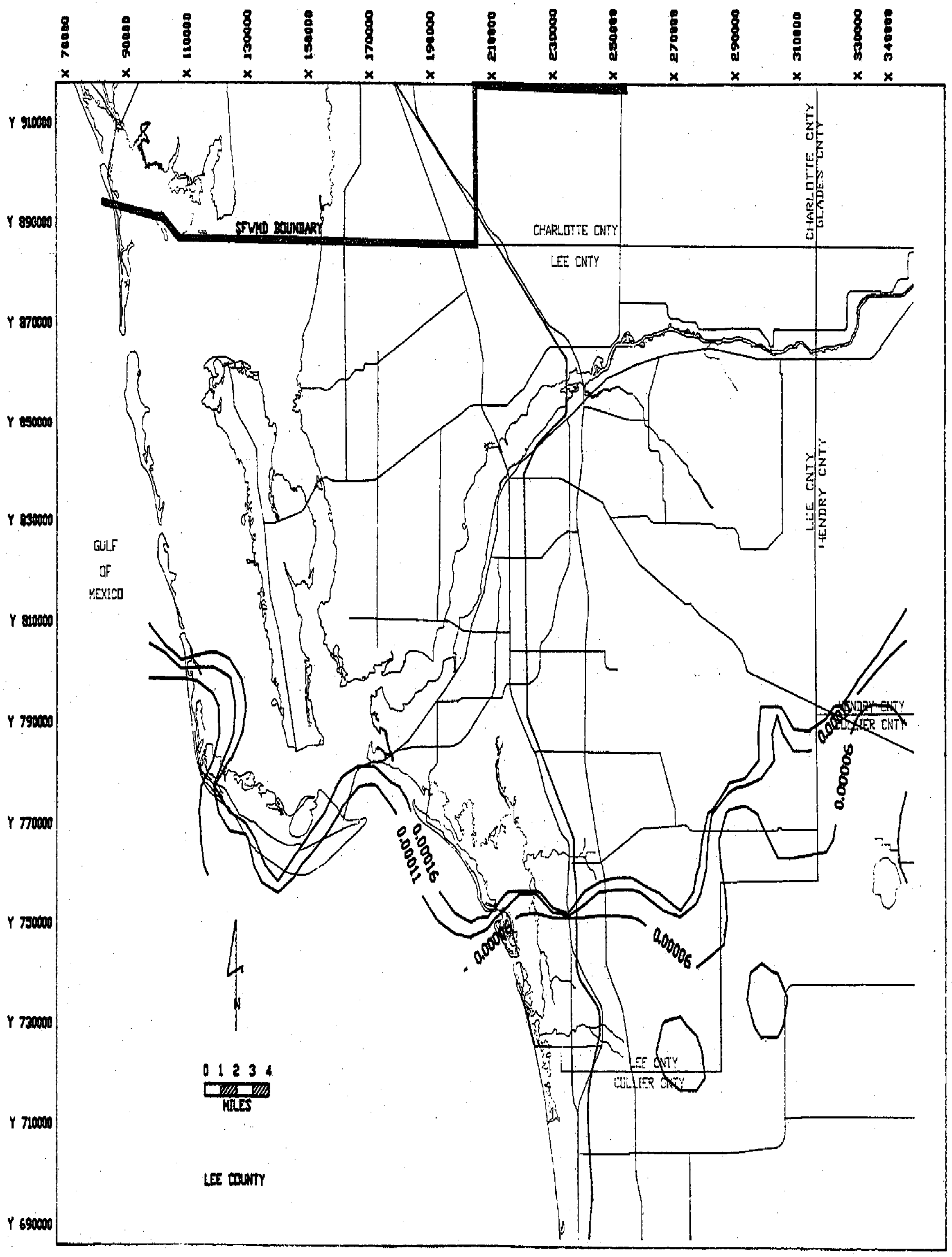

Figure A-40. VERTICAL CONDUCTANCE, BOTTOM OF LAYER 1 (LOWER TAMIAMI CONFINING BED) IN 1/DAY (0.0124 FT./DAY / LOWER TAMIAMI CONFINING BED THICKNESS)

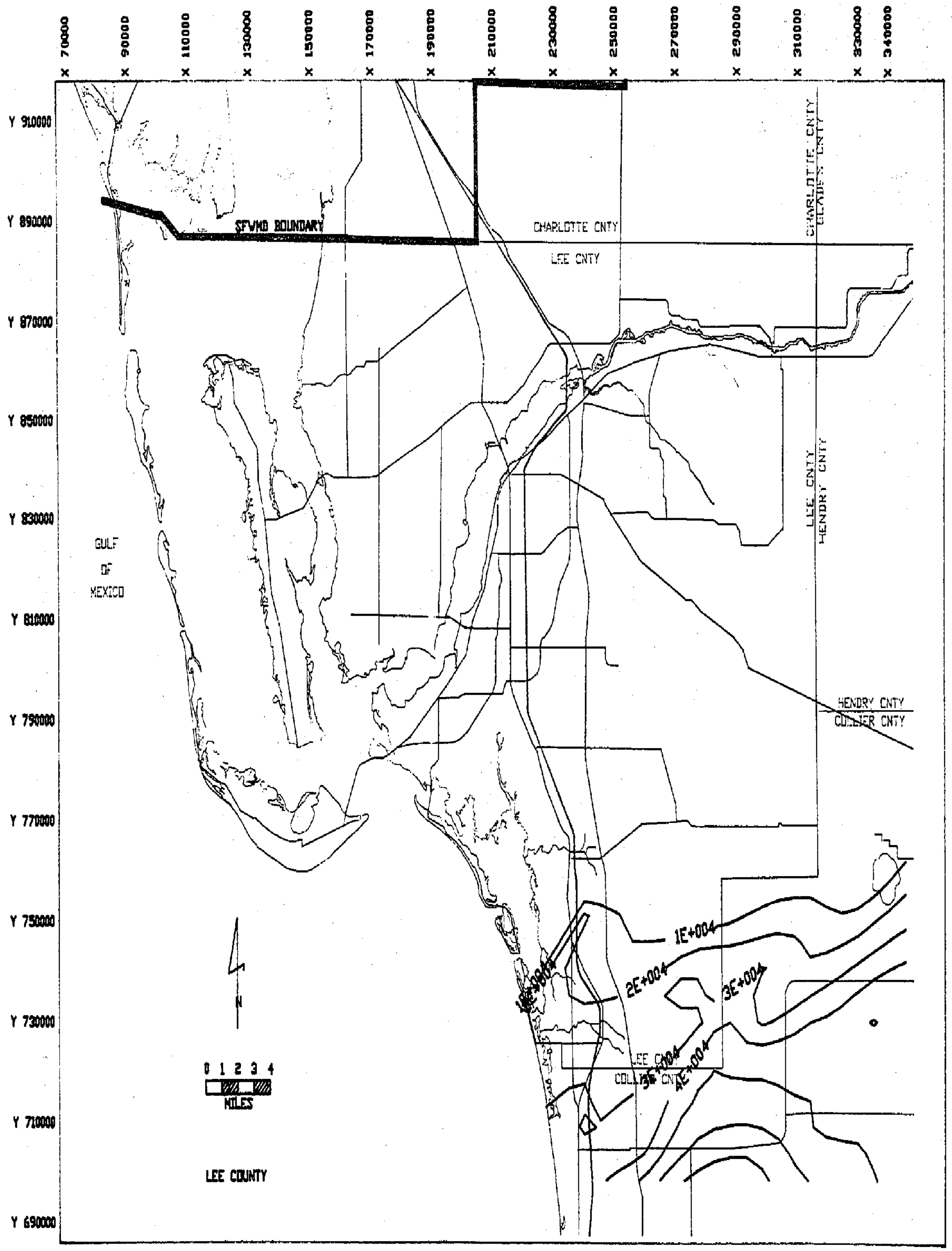

Figure A-41. TRANSMISSIVITY OF LAYER 2 (LOWER TAMIAMI AQUIFER) IN FT.2/DAY

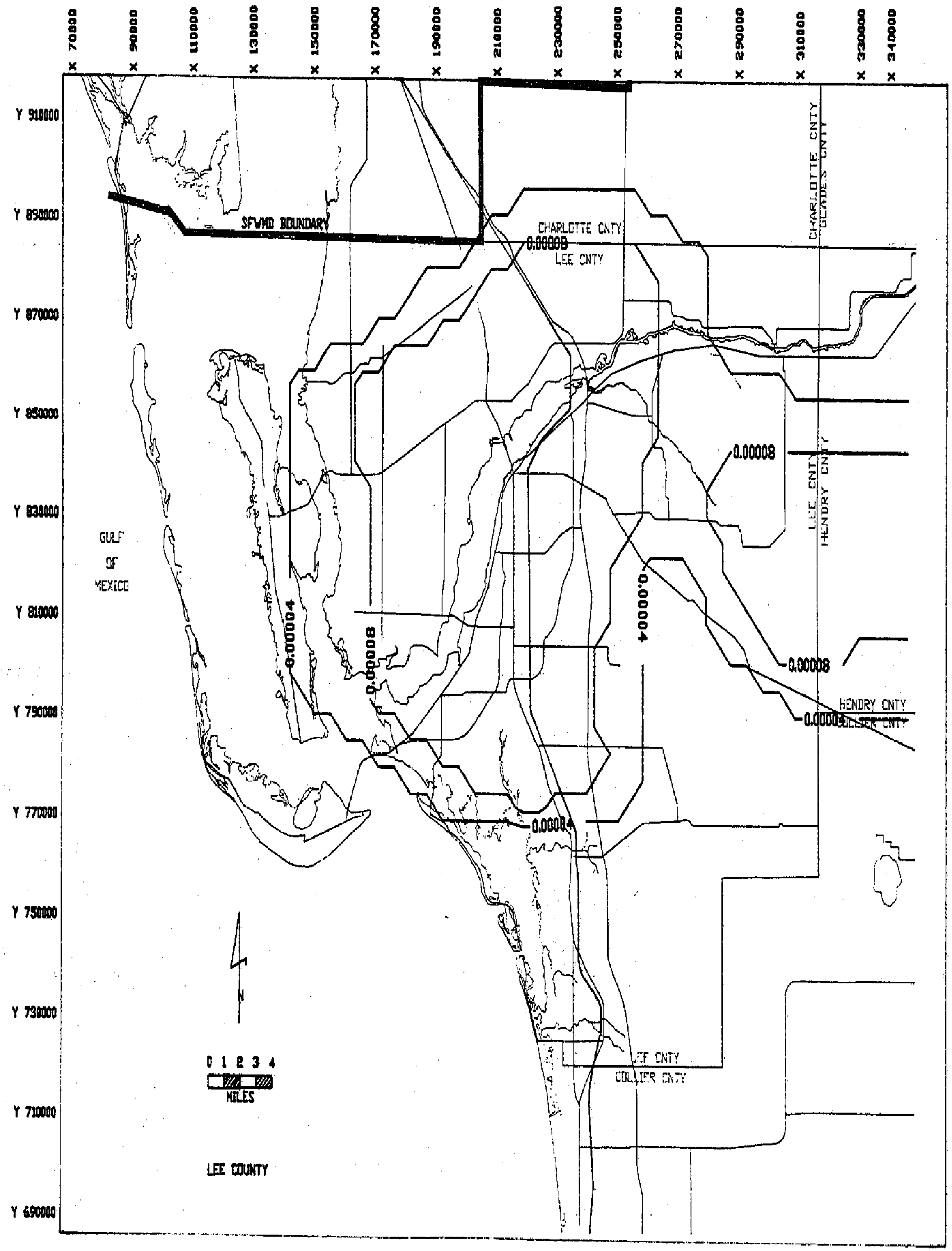

Figure A-42. VERTICAL CONDUCTANCE, BOTTOM OF LAYER 2 (UPPER HAWTHORN CONFINING BED) IN 1/DAY

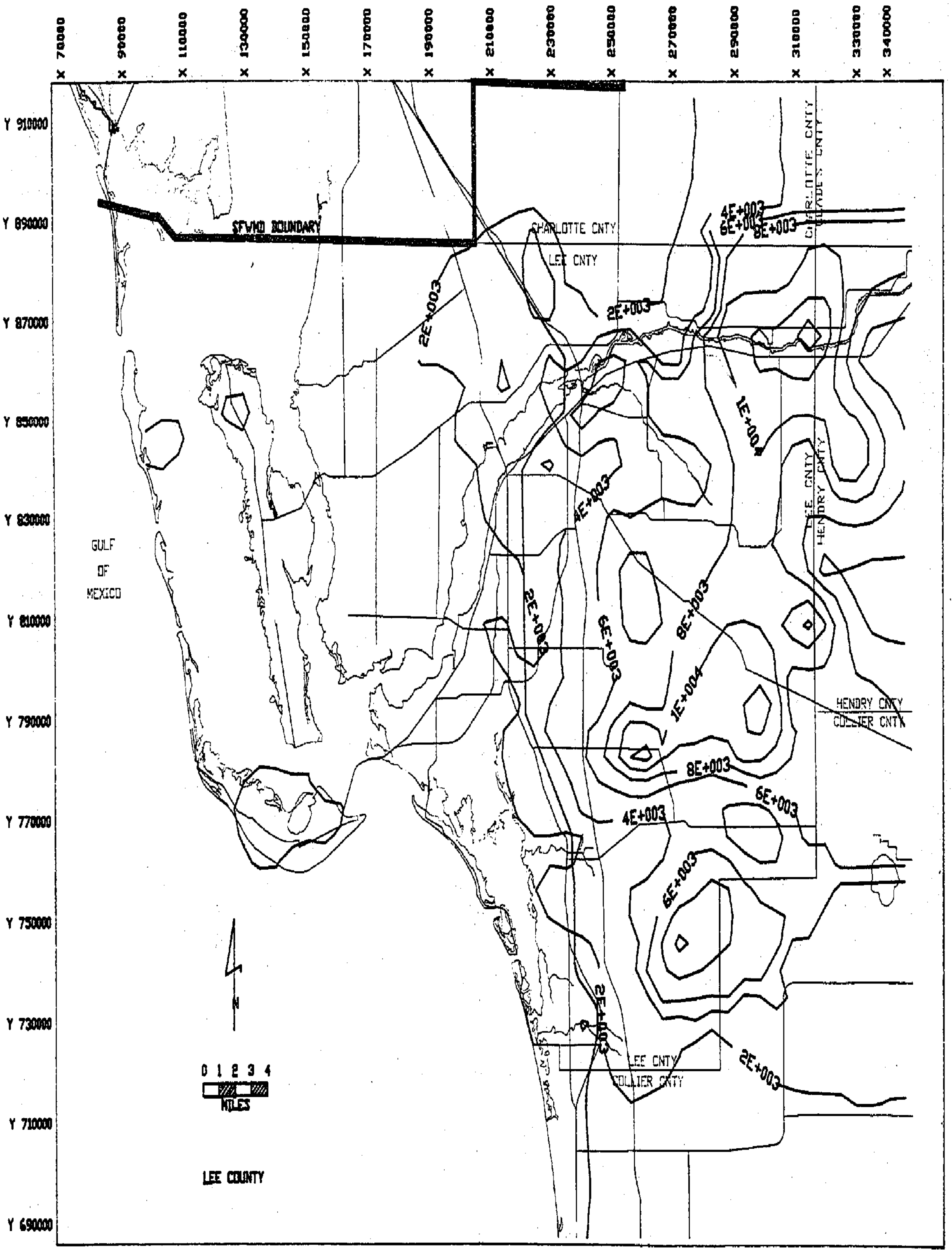

Figure A-43. TRANSMISSIVITY OF LAYER 3 (SANDSTONE AQUIFER) IN FT.2/DAY

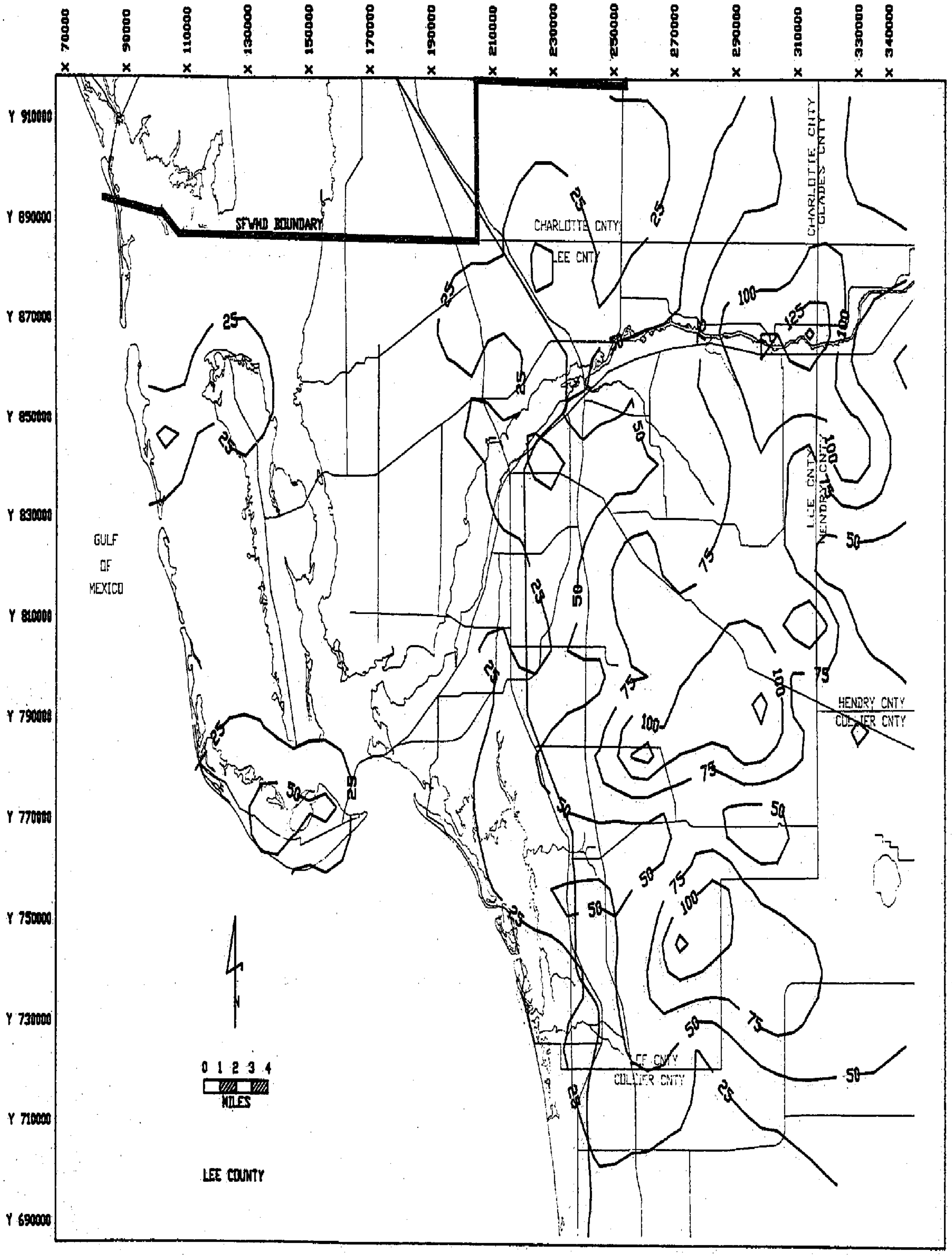

Figure A-44. THICKNESS OF LAYER 3 (SANDSTONE AQUIFER) IN FEET

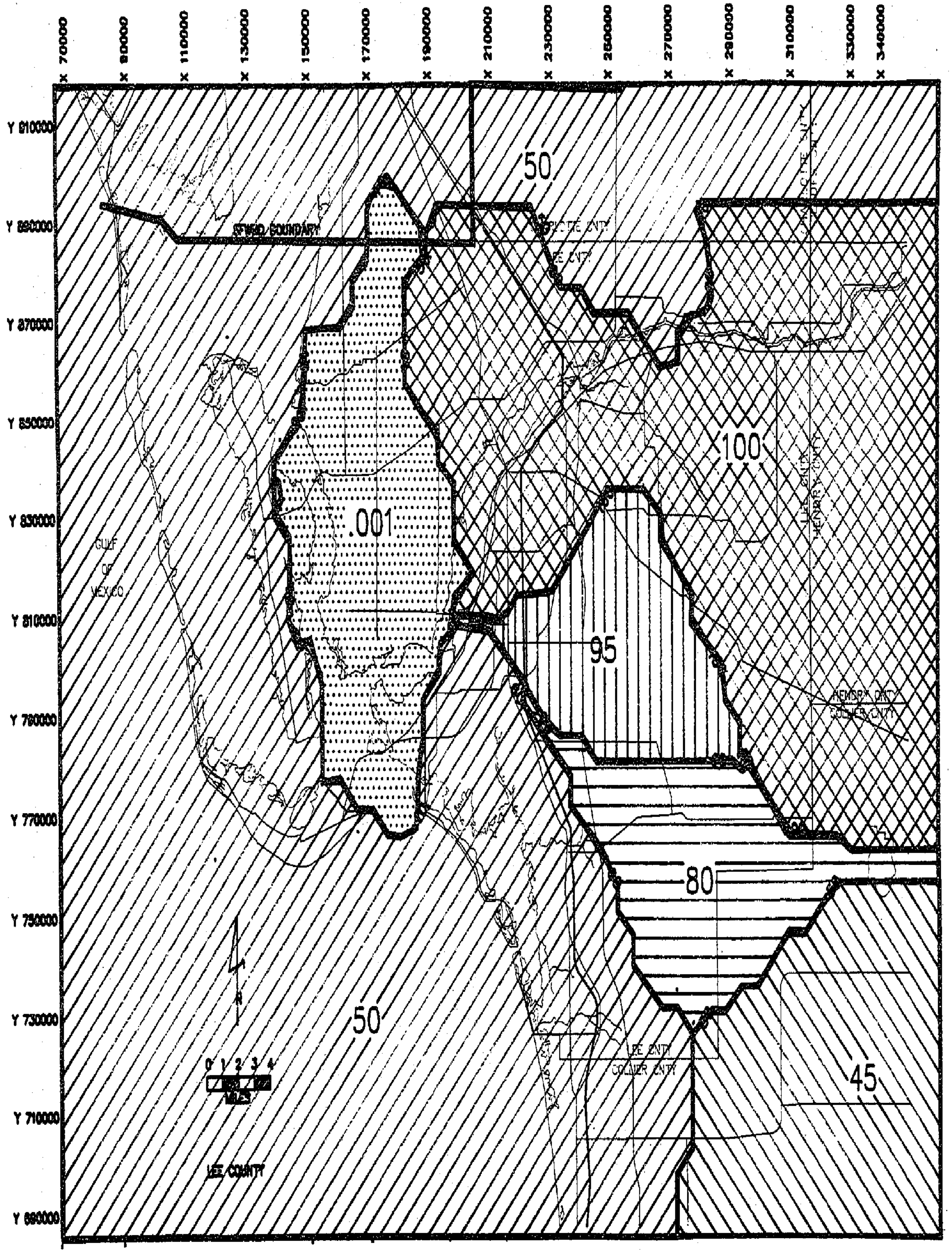

Figure A-45. HYDRAULIC CONDUCTIVITY OF LAYER 3 (SANDSTONE AQUIFER) IN FT./DAY

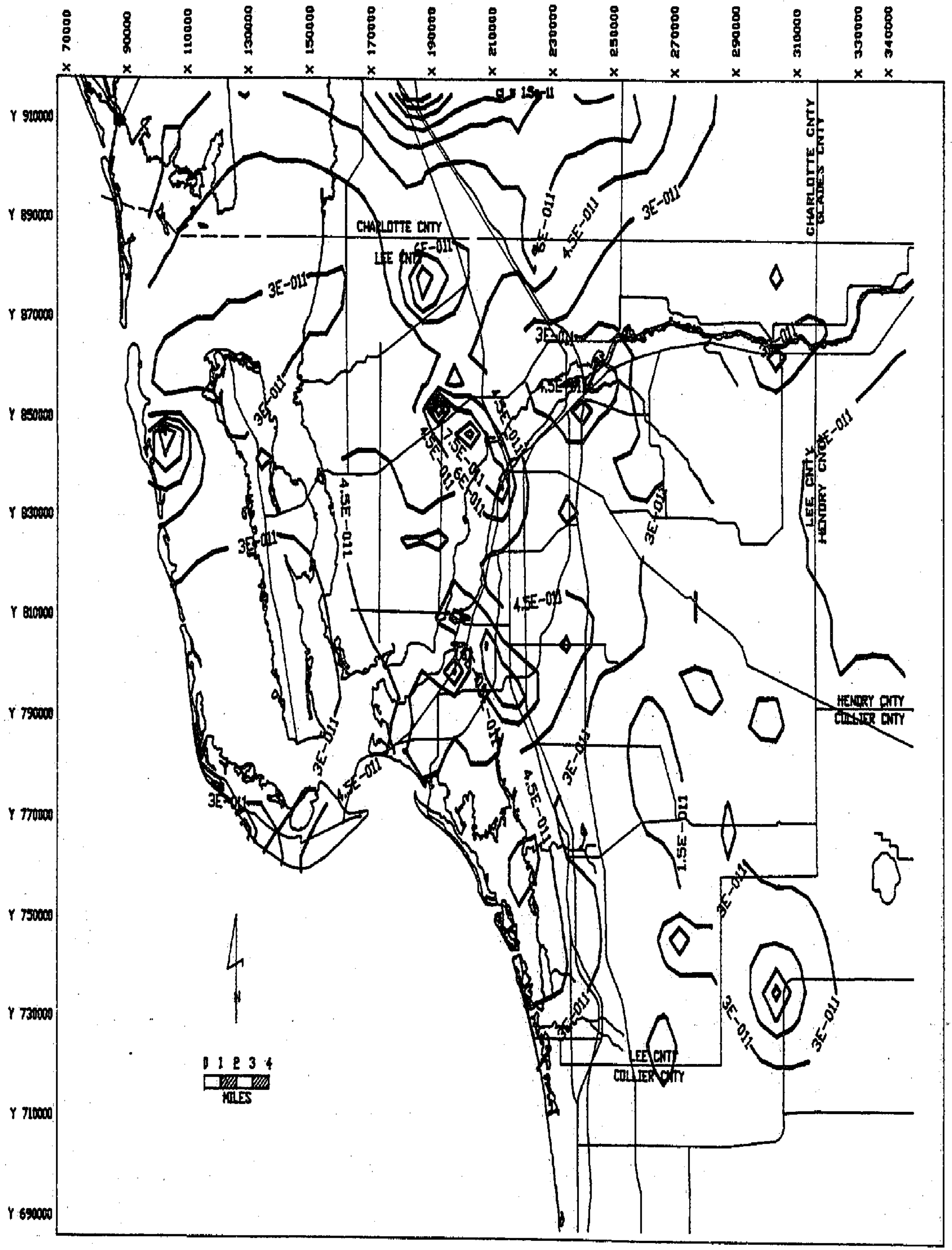

Figure A-46. VERTICAL CONDUCTANCE, BOTTOM OF LAYER 3 (SANDSTONE AQUIFER) IN 1/DAY (0.00017 FT/DAY / MID HAWTHORN CONFINING BED THICKNESS)

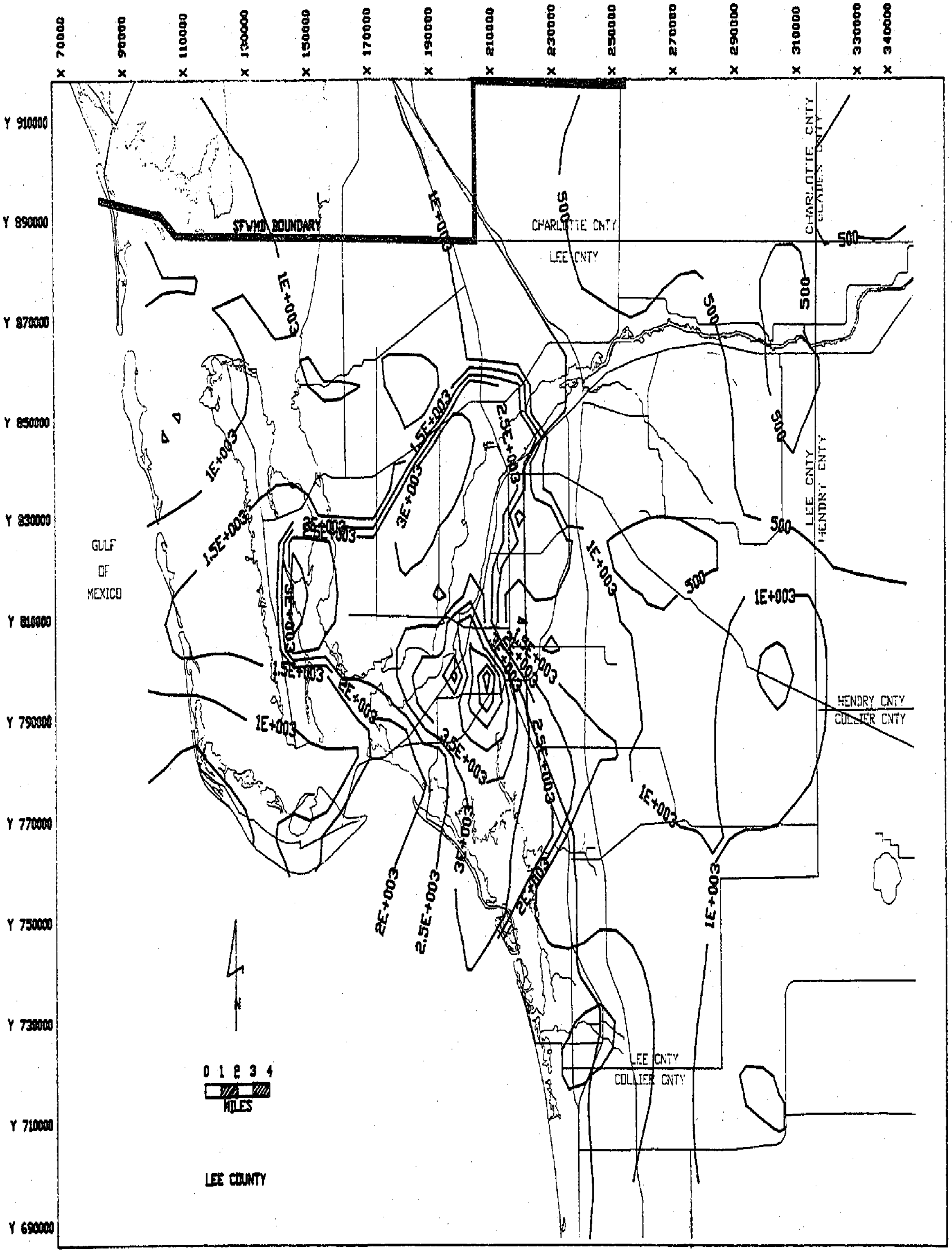

Figure A-47. TRANSMISSIVITY OF LAYER 4 (MID-HAWTHORN AQUIFER) IN FT.2/DAY

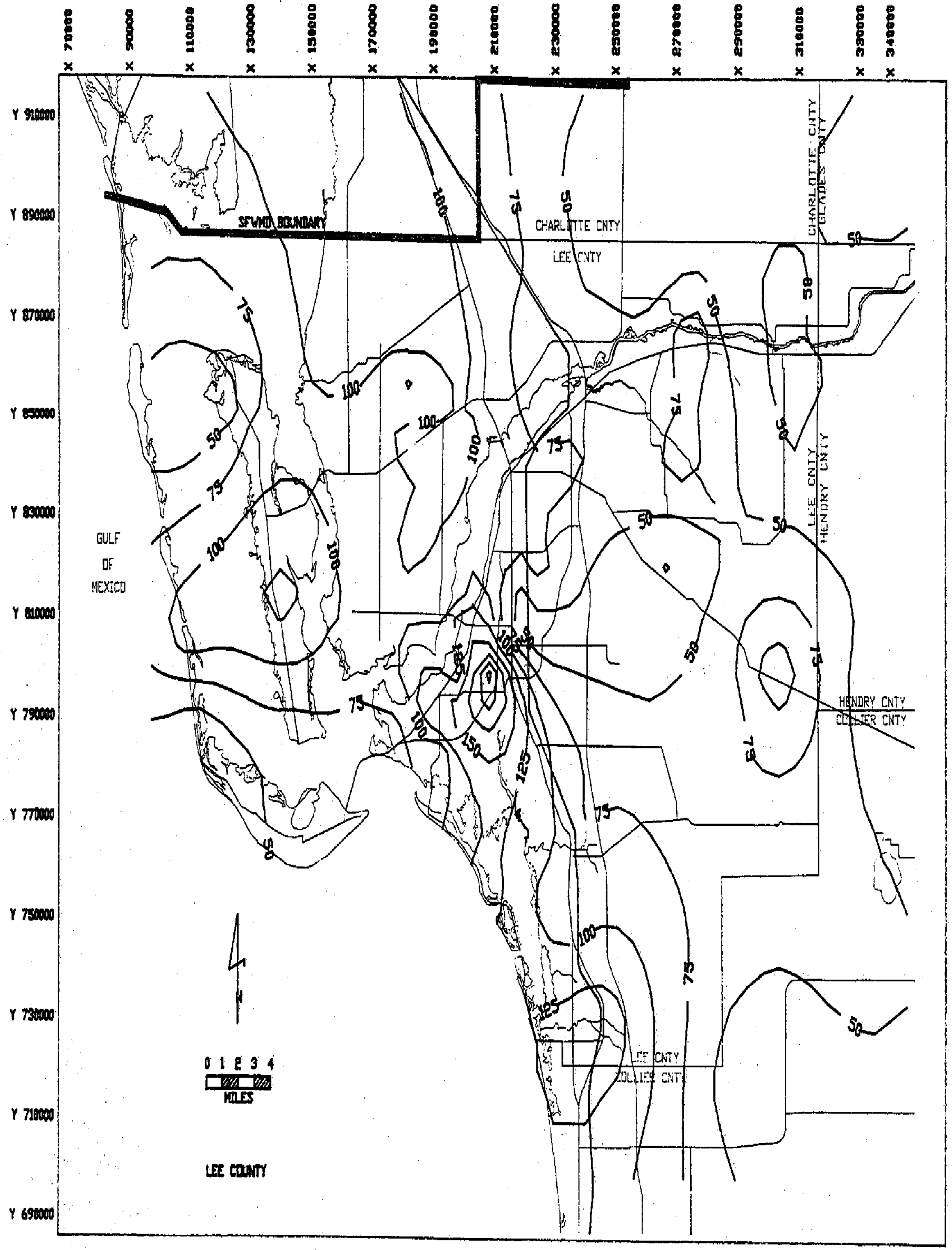

Figure A-48. THICKNESS OF LAYER 4 (MID-HAWTHORN AQUIFER) IN FEET

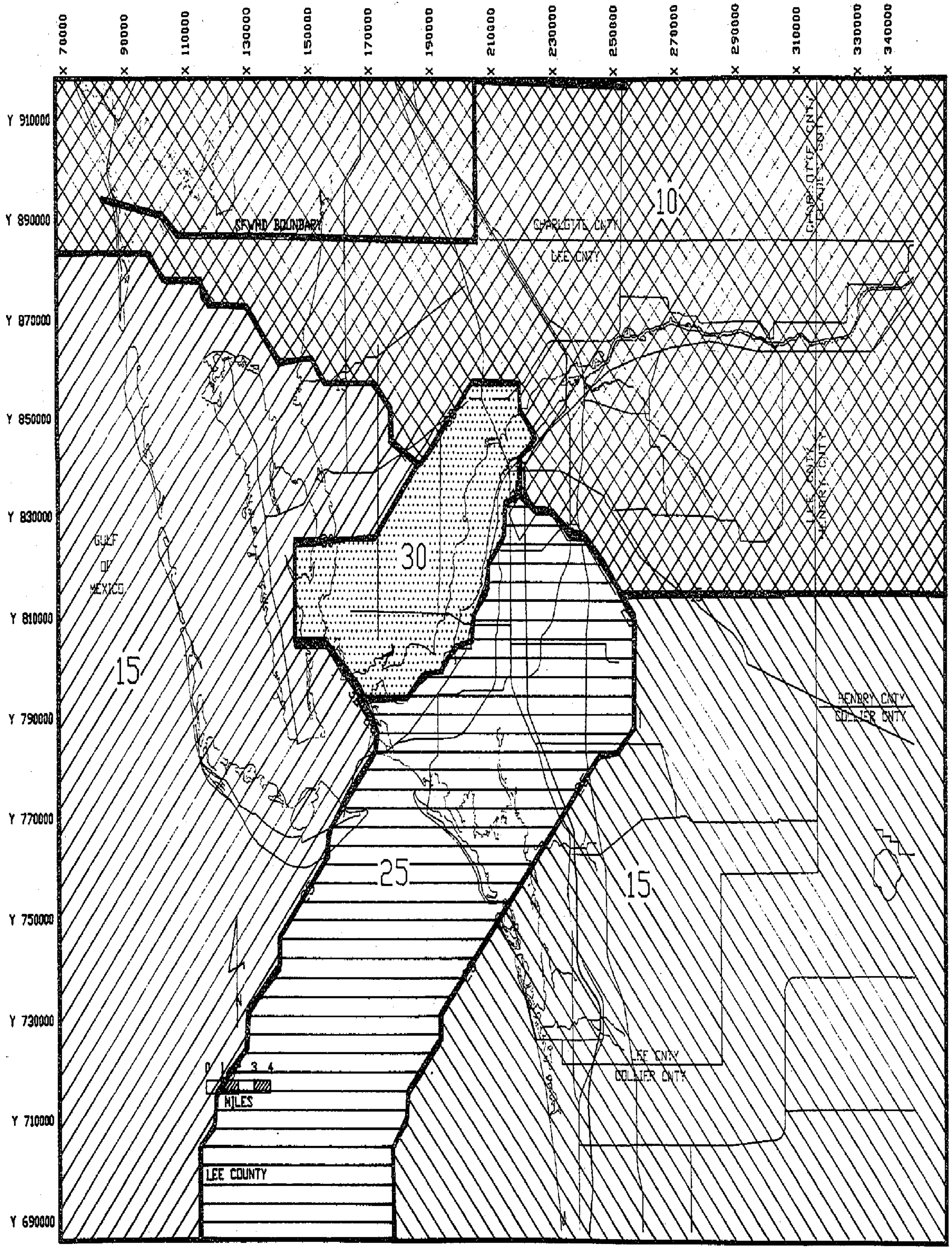

Figure A-49. HYDRAULIC CONDUCTIVITY OF LAYER 4 (MID-HAWTHORN AQUIFER) IN FT./DAY

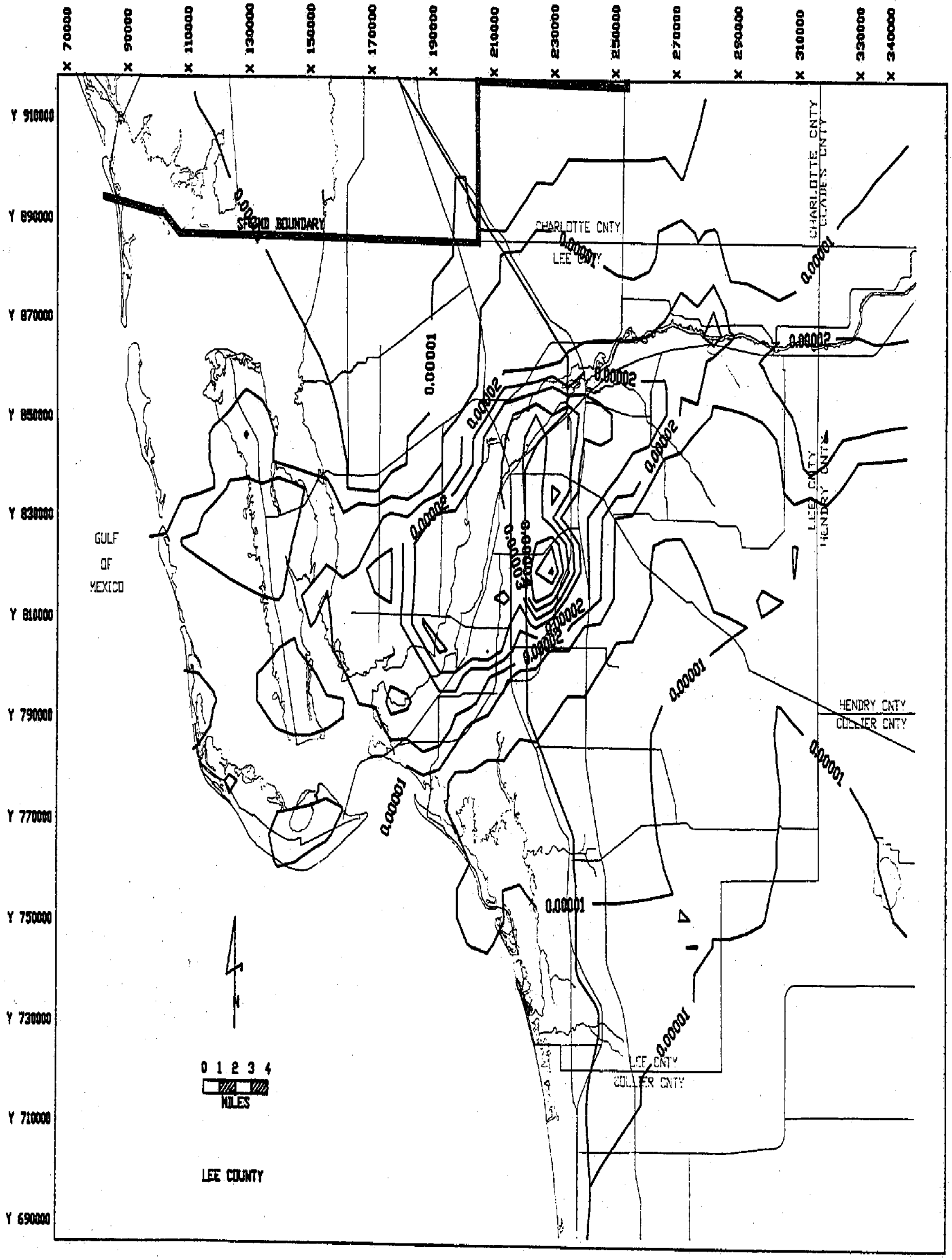

Figure A-50. VERTICAL CONDUCTANCE, BOTTOM OF LAYER 4 (LOWER HAWTHORN CONFINING BED) IN 1/DAY

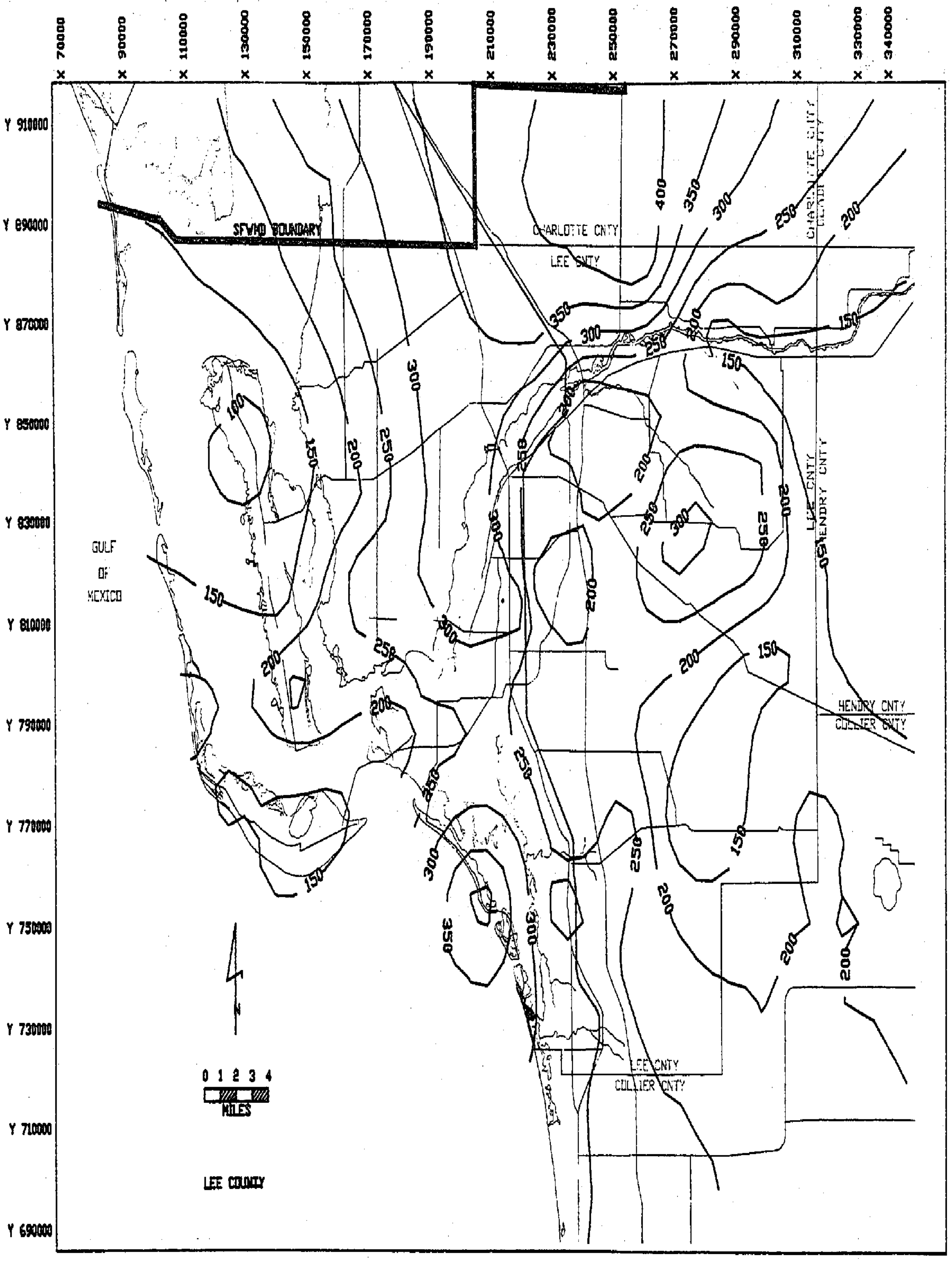

Figure A-51. THICKNESS OF THE LOWER HAWTHORN CONFINING BED (FEET)

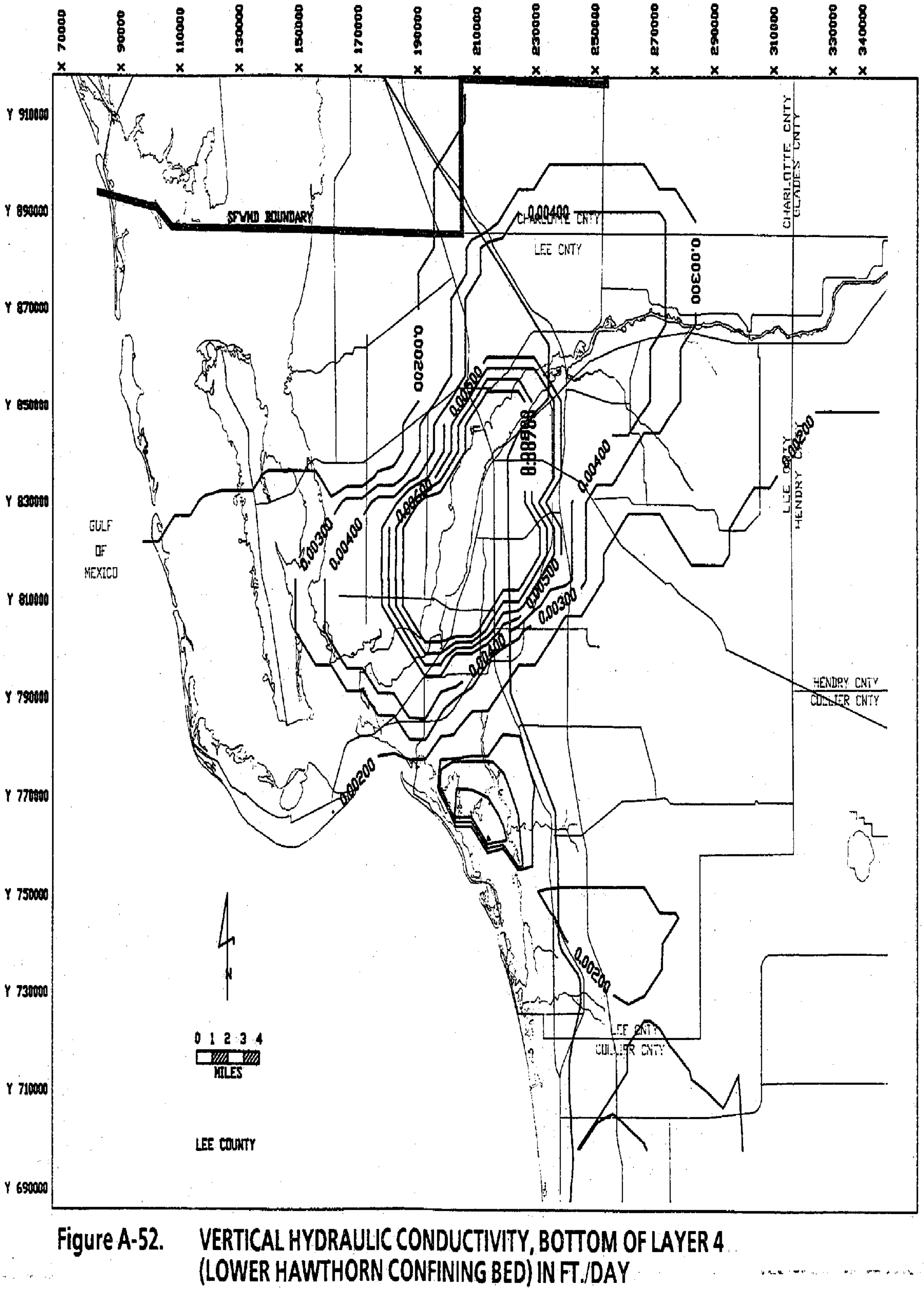

Figure A-52. VERTICAL HYDRAULIC CONDUCTIVITY, BOTTOM OF LAYER 4 (LOWER HAWTHORN CONFINING BED) IN FT./DAY

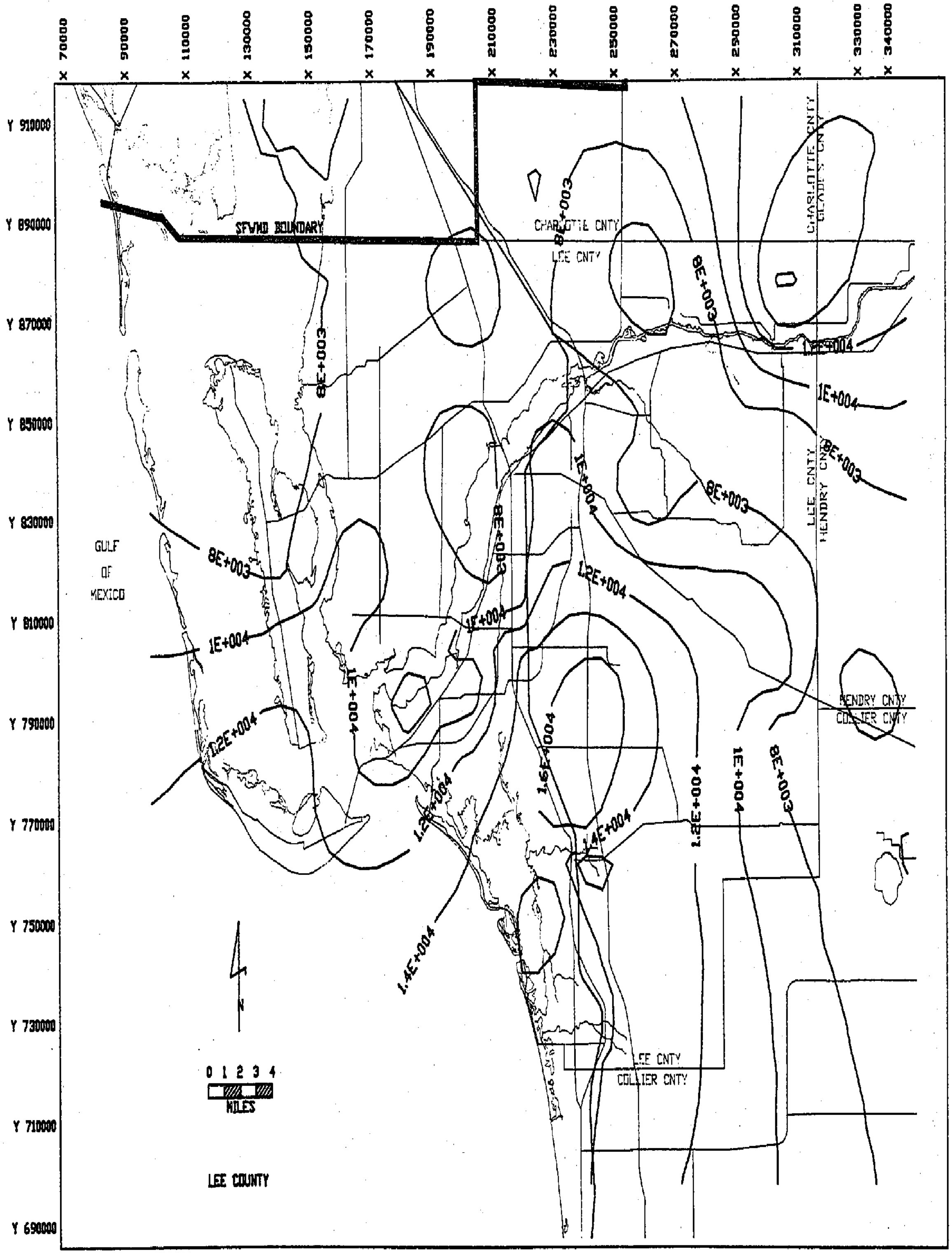

Figure A-53. TRANSMISSIVITY OF LAYER 5 (LOWER HAWTHORN CONFINING BED) IN FT.2/DAY (56 FT./DAY X LOWER HAWTHORN AQUIFER THICKNESS)

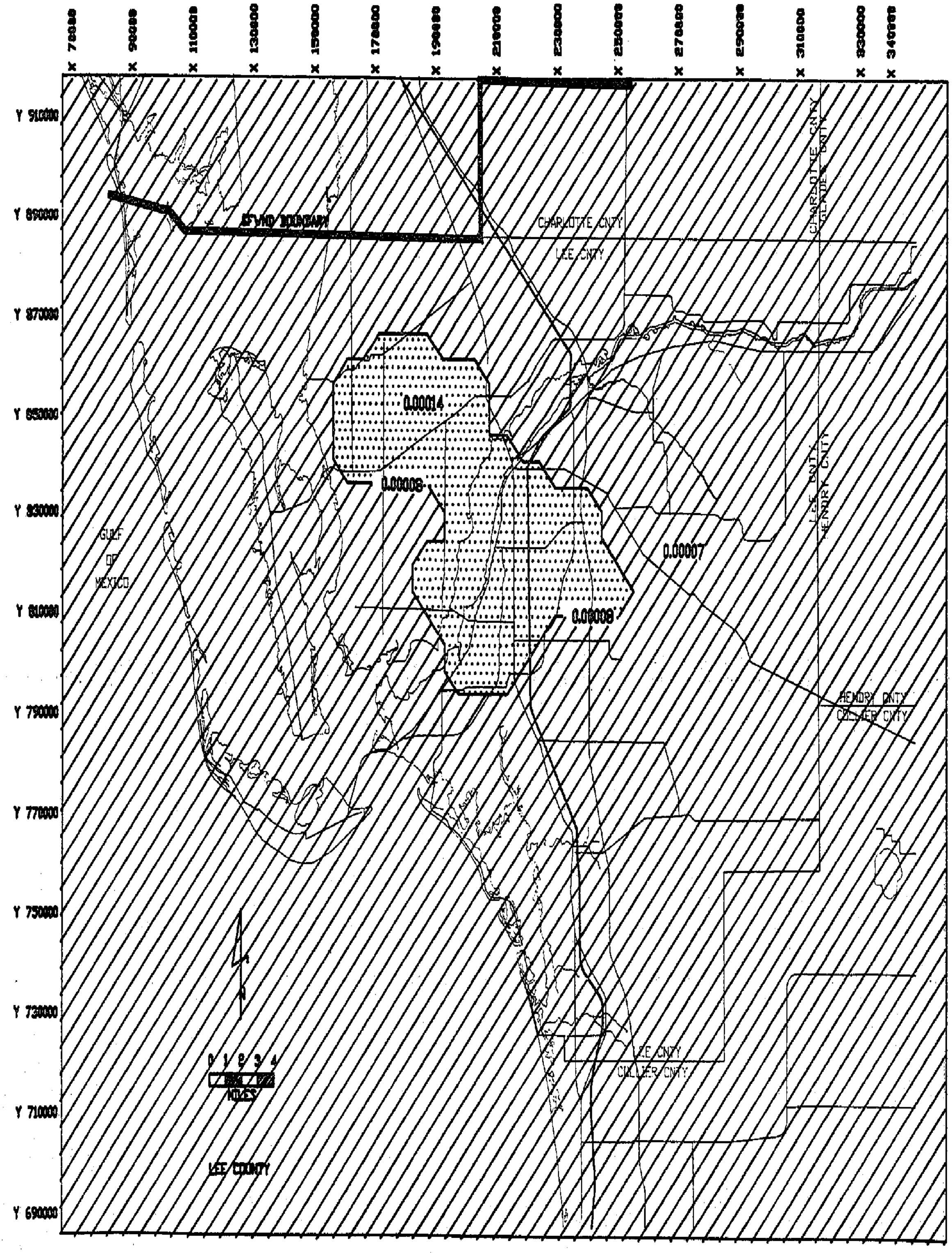

Figure A-54. VERTICAL CONDUCTANCE, BOTTOM OF LAYER 5 (1/DAY)

TABLE A-1: DESCRIPTION OF RIVER CELLS

Layer	Row	Column	Stage	Conductance	Bottom
1	11	36	3.00	0.16	-7.50
1	11	37	3.00	0.07	-5.00
1	12	37	4.00	0.03	-6.00
1	12	38	6.00	0.16	0.00
1	12	39	9.00	0.21	2.00
1	12	40	10.00	0.05	3.00
1	15	34	15.94	0.04	5.00
1	14	34	13.94	0.01	2.50
1	14	33	12.44	0.05	0.00
1	14	32	10.44	0.01	-2.50
1	13	32	8.44	0.16	-5.00
1	12	31	6.44	0.20	-7.50
1	12	30	3.44	0.22	-7.50
1	12	29	1.94	0.63	-7.50
1	11	27	1.00	0.51	-28.00
1	12	27	1.00	8.96	-28.00
1	11	28	1.00	1.43	-28.00
1	12	28	1.00	2.03	-28.00
1	11	29	1.00	5.09	-28.00
1	11	30	1.00	1.43	-28.00
1	10	30	1.00	1.08	-28.00
1	10	31	1.00	1.63	-28.00
1	10	32	1.00	1.02	-28.00
1	10	33	1.00	1.43	-28.00
1	10	34	1.00	1.08	-28.00
1	10	35	3.15	1.22	-24.00
1	10	36	3.15	1.12	-24.00
1	10	37	3.15	1.02	-24.00
1	10	38	3.15	0.81	-24.00
1	10	39	3.15	0.81	-23.00
1	11	40	3.15	0.82	-22.00
1	10	41	3.15	1.08	-17.00
1	10	42	3.15	1.01	-17.00
1	10	43	3.15	1.04	-17.00
1	10	44	3.15	0.93	-17.00
1	10	45	3.15	0.79	-17.00
1	9	45	3.15	0.93	-17.00
1	8	46	3.15	0.92	-17.00
1	8	47	3.15	0.92	-17.00
1	8	48	3.15	0.62	-17.00
1	30	25	7.77	0.41	-2.50
1	29	25	7.77	0.07	-2.50
1	30	26	7.77	0.15	-2.50
1	29	26	7.77	0.17	-2.50
1	30	27	7.77	0.07	-2.50
1	29	27	7.77	0.04	-2.50
1	30	28	7.77	0.12	-2.50
1	29	28	4.28	0.08	0.00
1	28	24	0.00	0.22	-2.50

TABLE A-1: DESCRIPTION OF RIVER CELLS (Continued)

Layer	Row	Column	Stage	Conductance	Bottom
1	27	24	1.00	0.30	-2.50
1	27	25	3.00	0.02	-1.50
1	28	25	5.00	0.05	0.00
1	33	26	6.53	0.46	-2.50
1	34	26	6.53	0.41	-3.00
1	35	26	6.53	0.04	-4.00
1	34	27	6.53	0.07	0.00
1	36	26	3.53	0.54	-7.00
1	36	27	3.53	0.39	-5.50
1	36	28	3.53	0.25	-5.50
1	36	29	3.53	0.25	-5.00
1	36	30	3.53	0.06	-7.00
1	37	29	6.53	0.11	-3.60
1	37	30	8.53	0.05	3.00
1	35	30	6.53	0.02	4.00
1	40	27	4.20	0.81	-4.00
1	40	28	4.20	0.20	-4.00
1	41	29	4.20	0.10	-4.00
1	41	30	10.02	0.08	3.00
1	41	31	10.02	0.06	7.00
1	41	32	10.02	0.06	7.00
1	41	33	10.02	0.06	7.00
1	41	34	10.02	0.06	8.00
1	41	35	10.02	0.05	9.00
1	41	36	10.02	0.05	9.00
1	9	34	5.00	0.05	-4.00
1	9	35	8.00	0.06	-2.50
1	8	35	11.00	0.03	-5.00
1	8	36	13.00	0.03	-2.50
1	28	23	0.00	0.29	-10.00
1	27	23	0.00	0.71	-7.00
1	26	23	1.00	0.42	-8.50
1	25	23	2.00	0.24	-7.00
1	24	23	3.00	0.15	-4.50
1	17	24	11.00	0.08	6.00
1	18	24	11.00	0.10	6.00
1	19	24	11.00	0.10	5.00
1	20	24	9.50	0.10	4.00
1	21	24	9.50	0.10	4.00
1	22	24	8.00	0.10	2.50
1	23	34	5.50	0.10	0.00
1	24	24	5.50	0.10	-2.50
1	25	24	4.00	0.14	-2.50

TABLE A-2: DESCRIPTION OF DRAIN CELLS

Layer	Row	Column	Elevation	Conductance
1	25	42	19.5	3.6667
1	24	42	19.5	3.6667
1	23	42	19.5	3.6667
1	22	42	19.5	3.6667
1	21	42	19.5	3.6667
1	20	42	18.0	3.6667
1	20	43	18.0	5.5000
1	19	42	18.0	3.6667
1	19	43	18.0	5.5000
1	18	42	18.0	3.6667
1	18	43	18.0	5.5000
1	17	42	18.0	3.6667
1	17	43	18.0	5.5000
1	16	42	14.5	3.6667
1	16	43	14.5	5.5000
1	15	42	14.5	3.6667
1	15	43	14.5	5.5000
1	20	40	17.8	8.2500
1	20	39	13.4	7.1500
1	20	38	19.4	8.2500
1	19	37	13.4	8.2500
1	19	36	11.0	3.3000
1	19	35	14.5	8.2500
1	18	35	11.0	9.3500

TABLE A-3: ORIENTATION AND DIMENSIONS OF THE MODEL GRID

East Zone Planar Coordinate Location of
The Origin Point (Upper-Left Corner):

996652 North
15538 East

Row	Cell Width, Row Direction (Feet)	Column	Cell Width, Column Direction (Feet)
1	40000	1	40000
2	27000	2	27000
3	18000	3	18000
4	12000	4	12000
5	8000	5	8000
6	5280	6	5280
7	5280	7	5280
8	5280	8	5280
9	5280	9	5280
10	5280	10	5280
11	5280	11	5280
12	5280	12	5280
13	5280	13	5280
14	5280	14	5280
15	5280	15	5280
16	5280	16	5280
17	5280	17	5280
18	5280	18	5280
19	5280	19	5280
20	5280	20	5280
21	5280	21	5280
22	5280	22	5280
23	5280	23	5280
24	5280	24	5280
25	5280	25	5280
26	5280	26	5280
27	5280	27	5280
28	5280	28	5280
29	5280	29	5280
30	5280	30	5280
31	5280	31	5280
32	5280	32	5280
33	5280	33	5280
34	5280	34	5280
35	5280	35	5280
36	5280	36	5280

Total Width of the Model, Row Direction:	300360 Feet
Total Width of the Model, Column Direction:	332040 Feet

TABLE A-3: ORIENTATION AND DIMENSIONS OF THE MODEL GRID (Continued)

East Zone Planar Coordinate Location of
The Origin Point (Upper-Left Corner):

996652 North
15538 East

Row	Cell Width, Row Direction (Feet)	Column	Cell Width, Column Direction (Feet)
37	5280	37	5280
38	5280	38	5280
39	5280	39	5280
40	5280	40	5280
41	5280	41	5280
42	5280	42	5280
		43	5280
		44	5280
		45	5280
		46	5280
		47	5280
		48	5280

Total Width of the Model, Row Direction:	300360 Feet
Total Width of the Model, Column Direction:	332040 Feet

APPENDIX B

COMPARISONS OF COMPUTED AND OBSERVED WATER LEVELS

In the following hydrographs, observed water levels in monitoring wells are compared with computed heads in cells which correspond to the monitor well locations. A "+" shows the observed level and a "*" shows the corresponding computed head. If the levels coincide, only the asterisk is shown. The letter "M" means that the observed water level is missing for the month.

Figures B-1 through B-5 show the locations of the monitor wells used for the comparisons.

LIST OF FIGURES - APPENDIX B

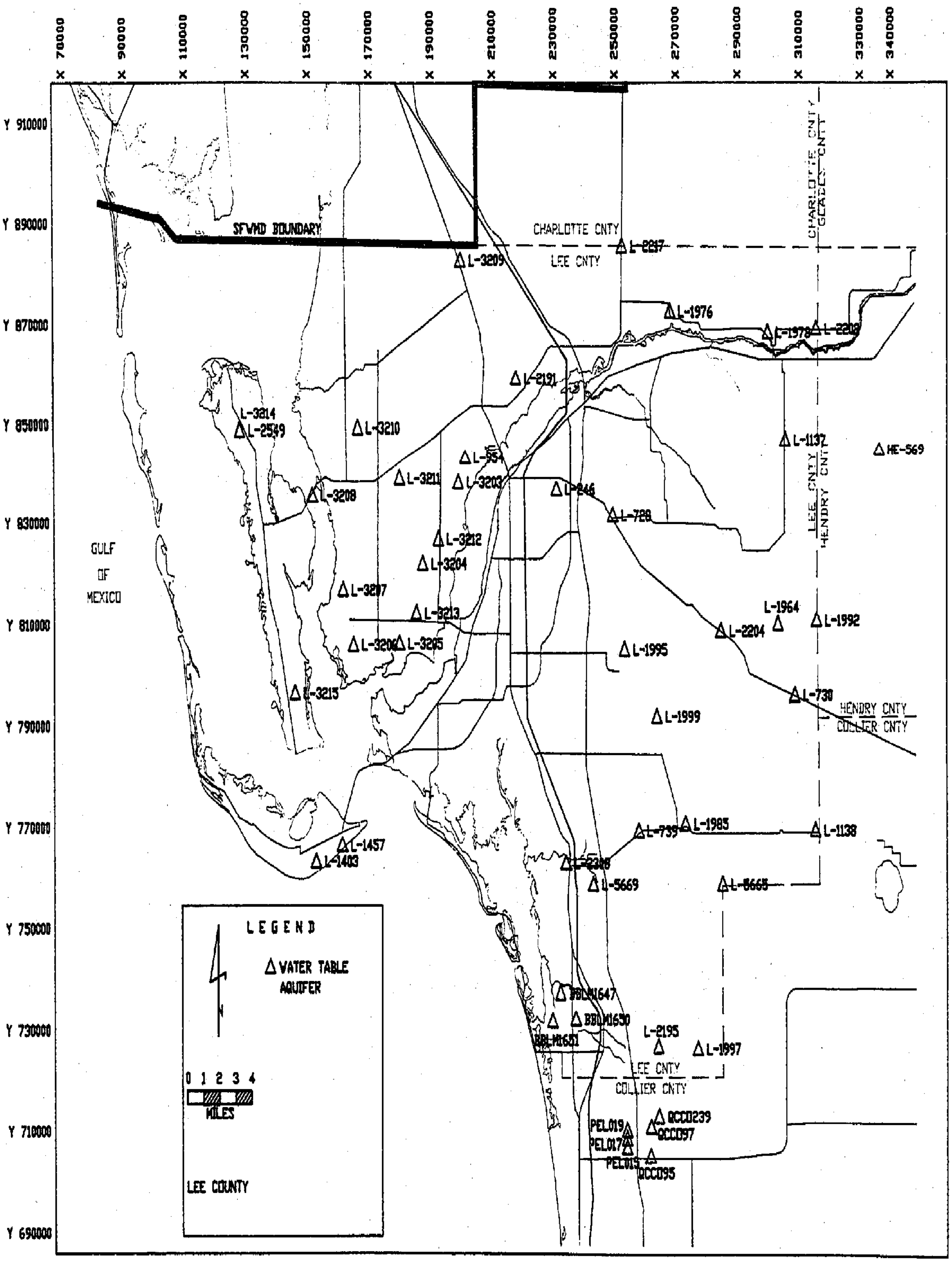

Figure B-1. LOCATION OF WATER LEVEL MONITORING WELLS, WATER TABLE AQUIFER (LAYER 1)

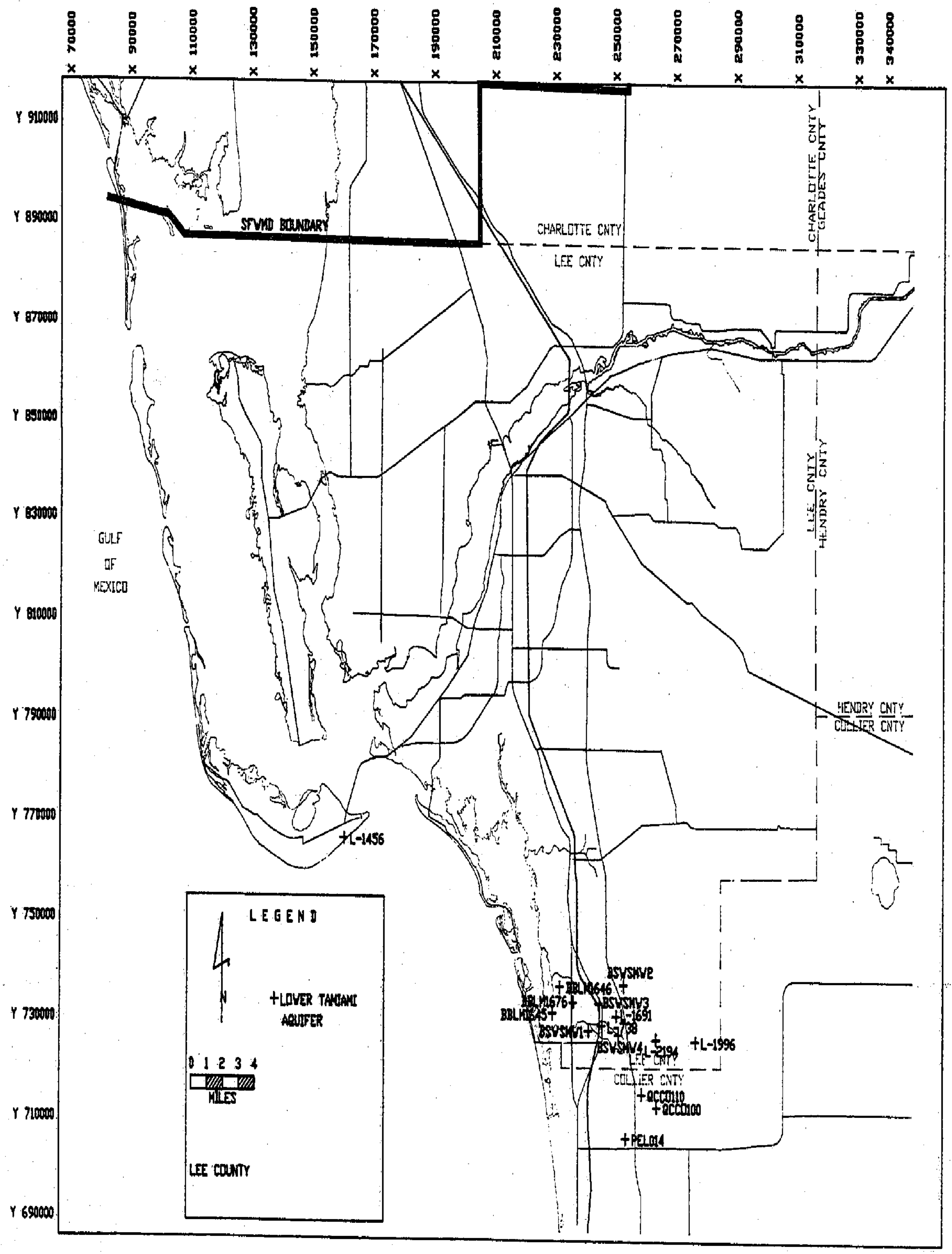

Figure B-2. LOCATION OF WATER LEVEL MONITORING WELLS, LOWER TAMIAMI AQUIFER (LAYER 2)

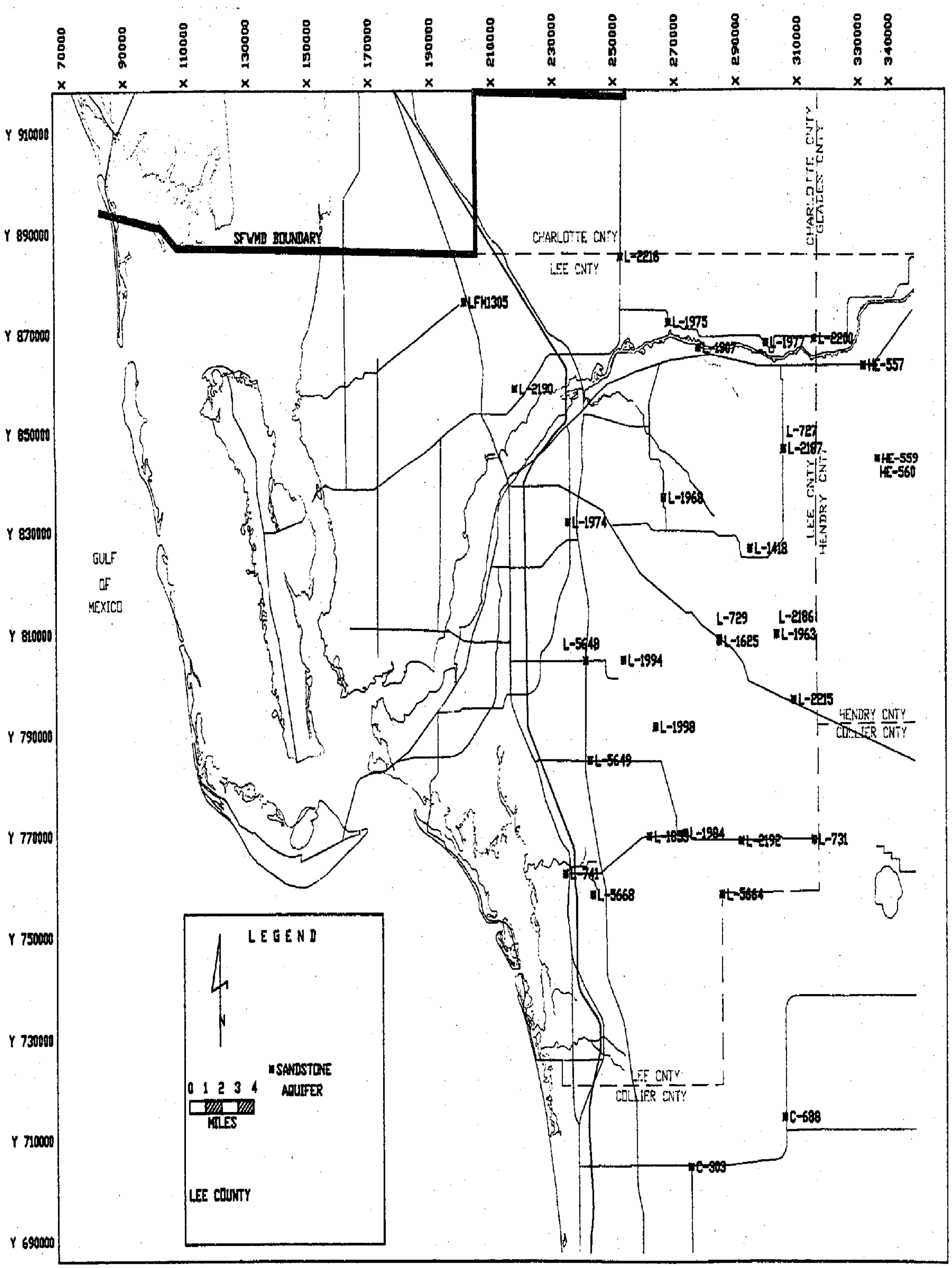

Figure B-3. LOCATION OF WATER LEVEL MONITORING WELLS, SANDSTONE AQUIFER (LAYER 3)

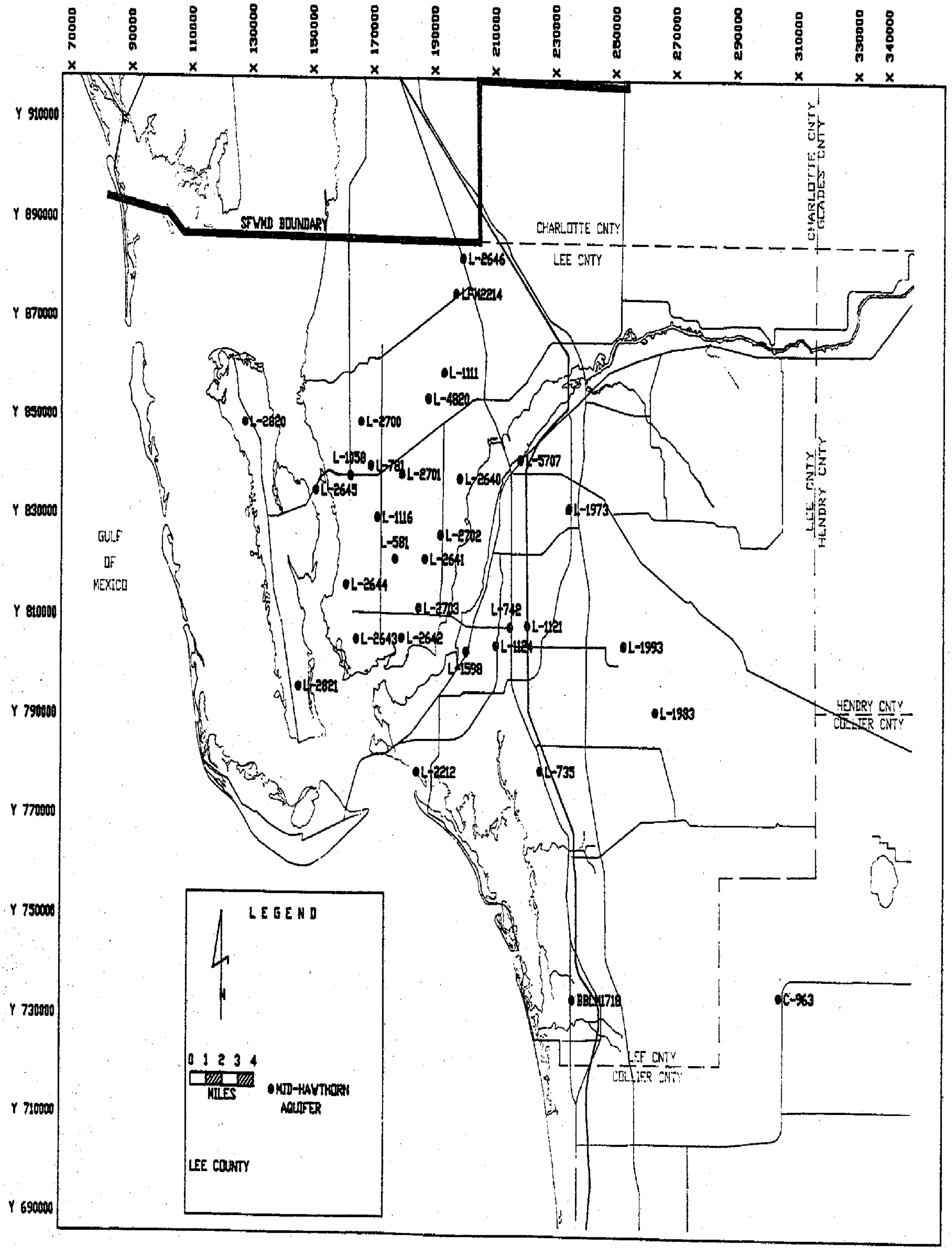

Figure B-4. LOCATION OF WATER LEVEL MONITORING WELLS, MID-HAWTORN AQUIFER (LAYER 4)

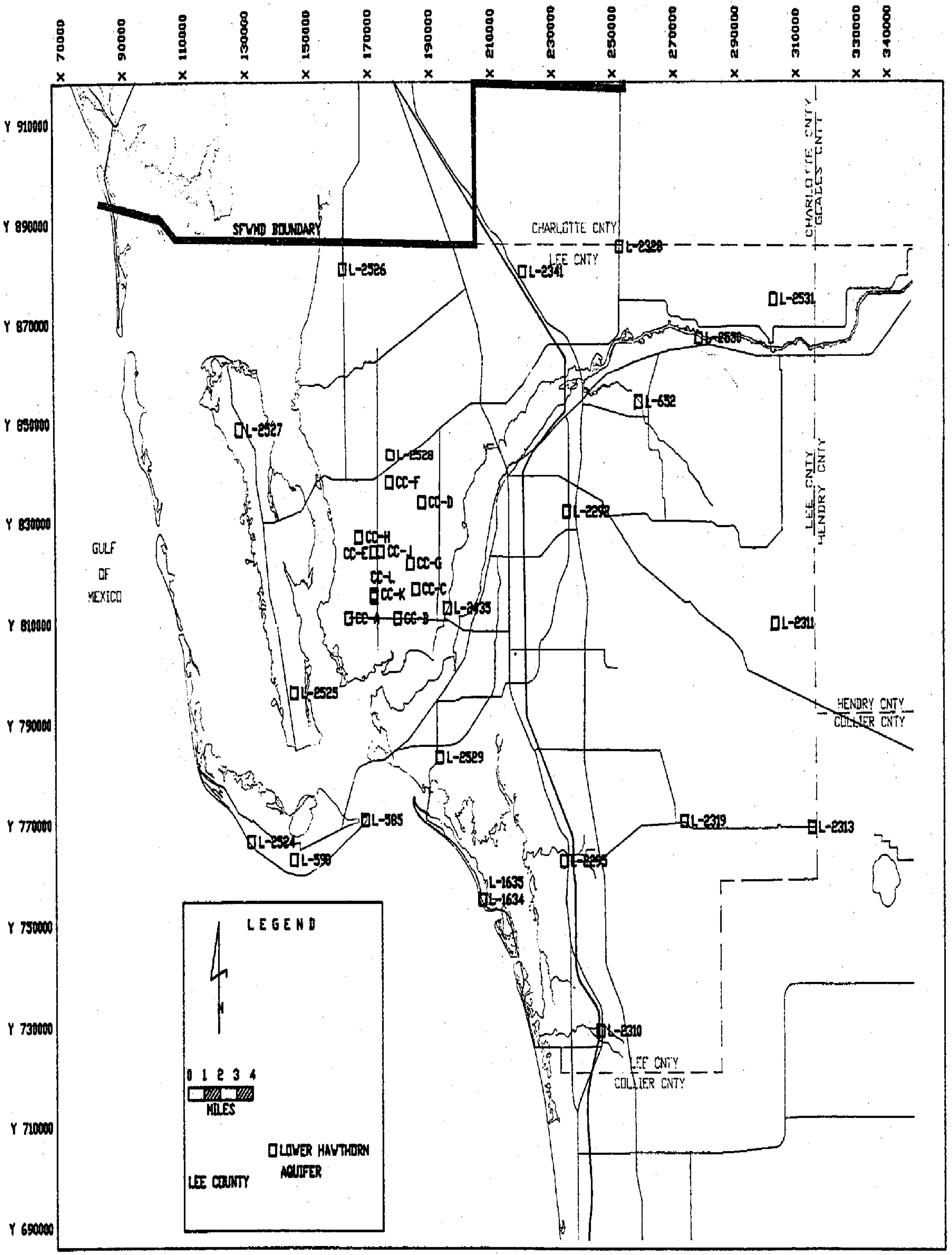

Figure B-5. LOCATION OF WATER LEVEL MONITORING WELLS, LOWER HAWTHORN AQUIFER (LAYER 5)

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STATION:   HE-569     LAYER:  1      ROW: 14        COLUMN: 46

                 Water Level, Feet (NGVD)

      17        27        37        47        57        67        77
       +.........+.........+.........+.........+.........+.........+
APR 85 :    + *
MAY 85 :    +*
JUN 85 :   +  *
JUL 85 :   +   *
AUG 85 :    +  *
SEP 85 :    +  *
OCT 85 :    + *
NOV 85 :    + *
DEC 85 :     +*
JAN 86 :    +*
FEB 86 :    +*
MAR 86 :   +  *
APR 86 :    +*
MAY 86 :   + *
JUN 86 :  +    *
JUL 86 :    +  *
AUG 86 :     + *
SEP 86 :    +  *
```

```
STATION:   L-1138     LAYER:  1      ROW: 29        COLUMN: 42

                 Water Level, Feet (NGVD)

      17        27        37        47        57        67        77
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *
MAY 85 :   *
JUN 85 :   *
JUL 85 :    *
AUG 85 :    *
SEP 85 :    +*
OCT 85 :    *
NOV 85 M    *
DEC 85 :   *+
JAN 86 :   *+
FEB 86 :   *+
MAR 86 :   *+
APR 86 :  *+
MAY 86 :  * +
JUN 86 :    *+
JUL 86 :    *+
AUG 86 :    *+
SEP 86 :    *+
```

```
STATION:   L-1403     LAYER:  1      ROW: 30       COLUMN: 11

                 Water Level, Feet (NGVD)

      -4         6        16        26        36        46        56
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  + *
JUN 85 :   +*
JUL 85 :     *+
AUG 85 :     *
SEP 85 :     *
OCT 85 :     *
NOV 85 :     *
DEC 85 :    *
JAN 86 :    *
FEB 86 :   *+
MAR 86 :    *
APR 86 :   *
MAY 86 :   +*
JUN 86 :    +*
JUL 86 :     *+
AUG 86 :     +*
SEP 86 :     *
```

```
STATION:   L-1457     LAYER:  1      ROW: 29       COLUMN: 13

                 Water Level, Feet (NGVD)

      -2         8        18        28        38        48        58
       +.........+.........+.........+.........+.........+.........+
APR 85 :  *
MAY 85 :  *
JUN 85 :   *
JUL 85 :   *+
AUG 85 :   *
SEP 85 :   *
OCT 85 :   *
NOV 85 :  +*
DEC 85 :  *
JAN 86 :  *
FEB 86 :  *
MAR 86 :  *
APR 86 :  *
MAY 86 :  *+
JUN 86 :   *+
JUL 86 :   * +
AUG 86 :    *
SEP 86 :   *+
```

```
STATION:   L-1964     LAYER:  1      ROW: 21        COLUMN: 40

                 Water Level, Feet (NGVD)

      20        30        40        50        60        70        80
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *
MAY 85 :  +*
JUN 85 :    *
JUL 85 :     *+
AUG 85 :     +*
SEP 85 :      *
OCT 85 :     +*
NOV 85 :     *
DEC 85 :    *
JAN 86 :    *
FEB 86 :   *+
MAR 86 :   * +
APR 86 :   *+
MAY 86 :   *+
JUN 86 :     *  +
JUL 86 :      *
AUG 86 :       *
SEP 86 :     +*
```

```
STATION:   L-1976     LAYER:  1      ROW:  9        COLUMN: 33

                 Water Level, Feet (NGVD)

       4        14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *
MAY 85 :  *+
JUN 85 :   *+
JUL 85 :   *+
AUG 85 :   *  +
SEP 85 :   *  +
OCT 85 :   *  +
NOV 85 :   * +
DEC 85 :   * +
JAN 86 :   * +
FEB 86 :  *  +
MAR 86 :  *  +
APR 86 :  * +
MAY 86 :  *+
JUN 86 :   *   +
JUL 86 :   *  +
AUG 86 :   *   +
SEP 86 :   *  +
```

STATION: L-1978 LAYER: 1 ROW: 10 COLUMN: 39

Water Level, Feet (NGVD)

```
       3        13        23        33        43        53        63
       +.........+.........+.........+.........+.........+.........+
APR 85 :  *   +
MAY 85 :  *   +
JUN 85 :   *    +
JUL 85 :   *     +
AUG 85 :   *      +
SEP 85 :   *       +
OCT 85 :   *      +
NOV 85 :  *      +
DEC 85 :  *      +
JAN 86 :  *      +
FEB 86 :  *     +
MAR 86 :  *     +
APR 86 :  *    +
MAY 86 :  *    +
JUN 86 :   *   +
JUL 86 :   *     +
AUG 86 :   *       +
SEP 86 :   *      +
```

STATION: L-1992 LAYER: 1 ROW: 21 COLUMN: 42

Water Level, Feet (NGVD)

```
      17        27        37        47        57        67        77
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *+
MAY 85 :  * +
JUN 85 :   * +
JUL 85 :    * +
AUG 85 :    *+
SEP 85 :    * +
OCT 85 :   * +
NOV 85 :   * +
DEC 85 :   * +
JAN 86 :   * +
FEB 86 :  *  +
MAR 86 :   * +
APR 86 :  * +
MAY 86 :  *    +
JUN 86 :    *  +
JUL 86 :    * +
AUG 86 :    * +
SEP 86 :   * +
```

```
STATION:   L-1999     LAYER:  1      ROW: 24        COLUMN: 32

                 Water Level, Feet (NGVD)

      16        26        36        46        56        66        76
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +  *
MAY 85 :  +  *
JUN 85 :   +  *
JUL 85 :       *+
AUG 85 :      +*
SEP 85 :       *
OCT 85 :       *
NOV 85 :     +*
DEC 85 :     +*
JAN 86 :    +*
FEB 86 :    +*
MAR 86 :     *
APR 86 :   + *
MAY 86 :   +*
JUN 86 :     +*
JUL 86 :       *
AUG 86 :       *+
SEP 86 :      *+
```

```
STATION:   L-2191     LAYER:  1      ROW: 12        COLUMN: 24

                 Water Level, Feet (NGVD)

       3        13        23        33        43        53        63
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +*
MAY 85 :  + *
JUN 85 :   +*
JUL 85 :    *
AUG 85 :     *
SEP 85 :     *+
OCT 85 :     *
NOV 85 :    * +
DEC 85 :    *
JAN 86 :    *
FEB 86 :    *
MAR 86 :    *+
APR 86 :   *+
MAY 86 :   +*
JUN 86 :     *+
JUL 86 :     *  +
AUG 86 :     * +
SEP 86 :     *+
```

```
STATION:   L-2202     LAYER:  1      ROW: 10       COLUMN: 42

                   Water Level, Feet (NGVD)

       2        12        22        32        42        52        62
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *    +
MAY 85 :  *     +
JUN 85 :   *     +
JUL 85 :    *      +
AUG 85 :    *       +
SEP 85 :    *       +
OCT 85 :    *      +
NOV 85 :   *      +
DEC 85 :  *       +
JAN 86 :  *      +
FEB 86 :  *      +
MAR 86 :  *       +
APR 86 :  *     +
MAY 86 :  *    +
JUN 86 :   *        +
JUL 86 :    *       +
AUG 86 :    *        +
SEP 86 :    *      +
```

```
STATION:   L-2204     LAYER:  1      ROW: 21       COLUMN: 36

                   Water Level, Feet (NGVD)

      15        25        35        45        55        65        75
       +.........+.........+.........+.........+.........+.........+
APR 85 :        +*
MAY 85 :       +*
JUN 85 :        +*
JUL 85 :          *
AUG 85 :          +*
SEP 85 :           *
OCT 85 :          +*
NOV 85 :  +       *
DEC 85 :         +*
JAN 86 :         *
FEB 86 :         *
MAR 86 :         *
APR 86 :        *
MAY 86 :        *
JUN 86 :           *+
JUL 86 :           *
AUG 86 :           *+
SEP 86 :           *
```

```
STATION:   L-2217     LAYER:  1      ROW:  7        COLUMN: 30

                 Water Level, Feet (NGVD)

      17        27        37        47        57        67        77
       +.........+.........+.........+.........+.........+.........+
APR 85 :   + *
MAY 85 :  +  *
JUN 85 :     *
JUL 85 :     *
AUG 85 :      * +
SEP 85 :      *+
OCT 85 :     *
NOV 85 :     *+
DEC 85 :    +*
JAN 86 :    +*
FEB 86 :    +*
MAR 86 :    +*
APR 86 :   + *
MAY 86 :  +  *
JUN 86 :      * +
JUL 86 :     * +
AUG 86 :     *  +
SEP 86 :     * +
```

```
STATION:   L-2308     LAYER:  1      ROW: 30        COLUMN: 27

                 Water Level, Feet (NGVD)

       6        16        26        36        46        56        66
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  + *
JUN 85 :  +  *
JUL 85 :     +*
AUG 85 :      *
SEP 85 :      *
OCT 85 :      *
NOV 85 :     *
DEC 85 :    *
JAN 86 :    *
FEB 86 :    *
MAR 86 :    *
APR 86 :   *
MAY 86 :  +*
JUN 86 :     *+
JUL 86 :     *
AUG 86 :      *+
SEP 86 :     * +
```

```
STATION:   L-2549     LAYER:  1      ROW: 14        COLUMN:  7

                 Water Level, Feet (NGVD)

      -2         8         18        28        38        48        58
       +.........+.........+.........+.........+.........+.........+
APR 85 :   * +
MAY 85 :   *+
JUN 85 :   * +
JUL 85 :    * +
AUG 85 :    * +
SEP 85 :     * +
OCT 85 :     *  +
NOV 85 :     * +
DEC 85 :    *  +
JAN 86 :   *  +
FEB 86 :  *   +
MAR 86 :   *  +
APR 86 :  *  +
MAY 86 :  *   +
JUN 86 :    *  +
JUL 86 :    *  +
AUG 86 :     *  +
SEP 86 :     *  +
```

```
STATION:   L-3203     LAYER:  1      ROW: 16        COLUMN: 20

                 Water Level, Feet (NGVD)

       0         10        20        30        40        50        60
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +*
MAY 85 :  +*
JUN 85 :   *
JUL 85 :   +*
AUG 85 :   +*
SEP 85 :   +*
OCT 85 :   +*
NOV 85 :   +*
DEC 85 :   *
JAN 86 :   *
FEB 86 :   *
MAR 86 :   *
APR 86 :  +*
MAY 86 :   *
JUN 86 :   +*
JUL 86 :   +*
AUG 86 :    *
SEP 86 :   +*
```

```
STATION:   L-3204     LAYER:  1      ROW: 19         COLUMN: 18

                 Water Level, Feet (NGVD)

      -2         8        18        28        38        48        58
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  +*
JUN 85 :   *+
JUL 85 :     * +
AUG 85 :    * +
SEP 85 :     * +
OCT 85 M     *
NOV 85 :     *
DEC 85 :    *
JAN 86 :   +*
FEB 86 :   *
MAR 86 :   *
APR 86 :   *
MAY 86 :   *+
JUN 86 :    *  +
JUL 86 :    * +
AUG 86 :     *  +
SEP 86 :    * +
```

```
STATION:   L-3205     LAYER:  1      ROW: 22         COLUMN: 17

                 Water Level, Feet (NGVD)

      -6         4        14        24        34        44        54
       +.........+.........+.........+.........+.........+.........+
APR 85 :    *+
MAY 85 :  *  +
JUN 85 :  *   +
JUL 85 :    * +
AUG 85 :    * +
SEP 85 :    * +
OCT 85 :     * +
NOV 85 :    * +
DEC 85 :    *+
JAN 86 :   * +
FEB 86 :   * +
MAR 86 :   * +
APR 86 :  *  +
MAY 86 :  *   +
JUN 86 :   *  +
JUL 86 :   *  +
AUG 86 :    * +
SEP 86 :    * +
```

```
STATION:   L-3206    LAYER:  1      ROW: 22        COLUMN: 14

                 Water Level, Feet (NGVD)

      -4         6        16        26        36        46        56
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *+
MAY 85 :  * +
JUN 85 :  * +
JUL 85 :   *  +
AUG 85 :   * +
SEP 85 :    *+
OCT 85 :    * +
NOV 85 :   * +
DEC 85 :   *+
JAN 86 :   *+
FEB 86 :  * +
MAR 86 :  * +
APR 86 :  * +
MAY 86 :  *  +
JUN 86 :   * +
JUL 86 :   *  +
AUG 86 :   *  +
SEP 86 :   * +
```

```
STATION:   L-3207    LAYER:  1      ROW: 20        COLUMN: 13

                 Water Level, Feet (NGVD)

      -3         7        17        27        37        47        57
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *
MAY 85 :  *+
JUN 85 :  *+
JUL 85 :   *+
AUG 85 :   *+
SEP 85 :    *
OCT 85 :    *
NOV 85 :   *+
DEC 85 :   *
JAN 86 :   *
FEB 86 :  *+
MAR 86 :  *+
APR 86 :  *+
MAY 86 :  * +
JUN 86 :   *+
JUL 86 :   *+
AUG 86 :   * +
SEP 86 :   *+
```

```
STATION:   L-3208     LAYER:  1      ROW: 16        COLUMN: 11

                 Water Level, Feet (NGVD)

      -3         7        17        27        37        47        57
       +.........+.........+.........+.........+.........+.........+
APR 85 :  *+
MAY 85 :  *+
JUN 85 :  *+
JUL 85 :  * +
AUG 85 :  * +
SEP 85 :  *+
OCT 85 :  *+
NOV 85 :  *+
DEC 85 :  *
JAN 86 :  *
FEB 86 :  *
MAR 86 :  *+
APR 86 :  *
MAY 86 :  *+
JUN 86 :  *+
JUL 86 :  * +
AUG 86 :  * +
SEP 86 :  *+
```

```
STATION:   L-3209     LAYER:  1      ROW:  7        COLUMN: 20

                 Water Level, Feet (NGVD)

      14        24        34        44        54        64        74
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +*
MAY 85 :  +*
JUN 85 :   *
JUL 85 :    *+
AUG 85 :    *+
SEP 85 :    *
OCT 85 :    *
NOV 85 :    *
DEC 85 M   *
JAN 86 :   *
FEB 86 :   *
MAR 86 :   *+
APR 86 :   *
MAY 86 :  +*
JUN 86 :    *+
JUL 86 :    *
AUG 86 :    *+
SEP 86 :    *
```

STATION: L-3210   LAYER: 1   ROW: 13   COLUMN: 14

Water Level, Feet (NGVD)

```
      -1        9        19        29        39        49        59
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +*
MAY 85 :  +*
JUN 85 :   *
JUL 85 :    *+
AUG 85 :    *
SEP 85 :    +*
OCT 85 :     *
NOV 85 :    *
DEC 85 :    *
JAN 86 :    *
FEB 86 :   *
MAR 86 M   *
APR 86 :   *
MAY 86 :   *
JUN 86 :    *+
JUL 86 :    *+
AUG 86 :    *  +
SEP 86 :    *+
```

STATION: L-3211   LAYER: 1   ROW: 15   COLUMN: 17

Water Level, Feet (NGVD)

```
       2        12        22        32        42        52        62
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +  *
MAY 85 :  + *
JUN 85 :   +*
JUL 85 :    +*
AUG 85 :    +*
SEP 85 :    + *
OCT 85 :   +  *
NOV 85 M      *
DEC 85 :   + *
JAN 86 :   + *
FEB 86 :  +  *
MAR 86 :   + *
APR 86 :   +*
MAY 86 :   +*
JUN 86 :    +*
JUL 86 :   + *
AUG 86 :   +  *
SEP 86 :   + *
```

```
STATION:   L-3212    LAYER:  1     ROW: 18      COLUMN: 19

                Water Level, Feet (NGVD)

      -3         7        17        27        37        47        57
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :   +*
JUN 85 :   +*
JUL 85 :    +*
AUG 85 :    +*
SEP 85 :    + *
OCT 85 :    + *
NOV 85 :   + *
DEC 85 :   + *
JAN 86 :  + *
FEB 86 :  + *
MAR 86 :  + *
APR 86 :   +*
MAY 86 :   +*
JUN 86 :    +*
JUL 86 :   + *
AUG 86 :    +*
SEP 86 :    +*
```

```
STATION:   L-3213    LAYER:  1     ROW: 20      COLUMN: 18

                Water Level, Feet (NGVD)

      -3         7        17        27        37        47        57
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  + *
JUN 85 :   +*
JUL 85 :     *+
AUG 85 :    +*
SEP 85 :     *
OCT 85 :    + *
NOV 85 :   + *
DEC 85 :    *
JAN 86 :    *
FEB 86 :    *
MAR 86 :    *
APR 86 :   *+
MAY 86 :    *
JUN 86 :     *+
JUL 86 :     *
AUG 86 :     * +
SEP 86 :     *
```

```
STATION:   L-3214     LAYER:  1      ROW: 14        COLUMN:  7

                 Water Level, Feet (NGVD)

      -2         8        18        28        38        48        58
       +.........+.........+.........+.........+.........+.........+
APR 85 :   * +
MAY 85 :   *+
JUN 85 :   * +
JUL 85 :    * +
AUG 85 :    *  +
SEP 85 :     * +
OCT 85 :     *  +
NOV 85 :     * +
DEC 85 :    *  +
JAN 86 :   *  +
FEB 86 :  *   +
MAR 86 :   *  +
APR 86 :  *  +
MAY 86 :  *   +
JUN 86 :    *  +
JUL 86 :    *  +
AUG 86 :     *  +
SEP 86 :     *  +
```

```
STATION:   L-3215     LAYER:  1      ROW: 23        COLUMN: 10

                 Water Level, Feet (NGVD)

      -4         6        16        26        36        46        56
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +*
MAY 85 :  + *
JUN 85 :  + *
JUL 85 :     * +
AUG 85 :     *
SEP 85 :      *
OCT 85 :     * +
NOV 85 :     *+
DEC 85 :    *+
JAN 86 :    *+
FEB 86 :    *
MAR 86 :    *
APR 86 :   *+
MAY 86 :   +*
JUN 86 :     *+
JUL 86 :     *+
AUG 86 :     *  +
SEP 86 :     * +
```

```
STATION:   L-5665     LAYER:  1      ROW: 31        COLUMN: 36

                 Water Level, Feet (NGVD)

      10        20        30        40        50        60        70
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :   +*
JUN 85 :   +  *
JUL 85 :      *
AUG 85 :      *
SEP 85 :     + *
OCT 85 :    +  *
NOV 85 :    + *
DEC 85 :    +*
JAN 86 :    +*
FEB 86 :    +*
MAR 86 :    +*
APR 86 :   +*
MAY 86 :   *
JUN 86 :     *
JUL 86 :      *
AUG 86 :      *
SEP 86 :     +*
```

```
STATION:   L-5669     LAYER:  1      ROW: 31        COLUMN: 29

                 Water Level, Feet (NGVD)

       7        17        27        37        47        57        67
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  + *
JUN 85 :  +  *
JUL 85 :     *
AUG 85 :     *
SEP 85 :     *
OCT 85 :    +*
NOV 85 :    +*
DEC 85 :    *
JAN 86 :   +*
FEB 86 :    *
MAR 86 :    *
APR 86 :   *
MAY 86 :   *
JUN 86 :    * +
JUL 86 :    *
AUG 86 :     *+
SEP 86 :     *+
```

```
STATION:   L-726      LAYER:  1      ROW: 35        COLUMN: 29

                 Water Level, Feet (NGVD)

       6        16        26        36        46        56        66
       +.........+.........+.........+.........+.........+.........+
APR 85 :  *+
MAY 85 :  *+
JUN 85 :   *+
JUL 85 :    *+
AUG 85 :    * +
SEP 85 :   *  +
OCT 85 :   * +
NOV 85 :   * +
DEC 85 :  * +
JAN 86 :  * +
FEB 86 :  * +
MAR 86 :  *  +
APR 86 :  *+
MAY 86 :  *+
JUN 86 :   *   +
JUL 86 :   *  +
AUG 86 :    *  +
SEP 86 :   * +
```

```
STATION:   L-728      LAYER:  1      ROW: 17        COLUMN: 30

                 Water Level, Feet (NGVD)

      13        23        33        43        53        63        73
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +  *
MAY 85 :  +  *
JUN 85 :    +*
JUL 85 :    +*
AUG 85 :      *
SEP 85 :      *
OCT 85 :     +*
NOV 85 :     +*
DEC 85 :    +*
JAN 86 :    +*
FEB 86 :    +*
MAR 86 :     *
APR 86 :   +*
MAY 86 :  +  *
JUN 86 :      *
JUL 86 :      *
AUG 86 :      *+
SEP 86 :     +*
```

```
STATION:   L-739      LAYER:  1      ROW: 29        COLUMN: 31

                 Water Level, Feet (NGVD)

      10        20        30        40        50        60        70
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +*
MAY 85 :  +*
JUN 85 :  +*
JUL 85 :    *  +
AUG 85 :    *  +
SEP 85 :    * +
OCT 85 :    *+
NOV 85 :    *+
DEC 85 :    *
JAN 86 :   *+
FEB 86 :   *+
MAR 86 :   *+
APR 86 :  *+
MAY 86 :  *+
JUN 86 :   * +
JUL 86 :    *+
AUG 86 :    *  +
SEP 86 :    * +
```

```
STATION:   L-1137*    LAYER:  1      ROW: 14        COLUMN: 40

                 Water Level, Feet (NGVD)

      12        22        32        42        52        62        72
       +.........+.........+.........+.........+.........+.........+
APR 85 :   + *
MAY 85 :  + *
JUN 85 :    +*
JUL 85 :      *
AUG 85 :      *+
SEP 85 :      *
OCT 85 :     +*
NOV 85 :     +*
DEC 85 :    +*
JAN 86 :    +*
FEB 86 :    +*
MAR 86 :    +*
APR 86 :   +*
MAY 86 :   *
JUN 86 :     *  +
JUL 86 :     *+
AUG 86 :      *+
SEP 86 :     *
```

```
STATION:    L-1403*    LAYER:  1      ROW: 30       COLUMN: 11

                   Water Level, Feet (NGVD)

      -4         6        16        26        36        46        56
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +*
MAY 85 :  + *
JUN 85 :   +*
JUL 85 :     *+
AUG 85 :     *
SEP 85 :     *
OCT 85 :     *
NOV 85 :    +*
DEC 85 :    *
JAN 86 :    *
FEB 86 :   *+
MAR 86 :    *
APR 86 :   *
MAY 86 :   +*
JUN 86 :     *
JUL 86 :     *+
AUG 86 :     +*
SEP 86 :     *
```

```
STATION:    L-1985*    LAYER:  1      ROW: 28       COLUMN: 34

                   Water Level, Feet (NGVD)

       6        16        26        36        46        56        66
       +.........+.........+.........+.........+.........+.........+
APR 85 :    +     *
MAY 85 :  +       *
JUN 85 :  +        *
JUL 85 :           +*
AUG 85 :          + *
SEP 85 :          + *
OCT 85 :         +  *
NOV 85 :       +    *
DEC 85 :      +    *
JAN 86 :      +    *
FEB 86 :      +    *
MAR 86 :       +   *
APR 86 :     +    *
MAY 86 :    +     *
JUN 86 :       +   *
JUL 86 :        +  *
AUG 86 :           +*
SEP 86 :         + *
```

```
STATION:   L-1995*    LAYER:  1      ROW: 22        COLUMN: 30

                 Water Level, Feet (NGVD)

       16        26        36        46        56        66        76
        +.........+.........+.........+.........+.........+.........+
APR 85 :   + *
MAY 85 :  +  *
JUN 85 :    +*
JUL 85 :      *+
AUG 85 :      *+
SEP 85 :      *+
OCT 85 :      *+
NOV 85 :     *+
DEC 85 :     *
JAN 86 :     *
FEB 86 :     *
MAR 86 :     *
APR 86 :    +*
MAY 86 :    +*
JUN 86 :      *+
JUL 86 :      *+
AUG 86 :      * +
SEP 86 :     *+
```

```
STATION:   L-1997*    LAYER:  1      ROW: 37        COLUMN: 35

                 Water Level, Feet (NGVD)

        5        15        25        35        45        55        65
        +.........+.........+.........+.........+.........+.........+
APR 85 :  +  *
MAY 85 :    +*
JUN 85 :      +*
JUL 85 :       * +
AUG 85 :       *+
SEP 85 :       * +
OCT 85 :      +*
NOV 85 :     +*
DEC 85 :     +*
JAN 86 :     *
FEB 86 :      *
MAR 86 :   + *
APR 86 :   +*
MAY 86 :  + *
JUN 86 :      *
JUL 86 :      * +
AUG 86 :       * +
SEP 86 :       *
```

```
STATION:   L-2195*   LAYER:  1     ROW: 37      COLUMN: 33

                 Water Level, Feet (NGVD)

       5        15        25        35        45        55        65
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  + *
JUN 85 :    + *
JUL 85 :      * +
AUG 85 :      *
SEP 85 :      *
OCT 85 :     +*
NOV 85 :    +*
DEC 85 :   + *
JAN 86 :   +*
FEB 86 :    +*
MAR 86 :   + *
APR 86 :  + *
MAY 86 :  +*
JUN 86 :    *  +
JUL 86 :     *
AUG 86 :      *+
SEP 86 :     +*
```

```
STATION:   L-246*   LAYER:  1     ROW: 16      COLUMN: 26

                 Water Level, Feet (NGVD)

      11        21        31        41        51        61        71
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *
MAY 85 :  * +
JUN 85 :   * +
JUL 85 :    *+
AUG 85 :    * +
SEP 85 :     * +
OCT 85 :     *+
NOV 85 :    *+
DEC 85 :    *+
JAN 86 :   * +
FEB 86 :   *+
MAR 86 :   * +
APR 86 :  * +
MAY 86 :  *+
JUN 86 :    * +
JUL 86 :    *+
AUG 86 :     * +
SEP 86 :     *+
```

```
STATION:   L-730*     LAYER:  1      ROW: 23        COLUMN: 41

                 Water Level, Feet (NGVD)

      21        31        41        51        61        71        81
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +*
MAY 85 :  *
JUN 85 :   *
JUL 85 :    *+
AUG 85 :     *
SEP 85 :     *+
OCT 85 :     *
NOV 85 :    *
DEC 85 :   *+
JAN 86 :   *+
FEB 86 :   *+
MAR 86 :   *+
APR 86 :  *+
MAY 86 :  *+
JUN 86 :     *+
JUL 86 :     *+
AUG 86 :      *
SEP 86 :     *
```

```
STATION:   L-954*     LAYER:  1      ROW: 15        COLUMN: 21

                 Water Level, Feet (NGVD)

      -5         5        15        25        35        45        55
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +    *
MAY 85 :  +   *
JUN 85 :    + *
JUL 85 :     + *
AUG 85 :       *
SEP 85 :       +*
OCT 85 :        *
NOV 85 :      +*
DEC 85 :     + *
JAN 86 :    +  *
FEB 86 :   +  *
MAR 86 :    + *
APR 86 :  +   *
MAY 86 :   +  *
JUN 86 :      +*
JUL 86 :       *
AUG 86 :        *
SEP 86 :       *
```

```
STATION:   BBL1647    LAYER:  1      ROW: 35        COLUMN: 26

                 Water Level, Feet (NGVD)

      -1         9        19        29        39        49        59
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *
MAY 85 :   *
JUN 85 :  + *
JUL 85 :    * +
AUG 85 :    *  +
SEP 85 :    *
OCT 85 :   *  +
NOV 85 :   *  +
DEC 85 :   * +
JAN 86 :   *+
FEB 86 :   * +
MAR 86 :   * +
APR 86 :  * +
MAY 86 :  *  +
JUN 86 :   * +
JUL 86 :   * +
AUG 86 :    *  +
SEP 86 :   *   +
```

```
STATION:   BBL1650    LAYER:  1      ROW: 36        COLUMN: 27

                 Water Level, Feet (NGVD)

      -2         8        18        28        38        48        58
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  + *
JUN 85 :  +  *
JUL 85 :     *
AUG 85 :      *
SEP 85 :      *+
OCT 85 :     +*
NOV 85 :     +*
DEC 85 :    +*
JAN 86 :    +*
FEB 86 :    +*
MAR 86 :    +*
APR 86 :   +*
MAY 86 :   +*
JUN 86 :   + *
JUL 86 :   + *
AUG 86 :      *
SEP 86 :     *+
```

```
STATION:   BBL1651    LAYER:  1     ROW: 36       COLUMN: 26

                Water Level, Feet (NGVD)

      -4         6        16        26        36        46        56
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +  *
MAY 85 :  +   *
JUN 85 :    + *
JUL 85 :      +*
AUG 85 :     + *
SEP 85 :      +*
OCT 85 :     + *
NOV 85 :     + *
DEC 85 :    +  *
JAN 86 :    + *
FEB 86 :    + *
MAR 86 :     +*
APR 86 :   + *
MAY 86 :   + *
JUN 86 :    + *
JUL 86 :    + *
AUG 86 :      +*
SEP 86 :     + *
```

```
STATION:   PEL015     LAYER:  1     ROW: 40       COLUMN: 31

                Water Level, Feet (NGVD)

       3        13        23        33        43        53        63
       +.........+.........+.........+.........+.........+.........+
APR 85 :   + *
MAY 85 :  +  *
JUN 85 :   +   *
JUL 85 :       *
AUG 85 :      +*
SEP 85 :      +*
OCT 85 :      *
NOV 85 :    + *
DEC 85 :    + *
JAN 86 :    +*
FEB 86 :    +*
MAR 86 :   + *
APR 86 :   + *
MAY 86 :  +  *
JUN 86 :    +*
JUL 86 :    +*
AUG 86 :      +*
SEP 86 :     +*
```

```
STATION:   PEL017     LAYER:  1      ROW: 40         COLUMN: 31

                 Water Level, Feet (NGVD)

       4        14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 :    *
MAY 85 :  + *
JUN 85 :  +   *
JUL 85 :    + *
AUG 85 :      *+
SEP 85 :      *+
OCT 85 :     *
NOV 85 :    +*
DEC 85 :   + *
JAN 86 :   +*
FEB 86 :   +*
MAR 86 :   +*
APR 86 :  + *
MAY 86 :  + *
JUN 86 :   +*
JUL 86 :    *
AUG 86 :      *+
SEP 86 :     *
```

```
STATION:   PEL019     LAYER:  1      ROW: 40         COLUMN: 31

                 Water Level, Feet (NGVD)

       4        14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 M    *
JUN 85 M      *
JUL 85 :      *+
AUG 85 :      *+
SEP 85 :      *
OCT 85 :     *
NOV 85 :    +*
DEC 85 :   + *
JAN 86 :   +*
FEB 86 :   +*
MAR 86 :   +*
APR 86 :  + *
MAY 86 M    *
JUN 86 :   +*
JUL 86 :   +*
AUG 86 :      *
SEP 86 :     *
```

```
STATION:   QCC0239    LAYER:  1      ROW: 39        COLUMN: 33

                  Water Level, Feet (NGVD)

       4         14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +  *
MAY 85 :  +   *
JUN 85 :    +  *
JUL 85 :       *
AUG 85 :      +*
SEP 85 :       *
OCT 85 :     + *
NOV 85 :     + *
DEC 85 :    + *
JAN 86 M      *
FEB 86 :    + *
MAR 86 :    + *
APR 86 :   + *
MAY 86 :   + *
JUN 86 :     +*
JUL 86 :     +*
AUG 86 :       *
SEP 86 :     + *
```

```
STATION:   QCC095     LAYER:  1      ROW: 41        COLUMN: 32

                  Water Level, Feet (NGVD)

       4         14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 M    *
MAY 85 M     *
JUN 85 M      *
JUL 85 :      +*
AUG 85 :     + *
SEP 85 :      *
OCT 85 :     +*
NOV 85 :    +*
DEC 85 :   + *
JAN 86 M    *
FEB 86 :   +*
MAR 86 :  + *
APR 86 :  + *
MAY 86 :  +*
JUN 86 :   +*
JUL 86 :    *
AUG 86 :      *
SEP 86 :    + *
```

```
STATION:   QCC097     LAYER:  1      ROW: 40        COLUMN: 32

                 Water Level, Feet (NGVD)

       4        14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 M      *
MAY 85 M      *
JUN 85 M       *
JUL 85 :      + *
AUG 85 :     +  *
SEP 85 :      +*
OCT 85 :     + *
NOV 85 :    + *
DEC 85 :   +  *
JAN 86 M      *
FEB 86 :   + *
MAR 86 :  +  *
APR 86 :  +  *
MAY 86 :  +  *
JUN 86 :    +*
JUL 86 :    + *
AUG 86 :      +*
SEP 86 :    +  *
```

```
STATION:   L-738+     LAYER:  2      ROW: 36        COLUMN: 29

                 Water Level, Feet (NGVD)

      -8         2        12        22        32        42        52
       +.........+.........+.........+.........+.........+.........+
APR 85 :    *
MAY 85 :    *
JUN 85 :         *
JUL 85 :         *  +
AUG 85 :         *   +
SEP 85 :          *+
OCT 85 :         *+
NOV 85 :       *
DEC 85 :     +*
JAN 86 :  +   *
FEB 86 :      +*
MAR 86 :     * +
APR 86 :  +*
MAY 86 :    * +
JUN 86 :         * +
JUL 86 :         * +
AUG 86 :          * +
SEP 86 :         *+
```

```
STATION:    L-1456+    LAYER:  2      ROW: 29       COLUMN: 13

                 Water Level, Feet (NGVD)

      -2         8        18        28        38        48        58
       +.........+.........+.........+.........+.........+.........+
APR 85 :  *
MAY 85 :  *+
JUN 85 :  *+
JUL 85 :   *
AUG 85 :   *+
SEP 85 :   *
OCT 85 :   *+
NOV 85 :  *+
DEC 85 :  *
JAN 86 :  *
FEB 86 :  *+
MAR 86 :  *+
APR 86 :  *+
MAY 86 :  *+
JUN 86 :   *
JUL 86 :  *+
AUG 86 :   *
SEP 86 :  *+
```

```
STATION:    L-1691+    LAYER:  2      ROW: 36       COLUMN: 30

                 Water Level, Feet (NGVD)

      -7         3        13        23        33        43        53
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *   +
MAY 85 :   *    +
JUN 85 :         * +
JUL 85 :         *     +
AUG 85 :         *     +
SEP 85 :          *    +
OCT 85 :         * +
NOV 85 :      * +
DEC 85 :    + *
JAN 86 :    +*
FEB 86 :      *
MAR 86 :    *   +
APR 86 :  * +
MAY 86 :   *   +
JUN 86 :         *   +
JUL 86 :         *   +
AUG 86 :          *    +
SEP 86 :         *+
```

```
STATION:   L-1996+    LAYER:  2      ROW: 37        COLUMN: 35

                 Water Level, Feet (NGVD)

      -1         9        19        29        39        49        59
       +.........+.........+.........+.........+.........+.........+
APR 85 :  * +
MAY 85 :  *  +
JUN 85 :       +  *
JUL 85 :          * +
AUG 85 :           *+
SEP 85 :           *
OCT 85 :        + *
NOV 85 :      +*
DEC 85 :   + *
JAN 86 :  +   *
FEB 86 :    +    *
MAR 86 :     +*
APR 86 :  *+
MAY 86 :  *  +
JUN 86 :          *+
JUL 86 :          *
AUG 86 :           *+
SEP 86 :         +*
```

```
STATION:   L-2194*    LAYER:  2      ROW: 37        COLUMN: 33

                 Water Level, Feet (NGVD)

     -15        -5         5        15        25        35        45
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *              +
MAY 85 :  *               +
JUN 85 :                     +*
JUL 85 :                      *  +
AUG 85 :                      *  +
SEP 85 :                      *  +
OCT 85 :                     +*
NOV 85 :              *    +
DEC 85 :          *    +
JAN 86 :           *  +
FEB 86 :                 +  *
MAR 86 :            *     +
APR 86 :   *            +
MAY 86 :  *                +
JUN 86 :                      * +
JUL 86 :                      * +
AUG 86 :                       * +
SEP 86 :                      *
```

```
STATION:   BBL1645    LAYER:  2      ROW: 36        COLUMN: 26

                 Water Level, Feet (NGVD)

      -4         6        16        26        36        46        56
       +.........+.........+.........+.........+.........+.........+
APR 85 :  *+
MAY 85 :  *+
JUN 85 :   * +
JUL 85 :    *  +
AUG 85 :    *  +
SEP 85 :    *  +
OCT 85 :   *  +
NOV 85 :   *
DEC 85 :   *
JAN 86 :  *+
FEB 86 :   *+
MAR 86 :  * +
APR 86 :  *
MAY 86 :  *+
JUN 86 :   *  +
JUL 86 :   *  +
AUG 86 :    *  +
SEP 86 :    * +
```

```
STATION:   BBL1646    LAYER:  2      ROW: 35        COLUMN: 26

                 Water Level, Feet (NGVD)

      -7         3        13        23        33        43        53
       +.........+.........+.........+.........+.........+.........+
APR 85 :     *
MAY 85 :    +*
JUN 85 :       *+
JUL 85 :       *   +
AUG 85 :       *   +
SEP 85 :       *    +
OCT 85 :       * +
NOV 85 :      * +
DEC 85 :     +*
JAN 86 :    +*
FEB 86 :      *+
MAR 86 :     *+
APR 86 :  +  *
MAY 86 :    +*
JUN 86 :       * +
JUL 86 :       *  +
AUG 86 :       *    +
SEP 86 :       *  +
```

```
STATION:   BBL1676    LAYER:  2      ROW: 35        COLUMN: 27

                 Water Level, Feet (NGVD)

      -7         3        13        23        33        43        53
       +.........+.........+.........+.........+.........+.........+
APR 85 :    *+
MAY 85 :    *
JUN 85 :       *+
JUL 85 M       *
AUG 85 :       *   +
SEP 85 :        *   +
OCT 85 :       * +
NOV 85 :      * +
DEC 85 :    +*
JAN 86 :   + *
FEB 86 :     * +
MAR 86 :     *   +
APR 86 :  +*
MAY 86 :    *
JUN 86 :       *    +
JUL 86 :       *  +
AUG 86 :        *   +
SEP 86 :       *  +
```

```
STATION:   BSWSMW1    LAYER:  2      ROW: 36        COLUMN: 28

                 Water Level, Feet (NGVD)

      -8         2        12        22        32        42        52
       +.........+.........+.........+.........+.........+.........+
APR 85 :    *+
MAY 85 :    *
JUN 85 :       +*
JUL 85 :         * +
AUG 85 :         *  +
SEP 85 :         *   +
OCT 85 :        * +
NOV 85 :       *
DEC 85 :      *
JAN 86 M     *
FEB 86 :    + *
MAR 86 :     *  +
APR 86 :  + *
MAY 86 :    *
JUN 86 :        * +
JUL 86 :        *  +
AUG 86 :         *  +
SEP 86 :        * +
```

```
STATION:   BSWSMW2    LAYER:  2      ROW: 35        COLUMN: 30

                 Water Level, Feet (NGVD)

      -7         3        13        23        33        43        53
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *   +
MAY 85 :   *  +
JUN 85 :        +*
JUL 85 :         *  +
AUG 85 :         *    +
SEP 85 :          *   +
OCT 85 :         * +
NOV 85 :       *
DEC 85 :      *+
JAN 86 M     *
FEB 86 :     +*
MAR 86 :    *  +
APR 86 :  *
MAY 86 :   * +
JUN 86 :         * +
JUL 86 :         *  +
AUG 86 :          *  +
SEP 86 :         *+
```

```
STATION:   BSWSMW3    LAYER:  2      ROW: 35        COLUMN: 29

                 Water Level, Feet (NGVD)

      -7         3        13        23        33        43        53
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *+
MAY 85 :   *+
JUN 85 :      + *
JUL 85 :         *+
AUG 85 :         *  +
SEP 85 :         *  +
OCT 85 :        *+
NOV 85 :      *   +
DEC 85 :     *
JAN 86 :    *             +
FEB 86 :   + *
MAR 86 :    *  +
APR 86 :  *
MAY 86 :   *+
JUN 86 :        *+
JUL 86 :        * +
AUG 86 :         * +
SEP 86 :        * +
```

```
STATION:   BSWSMW4   LAYER:  2     ROW: 36       COLUMN: 30

                  Water Level, Feet (NGVD)

      -7         3        13        23        33        43        53
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *+
MAY 85 :   *   +
JUN 85 :        +*
JUL 85 :         * +
AUG 85 :         *    +
SEP 85 :          *   +
OCT 85 :         *   +
NOV 85 :      *   +
DEC 85 :      *
JAN 86 M     *
FEB 86 M      *
MAR 86 :    * +
APR 86 :  *+
MAY 86 :   *   +
JUN 86 :         *  +
JUL 86 :         *  +
AUG 86 :          *    +
SEP 86 :         *  +
```

```
STATION:   PEL014+   LAYER:  2     ROW: 40       COLUMN: 31

                  Water Level, Feet (NGVD)

      -6         4        14        24        34        44        54
       +.........+.........+.........+.........+.........+.........+
APR 85 :     + *
MAY 85 :    +  *
JUN 85 :      +   *
JUL 85 :          * +
AUG 85 :           * +
SEP 85 :          * +
OCT 85 :         +*
NOV 85 :    +    *
DEC 85 :  +      *
JAN 86 :  +     *
FEB 86 :  +      *
MAR 86 :   +    *
APR 86 :       *
MAY 86 :     + *
JUN 86 :          *
JUL 86 :       +  *
AUG 86 :           *+
SEP 86 :       +  *
```

```
STATION:   QCCO100    LAYER:  2      ROW: 39        COLUMN: 33

                 Water Level, Feet (NGVD)

      -3         7        17        27        37        47        57
       +.........+.........+.........+.........+.........+.........+
APR 85 :  *+
MAY 85 :  *  +
JUN 85 :     +   *
JUL 85 :         *  +
AUG 85 :          * +
SEP 85 :         *  +
OCT 85 :        +*
NOV 85 :     +*
DEC 85 :  +   *
JAN 86 M     *
FEB 86 :   +    *
MAR 86 :     *
APR 86 :  *+
MAY 86 :  * +
JUN 86 :         *+
JUL 86 :         *
AUG 86 :          * +
SEP 86 :         *+
```

```
STATION:   QCCO110    LAYER:  2      ROW: 39        COLUMN: 32

                 Water Level, Feet (NGVD)

      -5         5        15        25        35        45        55
       +.........+.........+.........+.........+.........+.........+
APR 85 :  * +
MAY 85 :   * +
JUN 85 :       +   *
JUL 85 :          * +
AUG 85 :           *+
SEP 85 :          * +
OCT 85 :        +*
NOV 85 :      *
DEC 85 :   +   *
JAN 86 M      *
FEB 86 :   +    *
MAR 86 :    +*
APR 86 :  *
MAY 86 :  *  +
JUN 86 :          *
JUL 86 :         *+
AUG 86 :           *+
SEP 86 :         *
```

```
STATION:   QCC094+   LAYER:  2     ROW: 41       COLUMN: 32

                 Water Level, Feet (NGVD)

      -3         7        17        27        37        47        57
       +.........+.........+.........+.........+.........+.........+
APR 85 M      *
MAY 85 M      *
JUN 85 M        *
JUL 85 :        *   +
AUG 85 :        *  +
SEP 85 :        *  +
OCT 85 :       +*
NOV 85 :     + *
DEC 85 :   +   *
JAN 86 M       *
FEB 86 :   +   *
MAR 86 :   +   *
APR 86 :  +   *
MAY 86 :    + *
JUN 86 :        *+
JUL 86 :        *+
AUG 86 :        *  +
SEP 86 :        *+
```

```
STATION:   QCC096+   LAYER:  2     ROW: 40       COLUMN: 32

                 Water Level, Feet (NGVD)

      -4         6        16        26        36        46        56
       +.........+.........+.........+.........+.........+.........+
APR 85 M     *
MAY 85 M     *
JUN 85 M         *
JUL 85 :         *   +
AUG 85 :         *  +
SEP 85 :         *  +
OCT 85 :        +*
NOV 85 :      +*
DEC 85 :   +   *
JAN 86 M       *
FEB 86 :    +   *
MAR 86 :    + *
APR 86 :  +  *
MAY 86 :     *
JUN 86 :         *+
JUL 86 :         *+
AUG 86 :          * +
SEP 86 :         *+
```

```
STATION:   QCC098+   LAYER:  2     ROW: 40        COLUMN: 33

                 Water Level, Feet (NGVD)

      -3         7        17        27        37        47        57
       +.........+.........+.........+.........+.........+.........+
APR 85 M     *
MAY 85 M     *
JUN 85 M         *
JUL 85 :         *  +
AUG 85 :         *  +
SEP 85 :         * +
OCT 85 :       + *
NOV 85 :     + *
DEC 85 :  +    *
JAN 86 M       *
FEB 86 :   +    *
MAR 86 :    + *
APR 86 :  +  *
MAY 86 :    +*
JUN 86 :         *
JUL 86 :         *
AUG 86 :         * +
SEP 86 :         *
```

```
STATION:   C-303     LAYER:  3     ROW: 41        COLUMN: 35

                 Water Level, Feet (NGVD)

      -1         9        19        29        39        49        59
       +.........+.........+.........+.........+.........+.........+
APR 85 :    + *
MAY 85 :    + *
JUN 85 :      +  *
JUL 85 :         * +
AUG 85 :         * +
SEP 85 :         *+
OCT 85 :        +*
NOV 85 :       +*
DEC 85 :   +   *
JAN 86 :  +    *
FEB 86 :    +    *
MAR 86 :   +   *
APR 86 :   + *
MAY 86 :    + *
JUN 86 :        +*
JUL 86 :        +*
AUG 86 :         *+
SEP 86 :        +*
```

```
STATION:    C-688      LAYER:  3      ROW: 39        COLUMN: 40

                Water Level, Feet (NGVD)

       5        15        25        35        45        55        65
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +   *
MAY 85 :   +  *
JUN 85 :     +   *
JUL 85 :        +*
AUG 85 :         +*
SEP 85 :         +*
OCT 85 :       +  *
NOV 85 :       +*
DEC 85 :    +  *
JAN 86 :   +    *
FEB 86 :    +    *
MAR 86 :    +   *
APR 86 :  +   *
MAY 86 :    + *
JUN 86 :       +*
JUL 86 :       + *
AUG 86 :        +*
SEP 86 :     +   *
```

```
STATION:    HE-557     LAYER:  3      ROW: 11        COLUMN: 45

                Water Level, Feet (NGVD)

       8        18        28        38        48        58        68
       +.........+.........+.........+.........+.........+.........+
APR 85 :    + *
MAY 85 :    +*
JUN 85 :     +*
JUL 85 :      +*
AUG 85 :      + *
SEP 85 :      + *
OCT 85 :     +  *
NOV 85 :     + *
DEC 85 :    +  *
JAN 86 :    +  *
FEB 86 :    + *
MAR 86 :    + *
APR 86 :  +   *
MAY 86 :  +  *
JUN 86 :     + *
JUL 86 :     + *
AUG 86 :      + *
SEP 86 :      + *
```

```
STATION:   HE-559     LAYER:  3      ROW: 14       COLUMN: 46

                 Water Level, Feet (NGVD)

      15        25        35        45        55        65        75
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *
MAY 85 :   *
JUN 85 :   *+
JUL 85 :    *+
AUG 85 :    *+
SEP 85 :     *
OCT 85 :    *
NOV 85 :    *
DEC 85 :   +*
JAN 86 :   +*
FEB 86 :   *
MAR 86 :   *
APR 86 :  +*
MAY 86 :  +*
JUN 86 :    *
JUL 86 :    *+
AUG 86 :     *
SEP 86 :     *
```

```
STATION:   HE-560     LAYER:  3      ROW: 14       COLUMN: 46

                 Water Level, Feet (NGVD)

      16        26        36        46        56        66        76
       +.........+.........+.........+.........+.........+.........+
APR 85 :  *+
MAY 85 :  *+
JUN 85 :  *+
JUL 85 :   *+
AUG 85 :   *+
SEP 85 :    *+
OCT 85 :   *+
NOV 85 :   *+
DEC 85 :   *+
JAN 86 :   *
FEB 86 :  *+
MAR 86 :  * +
APR 86 :  *+
MAY 86 :  *
JUN 86 :   *+
JUL 86 :   *+
AUG 86 :    *+
SEP 86 :    *+
```

STATION: L-1625   LAYER: 3   ROW: 21   COLUMN: 36

Water Level, Feet (NGVD)

```
      11        21        31        41        51        61        71
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  +*
JUN 85 :    +*
JUL 85 :      *+
AUG 85 :       *+
SEP 85 :        *+
OCT 85 :       +*
NOV 85 :       *       +
DEC 85 :      *  +
JAN 86 :     *
FEB 86 :    +*
MAR 86 :    *
APR 86 :  +*
MAY 86 :  *+
JUN 86 :      *
JUL 86 :       *+
AUG 86 :        *+
SEP 86 :        *+
```

STATION: L-1853   LAYER: 3   ROW: 28   COLUMN: 32

Water Level, Feet (NGVD)

```
       2        12        22        32        42        52        62
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +       *
MAY 85 :   +      *
JUN 85 :     +     *
JUL 85 :         +  *
AUG 85 :          + *
SEP 85 :           + *
OCT 85 :        +    *
NOV 85 :       +    *
DEC 85 :    +      *
JAN 86 :  +       *
FEB 86 :   +      *
MAR 86 :   +    *
APR 86 :  +     *
MAY 86 :    +  *
JUN 86 :       +   *
JUL 86 :         +  *
AUG 86 :           + *
SEP 86 :          +   *
```

```
STATION:   L-1907     LAYER:  3      ROW: 10        COLUMN: 35

                 Water Level, Feet (NGVD)

       5        15        25        35        45        55        65
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  +*
JUN 85 :   +*
JUL 85 :    +*
AUG 85 :     *
SEP 85 :     *+
OCT 85 :     *
NOV 85 :    *+
DEC 85 :   +*
JAN 86 :   +*
FEB 86 :  + *
MAR 86 :   *+
APR 86 :  +*
MAY 86 :  +*
JUN 86 :  +  *
JUL 86 :   + *
AUG 86 :   + *
SEP 86 :    +*
```

```
STATION:   L-1963     LAYER:  3      ROW: 21        COLUMN: 40

                 Water Level, Feet (NGVD)

       9        19        29        39        49        59        69
       +.........+.........+.........+.........+.........+.........+
APR 85 :     *
MAY 85 :   *+
JUN 85 :       *
JUL 85 :       *   +
AUG 85 :           *+
SEP 85 :           *+
OCT 85 :          +*
NOV 85 :         *
DEC 85 :        *
JAN 86 :       +*
FEB 86 :      *+
MAR 86 :     *  +
APR 86 :   *+
MAY 86 :  * +
JUN 86 :        *  +
JUL 86 :       *   +
AUG 86 :           * +
SEP 86 :           *
```

```
STATION:   L-1968     LAYER:  3     ROW: 16       COLUMN: 33

                  Water Level, Feet (NGVD)

       11        21        31        41        51        61        71
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  + *
JUN 85 :    *+
JUL 85 :     *+
AUG 85 :      *+
SEP 85 :      * +
OCT 85 :      *
NOV 85 :     *+
DEC 85 :     *
JAN 86 :    *
FEB 86 :    *
MAR 86 :    *+
APR 86 :  +*
MAY 86 :  +*
JUN 86 :   + *
JUL 86 :     * +
AUG 86 :      *+
SEP 86 :      * +
```

```
STATION:   L-1974     LAYER:  3     ROW: 17       COLUMN: 27

                  Water Level, Feet (NGVD)

       9         19        29        39        49        59        69
       +.........+.........+.........+.........+.........+.........+
APR 85 :     *
MAY 85 :    *+
JUN 85 :    * +
JUL 85 :     *+
AUG 85 :      *
SEP 85 :      * +
OCT 85 :  +   *
NOV 85 :      *+
DEC 85 :     * +
JAN 86 :     *+
FEB 86 :    * +
MAR 86 :    * +
APR 86 :    *+
MAY 86 :    *+
JUN 86 :     * +
JUL 86 :      *+
AUG 86 :      * +
SEP 86 :      *+
```

```
STATION:   L-1975     LAYER:  3      ROW:  9         COLUMN: 33

                 Water Level, Feet (NGVD)

       5        15        25        35        45        55        65
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *  +
MAY 85 :   * +
JUN 85 :   *  +
JUL 85 :   *   +
AUG 85 :    *   +
SEP 85 :    *   +
OCT 85 :    *  +
NOV 85 :   *   +
DEC 85 :   *  +
JAN 86 :   *  +
FEB 86 :   * +
MAR 86 :   *  +
APR 86 :  * +
MAY 86 :  * +
JUN 86 :    *  +
JUL 86 :   *   +
AUG 86 :    *  +
SEP 86 :    *  +
```

```
STATION:   L-1977     LAYER:  3      ROW: 10         COLUMN: 39

                 Water Level, Feet (NGVD)

       6        16        26        36        46        56        66
       +.........+.........+.........+.........+.........+.........+
APR 85 :   + *
MAY 85 :   +*
JUN 85 :    + *
JUL 85 :     + *
AUG 85 :      + *
SEP 85 :      + *
OCT 85 :     + *
NOV 85 :     +*
DEC 85 :   +  *
JAN 86 :    + *
FEB 86 :    +*
MAR 86 :    +*
APR 86 :  + *
MAY 86 :   +*
JUN 86 :     +*
JUL 86 :     + *
AUG 86 :      + *
SEP 86 :     + *
```

```
STATION:   L-2187     LAYER:  3      ROW: 14       COLUMN: 40

                  Water Level, Feet (NGVD)

      10        20        30        40        50        60        70
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +*
MAY 85 :  +*
JUN 85 :   +*
JUL 85 :    *+
AUG 85 :     *+
SEP 85 :     *+
OCT 85 :     *
NOV 85 :    *
DEC 85 :    *
JAN 86 :   *
FEB 86 :   *
MAR 86 :   *+
APR 86 :  *
MAY 86 :  *
JUN 86 :    *+
JUL 86 :    *+
AUG 86 :     *+
SEP 86 :     *


STATION:   L-2190     LAYER:  3      ROW: 12       COLUMN: 24

                  Water Level, Feet (NGVD)

      -3        7         17        27        37        47        57
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +  *
MAY 85 :   +*
JUN 85 :  +  *
JUL 85 :   +  *
AUG 85 :    + *
SEP 85 :       *
OCT 85 :       *+
NOV 85 :      *+
DEC 85 :      *+
JAN 86 :     *+
FEB 86 :    *+
MAR 86 :    *+
APR 86 :   *  +
MAY 86 :   *+
JUN 86 :   + *
JUL 86 :      *
AUG 86 :      * +
SEP 86 :      * +
```

```
STATION:   L-2192     LAYER:  3      ROW: 29        COLUMN: 38

                Water Level, Feet (NGVD)

       7        17        27        37        47        57        67
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +    *
MAY 85 :   +*
JUN 85 :    +   *
JUL 85 :        *
AUG 85 :         +  *
SEP 85 :         +  *
OCT 85 :       +     *
NOV 85 :      +    *
DEC 85 :    +     *
JAN 86 :    +    *
FEB 86 :    +   *
MAR 86 :    +  *
APR 86 :  + *
MAY 86 :   *
JUN 86 :      + *
JUL 86 :        *
AUG 86 :          + *
SEP 86 :         +  *
```

```
STATION:   L-2200     LAYER:  3      ROW: 10        COLUMN: 42

                Water Level, Feet (NGVD)

       6        16        26        36        46        56        66
       +.........+.........+.........+.........+.........+.........+
APR 85 :    + *
MAY 85 :   + *
JUN 85 :     +*
JUL 85 :      +*
AUG 85 :      + *
SEP 85 :      +  *
OCT 85 :      +  *
NOV 85 :     +  *
DEC 85 :    +  *
JAN 86 :   +   *
FEB 86 :    + *
MAR 86 :    + *
APR 86 :  +  *
MAY 86 :  +  *
JUN 86 :     +*
JUL 86 :      +*
AUG 86 :      + *
SEP 86 :      + *
```

```
STATION:   L-2215     LAYER:  3      ROW: 23        COLUMN: 41

                 Water Level, Feet (NGVD)

       8        18        28        38        48        58        68
       +.........+.........+.........+.........+.........+.........+
APR 85 :      *
MAY 85 :   *+
JUN 85 :        *
JUL 85 :       *   +
AUG 85 :             *
SEP 85 :              *
OCT 85 :          +    *
NOV 85 :         +  *
DEC 85 :        + *
JAN 86 :        + *
FEB 86 :        *
MAR 86 :       * +
APR 86 :   +*
MAY 86 :  *+
JUN 86 :    +    *
JUL 86 :        *  +
AUG 86 :              *
SEP 86 :             +*
```

```
STATION:   L-2216     LAYER:  3      ROW:  7        COLUMN: 30

                 Water Level, Feet (NGVD)

      11        21        31        41        51        61        71
       +.........+.........+.........+.........+.........+.........+
APR 85 :    +   *
MAY 85 :    +   *
JUN 85 :     +  *
JUL 85 :      +  *
AUG 85 :       + *
SEP 85 :        +*
OCT 85 :       + *
NOV 85 :       +*
DEC 85 :      + *
JAN 86 :     +  *
FEB 86 :    +   *
MAR 86 :     +  *
APR 86 :  +    *
MAY 86 :   +   *
JUN 86 :      +  *
JUL 86 :      +  *
AUG 86 :       + *
SEP 86 :       + *
```

```
STATION:   L-5648    LAYER:  3     ROW: 22        COLUMN: 28

                 Water Level, Feet (NGVD)

      11        21        31        41        51        61        71
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +*
MAY 85 :  +*
JUN 85 :    *
JUL 85 :     *+
AUG 85 :      *
SEP 85 :      *+
OCT 85 :      *+
NOV 85 :     * +
DEC 85 :     *+
JAN 86 :    *+
FEB 86 :    *+
MAR 86 :    * +
APR 86 :   *
MAY 86 :   *+
JUN 86 :     *+
JUL 86 :     *+
AUG 86 :      * +
SEP 86 :      *+
```

```
STATION:   L-5664    LAYER:  3     ROW: 31        COLUMN: 36

                 Water Level, Feet (NGVD)

       3        13        23        33        43        53        63
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +      *
MAY 85 :   +    *
JUN 85 :     +    *
JUL 85 :        +  *
AUG 85 :         +  *
SEP 85 :         +   *
OCT 85 :      +      *
NOV 85 :      +     *
DEC 85 :   +       *
JAN 86 :  +       *
FEB 86 :   +      *
MAR 86 :   +     *
APR 86 :  +    *
MAY 86 :   +  *
JUN 86 :       + *
JUL 86 :        + *
AUG 86 :         +  *
SEP 86 :        +    *
```

```
STATION:   L-5668     LAYER:  3      ROW: 31        COLUMN: 29

                 Water Level, Feet (NGVD)

       4        14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +*
MAY 85 :  + *
JUN 85 :   + *
JUL 85 :    + *
AUG 85 :     +*
SEP 85 :      +*
OCT 85 :      *
NOV 85 :     +*
DEC 85 :     *
JAN 86 :    *
FEB 86 :   +*
MAR 86 :   +*
APR 86 :  +*
MAY 86 :  +*
JUN 86 :   + *
JUL 86 :    + *
AUG 86 :     +*
SEP 86 :      *
```

```
STATION:   L-741      LAYER:  3      ROW: 30        COLUMN: 27

                 Water Level, Feet (NGVD)

       4        14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +*
MAY 85 :  +*
JUN 85 :  + *
JUL 85 :   + *
AUG 85 :    +*
SEP 85 :  +  *
OCT 85 :     *
NOV 85 :    *+
DEC 85 :    *
JAN 86 :   *+
FEB 86 :   *
MAR 86 :   *
APR 86 :  *+
MAY 86 :  *
JUN 86 :   +*
JUL 86 :   +*
AUG 86 :     *
SEP 86 :     *
```

```
STATION:   L-1418*    LAYER:  3      ROW: 18        COLUMN: 38

                 Water Level, Feet (NGVD)

      10        20        30        40        50        60        70
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +*
MAY 85 :  *
JUN 85 :   * +
JUL 85 :    * +
AUG 85 :     * +
SEP 85 :      *
OCT 85 :     *
NOV 85 :    *+
DEC 85 :    *
JAN 86 :   *+
FEB 86 :  * +
MAR 86 :  * +
APR 86 :  *
MAY 86 :  *
JUN 86 :    *   +
JUL 86 :     *+
AUG 86 :     * +
SEP 86 :     *
```

```
STATION:   L-1984*    LAYER:  3      ROW: 28        COLUMN: 34

                 Water Level, Feet (NGVD)

     -16        -6         4        14        24        34        44
       +.........+.........+.........+.........+.........+.........+
APR 85 :                      +       *
MAY 85 :                      +     *
JUN 85 :                        +    *
JUL 85 :                            + *
AUG 85 :                             + *
SEP 85 :                             +*
OCT 85 :                         +     *
NOV 85 :                            + *
DEC 85 :                      +   *
JAN 86 :                   +    *
FEB 86 :            +          *
MAR 86 :  +             *
APR 86 :   +             *
MAY 86 :                 *  +
JUN 86 :                          + *
JUL 86 :                         +   *
AUG 86 :                              + *
SEP 86 :                             +   *
```

```
STATION:    L-1994*    LAYER:  3      ROW: 22        COLUMN: 30

                 Water Level, Feet (NGVD)

       7        17        27        37        47        57        67
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +      *
MAY 85 :     +   *
JUN 85 :        + *
JUL 85 :           *
AUG 85 :           *
SEP 85 :            *
OCT 85 :          + *
NOV 85 :         + *
DEC 85 :        + *
JAN 86 :       +  *
FEB 86 :     +    *
MAR 86 :      +   *
APR 86 :   +     *
MAY 86 :      + *
JUN 86 :           *
JUL 86 :           *
AUG 86 :            * +
SEP 86 :            *
```

```
STATION:    L-1998*    LAYER:  3      ROW: 24        COLUMN: 32

                 Water Level, Feet (NGVD)

     -21       -11        -1         9        19        29        39
       +.........+.........+.........+.........+.........+.........+
APR 85 :      +                     *
MAY 85 :  +                         *
JUN 85 :                 +            *
JUL 85 :                       +        *
AUG 85 :                            +  *
SEP 85 :                            +    *
OCT 85 :                   +              *
NOV 85 :             +                 *
DEC 85 :             +                *
JAN 86 :            +                 *
FEB 86 :                    +           *
MAR 86 :                         +    *
APR 86 :  +                         *
MAY 86 :       +                   *
JUN 86 :                            +  *
JUL 86 :                        +       *
AUG 86 :                                   *   +
SEP 86 :                      +              *
```

```
STATION:   L-2186*    LAYER:  3     ROW: 21        COLUMN: 40

                 Water Level, Feet (NGVD)

       9        19        29        39        49        59        69
       +.........+.........+.........+.........+.........+.........+
APR 85 :     *
MAY 85 :   *+
JUN 85 :       *
JUL 85 :       *   +
AUG 85 :           *+
SEP 85 :           *+
OCT 85 :          +*
NOV 85 :         *
DEC 85 :        *
JAN 86 :       +*
FEB 86 :      *+
MAR 86 :     *  +
APR 86 :   *+
MAY 86 :  * +
JUN 86 :        *   +
JUL 86 :       *   +
AUG 86 :           * +
SEP 86 :          +*
```

```
STATION:   L-5649*    LAYER:  3     ROW: 26        COLUMN: 28

                 Water Level, Feet (NGVD)

       4        14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 :    *+
MAY 85 :   *   +
JUN 85 :        *
JUL 85 :         *+
AUG 85 :         * +
SEP 85 :          * +
OCT 85 :          * +
NOV 85 :       *  +
DEC 85 :      *  +
JAN 86 :      *  +
FEB 86 :        *
MAR 86 :     *  +
APR 86 :   *  +
MAY 86 :  *    +
JUN 86 :        *  +
JUL 86 :         * +
AUG 86 :          *   +
SEP 86 :          *  +
```

```
STATION:   L-727*    LAYER:  3     ROW: 14      COLUMN: 40

                 Water Level, Feet (NGVD)

      10        20        30        40        50        60        70
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *
MAY 85 :  +*
JUN 85 :   +*
JUL 85 :    *+
AUG 85 :     *+
SEP 85 :     *+
OCT 85 :     *
NOV 85 :    *
DEC 85 :    *
JAN 86 :   *
FEB 86 :   *
MAR 86 :   *+
APR 86 :  *
MAY 86 :  *
JUN 86 :    *+
JUL 86 :    *+
AUG 86 :     *+
SEP 86 :     *
```

```
STATION:   L-729*    LAYER:  3     ROW: 21      COLUMN: 36

                 Water Level, Feet (NGVD)

       9        19        29        39        49        59        69
       +.........+.........+.........+.........+.........+.........+
APR 85 :    + *
MAY 85 :     *
JUN 85 :       *
JUL 85 :        * +
AUG 85 :         *+
SEP 85 :          *+
OCT 85 :         +*
NOV 85 :         *
DEC 85 :       +*
JAN 86 :     + *
FEB 86 :    +  *
MAR 86 :     +*
APR 86 :  +  *
MAY 86 :    *+
JUN 86 :        *  +
JUL 86 :         * +
AUG 86 :          *  +
SEP 86 :          *
```

```
STATION:   L-731*     LAYER:  3      ROW: 29        COLUMN: 42

                 Water Level, Feet (NGVD)

      -4         6        16        26        36        46        56
       +.........+.........+.........+.........+.........+.........+
APR 85 :       +      *
MAY 85 :           *
JUN 85 :         +         *
JUL 85 :                   +*
AUG 85 :                       +*
SEP 85 :             +           *
OCT 85 :         +               *
NOV 85 :        +            *
DEC 85 :             +     *
JAN 86 :             +     *
FEB 86 :            +       *
MAR 86 :                 * +
APR 86 :  +         *
MAY 86 :      +   *
JUN 86 :                   *  +
JUL 86 :                    *+
AUG 86 :                        *+
SEP 86 :                 +      *
```

```
STATION:   LFM1305    LAYER:  3      ROW:  8        COLUMN: 21

                 Water Level, Feet (NGVD)

       4        14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +        *
MAY 85 :   +       *
JUN 85 :     +      *
JUL 85 :        +   *
AUG 85 :        +    *
SEP 85 :         +   *
OCT 85 M             *
NOV 85 :      +     *
DEC 85 :      +     *
JAN 86 :    +       *
FEB 86 M            *
MAR 86 :   +        *
APR 86 :  +        *
MAY 86 :   +       *
JUN 86 :       +     *
JUL 86 :        +    *
AUG 86 :         +   *
SEP 86 :         +   *
```

```
STATION:    C-963      LAYER:  4      ROW: 35       COLUMN: 40

                 Water Level, Feet (NGVD)

      29        39        49        59        69        79        89
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +*
MAY 85 :   *
JUN 85 :   + *
JUL 85 :   + *
AUG 85 :    + *
SEP 85 :     +*
OCT 85 :      *
NOV 85 :     *
DEC 85 :     *+
JAN 86 :   + *
FEB 86 :   + *
MAR 86 :    +*
APR 86 :   +*
MAY 86 :  +*
JUN 86 :   + *
JUL 86 :   + *
AUG 86 :    + *
SEP 86 :   +  *
```

```
STATION:    L-1058     LAYER:  4      ROW: 16       COLUMN: 13

                 Water Level, Feet (NGVD)

      -2         8        18        28        38        48        58
       +.........+.........+.........+.........+.........+.........+
APR 85 :    +   *
MAY 85 :  +   *
JUN 85 :   +    *
JUL 85 :      + *
AUG 85 :        +  *
SEP 85 :         +  *
OCT 85 :         + *
NOV 85 :         + *
DEC 85 :         +  *
JAN 86 :         + *
FEB 86 :        + *
MAR 86 :        +  *
APR 86 :       *
MAY 86 :      +  *
JUN 86 :        +    *
JUL 86 :        +    *
AUG 86 :          +   *
SEP 86 :          +  *
```

```
STATION:   L-1111     LAYER:  4     ROW: 12         COLUMN: 19

                 Water Level, Feet (NGVD)

      -9         1        11        21        31        41        51
       +.........+.........+.........+.........+.........+.........+
APR 85 :        *
MAY 85 :  *     +
JUN 85 :      *+
JUL 85 :  *      +
AUG 85 :     *    +
SEP 85 :          + *
OCT 85 :            *
NOV 85 :          * +
DEC 85 :            +  *
JAN 86 :            + *
FEB 86 :          *  +
MAR 86 :         *+
APR 86 :      * +
MAY 86 :     + *
JUN 86 :       +   *
JUL 86 :        +   *
AUG 86 :         +   *
SEP 86 :          + *
```

```
STATION:   L-1116     LAYER:  4     ROW: 17         COLUMN: 15

                 Water Level, Feet (NGVD)

     -42       -32       -22       -12        -2         8        18
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +                           *
MAY 85 :  +                   *
JUN 85 :            +                 *
JUL 85 :                        +     *
AUG 85 :                               +   *
SEP 85 :                                 +     *
OCT 85 :                                 +    *
NOV 85 :                                 +   *
DEC 85 :                                +        *
JAN 86 :                              +        *
FEB 86 :                             +      *
MAR 86 :                               +     *
APR 86 :                          +     *
MAY 86 :                         +        *
JUN 86 :                               +         *
JUL 86 :                                 +       *
AUG 86 :                                    +     *
SEP 86 :                                    +     *
```

```
STATION:   L-1121     LAYER:  4      ROW: 21        COLUMN: 24

                Water Level, Feet (NGVD)

     -46       -36       -26       -16        -6         4        14
       +.........+.........+.........+.........+.........+.........+
APR 85 :         +         *
MAY 85 :  +                     *
JUN 85 :           +                       *
JUL 85 :                           +      *
AUG 85 :                            +          *
SEP 85 :                                  +     *
OCT 85 :                                   *+
NOV 85 :                          *         +
DEC 85 :                              *+
JAN 86 :                       *     +
FEB 86 :              *         +
MAR 86 :          *         +
APR 86 :             *  +
MAY 86 :         +     *
JUN 86 :         +                              *
JUL 86 :                           +           *
AUG 86 :                            +            *
SEP 86 :                                      +*
```

```
STATION:   L-1124     LAYER:  4      ROW: 22        COLUMN: 22

                Water Level, Feet (NGVD)

     -47       -37       -27       -17        -7         3        13
       +.........+.........+.........+.........+.........+.........+
APR 85 :      +                *
MAY 85 M                          *
JUN 85 :                  +                 *
JUL 85 :                                 +*
AUG 85 :                                    +  *
SEP 85 :                                        * +
OCT 85 :                                    *     +
NOV 85 :                             *      +
DEC 85 :                                 *
JAN 86 :                           *   +
FEB 86 :                 + *
MAR 86 :                 *  +
APR 86 :                + *
MAY 86 :  +                *
JUN 86 :                         +               *
JUL 86 :                                    +   *
AUG 86 :                                          *
SEP 86 :                                         *
```

```
STATION:   L-1598     LAYER:  4      ROW: 22        COLUMN: 21

                 Water Level, Feet (NGVD)

     -37       -27       -17        -7         3        13        23
       +.........+.........+.........+.........+.........+.........+
APR 85 :           + *
MAY 85 :         +     *
JUN 85 :                   +    *
JUL 85 :                      *        +
AUG 85 :                          *       +
SEP 85 :                             *    +
OCT 85 :                         *    +
NOV 85 :                  *  +
DEC 85 :                   +  *
JAN 86 :               + *
FEB 86 :          *   +
MAR 86 :       *            +
APR 86 :  +     *
MAY 86 :        *   +
JUN 86 :                            +*
JUL 86 :                             *
AUG 86 :                               *     +
SEP 86 :                             *  +


STATION:   L-1973     LAYER:  4      ROW: 17        COLUMN: 27

                 Water Level, Feet (NGVD)

       2        12        22        32        42        52        62
       +.........+.........+.........+.........+.........+.........+
APR 85 :     +          *
MAY 85 :  +            *
JUN 85 :   +              *
JUL 85 :     +            *
AUG 85 :       +            *
SEP 85 :         +           *
OCT 85 :              +    *
NOV 85 :          +     *
DEC 85 :           +     *
JAN 86 :         +     *
FEB 86 :         +    *
MAR 86 :        +    *
APR 86 :      +    *
MAY 86 :     +      *
JUN 86 :       +            *
JUL 86 :        +           *
AUG 86 :         +          *
SEP 86 :          +         *
```

```
STATION:   L-1983     LAYER:  4      ROW: 24        COLUMN: 32

                  Water Level, Feet (NGVD)

      25        35        45        55        65        75        85
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +      *
MAY 85 :  +      *
JUN 85 :   +       *
JUL 85 :   +       *
AUG 85 :   +       *
SEP 85 :   +        *
OCT 85 :    +      *
NOV 85 :    +      *
DEC 85 :    +      *
JAN 86 :    +     *
FEB 86 :    +     *
MAR 86 :    +    *
APR 86 :   +     *
MAY 86 :   +     *
JUN 86 :   +       *
JUL 86 :   +       *
AUG 86 :    +       *
SEP 86 :    +       *
```

```
STATION:   L-2212     LAYER:  4      ROW: 27        COLUMN: 17

                  Water Level, Feet (NGVD)

      -4         6        16        26        36        46        56
       +.........+.........+.........+.........+.........+.........+
APR 85 :   + *
MAY 85 :  +   *
JUN 85 :    +    *
JUL 85 :       + *
AUG 85 :        +  *
SEP 85 :        +  *
OCT 85 :       +  *
NOV 85 :      +*
DEC 85 :      + *
JAN 86 :      *
FEB 86 :   *  +
MAR 86 :  *  +
APR 86 :  *+
MAY 86 :  *+
JUN 86 :      +    *
JUL 86 :       +   *
AUG 86 :        +   *
SEP 86 :        +   *
```

```
STATION:   L-2640     LAYER:  4      ROW: 16         COLUMN: 20

                 Water Level, Feet (NGVD)

     -46       -36       -26       -16        -6         4        14
       +.........+.........+.........+.........+.........+.........+
APR 85 :              +    *
MAY 85 :         +   *
JUN 85 :  +                  *
JUL 85 :           *            +
AUG 85 :                  *             +
SEP 85 :                            *        +
OCT 85 :                           *       +
NOV 85 :                         *       +
DEC 85 :                          +       *
JAN 86 :                            +  *
FEB 86 :                       +  *
MAR 86 :                          * +
APR 86 :                     *  +
MAY 86 :                   +  *
JUN 86 :                 +             *
JUL 86 :                                *
AUG 86 :                               *+
SEP 86 :                               *     +
```

```
STATION:   L-2641     LAYER:  4      ROW: 19         COLUMN: 18

                 Water Level, Feet (NGVD)

     -50       -40       -30       -20       -10         0        10
       +.........+.........+.........+.........+.........+.........+
APR 85 :     +      *
MAY 85 :  +  *
JUN 85 :             +  *
JUL 85 :     *                       +
AUG 85 :              *                   +
SEP 85 :                         *          +
OCT 85 :                        *          +
NOV 85 :                    *             +
DEC 85 :                              +*
JAN 86 :                             *
FEB 86 :                     *     +
MAR 86 :                     *      +
APR 86 :                *  +
MAY 86 :                 *+
JUN 86 :                             * +
JUL 86 :                             *   +
AUG 86 :                              *        +
SEP 86 :                             *     +
```

```
STATION:   L-2642     LAYER:  4      ROW: 22        COLUMN: 17

                 Water Level, Feet (NGVD)

     -34       -24       -14        -4         6        16        26
       +.........+.........+.........+.........+.........+.........+
APR 85 :         +   *
MAY 85 :  +        *
JUN 85 :            +    *
JUL 85 :         *            +
AUG 85 :               *         +
SEP 85 :                      *  +
OCT 85 :                     *   +
NOV 85 :                  *  +
DEC 85 :                   +    *
JAN 86 :                  +   *
FEB 86 :                 *
MAR 86 :                *  +
APR 86 :        +     *
MAY 86 :         +    *
JUN 86 :                     +  *
JUL 86 :                       + *
AUG 86 :                         *  +
SEP 86 :                         *
```

```
STATION:   L-2643     LAYER:  4      ROW: 22        COLUMN: 14

                 Water Level, Feet (NGVD)

      -2         8        18        28        38        48        58
       +.........+.........+.........+.........+.........+.........+
APR 85 :   + *
MAY 85 :  +  *
JUN 85 :  +    *
JUL 85 :     *
AUG 85 :       +*
SEP 85 :        +*
OCT 85 :         *
NOV 85 :        *
DEC 85 :        + *
JAN 86 :       +  *
FEB 86 :      +*
MAR 86 :       +*
APR 86 :    *+
MAY 86 :   + *
JUN 86 :      +   *
JUL 86 :       +  *
AUG 86 :         + *
SEP 86 :          +*
```

```
STATION:   L-2645     LAYER:  4      ROW: 16        COLUMN: 11

                 Water Level, Feet (NGVD)

       8        18        28        38        48        58        68
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +   *
MAY 85 :  +    *
JUN 85 :   +    *
JUL 85 :     +  *
AUG 85 :      +  *
SEP 85 :      +  *
OCT 85 :      +  *
NOV 85 :        +*
DEC 85 :        +*
JAN 86 :        +*
FEB 86 :       +*
MAR 86 :      +  *
APR 86 :     +*
MAY 86 :    +  *
JUN 86 :      +  *
JUL 86 :       + *
AUG 86 :       +  *
SEP 86 :       +  *
```

```
STATION:   L-2646     LAYER:  4      ROW:  7        COLUMN: 20

                 Water Level, Feet (NGVD)

      11        21        31        41        51        61        71
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +   *
MAY 85 :   + *
JUN 85 :   +   *
JUL 85 :     *
AUG 85 :      +*
SEP 85 :       + *
OCT 85 :      +  *
NOV 85 :      + *
DEC 85 :      +   *
JAN 86 :     +    *
FEB 86 :    +   *
MAR 86 :    +   *
APR 86 :   +  *
MAY 86 :  +    *
JUN 86 :    +     *
JUL 86 :     +    *
AUG 86 :      +   *
SEP 86 :      +   *
```

```
STATION:   L-2700     LAYER:  4      ROW: 13        COLUMN: 14

                 Water Level, Feet (NGVD)

       6        16        26        36        46        56        66
       +.........+.........+.........+.........+.........+.........+
APR 85 :   + *
MAY 85 :  +*
JUN 85 :   +*
JUL 85 :    *
AUG 85 :    + *
SEP 85 :     +  *
OCT 85 :      +*
NOV 85 :      +*
DEC 85 :    +   *
JAN 86 :      +*
FEB 86 :     +*
MAR 86 :      +*
APR 86 :    *
MAY 86 :    +*
JUN 86 :     +  *
JUL 86 :     +   *
AUG 86 :      +  *
SEP 86 :      +  *
```

```
STATION:   L-2820     LAYER:  4      ROW: 14        COLUMN:  7

                 Water Level, Feet (NGVD)

       7        17        27        37        47        57        67
       +.........+.........+.........+.........+.........+.........+
APR 85 :     +        *
MAY 85 :     +        *
JUN 85 :      +       *
JUL 85 :      +       *
AUG 85 :       +      *
SEP 85 :       +      *
OCT 85 :        +     *
NOV 85 :  +           *
DEC 85 :      +       *
JAN 86 :          +   *
FEB 86 :        +     *
MAR 86 :       +      *
APR 86 :        +    *
MAY 86 :       +      *
JUN 86 :       +      *
JUL 86 :        +     *
AUG 86 :         +     *
SEP 86 :         +     *
```

```
STATION:   L-2821     LAYER:  4      ROW: 23        COLUMN: 10

                 Water Level, Feet (NGVD)

       9        19        29        39        49        59        69
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +   *
MAY 85 :   +   *
JUN 85 :    +   *
JUL 85 :    +  *
AUG 85 :     +  *
SEP 85 :     +  *
OCT 85 :        *
NOV 85 :        *
DEC 85 :       +*
JAN 86 :        *
FEB 86 :       *
MAR 86 :    +  *
APR 86 :    + *
MAY 86 :    + *
JUN 86 :    +   *
JUL 86 :    +   *
AUG 86 :      +  *
SEP 86 :      +  *
```

```
STATION:   L-4820     LAYER:  4      ROW: 13        COLUMN: 18

                 Water Level, Feet (NGVD)

     -21       -11        -1         9        19        29        39
       +.........+.........+.........+.........+.........+.........+
APR 85 :         *      +
MAY 85 :   *           +
JUN 85 :       *        +
JUL 85 :  *              +
AUG 85 :      *           +
SEP 85 :               *     +
OCT 85 :               *     +
NOV 85 :             *       +
DEC 85 :                    * +
JAN 86 :                  *   +
FEB 86 :              *   +
MAR 86 :            *    +
APR 86 :         *    +
MAY 86 :          *    +
JUN 86 :               * +
JUL 86 :                * +
AUG 86 :                *  +
SEP 86 :                *  +
```

```
STATION:   L-5707     LAYER:  4      ROW: 15        COLUMN: 24

                 Water Level, Feet (NGVD)

      -8        2        12        22        32        42        52
       +.........+.........+.........+.........+.........+.........+
APR 85 :         *
MAY 85 :     *    +
JUN 85 :        *  +
JUL 85 :       *   +
AUG 85 :          *
SEP 85 :            *
OCT 85 :           *+
NOV 85 :         * +
DEC 85 :          +*
JAN 86 :         * +
FEB 86 :        * +
MAR 86 :        * +
APR 86 :  *      +
MAY 86 :    *       +
JUN 86 :          *+
JUL 86 :          * +
AUG 86 :           *
SEP 86 :          * +
```

```
STATION:   L-735      LAYER:  4      ROW: 27        COLUMN: 25

                 Water Level, Feet (NGVD)

      -1        9        19        29        39        49        59
       +.........+.........+.........+.........+.........+.........+
APR 85 :    +         *
MAY 85 M              *
JUN 85 :  +              *
JUL 85 :         +       *
AUG 85 :        +          *
SEP 85 :         +         *
OCT 85 :         +        *
NOV 85 :         +      *
DEC 85 :       +        *
JAN 86 :      +        *
FEB 86 :     +       *
MAR 86 :      +     *
APR 86 :   +        *
MAY 86 :   +        *
JUN 86 :      +           *
JUL 86 :       +          *
AUG 86 :         +         *
SEP 86 :         +         *
```

```
STATION:   BBLM171    LAYER:  4      ROW: 35        COLUMN: 27

                 Water Level, Feet (NGVD)

      19        29        39        49        59        69        79
       +.........+.........+.........+.........+.........+.........+
APR 85 :  * +
MAY 85 M  *
JUN 85 :    *+
JUL 85 :    * +
AUG 85 M     *
SEP 85 M     *
OCT 85 :    *     +
NOV 85 :   *   +
DEC 85 :    *  +
JAN 86 :   *   +
FEB 86 :   *   +
MAR 86 :  *    +
APR 86 :  *   +
MAY 86 :  *   +
JUN 86 :    *  +
JUL 86 :    *  +
AUG 86 :     *  +
SEP 86 :     *  +
```

```
STATION:   LFM2214    LAYER:  4      ROW:  8        COLUMN: 20

                 Water Level, Feet (NGVD)

      -7         3        13        23        33        43        53
       +.........+.........+.........+.........+.........+.........+
APR 85 M        *
MAY 85 M    *
JUN 85 M       *
JUL 85 M  *
AUG 85 M      *
SEP 85 :            *    +
OCT 85 :          *    +
NOV 85 :         *   +
DEC 85 :          +   *
JAN 86 :           + *
FEB 86 M         *
MAR 86 :       +  *
APR 86 :    + *
MAY 86 :     + *
JUN 86 :             *+
JUL 86 :              *+
AUG 86 :              * +
SEP 86 :              *+
```

```
STATION:    L-1993     LAYER:  4      ROW: 22        COLUMN: 30

                  Water Level, Feet (NGVD)

       9        19        29        39        49        59        69
       +.........+.........+.........+.........+.........+.........+
APR 85 :      +               *
MAY 85 :  +                   *
JUN 85 :     +                  *
JUL 85 :         +              *
AUG 85 :          +              *
SEP 85 :           +             *
OCT 85 :          +             *
NOV 85 :           +           *
DEC 85 :           +           *
JAN 86 :         +             *
FEB 86 :        +             *
MAR 86 :         +            *
APR 86 :   +                 *
MAY 86 :   +                 *
JUN 86 :        +               *
JUL 86 :        +               *
AUG 86 :           +             *
SEP 86 :            +            *


STATION:    L-2644     LAYER:  4      ROW: 20        COLUMN: 13

                  Water Level, Feet (NGVD)

      -3         7        17        27        37        47        57
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +   *
MAY 85 :  +    *
JUN 85 :  +       *
JUL 85 :     +  *
AUG 85 :        +  *
SEP 85 :         + *
OCT 85 :          + *
NOV 85 :         + *
DEC 85 :         +  *
JAN 86 :         +  *
FEB 86 :        +  *
MAR 86 :        +  *
APR 86 :      +*
MAY 86 :     +  *
JUN 86 :       +    *
JUL 86 :         +  *
AUG 86 :          +  *
SEP 86 :           +  *
```

STATION: L-2701   LAYER: 4   ROW: 15   COLUMN: 17

```
                    Water Level, Feet (NGVD)

     -39       -29       -19       -9          1        11        21
       +.........+.........+.........+.........+.........+.........+
APR 85 :            *     +
MAY 85 :  *      +
JUN 85 :          *    +
JUL 85 :    *                    +
AUG 85 :           *                 +
SEP 85 :                     *          +
OCT 85 :                    *            +
NOV 85 :                   *            +
DEC 85 :                           *    +
JAN 86 :                          *    +
FEB 86 :                    *         +
MAR 86 :                    *        +
APR 86 :                *      +
MAY 86 :                 *      +
JUN 86 :                        *     +
JUL 86 :                         *     +
AUG 86 :                         *        +
SEP 86 :                         *       +
```

STATION: L-2702   LAYER: 4   ROW: 18   COLUMN: 19

```
                    Water Level, Feet (NGVD)

     -45       -35       -25       -15        -5         5        15
       +.........+.........+.........+.........+.........+.........+
APR 85 :         +  *
MAY 85 :    +*
JUN 85 :             * +
JUL 85 :  *                       +
AUG 85 :          *                    +
SEP 85 :                      *       +
OCT 85 :                     *         +
NOV 85 :                  *         +
DEC 85 :                        +   *
JAN 86 :                        + *
FEB 86 :                    * +
MAR 86 :                   *  +
APR 86 :         +     *
MAY 86 :            +   *
JUN 86 :                         * +
JUL 86 :                          *
AUG 86 :                          *      +
SEP 86 :                         *     +
```

```
STATION:    L-2703    LAYER:  4     ROW: 20       COLUMN: 18

                 Water Level, Feet (NGVD)

     -44       -34       -24       -14        -4         6        16
       +.........+.........+.........+.........+.........+.........+
APR 85 :         *+
MAY 85 :  *+
JUN 85 :           *    +
JUL 85 :  *                        +
AUG 85 :          *                     +
SEP 85 :                    *         +
OCT 85 :                   *           +
NOV 85 :                *         +
DEC 85 :                       +  *
JAN 86 :                      + *
FEB 86 :                 *   +
MAR 86 :                 *   +
APR 86 :  +          *
MAY 86 :          +  *
JUN 86 :                        *    +
JUL 86 :                         *   +
AUG 86 :                         *         +
SEP 86 :                        *    +
```

```
STATION:    L-581     LAYER:  4     ROW: 19       COLUMN: 16

                 Water Level, Feet (NGVD)

     -41       -31       -21       -11        -1         9        19
       +.........+.........+.........+.........+.........+.........+
APR 85 :      +          *
MAY 85 :  +        *
JUN 85 :           +      *
JUL 85 :            *          +
AUG 85 :                  *         +
SEP 85 :                         *    +
OCT 85 :                          *   +
NOV 85 :                       *    +
DEC 85 :                           +  *
JAN 86 :                         +   *
FEB 86 :                        *
MAR 86 :                        +*
APR 86 :                +  *
MAY 86 :                 +  *
JUN 86 :                           +*
JUL 86 :                            +*
AUG 86 :                             *   +
SEP 86 :                             * +
```

STATION: L-742 LAYER: 4 ROW: 21 COLUMN: 23

Water Level, Feet (NGVD)

```
     -52       -42       -32       -22       -12        -2         8
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +           *
MAY 85 :     +                *
JUN 85 :                    +                  *
JUL 85 :                                +    *
AUG 85 :                                      +   *
SEP 85 :                                          + *
OCT 85 :                                       *
NOV 85 :                               *    +
DEC 85 :                                +  *
JAN 86 :                         +  *
FEB 86 :                *   +
MAR 86 :          *        +
APR 86 :        +      *
MAY 86 :             +      *
JUN 86 :                                  +         *
JUL 86 :                                   +       *
AUG 86 :                                             *
SEP 86 :                                          +*
```

STATION: L-781 LAYER: 4 ROW: 15 COLUMN: 15

Water Level, Feet (NGVD)

```
     -36       -26       -16        -6         4        14        24
       +.........+.........+.........+.........+.........+.........+
APR 85 :                    +    *
MAY 85 :  +                *
JUN 85 :                 +      *
JUL 85 :                      +*
AUG 85 :                             *
SEP 85 :                              +   *
OCT 85 :                             + *
NOV 85 :                               *
DEC 85 :                        +         *
JAN 86 :                 +             *
FEB 86 :                        +     *
MAR 86 :                          +    *
APR 86 :               +          *
MAY 86 :                        +   *
JUN 86 :                               +    *
JUL 86 :                                   +*
AUG 86 :                                     *
SEP 86 :                                   +*
```

```
STATION:   L-2292     LAYER:  5      ROW: 17        COLUMN: 27

                 Water Level, Feet (NGVD)

      31        41        51        61        71        81        91
       +.........+.........+.........+.........+.........+.........+
APR 85 :    *+
MAY 85 :   * +
JUN 85 :     +*
JUL 85 :      *
AUG 85 :      *+
SEP 85 :       *+
OCT 85 :      *  +
NOV 85 :     *   +
DEC 85 :     *    +
JAN 86 :     *   +
FEB 86 :     *  +
MAR 86 :    *  +
APR 86 :  *    +
MAY 86 :  +*
JUN 86 :      *
JUL 86 :      * +
AUG 86 :       *
SEP 86 :      * +
```

```
STATION:   L-2295     LAYER:  5      ROW: 30        COLUMN: 27

                 Water Level, Feet (NGVD)

      30        40        50        60        70        80        90
       +.........+.........+.........+.........+.........+.........+
APR 85 :     + *
MAY 85 :    +  *
JUN 85 :     +  *
JUL 85 :     +  *
AUG 85 :     +  *
SEP 85 :        *
OCT 85 :       +*
NOV 85 :      +*
DEC 85 :     + *
JAN 86 :    +  *
FEB 86 :      +*
MAR 86 :     + *
APR 86 :  +   *
MAY 86 :      *
JUN 86 :     +  *
JUL 86 :      + *
AUG 86 :       +*
SEP 86 :       +*
```

```
STATION:   L-2310     LAYER:   5      ROW: 36        COLUMN: 29

                 Water Level, Feet (NGVD)

      31        41        51        61        71        81        91
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  + *
JUN 85 :   +*
JUL 85 :   + *
AUG 85 :   + *
SEP 85 :     *
OCT 85 :    +*
NOV 85 :    *+
DEC 85 :   +*
JAN 86 :  + *
FEB 86 :   +*
MAR 86 :   +*
APR 86 :  + *
MAY 86 :   +*
JUN 86 :   + *
JUL 86 :   + *
AUG 86 :   + *
SEP 86 :   + *
```

```
STATION:   L-2311     LAYER:   5      ROW: 21        COLUMN: 40

                 Water Level, Feet (NGVD)

      47        57        67        77        87        97       107
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  + *
JUN 85 :  + *
JUL 85 :    *
AUG 85 :   +*
SEP 85 :    *+
OCT 85 :    *
NOV 85 :   +*
DEC 85 :   +*
JAN 86 :   +*
FEB 86 :  + *
MAR 86 :   +*
APR 86 :   +*
MAY 86 :   +*
JUN 86 :   +*
JUL 86 :    *+
AUG 86 :   +*
SEP 86 :    *
```

```
STATION:   L-2313     LAYER:  5      ROW: 29        COLUMN: 42

                 Water Level, Feet (NGVD)

      47        57        67        77        87        97       107
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :  + *
JUN 85 :  + *
JUL 85 :  + *
AUG 85 :  + *
SEP 85 :   +*
OCT 85 :    *
NOV 85 :    *+
DEC 85 :    *
JAN 86 :   +*
FEB 86 :   +*
MAR 86 :   +*
APR 86 :  + *
MAY 86 :  + *
JUN 86 :   +*
JUL 86 :   +*
AUG 86 :    *
SEP 86 :   +*
```

```
STATION:   L-2319     LAYER:  5      ROW: 28        COLUMN: 34

                 Water Level, Feet (NGVD)

      43        53        63        73        83        93       103
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *
MAY 85 :   *
JUN 85 :   *
JUL 85 :   *+
AUG 85 :   *
SEP 85 :   * +
OCT 85 :   *+
NOV 85 :   *   +
DEC 85 :   *  +
JAN 86 :   *+
FEB 86 :   *+
MAR 86 :   *+
APR 86 :  +*
MAY 86 :   *
JUN 86 M   *
JUL 86 M   *
AUG 86 M    *
SEP 86 M   *
```

```
STATION:   L-2328     LAYER:  5      ROW:  7        COLUMN: 30

                 Water Level, Feet (NGVD)

      45        55        65        75        85        95       105
       +.........+.........+.........+.........+.........+.........+
APR 85 :  *
MAY 85 :  *
JUN 85 :   +*
JUL 85 :    *
AUG 85 :    *
SEP 85 :    *+
OCT 85 :    *+
NOV 85 :   * +
DEC 85 :   *
JAN 86 :   *+
FEB 86 :    *+
MAR 86 :   *+
APR 86 :  *
MAY 86 :  * +
JUN 86 :    *
JUL 86 :    *
AUG 86 :    *
SEP 86 :    *
```

```
STATION:   L-2341     LAYER:  5      ROW:  8        COLUMN: 24

                 Water Level, Feet (NGVD)

      41        51        61        71        81        91       101
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *
MAY 85 :  *
JUN 85 :   *
JUL 85 :   * +
AUG 85 :    *
SEP 85 :    *+
OCT 85 :    * +
NOV 85 :   *    +
DEC 85 :    *    +
JAN 86 :   *   +
FEB 86 :   *  +
MAR 86 :   * +
APR 86 :  * +
MAY 86 :  *+
JUN 86 :   *+
JUL 86 :    *+
AUG 86 :    * +
SEP 86 :    * +
```

```
STATION:   L-2435     LAYER:  5      ROW: 20        COLUMN: 20

                 Water Level, Feet (NGVD)

      15        25        35        45        55        65        75
       +.........+.........+.........+.........+.........+.........+
APR 85 :    *   +
MAY 85 :   *    +
JUN 85 :       *+
JUL 85 :      *   +
AUG 85 :       *   +
SEP 85 :        *  +
OCT 85 :        *  +
NOV 85 :      *    +
DEC 85 :       *  +
JAN 86 :      *    +
FEB 86 :    *     +
MAR 86 :    *     +
APR 86 :  *     +
MAY 86 :  *     +
JUN 86 :         *+
JUL 86 :         * +
AUG 86 :          *+
SEP 86 :         * +
```

```
STATION:   L-2524     LAYER:  5      ROW: 29        COLUMN:  7

                 Water Level, Feet (NGVD)

       5        15        25        35        45        55        65
       +.........+.........+.........+.........+.........+.........+
APR 85 :     +       *
MAY 85 :   +          *
JUN 85 :     +        *
JUL 85 :             +*
AUG 85 :            + *
SEP 85 :               * +
OCT 85 :               *+
NOV 85 :             +*
DEC 85 :        +     *
JAN 86 :         +    *
FEB 86 :        +     *
MAR 86 :    +        *
APR 86 :    +         *
MAY 86 :  +          *
JUN 86 :            + *
JUL 86 :         +    *
AUG 86 :              * +
SEP 86 :               *  +
```

```
STATION:   L-2525     LAYER:  5      ROW: 23        COLUMN: 10

                 Water Level, Feet (NGVD)

      19        29        39        49        59        69        79
       +.........+.........+.........+.........+.........+.........+
APR 85 :   *     +
MAY 85 :   *      +
JUN 85 :    *     +
JUL 85 :    *      +
AUG 85 :    *       +
SEP 85 :    *      +
OCT 85 :    *        +
NOV 85 :    *        +
DEC 85 :    *       +
JAN 86 :    *       +
FEB 86 :    *      +
MAR 86 :    *      +
APR 86 :  *       +
MAY 86 :   *     +
JUN 86 :    *      +
JUL 86 :    *     +
AUG 86 :    *      +
SEP 86 :     *      +
```

```
STATION:   L-2526     LAYER:  5      ROW:  7        COLUMN: 13

                 Water Level, Feet (NGVD)

      34        44        54        64        74        84        94
       +.........+.........+.........+.........+.........+.........+
APR 85 :   +  *
MAY 85 :    + *
JUN 85 :     +*
JUL 85 :     +*
AUG 85 :      *
SEP 85 :      *
OCT 85 :      *
NOV 85 :      * +
DEC 85 :      *+
JAN 86 :      *+
FEB 86 :     +*
MAR 86 :  +   *
APR 86 :    + *
MAY 86 :    + *
JUN 86 :     +*
JUL 86 :     +*
AUG 86 :      *+
SEP 86 :      *
```

```
STATION:    L-2527     LAYER:  5      ROW: 14        COLUMN:  7

                 Water Level, Feet (NGVD)

      19        29        39        49        59        69        79
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +    *
MAY 85 :   +   *
JUN 85 :   +   *
JUL 85 :    +  *
AUG 85 :     +  *
SEP 85 :     + *
OCT 85 :      +*
NOV 85 :     + *
DEC 85 :      +*
JAN 86 :      +*
FEB 86 :     + *
MAR 86 :    +  *
APR 86 :   +  *
MAY 86 :    +  *
JUN 86 :    +  *
JUL 86 :     + *
AUG 86 :     +  *
SEP 86 :     + *
```

```
STATION:    L-2528     LAYER:  5      ROW: 15        COLUMN: 16

                 Water Level, Feet (NGVD)

      22        32        42        52        62        72        82
       +.........+.........+.........+.........+.........+.........+
APR 85 M     *
MAY 85 :     *     +
JUN 85 :      *      +
JUL 85 :      *      +
AUG 85 :      *      +
SEP 85 :      *       +
OCT 85 :       *       +
NOV 85 :      *      +
DEC 85 :      *      +
JAN 86 :     *        +
FEB 86 :     *         +
MAR 86 :     *        +
APR 86 :  *         +
MAY 86 :   *       +
JUN 86 :      *     +
JUL 86 :      *      +
AUG 86 :       *     +
SEP 86 :       *     +
```

```
STATION:   L-2530     LAYER:  5      ROW: 10        COLUMN: 35

                 Water Level, Feet (NGVD)

      40        50        60        70        80        90       100
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +     *
MAY 85 :  +     *
JUN 85 :   +     *
JUL 85 :      +  *
AUG 85 :      +   *
SEP 85 :        +*
OCT 85 :       + *
NOV 85 :      +  *
DEC 85 :     +   *
JAN 86 :     +   *
FEB 86 :     +   *
MAR 86 :     +   *
APR 86 :   +    *
MAY 86 :    +   *
JUN 86 :      +  *
JUL 86 :      +  *
AUG 86 :       +  *
SEP 86 :        +*
```

```
STATION:   L-2531     LAYER:  5      ROW:  9        COLUMN: 40

                 Water Level, Feet (NGVD)

      45        55        65        75        85        95       105
       +.........+.........+.........+.........+.........+.........+
APR 85 :  + *
MAY 85 :   *
JUN 85 :   + *
JUL 85 :    *
AUG 85 :   +   *
SEP 85 :     + *
OCT 85 :    +  *
NOV 85 :    + *
DEC 85 :    + *
JAN 86 :    + *
FEB 86 :    *
MAR 86 :    +*
APR 86 :   *
MAY 86 :  +*
JUN 86 :    +*
JUL 86 :    *
AUG 86 :   +   *
SEP 86 :     + *
```

```
STATION:    L-585       LAYER:  5       ROW: 28        COLUMN: 14

                 Water Level, Feet (NGVD)

      22        32        42        52        62        72        82
       +.........+.........+.........+.........+.........+.........+
APR 85 :  *   +
MAY 85 :  *   +
JUN 85 :   * +
JUL 85 :   *  +
AUG 85 :    * +
SEP 85 :    *  +
OCT 85 :    *  +
NOV 85 :   *  +
DEC 85 :   *  +
JAN 86 :   * +
FEB 86 :   * +
MAR 86 :  *  +
APR 86 :  *   +
MAY 86 :  *+
JUN 86 :    * +
JUL 86 :    * +
AUG 86 :    *  +
SEP 86 :    * +
```

```
STATION:    L-590       LAYER:  5       ROW: 30        COLUMN: 10

                 Water Level, Feet (NGVD)

       8        18        28        38        48        58        68
       +.........+.........+.........+.........+.........+.........+
APR 85 :     +      *
MAY 85 :   +         *
JUN 85 :      +      *
JUL 85 :            +*
AUG 85 :            + *
SEP 85 :              *
OCT 85 :              * +
NOV 85 :            +*
DEC 85 :       +      *
JAN 86 :          +  *
FEB 86 :         +   *
MAR 86 :    +       *
APR 86 :     +       *
MAY 86 :  +         *
JUN 86 :           + *
JUL 86 :           +  *
AUG 86 :              *+
SEP 86 :              * +
```

```
STATION:   L-652      LAYER:  5      ROW: 12       COLUMN: 32

                 Water Level, Feet (NGVD)

      38        48        58        68        78        88        98
       +.........+.........+.........+.........+.........+.........+
APR 85 :  +    *
MAY 85 :  +    *
JUN 85 :    +   *
JUL 85 :    +   *
AUG 85 :    +   *
SEP 85 :      + *
OCT 85 :      + *
NOV 85 :    +   *
DEC 85 :   +    *
JAN 86 :   +    *
FEB 86 :   +    *
MAR 86 :    +  *
APR 86 :   +   *
MAY 86 :   +   *
JUN 86 :    +   *
JUL 86 :     +  *
AUG 86 :     +  *
SEP 86 :      + *
```

```
STATION:    CC-A      LAYER:  5      ROW: 21       COLUMN: 13

                 Water Level, Feet (NGVD)

      13        23        33        43        53        63        73
       +.........+.........+.........+.........+.........+.........+
APR 85 M    *
MAY 85 M      *
JUN 85 M        *
JUL 85 :      + *
AUG 85 :      +  *
SEP 85 :      *
OCT 85 :       +*
NOV 85 :      +*
DEC 85 :     +*
JAN 86 :     + *
FEB 86 :     +*
MAR 86 :      +*
APR 86 :  *  +
MAY 86 :    *
JUN 86 :     + *
JUL 86 :      +*
AUG 86 :       +*
SEP 86 :       + *
```

```
STATION:    CC-B      LAYER:  5      ROW: 21       COLUMN: 16

                 Water Level, Feet (NGVD)

       8        18        28        38        48        58        68
       +.........+.........+.........+.........+.........+.........+
APR 85 M      *
MAY 85 M       *
JUN 85 M         *
JUL 85 :         *+
AUG 85 :         + *
SEP 85 :         *+
OCT 85 :          * +
NOV 85 :        * +
DEC 85 :         *
JAN 86 :        *
FEB 86 :       *+
MAR 86 :        *
APR 86 :  *      +
MAY 86 :    *  +
JUN 86 :       +  *
JUL 86 :       + *
AUG 86 :       +   *
SEP 86 :       +   *
```

```
STATION:    CC-C      LAYER:  5      ROW: 20       COLUMN: 18

                 Water Level, Feet (NGVD)

       9        19        29        39        49        59        69
       +.........+.........+.........+.........+.........+.........+
APR 85 M     *
MAY 85 M     *
JUN 85 M         *
JUL 85 :       * +
AUG 85 :         *+
SEP 85 :         *+
OCT 85 :          *
NOV 85 :       *+
DEC 85 :        +*
JAN 86 :       +*
FEB 86 :      *
MAR 86 :     +*
APR 86 :  *  +
MAY 86 :   *+
JUN 86 :        + *
JUL 86 :        + *
AUG 86 :         + *
SEP 86 :        + *
```

```
STATION:    CC-D      LAYER:  5      ROW: 16        COLUMN: 18

                 Water Level, Feet (NGVD)

      16        26        36        46        56        66        76
       +.........+.........+.........+.........+.........+.........+
APR 85 M       *
MAY 85 M      *
JUN 85 M         *
JUL 85 :      + *
AUG 85 :      +  *
SEP 85 :      +  *
OCT 85 :      +   *
NOV 85 :      +  *
DEC 85 :    +     *
JAN 86 :    +    *
FEB 86 :    +   *
MAR 86 :     +  *
APR 86 :   +*
MAY 86 :  +   *
JUN 86 :    +     *
JUL 86 :     +    *
AUG 86 :      +   *
SEP 86 :      +   *
```

```
STATION:    CC-E      LAYER:  5      ROW: 18        COLUMN: 15

                 Water Level, Feet (NGVD)

       1        11        21        31        41        51        61
       +.........+.........+.........+.........+.........+.........+
APR 85 M         *
MAY 85 M             *
JUN 85 M              *
JUL 85 :        +      *
AUG 85 :        +        *
SEP 85 :         +  *
OCT 85 :       +        *
NOV 85 :       +     *
DEC 85 :       +   *
JAN 86 :      +      *
FEB 86 :      +     *
MAR 86 :       +      *
APR 86 :  *
MAY 86 :   +    *
JUN 86 :        +    *
JUL 86 :       +     *
AUG 86 :         +     *
SEP 86 :    +            *
```

```
STATION:    CC-F      LAYER:  5      ROW: 16        COLUMN: 16

                 Water Level, Feet (NGVD)

      14        24        34        44        54        64        74
       +.........+.........+.........+.........+.........+.........+
APR 85 M       *
MAY 85 M        *
JUN 85 M          *
JUL 85 :     +   *
AUG 85 :     +    *
SEP 85 :      +  *
OCT 85 :       +   *
NOV 85 :     +   *
DEC 85 :    +    *
JAN 86 :      + *
FEB 86 :   +   *
MAR 86 :     + *
APR 86 :  * +
MAY 86 :   + *
JUN 86 :    +     *
JUL 86 :    +    *
AUG 86 :      +    *
SEP 86 :     +    *
```

```
STATION:    CC-G      LAYER:  5      ROW: 19        COLUMN: 17

                 Water Level, Feet (NGVD)

       0        10        20        30        40        50        60
       +.........+.........+.........+.........+.........+.........+
APR 85 M             *
MAY 85 M            *
JUN 85 M              *
JUL 85 :             +*
AUG 85 :         +    *
SEP 85 :              *+
OCT 85 :                *
NOV 85 :             *
DEC 85 :             *
JAN 86 :            *
FEB 86 :        *  +
MAR 86 :         *
APR 86 :  *      +
MAY 86 :    *  +
JUN 86 :             +*
JUL 86 :             *
AUG 86 :               *
SEP 86 :         +   *
```

```
STATION:    CC-H      LAYER:  5      ROW: 18        COLUMN: 14

                 Water Level, Feet (NGVD)

       4        14        24        34        44        54        64
       +.........+.........+.........+.........+.........+.........+
APR 85 M      *
MAY 85 M            *
JUN 85 M             *
JUL 85 :             +*
AUG 85 :             +  *
SEP 85 :        *    +
OCT 85 :             +*
NOV 85 :            *
DEC 85 :         *+
JAN 86 :           +*
FEB 86 :           *
MAR 86 :            *
APR 86 :  *       +
MAY 86 :        * +
JUN 86 :           *+
JUL 86 :           *+
AUG 86 :            + *
SEP 86 :             +  *
```

```
STATION:    CC-J      LAYER:  5      ROW: 18        COLUMN: 15

                 Water Level, Feet (NGVD)

       1        11        21        31        41        51        61
       +.........+.........+.........+.........+.........+.........+
APR 85 M         *
MAY 85 M             *
JUN 85 M              *
JUL 85 :            +  *
AUG 85 :            +    *
SEP 85 :         +  *
OCT 85 :            +   *
NOV 85 :           + *
DEC 85 :       +   *
JAN 86 :            +*
FEB 86 :            *
MAR 86 :             +*
APR 86 :  *    +
MAY 86 :        *
JUN 86 :            +*
JUL 86 :           + *
AUG 86 :           +   *
SEP 86 :              +  *
```

```
STATION:    CC-K      LAYER:  5      ROW: 20        COLUMN: 15

                 Water Level, Feet (NGVD)

       1        11        21        31        41        51        61
       +.........+.........+.........+.........+.........+.........+
APR 85 M        *
MAY 85 M           *
JUN 85 M             *
JUL 85 :         +    *
AUG 85 :       +         *
SEP 85 :       +   *
OCT 85 :       +       *
NOV 85 :     +      *
DEC 85 :   +       *
JAN 86 :       +    *
FEB 86 :       +   *
MAR 86 :        +    *
APR 86 :  *
MAY 86 :  +    *
JUN 86 :       +    *
JUL 86 :      +     *
AUG 86 :      +        *
SEP 86 :      +         *
```

```
STATION:    CC-L      LAYER:  5      ROW: 20        COLUMN: 15

                 Water Level, Feet (NGVD)

       1        11        21        31        41        51        61
       +.........+.........+.........+.........+.........+.........+
APR 85 M        *
MAY 85 M           *
JUN 85 M             *
JUL 85 :         +    *
AUG 85 :         +       *
SEP 85 :        +  *
OCT 85 :        +      *
NOV 85 :       +    *
DEC 85 :     +     *
JAN 86 :         +  *
FEB 86 :        +  *
MAR 86 :         +   *
APR 86 :  * +
MAY 86 :    +  *
JUN 86 :         +  *
JUL 86 :        +   *
AUG 86 :       +       *
SEP 86 :        +       *
```

```
STATION:   L-2529     LAYER:  5      ROW: 26        COLUMN: 19

                 Water Level, Feet (NGVD)

      20        30        40        50        60        70        80
       +.........+.........+.........+.........+.........+.........+
APR 85 :   * +
MAY 85 :   *    +
JUN 85 :       *+
JUL 85 :       *+
AUG 85 :        *+
SEP 85 :       *  +
OCT 85 :       * +
NOV 85 :     * +
DEC 85 :      * +
JAN 86 :     *+
FEB 86 :    *  +
MAR 86 :   *   +
APR 86 :  *   +
MAY 86 :  *
JUN 86 :       +*
JUL 86 :        *
AUG 86 :        *+
SEP 86 :        *+
```