### Magnesium

The concentration of dissolved magnesium in water from permeable zone E, based on median values of all samples in each 100-square-mile area, ranges from about 0.01 mg/L in outcrop and middip areas east of the Sabine arch to 1,990 mg/L in a middip area in southern Texas (table 1). The trend generally is increasing concentration of dissolved magnesium from outcrop to downdip limit of the data except for an area in southern Texas where the concentration increases to middip and then decreases to the downdip limit of the data (fig. 9). The concentration pattern of dissolved magnesium is similar to that of dissolved calcium.

From the Sabine arch eastward to the western edge of Florida the concentration of dissolved magnesium in the outcrop and in the area from outcrop to middip generally is less than 10 mg/L except in two areas, one in the vicinity of the Mississippi River and one in the vicinity of the Red River, where the concentration exceeds 20 mg/L. At middip the concentration increases to 100 mg/L and continues to increase in a downdip direction to as much as 1,000 mg/L in southwestern Louisiana.

From the Sabine arch southwestward to the Rio Grande the concentration of dissolved magnesium generally ranges from less than 10 to 20 mg/L in the outcrop. From the outcrop to middip the concentration increases to about 100 mg/L. From middip to downdip areas the concentration increases to 500 mg/L east of the Trinity River. Whereas west of the Trinity River the concentration increases to as much as 500 mg/L and then decreases to as small as 50 mg/L at the downdip limit of the data.

### Sodium

The concentration of dissolved sodium in water from permeable zone E, based on median values of all samples in each 100-square-mile area, ranges from 1.5 mg/L in outcrop areas east of the Sabine arch to 62,600 mg/L in an area between the outcrop and middip in southern Texas (table 1). The concentration generally increases from outcrop to the downdip limit of the data (fig. 10).

From the Sabine arch eastward to the western edge of Florida the concentration of dissolved sodium generally ranges from 10 to 100 mg/L along the outcrop and in the area from the outcrop to middip. At middip the concentration increases to as much as 20,000 mg/L in southern Louisiana and continues to be above 20,000 mg/L from middip to the downdip limit of permeable zone E in most of southern Louisiana.

From the Sabine arch southwestward to the Rio Grande the concentration of dissolved sodium in the outcrop generally ranges from 50 to 100 mg/L in the area between the Sabine arch and the San Marcos arch and to more than 1,000 mg/L near the Rio Grande in southern Texas. From the outcrop to middip the concentration increases to 20,000 mg/L and continues to increase in the downdip direction to more than 20,000 mg/L near the downdip limit of the data in most of the area. Much of the area having a large concentration of dissolved sodium is coincident with the deeper part of the permeable zone area and with the location of salt domes (fig. 4).

### Potassium

The concentration of dissolved potassium in water from permeable zone E, based on median values of all samples in each 100-square-mile area, ranges from 0.2 mg/L along the outcrop and in the area from the outcrop to middip to 7,540 mg/L at the downdip limit of the data in southern Texas (table 1). The concentration generally increases from the outcrop to the downdip limit of the data (fig. 11).

From the Mississippi River eastward to the western edge of Florida the concentration of dissolved potassium generally is less than 10 mg/L. From the Mississippi River westward to the Sabine arch the concentration generally is less than 10 mg/L in the outcrop and the area between the outcrop and middip. At about middip the concentration increases to 50 mg/L and continues to increase in a downdip direction to 100 mg/L in the downdip area.

From the Sabine arch southwestward to the Rio Grande the concentration of dissolved potassium in the outcrop generally ranges from about 10 mg/L near the Sabine arch to about 100 mg/L near the Rio Grande. From the outcrop southward to middip the concentration increases to 100 mg/L and continues to increase in a downdip direction to be more than 100 mg/L along the downdip limit of the data.

### Bicarbonate

The concentration of dissolved bicarbonate in water from permeable zone E, based on median values of all samples in each 100-square-mile area, ranges from 2 mg/L in the outcrop in southwestern Alabama to 1,450 mg/L in a downdip area in southeastern Texas (table 1). The concentration of dissolved bicarbonate generally increases from the outcrop to the downdip limit of the data in the area from the Sabine arch eastward to the western edge of Florida (fig. 12). There appears to be no trend in concentration in the area from the Sabine arch southwestward to the Rio Grande.

From the Mississippi River eastward to the western edge of Florida the concentration of dissolved bicarbonate in the outcrop area generally ranges from 2 to 100 mg/L. An exception is an area adjoining the Mississippi River where the concentration is more than 200 mg/L. From the outcrop to the downdip limit of the data the concentration increases from 100 to 200 mg/L in the area east of the Pearl River. Whereas west of the Pearl River the concentration begins at more than 200 mg/L at the outcrop, decreases to less than 200 mg/L at middip and increases to more than 200 mg/L near the downdip limit of the data. From the Mississippi River westward to the Sabine arch the concentration of dissolved bicarbonate in the outcrop generally ranges from 100 to more than 200 mg/L. From the outcrop to downdip the concentration increases from about 200 mg/L at the outcrop to 500 mg/L at the downdip limit of permeable zone E.

From the Sabine arch southwestward to the Rio Grande the concentration of dissolved bicarbonate in the outcrop area generally ranges from 100 to 500 mg/L. From the outcrop to the downdip limit of the data the concentration generally ranges from 200 to 500 mg/L with no specific pattern.

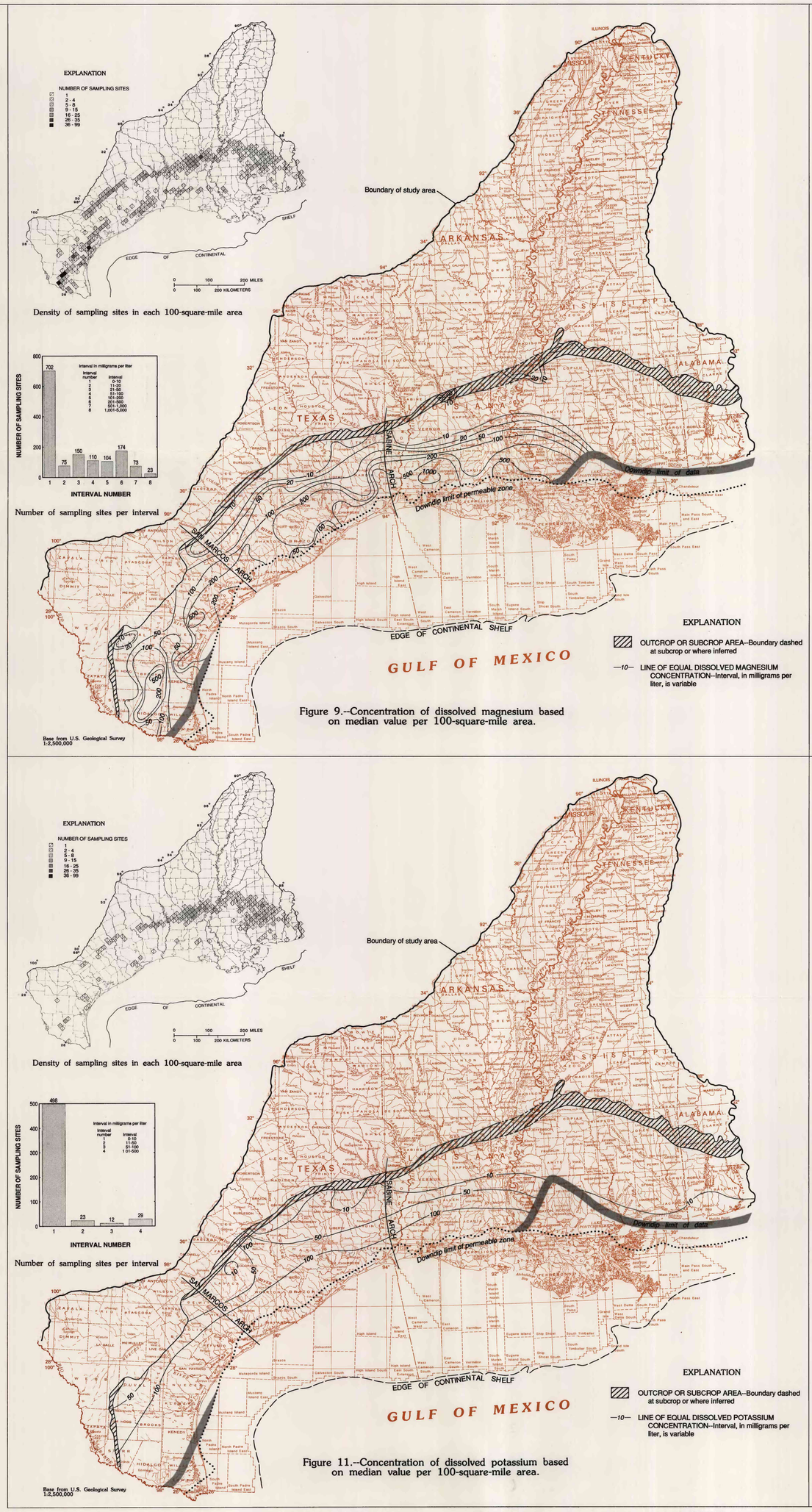


Figure 9.--Concentration of dissolved magnesium based on median value per 100-square-mile area.

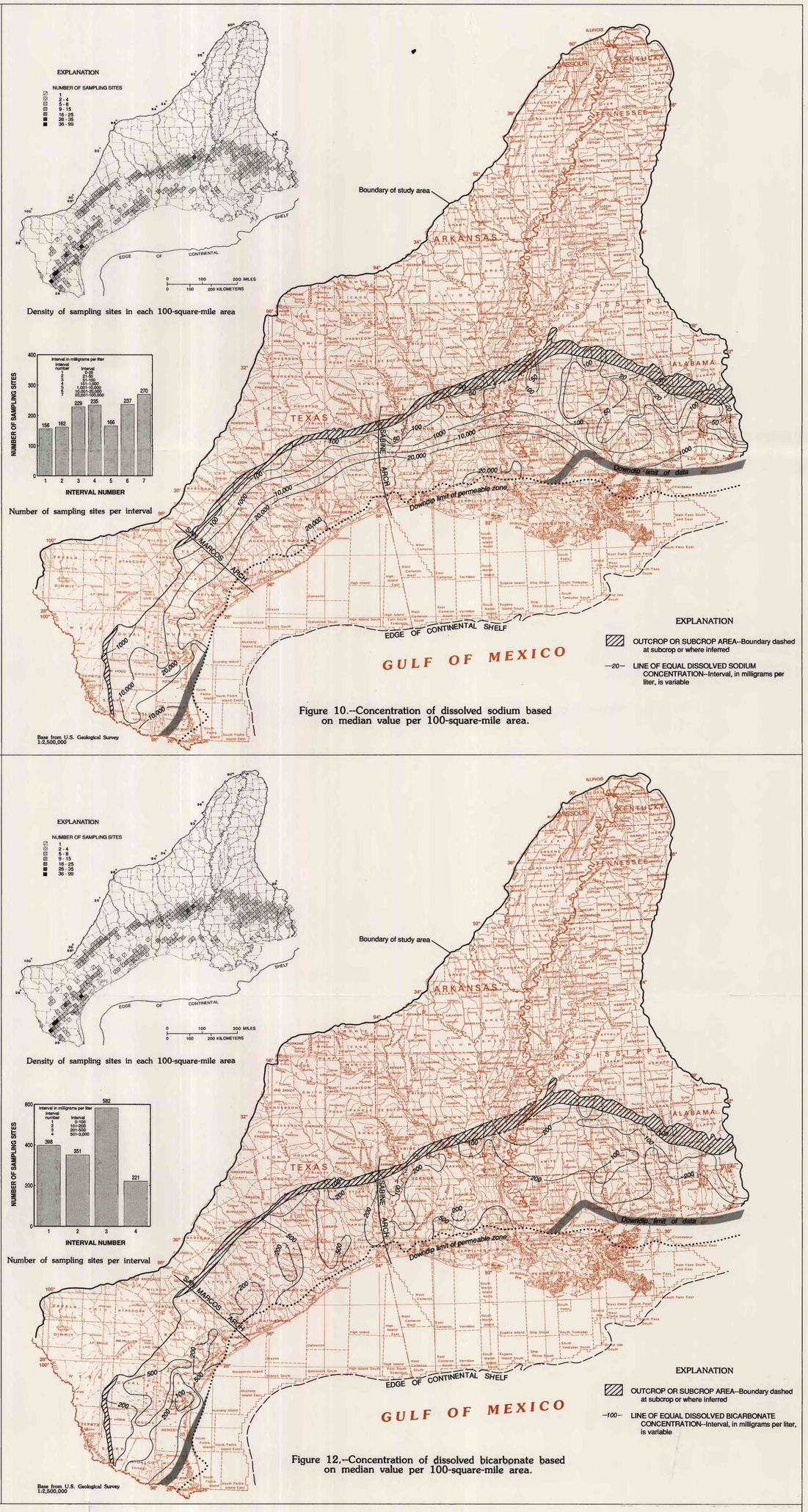


Figure 10.--Concentration of dissolved sodium based on median value per 100-square-mile area.




Figure 11.--Concentration of dissolved potassium based on median value per 100-square-mile area.




Figure 12.--Concentration of dissolved bicarbonate based on median value per 100-square-mile area.

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# PROPERTIES AND CHEMICAL CONSTITUENTS IN GROUND WATER FROM PERMEABLE ZONE E (LOWER MIOCENE-UPPER OLIGOCENE DEPOSITS), COASTAL LOWLANDS AQUIFER SYSTEM, SOUTH-CENTRAL UNITED STATES

by

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