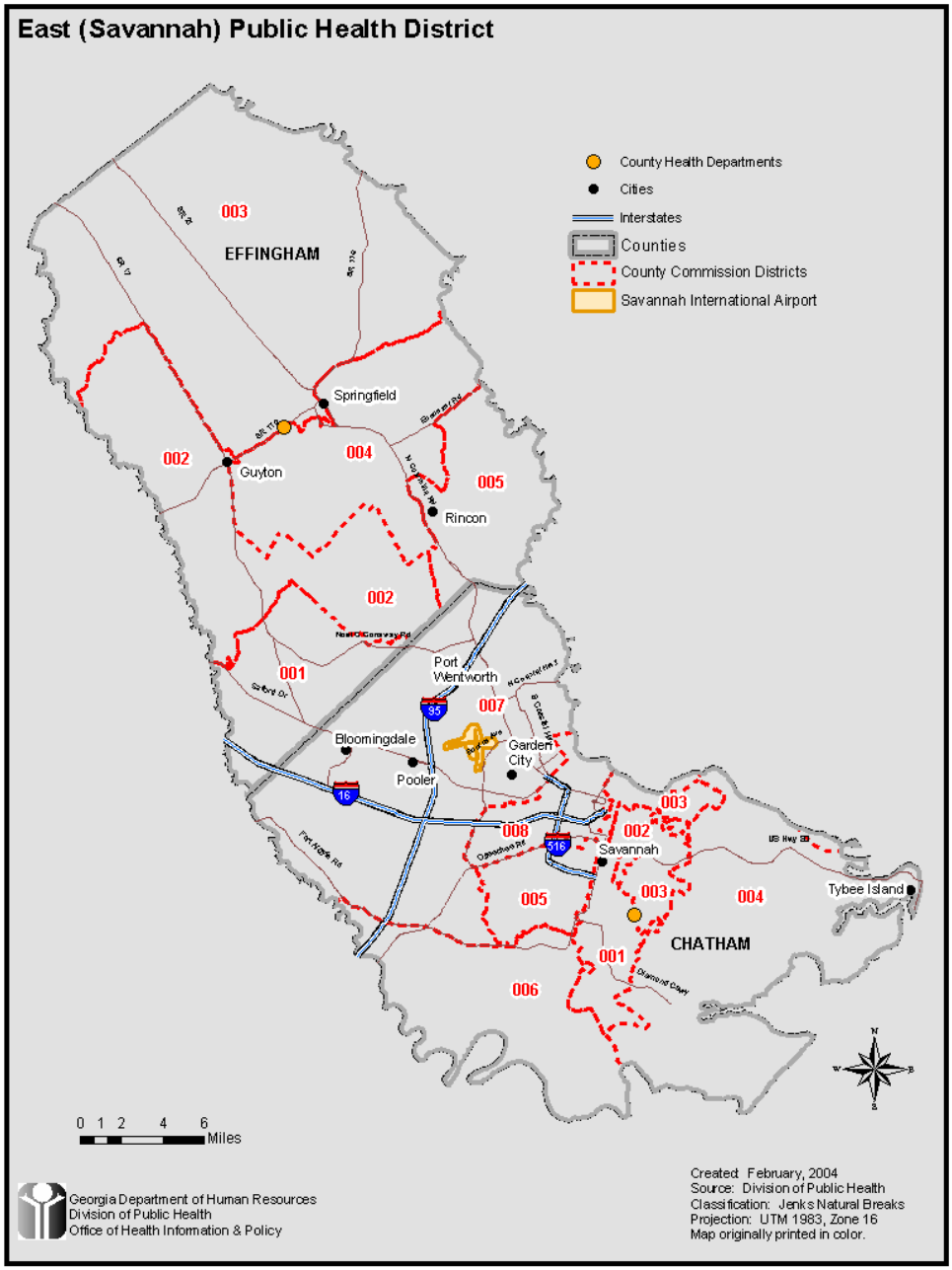
EAST (SAVANNAH) PUBLIC HEALTH DISTRICT
PERINATAL AND PREMATURE MORTALITY MEASURES
BY CENSUS TRACT WITH COUNTY COMMISSION DISTRICTS, 1998-2002



May 2004

Georgia Department of Human Resources
Division of Public Health
Office of Health Information & Policy

Perinatal and Premature Mortality Measures by Census Tract, with County Commission Districts, presented by Public Health District

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Editorial Review: Judith A. McDowell

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Birth Order / Birth Event Order - (also see Parity). The total number of live births ever had by a female; or in controlling for multiple births, the total number of birthing events (i.e. one event may produce twins, triplets, etc.) ever had by a female. Birth Order of 1 means a woman has had one live birth.

Birth Weight - Infant's weight recorded at the time of birth.

Census Tract: Census tracts are small, relatively permanent areas delineated to cover entire counties, primarily those in metropolitan areas. They are designed by local census statistical areas committees to be relatively homogeneous with respect to population characteristics, economic status, and living conditions at the time they are established. Census tracts average 4,000 people, but generally range from fewer than 2,500 to more than 8,000. They do not cross county boundaries, and spatial size depends on density of settlement. Tract boundaries are delineated with the intention of being maintained over a long period of time so that statistical comparisons can be made over time.

Extrusion – Extrusion extends features vertically from a given base height to the height that is specified. Points become vertical lines, lines become walls, and polygons become blocks.

Fetal Death - Death prior to the complete expulsion or extraction from its mother as a product of human conception (neither a live birth nor an induced termination of pregnancy), irrespective of the duration of the pregnancy. The death is indicated by the fact that after such expulsion or extraction the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. A fetal death certificate is completed for all fetal deaths in Georgia regardless of gestational age. However, the number and rate of fetal deaths are calculated for only those at or greater than 20 weeks gestation.

Infancy - The period from birth through the 364th day of life.

Infant Deaths – Deaths occurring between 0 and 364 days of life.

Live Birth - The complete expulsion or extraction of a product of conception from its mother, irrespective of the duration of the pregnancy, which after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached.

Public Health District - The state of Georgia is divided into 19 Public Health Districts. Each District has a various number of counties, and each county has a health department.

Weighted Measures: Weighted measures are simply calculated by taking the rate (or percentage) of a measures, and then multiplying that rate or percentage by the number of times the measure being examined occurred (the numerator used in calculating the rate). For example:

Weighted Infant Mortality Rate

Infant Mortality Rate (IMR) and number

(Total number of infant deaths)
(Total number of live births) * 1,000 **=** Infant Mortality Rate

Weighted Infant Mortality Rate
Infant Mortality Rate ***** Total number of infant deaths

Weighted Fetal Mortality Rate[1]

Fetal Mortality Rate[2]

Number of fetal deaths
(Number of fetal deaths + Total number of live births) * 1,000 = Fetal Mortality Rate

Weighted Fetal Mortality Rate
Fetal Mortality Rate * Number of fetal deaths

Weighted Percent Low Birth Weight Rate

Low Birth Weight Rate (Percentage)
Total number of live births < 2,500 grams
(Total number of live births) * 100
=Percent Low Birth Weight

Weighted Percent Low Birth Weight Rate**-**
Percent Low Birth Weight * Number of Live Births < 2500 grams

Weighted Percent of Births to Females Age 34 and Above

Percent of Births to Females Age 34 and Above
Total number of births to females age 34 and above
Total number of births * 100
= Percent of Births to Females Age 34 and Above

Weighted Percent of Births to Females Age 34 and Above
Total number of births to females age 34 and above ***** Percent of births to females 34 and above

[1] includes fetal deaths 20 weeks gestation and older

Weighted Percent of Births Where Birth Order is 4 or Above

Percent of Births Where Birth Order is 4 or Above
Total number of births where the female has had a total of 4 or more children
Total Number of Live Births * 100
=Percent of births where birth order is 4 or above

Weighted Percent of Births Where Birth Order is 4 or Above
Total number of births where the female has had a total of 4 or more children *****
Percent of births where birth order is 4 or above

Weighted Percent of Births to Females Less Than 18 Years of Age

Percent of Births to Females Less than 18 Years of Age
Total number of births to females less than 18 years of age
Total number of births * 100
= Percent of Births to Females Less Than 18 Years of Age

Weighted Percent of Births to Females Less Than 18 Years of Age
Total number of births to females less than 18 years of age ***** Percent of Births to Females Less Than 18 Years of Age

Weighted Percent of Births with Inadequate Prenatal Care based on Kotelchuck Index[3]

Percent of Births with Inadequate Prenatal Care based on Kotelchuck Index
Total number of live births with inadequate prenatal care
Total Number of Live Births * 100
=Percent of Births with Inadequate PNC based on Kotelchuck Index

Weighted Percent of Births with Inadequate Prenatal Care based on Kotelchuck Index
Percent of Births with Inadequate PNC ***** Number of live births with Inadequate prenatal care.

Years of Potential Life Lost - 75 (YPLL-75) - represents the number of years of life lost due to death before Age 75, as a measure of premature death. The **YPLL-75 Rate** is the years of potential life lost before age 75 that occur per 100,000 population less than 75 years of age. Formula = [Total Years of Life Lost before age 75 / Population less than 75 years old] * 100,000. YPLL can be age- and cause-specific.

Top 6 Causes of Years of Potential Life Lost (YPLL) – 18 Cause of Death Categories were ranked in descending order by the Years of Potential Life Lost (YPLL) due to each cause group for the State of Georgia, 1998-2002. The top 6 Causes are 1) Motor Vehicle Accidents, 2) Lung Cancer Deaths, 3) Acute Myocardial Infarction deaths, 4) Homicide deaths, 5) Suicide deaths, 6) HIV deaths.

[3] An index of adequacy of prenatal care based upon 1) month of entry, 2) number of prenatal visits and 3) gestational age of infant at birth. Uses ACOG (American College of Obstetricians and Gynecologists) standards for number of visits. Inadequate is defined as a score of 1 (Inadequate). Other values include -1 Missing, 2=Intermediate, 3=Adequate, and 4=Adequate Plus.

METHODOLOGY

Perinatal and Premature Mortality Measures by Census Tract, with County Commission Districts, presented by Public Health District

The purpose of the health district maps is to show spatial variation in variables by the Census tract unit of geographic analysis for each of the 19 Georgia Public Health Districts such that assessment capacity is improved for use in improved resource allocation. Maps are created by color shading the Census tracts within a Public Health District by the specific variable. This type of map is called a choropleth.

Typically, choropleth maps are created as 2-Dimensional maps. This report includes both 2-Dimensional choropleths and 3-Dimensional choropleths. The methodology for both types is explained below:

Methodology for 2-Dimensional Choropleth Maps

The perinatal maps were produced with *weighted* rates of perinatal variables.
Before we explain the benefit of weighted rates, it is perhaps best to review a traditional method for mapping perinatal variables.

Traditional Methods for 2-Dimensional Choropleth Maps

Traditional choropleth maps by Census Tract can depict either the number (n) or rate (r) of a specific perinatal variable.

Two examples of the traditional choropleth map:

1) Color shaded Census Tracts by the number of infant deaths per Census Tract within a specific Public Health District.
2) Color shaded Census Tracts by the infant mortality rate per Census Tract within a specific Public Health District.

This method produces **two** maps for each perinatal variable (a map for number and a map for rate).

Weighted Method for 2-Dimensional Choropleth Maps

This report uses an alternative method for choropleth mapping: the weighted method. This method weights the rate of the variable by the number of that same variable. The formula for this method is:

Weighted Rate = Rate * Number

An example of how this is applied to a Perinatal Variable:
Weighted Infant Mortality Rate = Infant Mortality Rate * Number of Infant Deaths

Therefore only **one** map for each perinatal variable (one weighted rate map) is needed. *This method integrates magnitude with rate so that the user/reader can instantly see that an area has a high rate and a high magnitude.*

Determination of Data Class Breaks for Color Shades (High, Mid, Low)

The reader expects to see a choropleth which indicates which areas are of concern, which areas are of no concern and perhaps which areas are neutral. Therefore, all choropleths

were created with 3 color shades which represent HIGH, MID, and LOW values for each perinatal variable.

The values for the MID class represent those values which are within +/- 2 standard deviations of the State mean value for a specific perinatal variable.
The values for the HIGH class represent those values which are +2 standard deviations from the *Georgia average* value for a specific perinatal variable.
The values for the LOW class represent those values which are -2 standard deviations from the State mean value for a specific perinatal variable.

Note: Therefore, each census tract is compared to the state average, and not the average of each health district.

Methodology for 3-Dimensional Choropleth Maps

The 3-Dimensional choropleth maps were created by following the traditional method for choropleth mapping of rates and then extruding those rates based upon the numerator involved. Extrusion is the process by which one can create an elevated plateau from a polygonal shape by elevating the outline of the shape by a specific magnitude.

An example of extrusion is a cookie cutter. The cookie cutter has a polygonal shape (snowman) and is extruded or elevated by an amount of cookie dough or other variable material.

An example of how extrusion was applied to a perinatal variable appears on the next page:

Example 1:

Infant Mortality Rate of a given Census tract = 5.1
The number of infant deaths in the same Census tract = 2
The shape of the Census tract is a perfect square.

The extrusion of the Infant Mortality Rate (5.1) by the number of infant deaths (2)
This produces a cube shape with an elevation of 2.

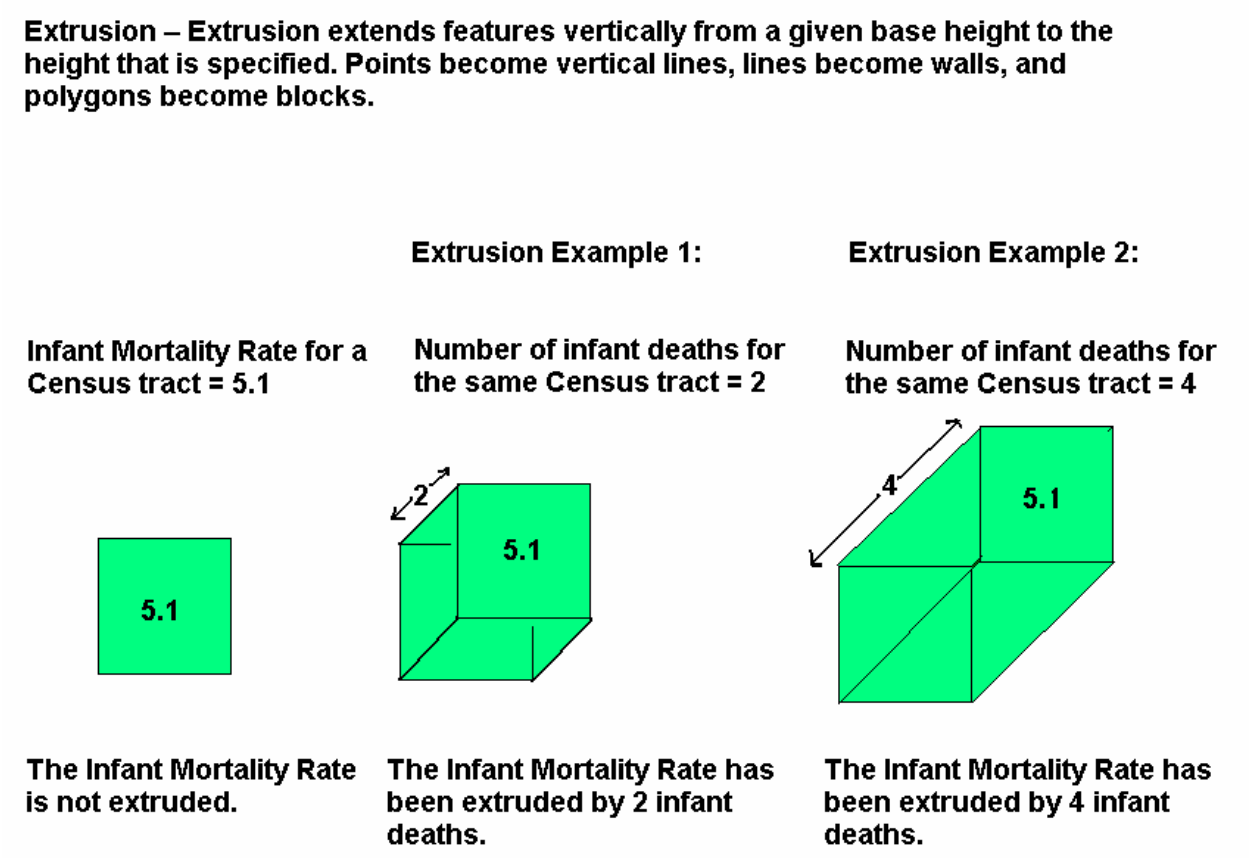
Example 2:

Infant Mortality Rate of a given Census tract = 5.1
The number of infant deaths in the same Census tract = 4
The shape of the Census tract is a perfect square.

The extrusion of the Infant Mortality Rate (5.1) by the number of infant deaths (4)
This produces a cube shape with an elevation of 4.

The 3-Dimensional choropleth map allows the reader to instantly see areas that are LOW in rate but perhaps HIGH in elevation (number). Certain areas may be HIGH in rate but LOW in elevation. This gives the reader more information, rate *and magnitude*, in one map.

Extrusion Example Diagram:



Methodology for Years of Potential Life Lost (YPLL) Maps

The YPLL maps were produced in the following manner:

1) Years of Potential Life Lost were aggregated by 18 cause of death categories. These 18 cause groups were then rank ordered in descending order to determine the top 6 causes of YPLL for the state.

   The top six causes of YPLL for the state of Georgia, 1998-2002 were:

   1) Motor Vehicle Accidents
   2) Lung Cancer
   3) Acute Myocardial Infarction
   4) Homicide
   5) Suicide
   6) HIV

Pie charts were then constructed for each of the Census Tracts within a public health district. These pie charts were constructed to describe both the number of YPLL per tract (shown by the relative *size* of the pie chart) and the percentage of YPLL due to each of the top six causes of YPLL (*slices* for each pie chart) (See Figures 1, 2, 3 and Example map on page 2b).

The pie chart contains as many as six pie wedges depending if each of the top six causes of YPLL for the state were present in a given census tract. If only two of the top six causes listed above were present for a tract, then only 2 slices in the pie chart will be present. Notice the pie chart in figure 1 has a wedge for each of the top six causes of YPLL, and each contributed the same percentage of YPLL.

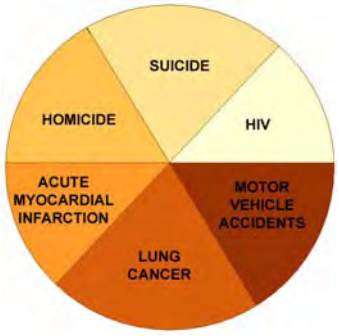


Figure 1

The pie charts in figure 2 are sized by the amount of total YPLL due to the top six causes of YPLL. The larger size of the first pie chart indicates more total YPLL than the second pie chart, yet their proportion of YPLL from each cause is the same.

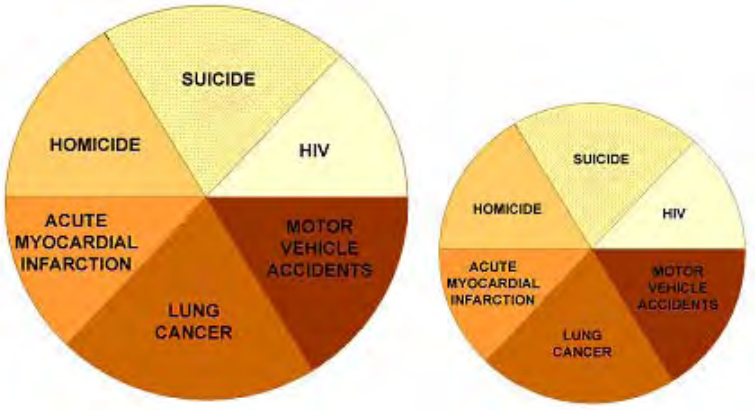


Figure 2

In figure 3, the first pie chart is again larger than the second pie chart. The first has only 3 wedges however. The percentage of YPLL due to Motor Vehicle accidents (Pie 1) is higher than the percentage of YPLL due to the same cause in Pie 2. Notice that there was no YPLL due to Lung Cancer, Suicide, or HIV in Pie 1.

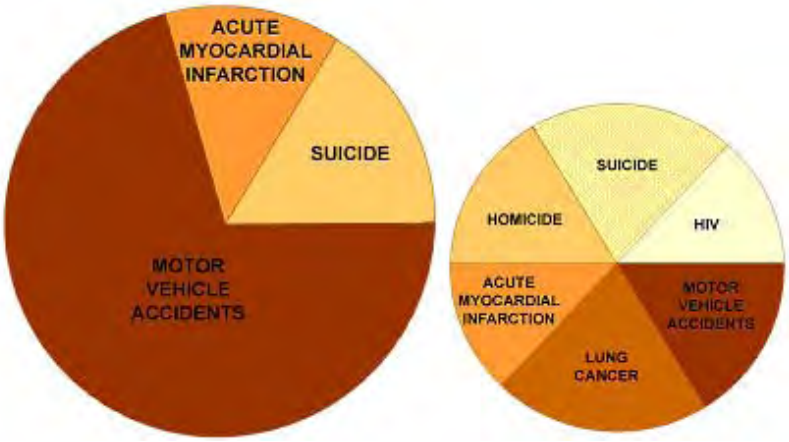
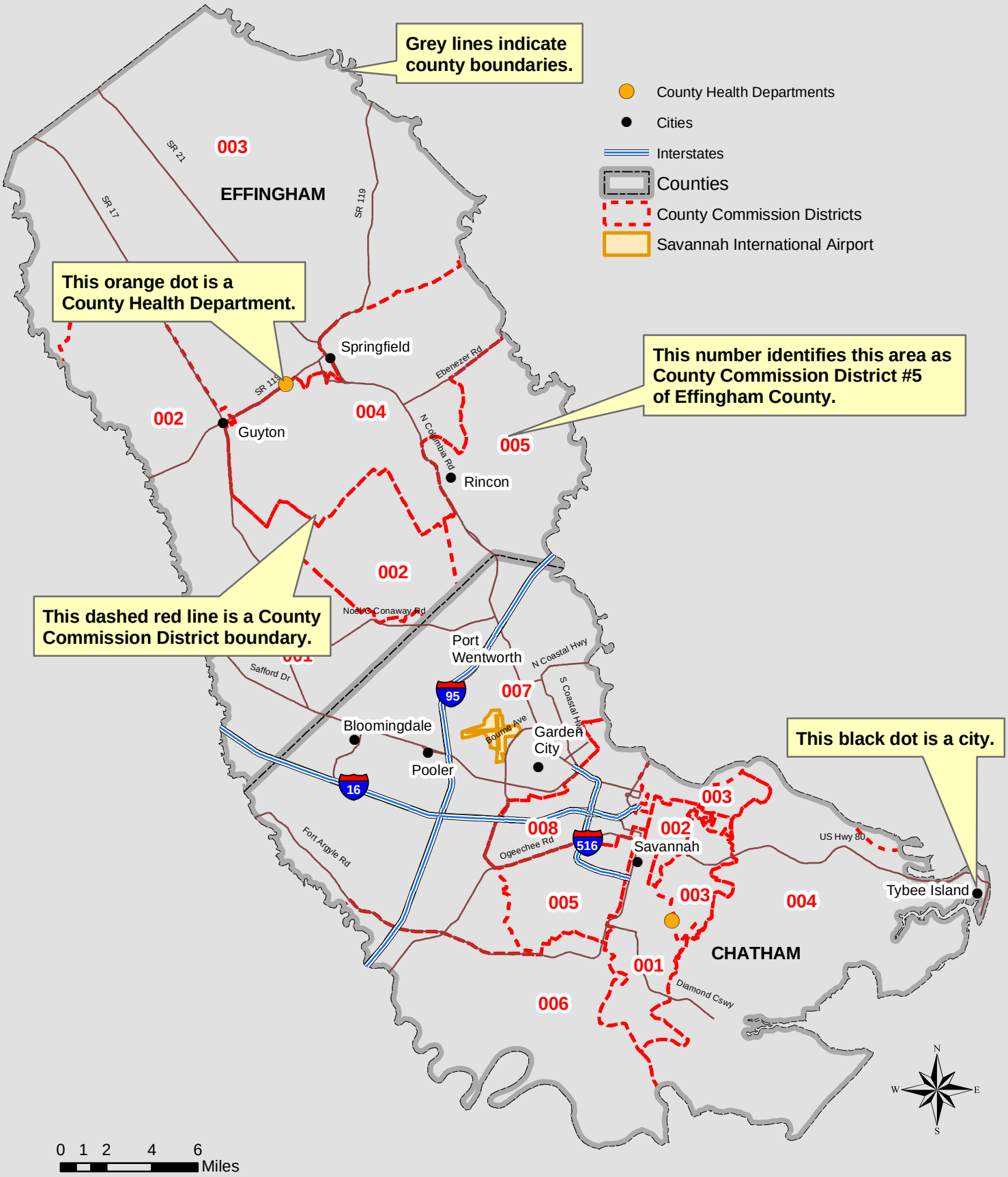


Figure 3

Introductory Maps:
East (Savannah) Public Health District (2-Dimensional)



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Map originally printed in color.

Introductory Maps:
East (Savannah) Public Health District (3-Dimensional)
Infant Mortality Rate and Number by Census Tract, East (Savannah) Public Health District, 1998-2002

Note: The 3D elevation of Census tracts is the number of infant deaths per tract, 1998-2002

This is the color scaled legend of the perinatal measure.

Infant Mortality Rate
- HIGH
- MID
- LOW

High = 2 Standard Deviations Above State
Mid = Within 2 Standard Deviations of State
Low = 2 Standard Deviations Below State

This Census tract has a HIGH infant mortality rate and a higher number of infant deaths.

This Census tract has a LOW infant mortality rate but has a higher number of infant deaths than other tracts with low rates, and in fact a higher number than some tracts with HIGH rates.

This Census tract has a HIGH infant mortality rate but a lower number of infant deaths.

0 2 4 Miles

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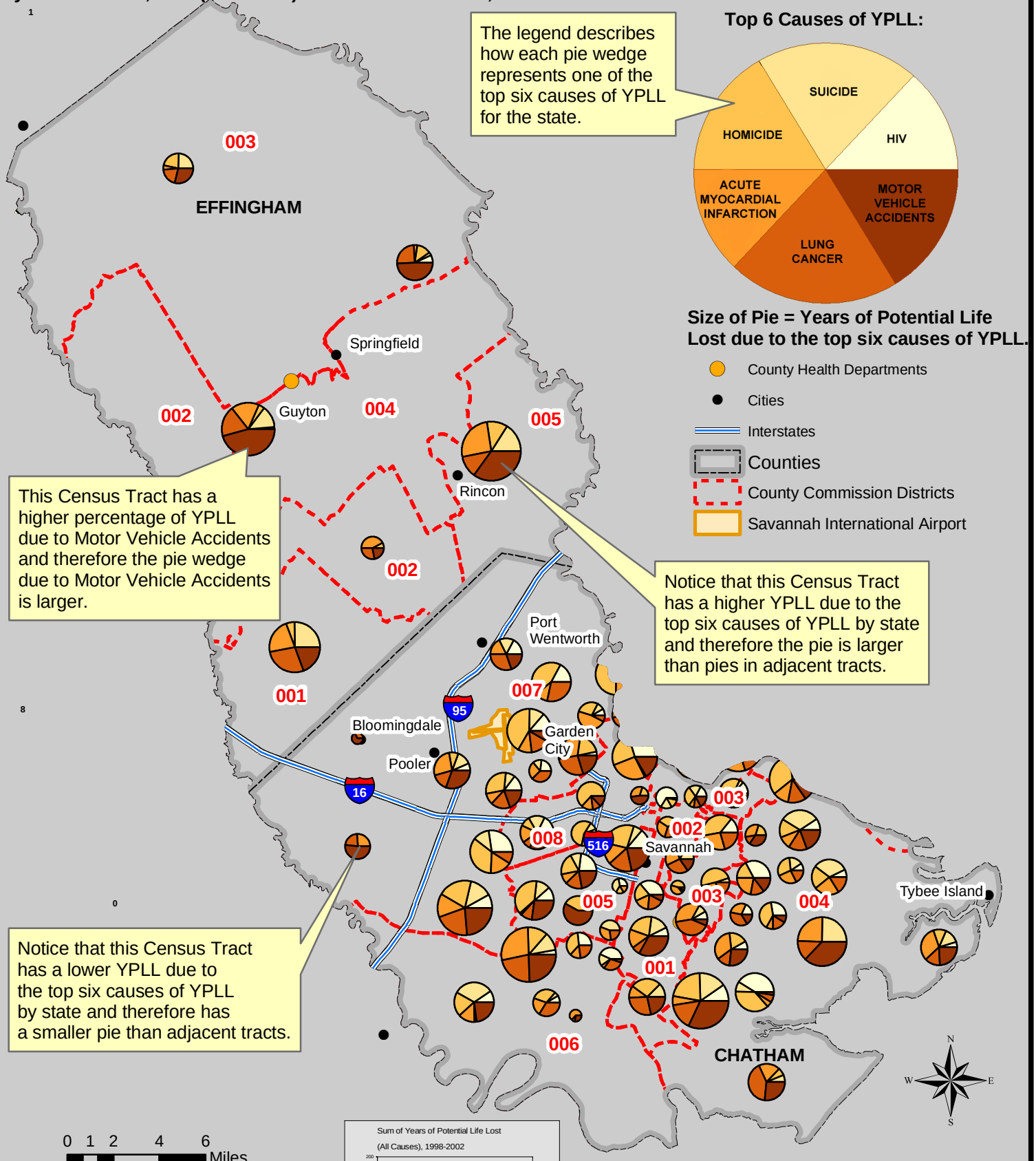
Introductory Maps:
East (Savannah) Public Health District, Years of Potential Life Lost (YPLL)

Years of Potential Life Lost (YPLL) from the Top 6 Causes of YPLL by Census Tract, East (Savannah) Public Health District, 1998-2002



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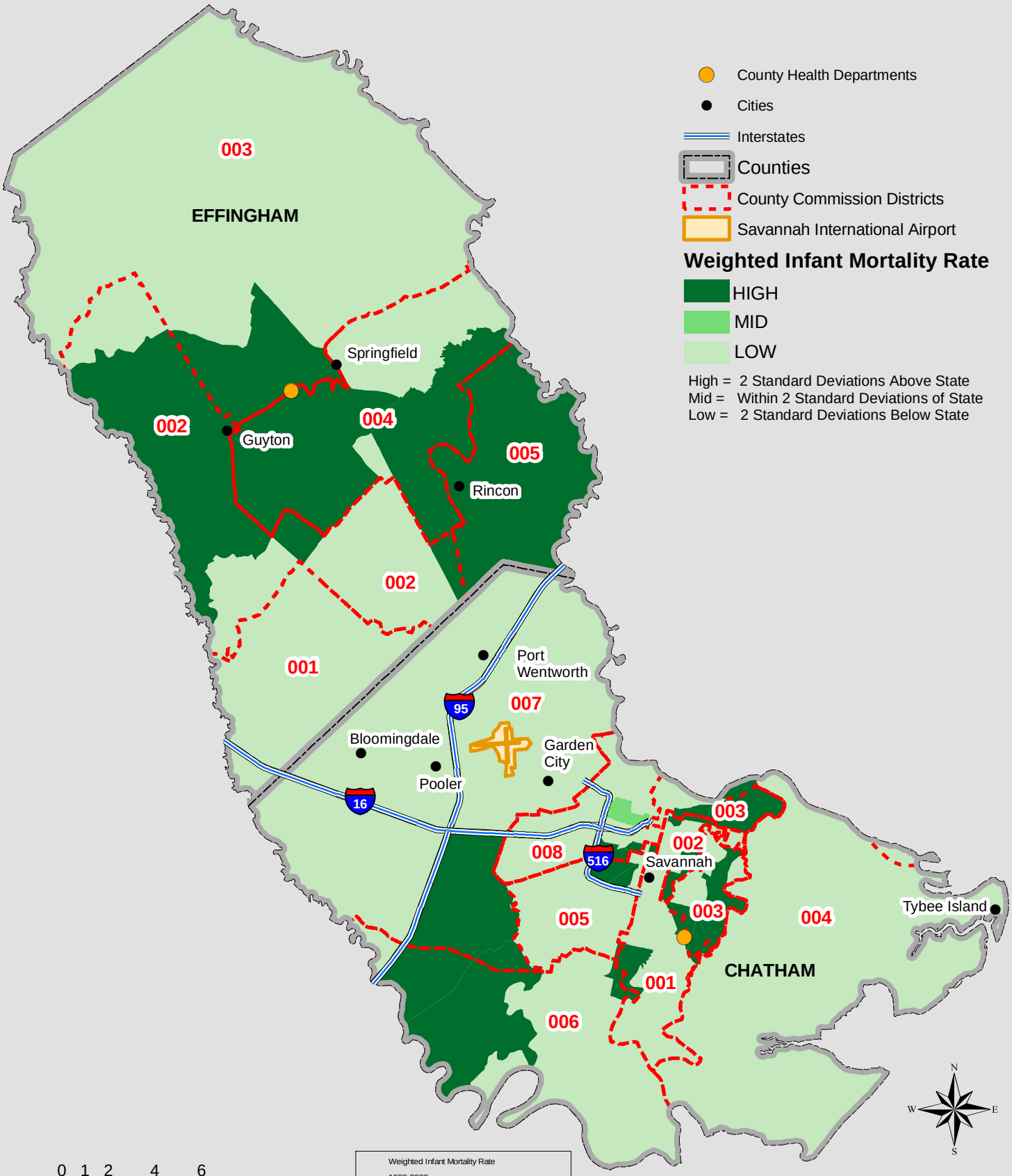
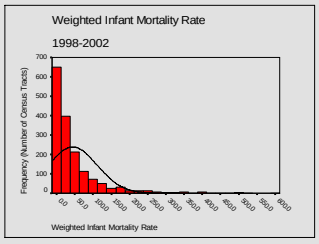
Weighted Infant Mortality Rate by Census Tract, East (Savannah) Public Health District, 1998-2002



0 1 2 4 6 Miles



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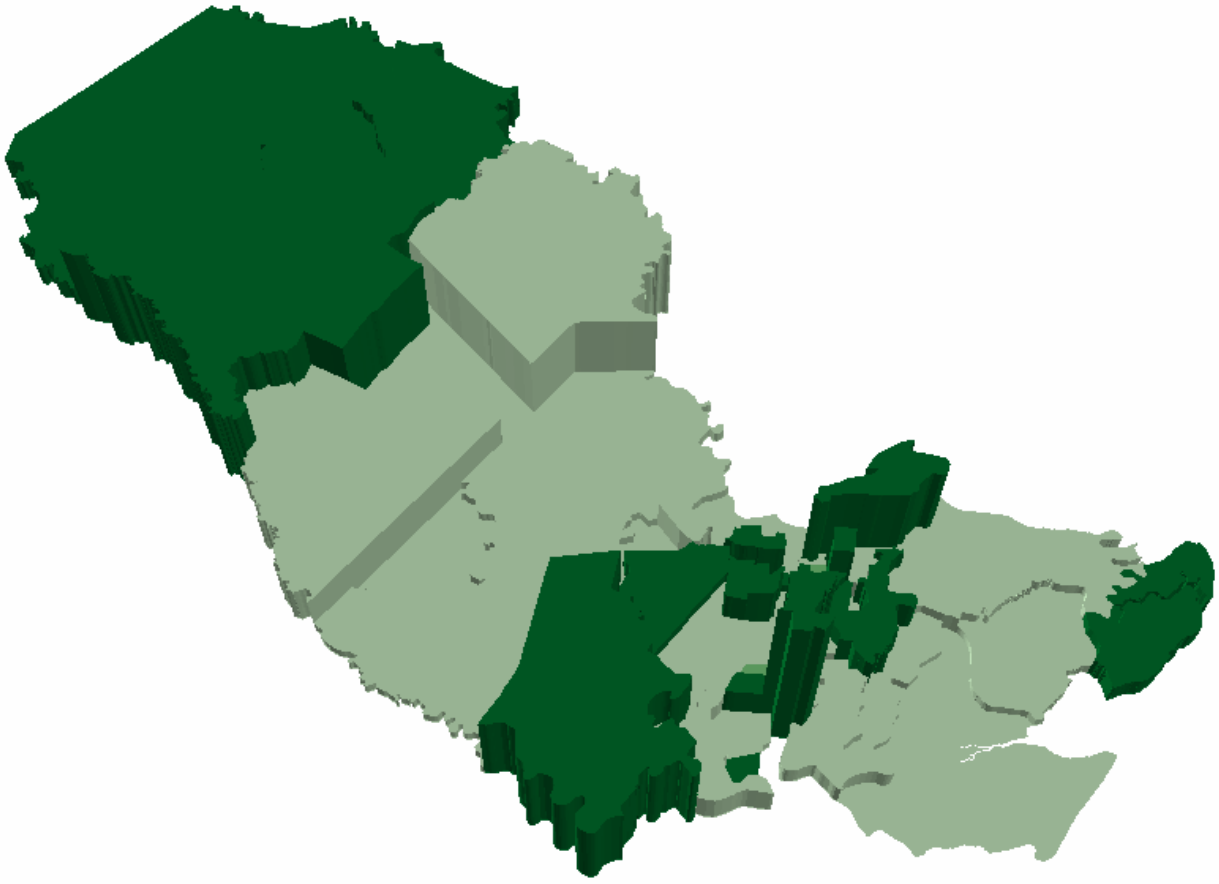
Infant Mortality Rate and Number by Census Tract, East (Savannah) Public Health District, 1998-2002

Note: The 3D elevation of Census tracts is the number of infant deaths per tract, 1998-2002

Infant Mortality Rate

- **HIGH**
- **MID**
- **LOW**

High = 2 Standard Deviations Above State
Mid = Within 2 Standard Deviations of State
Low = 2 Standard Deviations Below State



0 2 4 Miles

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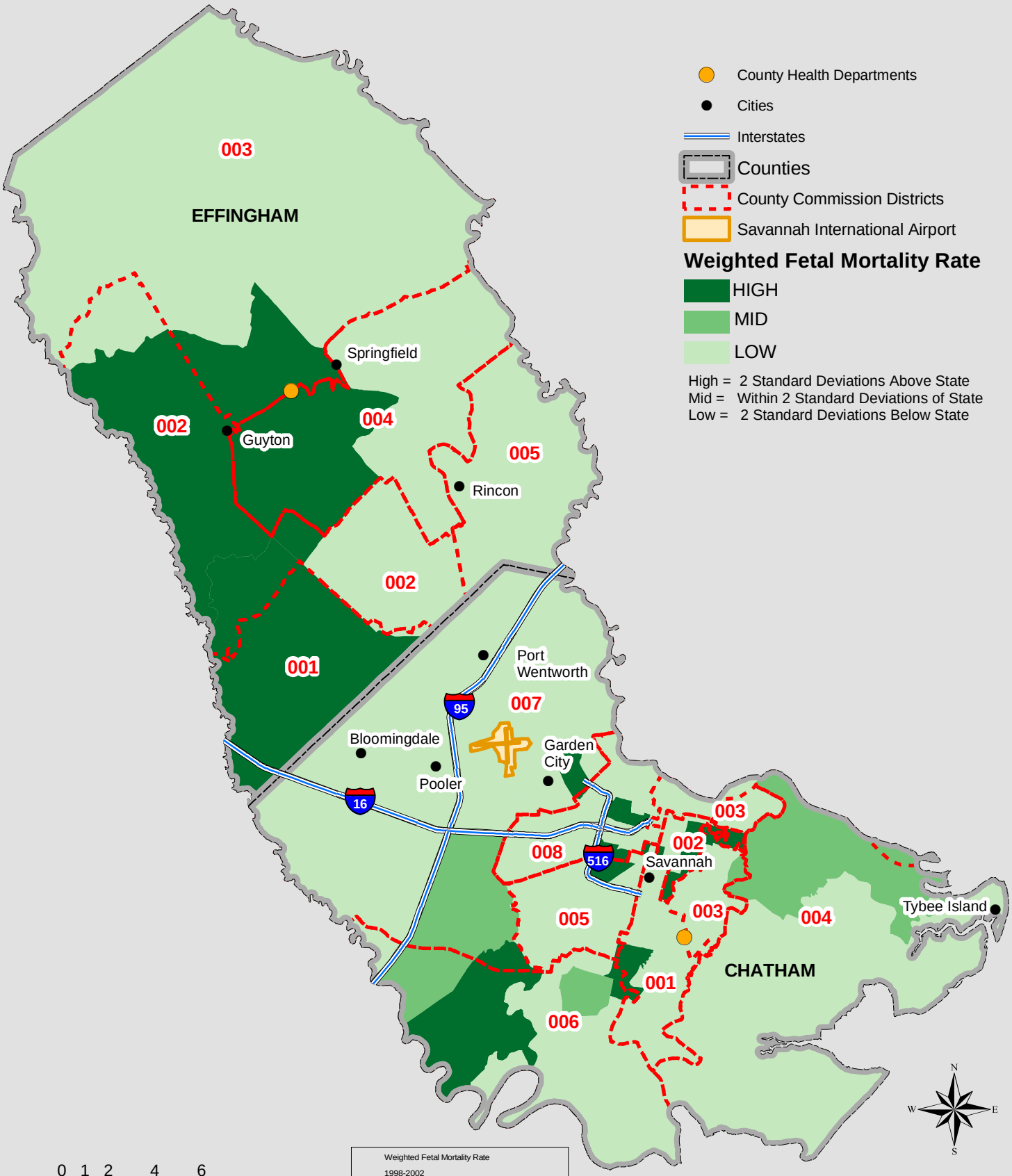
Weighted Fetal Mortality Rate by Census Tract, East (Savannah) Public Health District, 1998-2002



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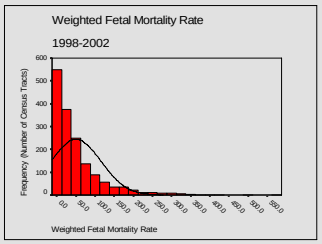

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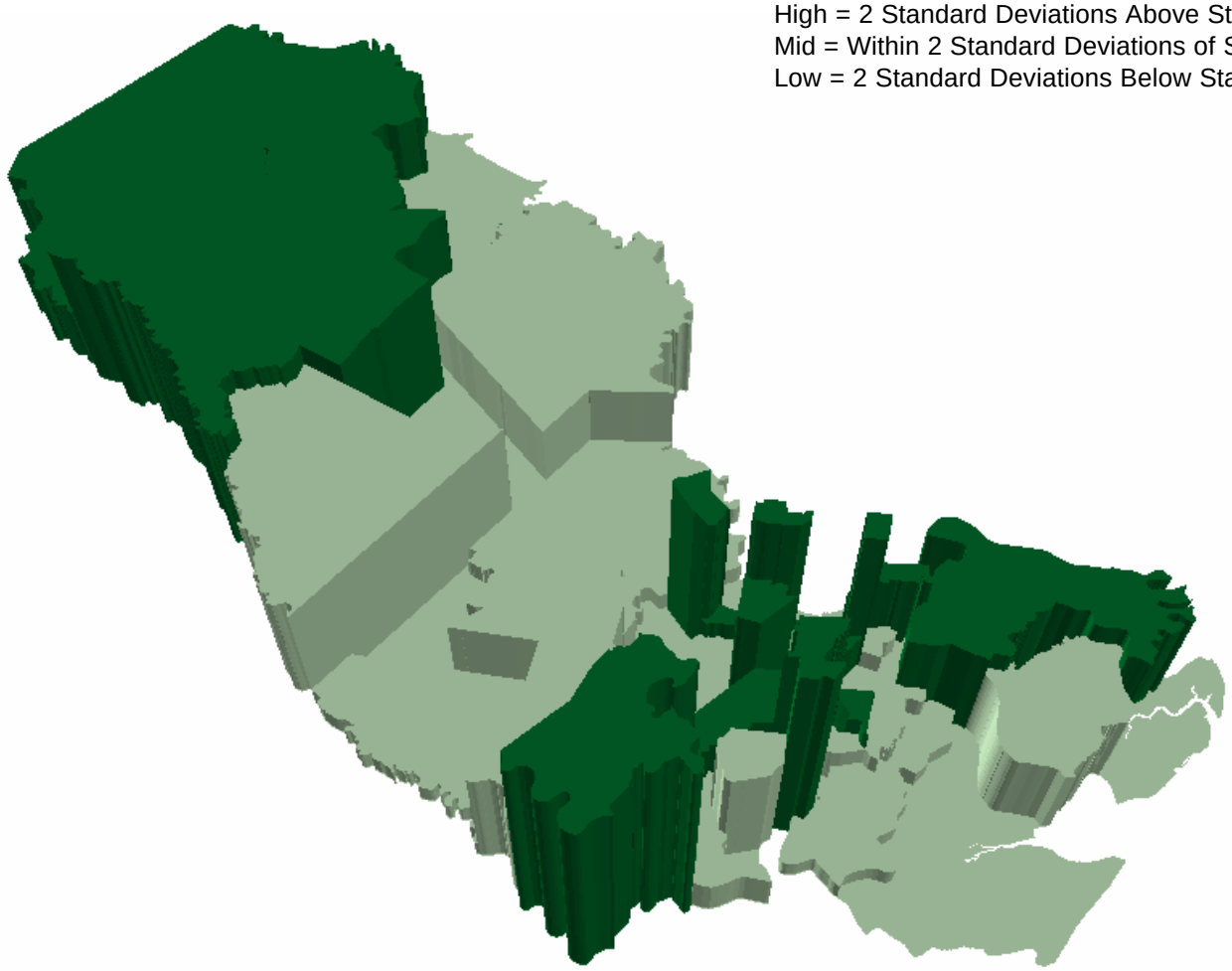
Fetal Mortality Rate and Number by Census Tract, East (Savannah) Public Health District, 1998-2002

Note: The 3D elevation of Census tracts is the number of fetal deaths (greater than 20 weeks gestation) per tract, 1998-2002

Fetal Mortality Rate

- **HIGH**
- **MID**
- **LOW**

High = 2 Standard Deviations Above State
Mid = Within 2 Standard Deviations of State
Low = 2 Standard Deviations Below State



0 2 4 Miles

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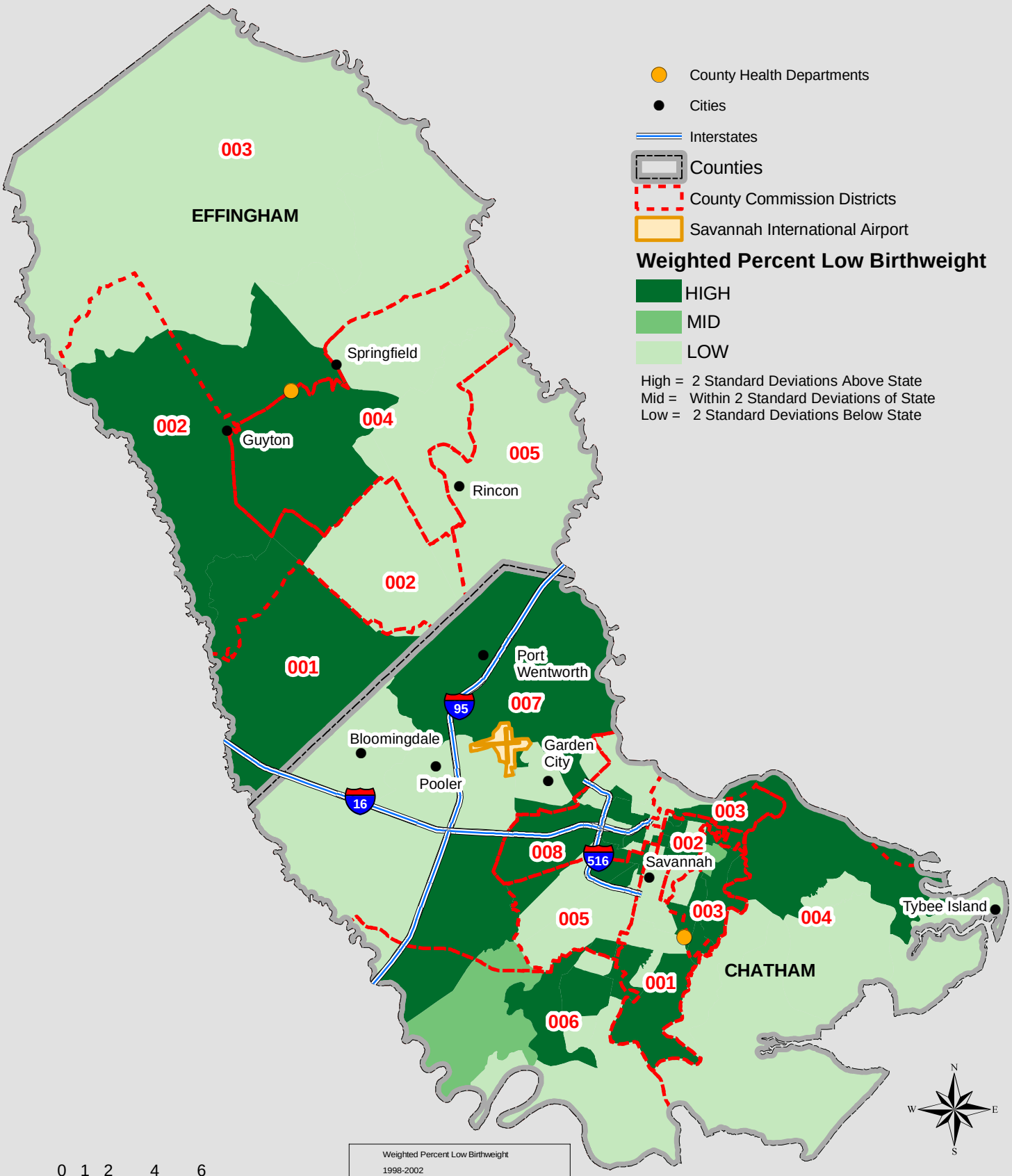
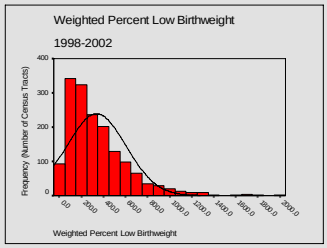
Weighted Percent Low Birthweight by Census Tract, East (Savannah) Public Health District, 1998-2002



0 1 2 4 6 Miles



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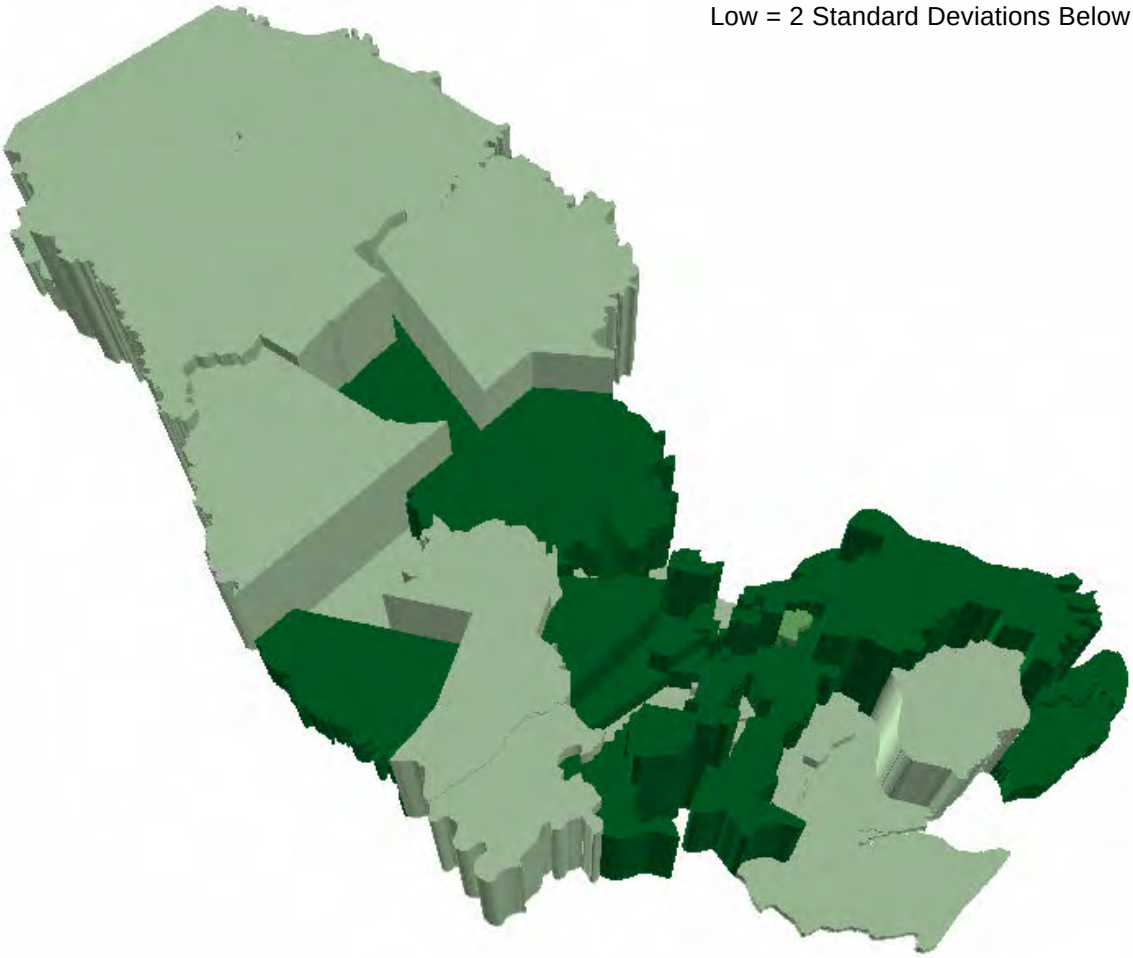
Percent Low Birthweight and Number by Census Tract, East (Savannah) Public Health District, 1998-2002

Note: The 3D elevation of Census tracts is the number of low birthweight births per tract, 1998-2002

Percent Low Birthweight

- **HIGH**
- **MID**
- **LOW**

High = 2 Standard Deviations Above State
Mid = Within 2 Standard Deviations of State
Low = 2 Standard Deviations Below State



0 2 4 Miles

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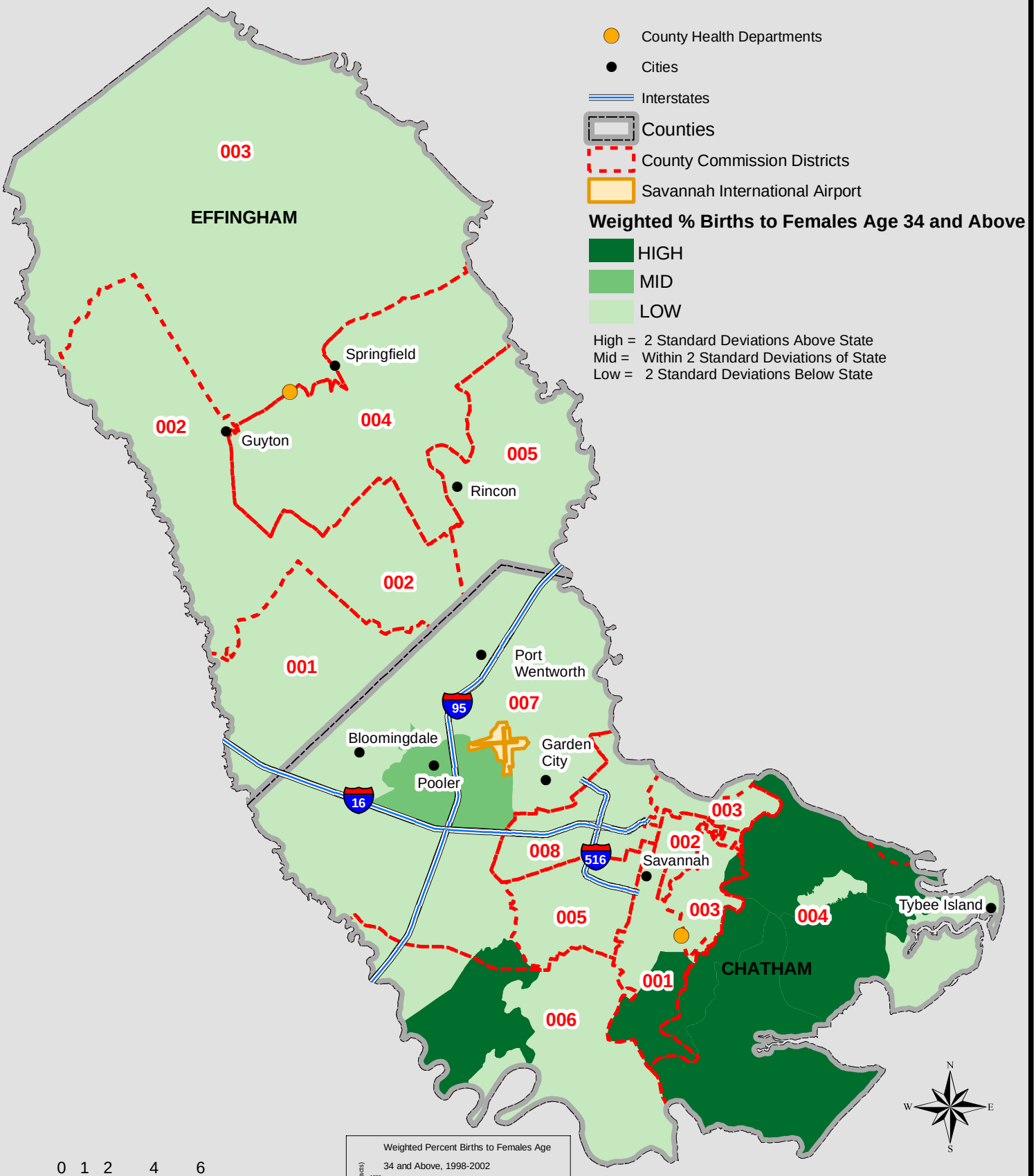
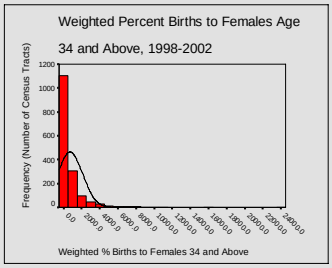
Weighted Percent Births to Females Age 34 and Above by Census Tract, East (Savannah) Public Health District, 1998-2002





0 1 2 4 6 Miles

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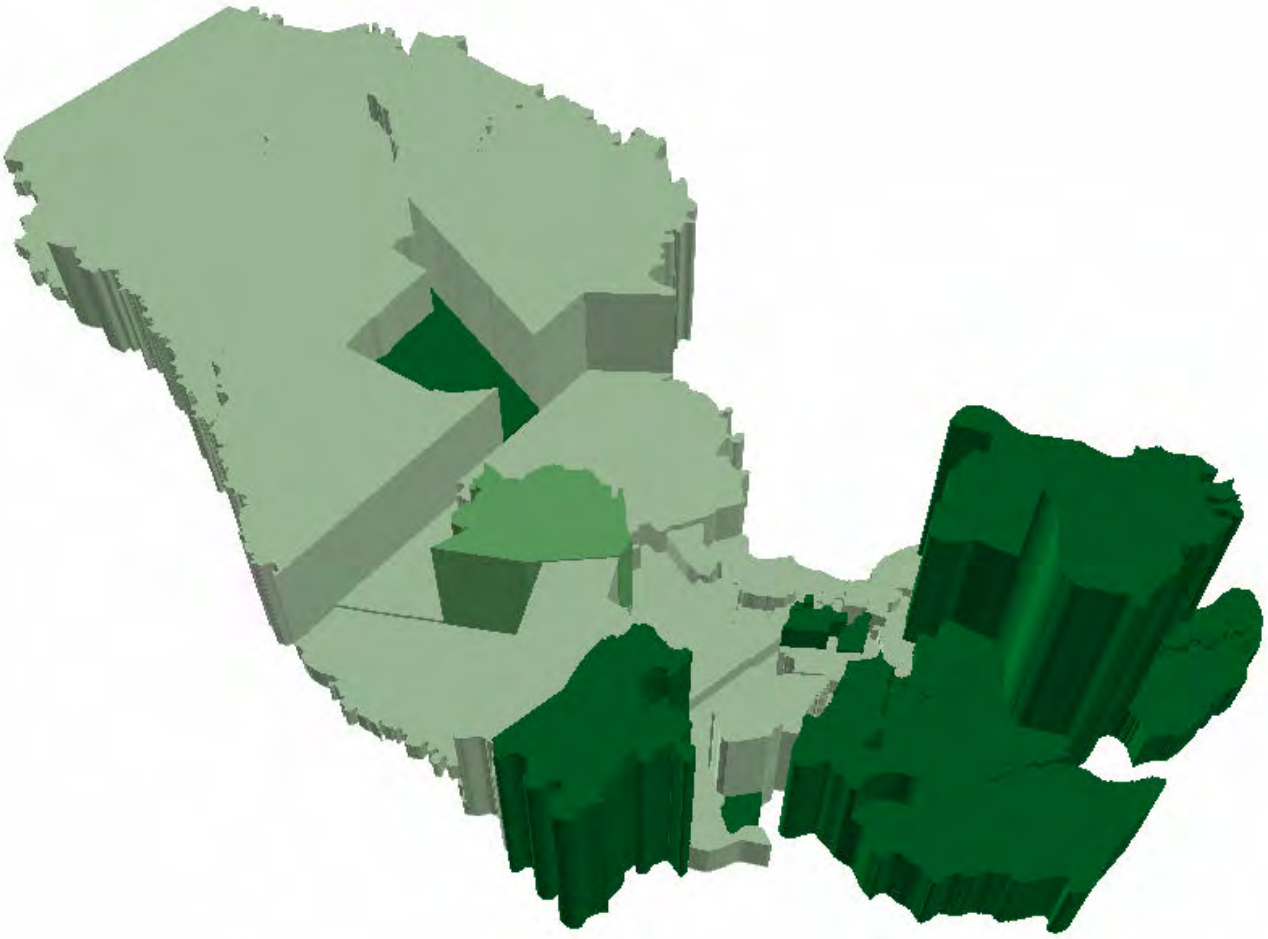
Percent Births to Females Age 34 and Above and Number by Census Tract, East (Savannah) Public Health District, 1998-2002

Note: The 3D elevation of Census Tracts is the number of births to females age 34 and above per tract, 1998-2002

Percent Births to Females Age 34 and Above

- **HIGH**
- **MID**
- **LOW**

High = 2 Standard Deviations Above State
Mid = Within 2 Standard Deviations of State
Low = 2 Standard Deviations Below State



0 2 4 Miles

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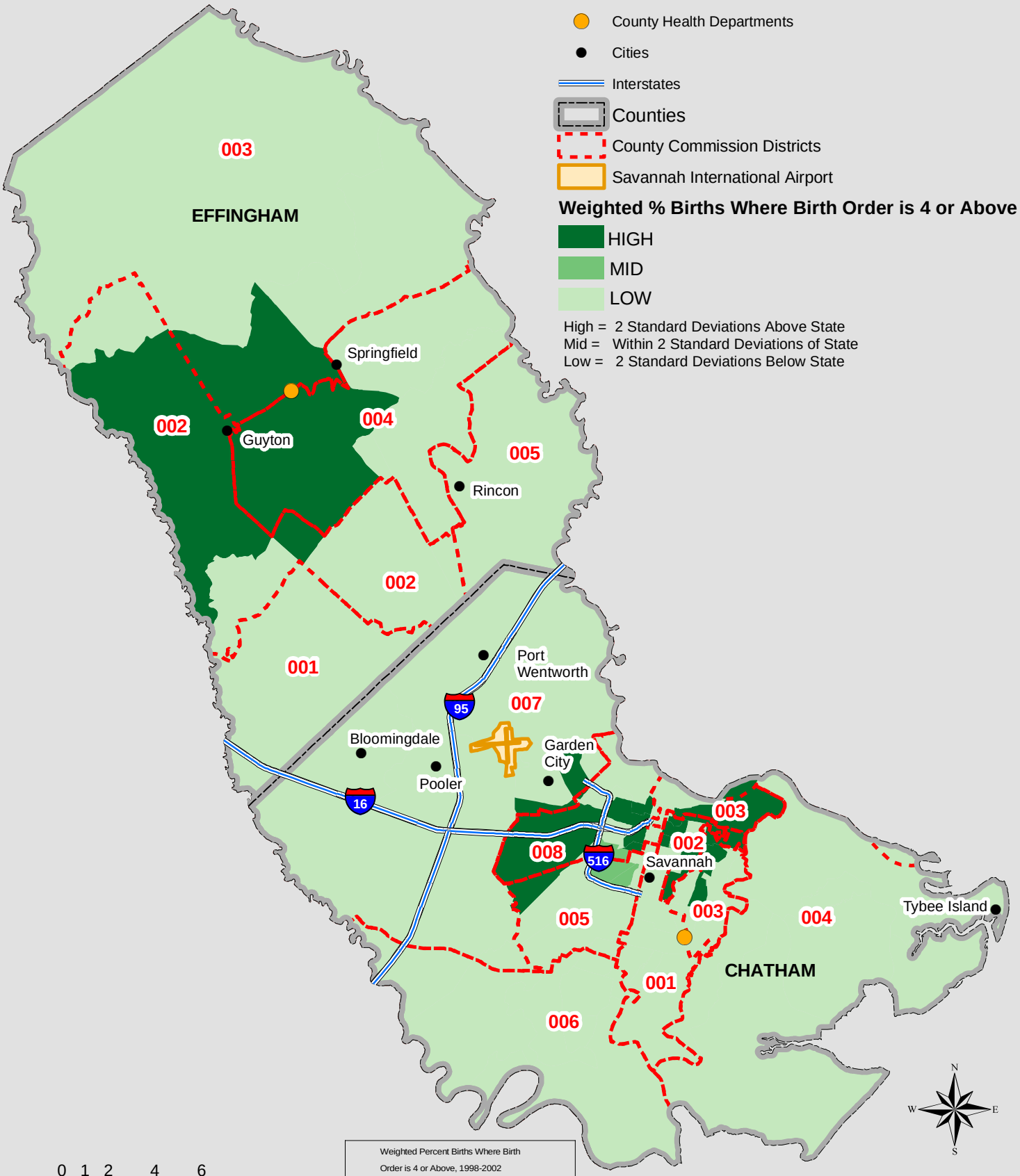
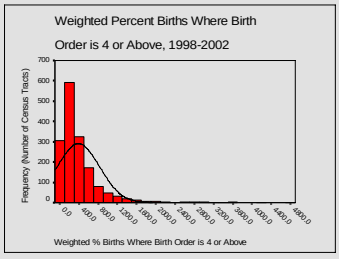
Map originally printed in color

Weighted Percent Births Where Birth Order is 4 or Above by Census Tract, East (Savannah) Public Health District, 1998-2002



0 1 2 4 6 Miles



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Division of Public Health
Office of Health Information & Policy

Created: February, 2004
Source: Division of Public Health
Classification: Jenks Natural Breaks
Projection: UTM 1983, Zone 16
Map originally printed in color.

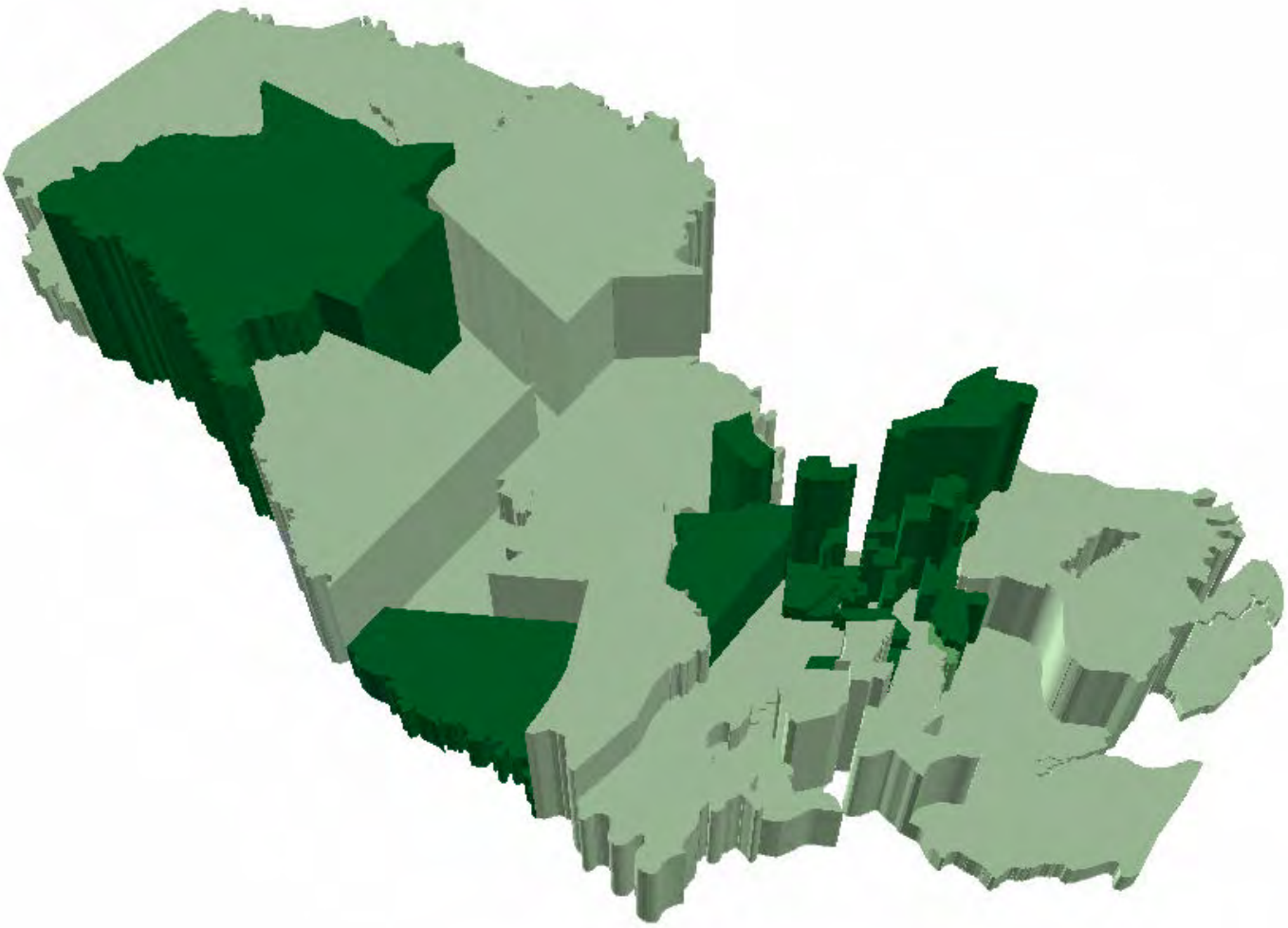
Percent Births that are Birth Order 4 or Above and Number by Census Tract, East (Savannah) Public Health District, 1998-2002

Note: The 3D elevation of Census tracts is the number of births that are birth order 4 or above per tract, 1998-2002

Percent Births that are Birth Order 4 or Above

- **HIGH**
- **MID**
- **LOW**

High = 2 Standard Deviations Above State
Mid = Within 2 Standard Deviations of State
Low = 2 Standard Deviations Below State



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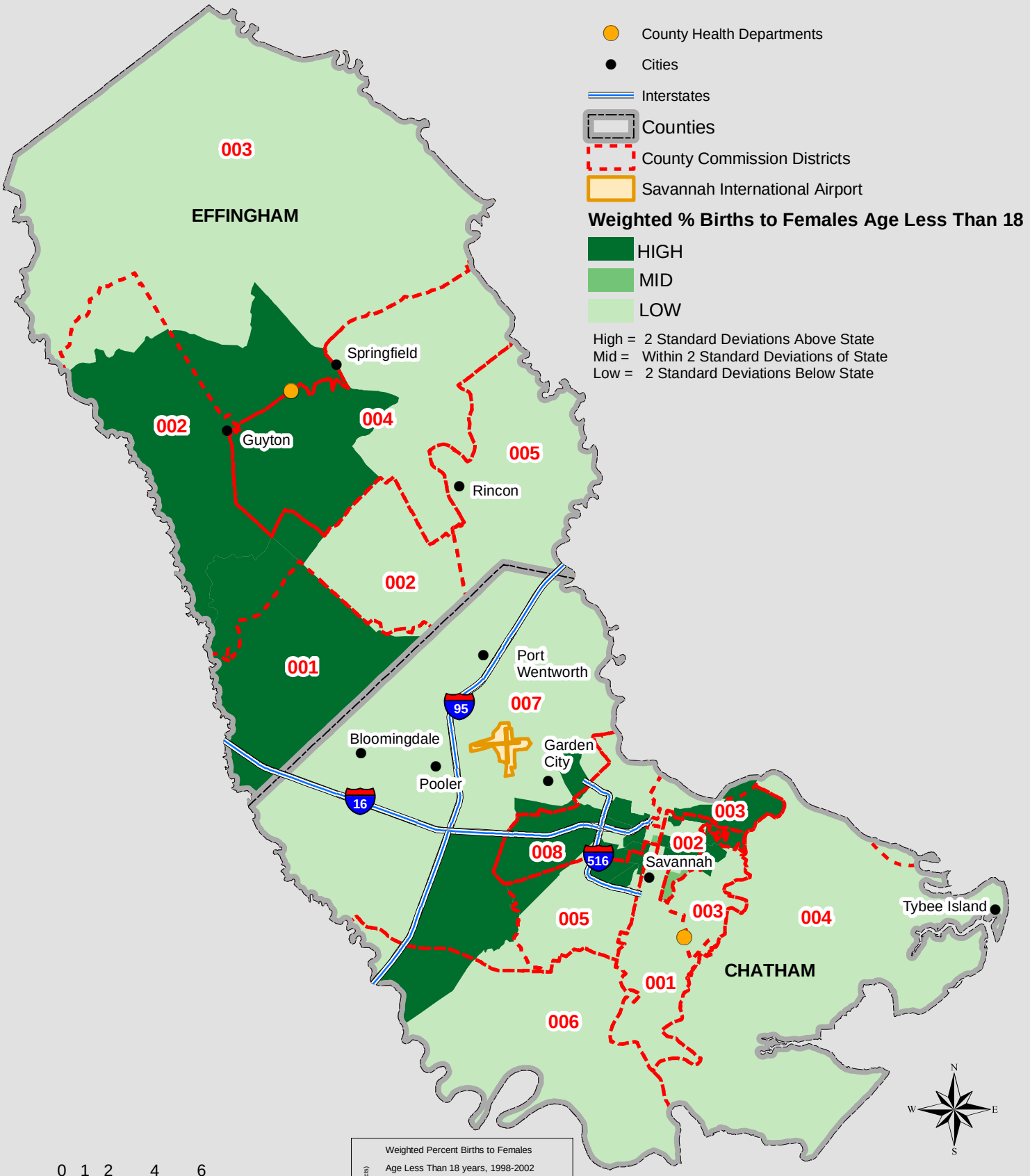
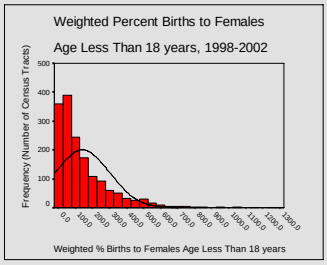
Division of Public Health
Office of Health Information & Policy

Created: March, 2004
Source: Division of Public Health
Projection: Geographic
Classification: Standard Deviations
Map originally printed in color

Weighted Percent Births to Females Age Less Than 18 by Census Tract, East (Savannah) Public Health District, 1998-2002



0 1 2 4 6 Miles



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Created: February, 2004
Source: Division of Public Health
Classification: Jenks Natural Breaks
Projection: UTM 1983, Zone 16
Map originally printed in color.

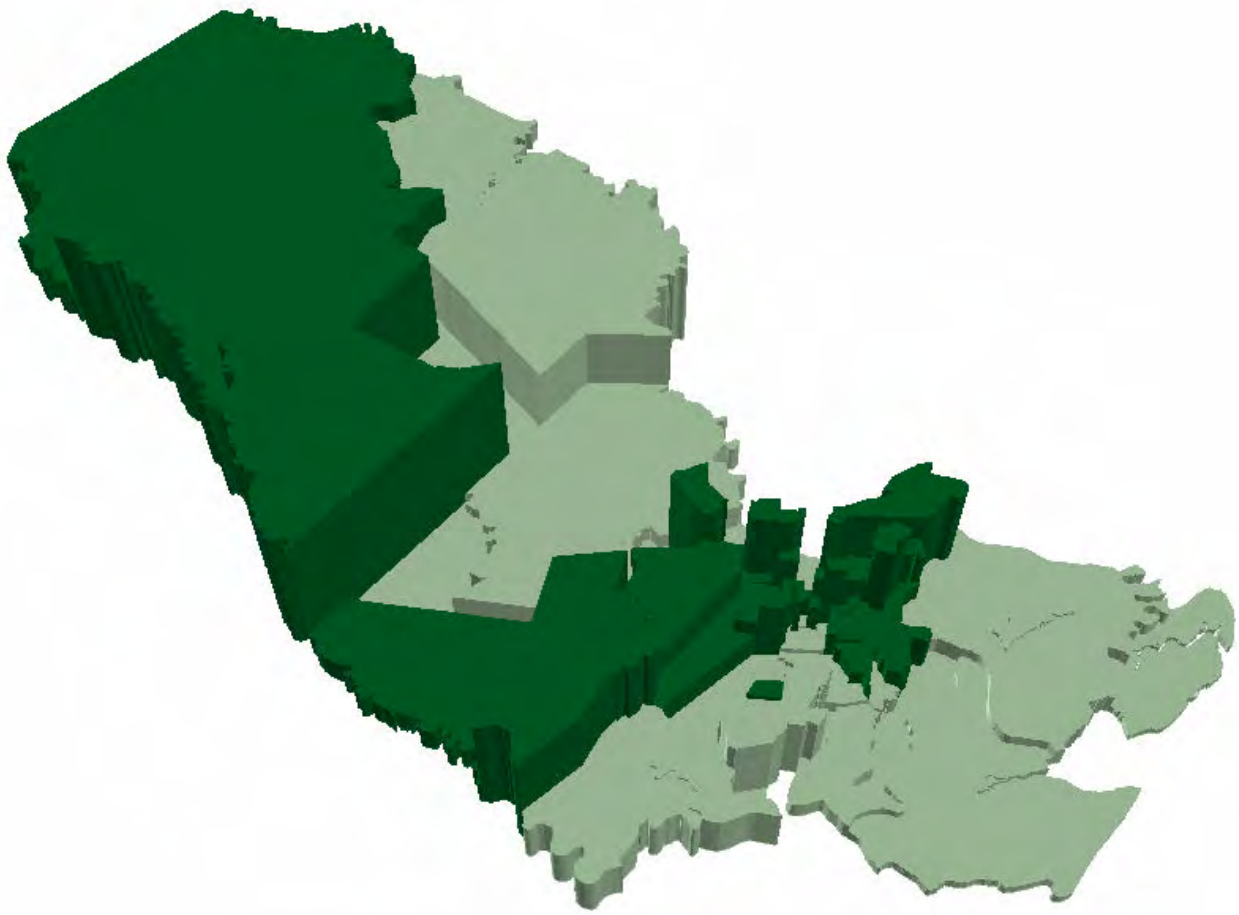
Percent Births to Females Age Less Than 18 and Number by Census Tract, East (Savannah) Public Health District, 1998-2002

Note: The 3D elevation of Census tracts is the number of births to females age less than 18 per tract, 1998-2002

Infant Mortality Rate

- **HIGH**
- **MID**
- **LOW**

High = 2 Standard Deviations Above State
Mid = Within 2 Standard Deviations of State
Low = 2 Standard Deviations Below State



0 2 4 Miles

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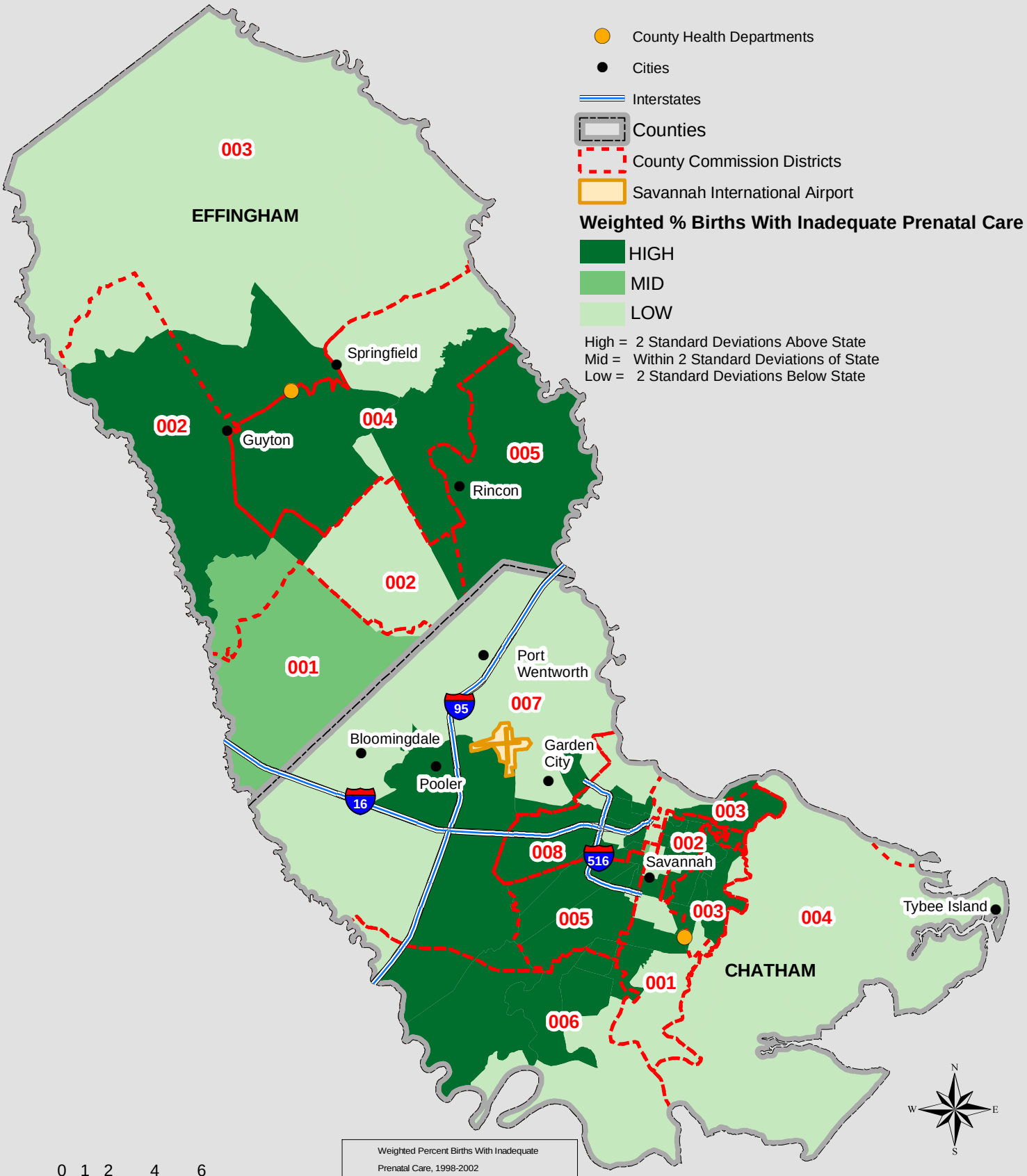
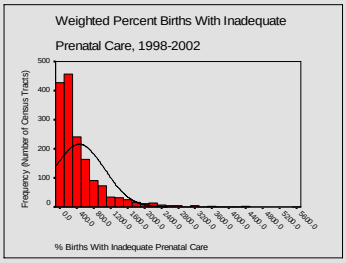
Office of Health Information & Policy

Created: March, 2004
Source: Division of Public Health
Projection: Geographic
Classification: Standard Deviations
Map originally printed in color

Weighted Percent Births With Inadequate Prenatal Care by Census Tract, East (Savannah) Public Health District, 1998-2002



0 1 2 4 6 Miles



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Map originally printed in color.

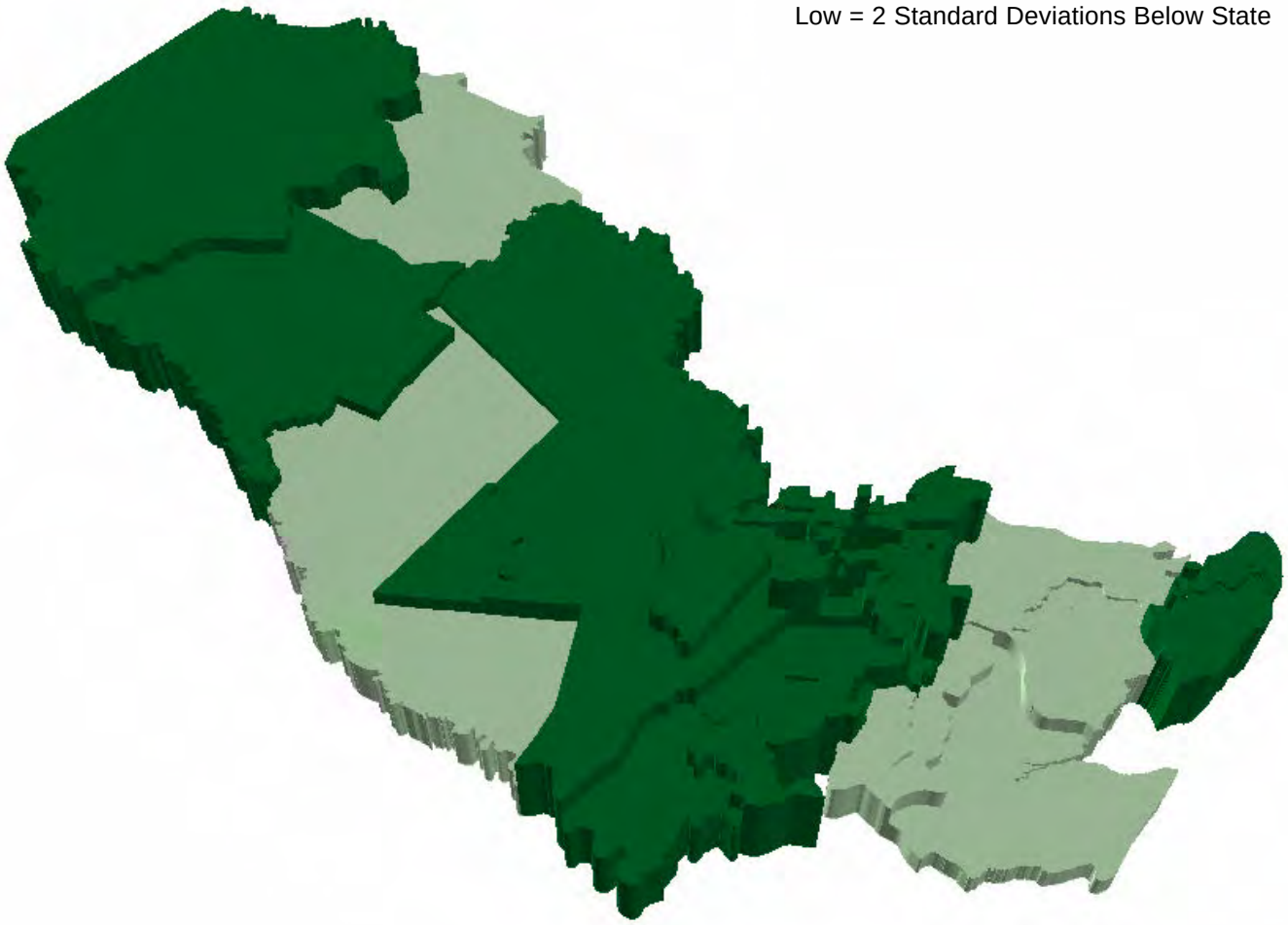
Percent Births With Inadequate Prenatal Care and Number by Census Tract, East (Savannah) Public Health District, 1998-2002

Note: The 3D elevation of Census tracts is the number of births with inadequate prenatal care per tract, 1998-2002

Percent Births With Inadequate Prenatal Care

- **HIGH**
- **MID**
- **LOW**

High = 2 Standard Deviations Above State
Mid = Within 2 Standard Deviations of State
Low = 2 Standard Deviations Below State



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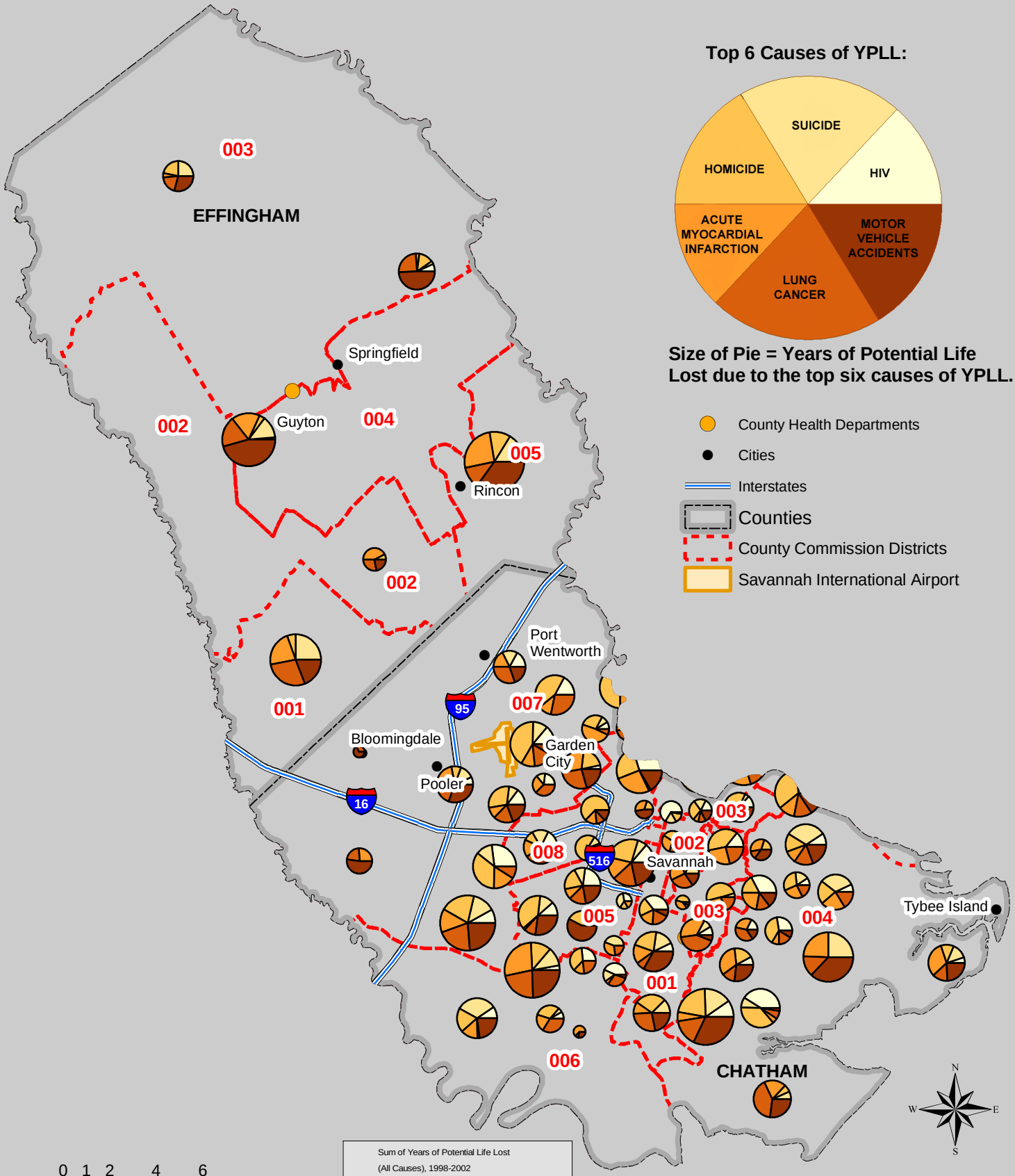
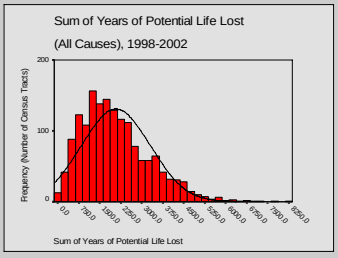
Created: March, 2004
Source: Division of Public Health
Projection: Geographic
Classification: Standard Deviations
Map originally printed in color

Years of Potential Life Lost (YPLL) from the Top 6 Causes of YPLL by Census Tract, East (Savannah) Public Health District, 1998-2002



0 1 2 4 6 Miles



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