A preliminary Analysis of
Impacts of Development of the
Coastal Planning Districts

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A preliminary Analysis of Impacts of Development on the Coastal Planning Districts

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Table of Contents

Introduction

Acknowledgements

I. Purpose..... 1

II. Study Design..... 2
Model Choice..... 3
Geographic Boundaries..... 4
Unit of Measurement..... 6
Assumptions..... 7

III. Methodology..... 8
SCOPE II Model..... 8
Planning District Models..... 9
Impact Assessment Methodology.....10
Infrastructure Methodology.....12
Assessing the Accuracy of the Models.....13
Comparison with other Planning Districts
and State Total.....14

IV. Results.....15
Baseline Forecasts.....19
Impact Assessment.....21
Infrastructure.....24
Education.....26
Health Care.....27
Law Enforcement and Fire Protection.....30
Households and Electric Utilities.....33
Water and Sewer Usage.....35

V. Using the Model: An Example.....36

VI. Concluding Remarks.....41

VII. Future Directions.....43

Bibliography.....44

Appendix A - Baseline and Scenario Forecasts,
Economic Impacts.....46

Appendix B - Social Factors.....81

Introduction

The three econometric models which form the basis of this study were developed by the Division of Research and Statistics, State Budget and Control Board, under a Coastal Energy Impact Program (CEIP) grant administered by the Coastal Council. It is hoped that the study will provide guidance to planners and administrators who must prepare for the future development of the coastal zone.

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I. PURPOSE

In the Coastal Zone Management Act of 1977, the General Assembly declared that the basic state policy with regard to the coastal zone is:

> "to protect the quality of the coastal environment and to promote the economic and social improvement of the coastal zone and of all the people of the State."

In keeping with this policy, the first goal of the South Carolina Coastal Council is:

> "Development of a management program that will achieve a rational balance between economic development and environmental conservation of natural resources in the coastal zone of South Carolina."[1]

One of the Coastal Council's objectives is to develop a "comprehensive data base to aid in making rational decisions." To this end, the staff has worked closely with the Division of Research and Statistics of the State Budget and Control Board to acquire information regarding the effects of development on some economic and sociological aspects of the coastal zone. They were aided in this effort by a grant from the Coastal Energy Impact Program, which was designed to "assist State and local communities as they experience the onshore and offshore impacts of coastal energy testing and to encourage them to cope with the impacts in a manner consistent with the State's developing coastal management program."[2]

Energy has become, and undoubtedly will remain, one of the principle factors affecting regional development. For that reason, it is vital to know not only the impact that energy developments will have on the coastal zone, but also the impact that coastal zone development will have on regional energy demands. With that in mind, econometric models have been developed for each of the three planning districts in the coastal zone. The purpose of these models is twofold: they forecast levels of economic activity within each planning district and can be used to assess the impact of development of various kinds. In other words, the econometric models

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[1] S. C. Coastal Zone Management Program, Goals and Objectives, 1979.

[2] S. C. Intrastate Allocation Process, Coastal Energy Impact Program, April, 1979, p. 2.

supply both a baseline forecast and, more importantly, a measure of how this forecast will change if new development occurs. Thus, the models can be used to forecast the effects of an energy-related development (such as an oil refinery) on various employment sectors in the area, and at the same time, projected growth in various employment sectors can be used in conjunction with other sources of information to estimate future energy needs. In either case, the results of the study will enable the Coastal Council to evaluate possible sites for energy developments in a more rational fashion.

The effects of development on regional infrastructure can also be estimated using the econometric model. Population projections generated by the econometric model can be used to estimate the additional demands for public expenditures such as number of schools, number of law enforcement and fire-fighting personnel, etc., necessitated by new development.

II. STUDY DESIGN

Regional growth resulting from new developments can be disaggregated into three components: direct, indirect, and induced effects of development.[3] Direct effects are those arising from industry itself--500 new employees in a chemical manufacturing plant, for example. Indirect effects are those caused by the demand for goods and services created by those 500 employees and their families. Induced effects are caused by responses to the needs of the industry itself, as is the case when a chemical manufacturing plant attracts a scientific equipment company. Both indirect and induced effects generate additional demands in other sectors of the economy, thereby creating even more jobs and additional cash flow. If cultural or leisure activities are developed, or if the area's infrastructure is significantly

[3] Because regional growth analysis is a relatively new field of study, the terminology used tends to be confusing. Therefore, if the terms used herein are not consistent with those found elsewhere, please be patient.

improved, new industries may find the location more attractive, increasing economic activity still more. Thus, it can be seen that regional growth feeds upon itself, and that growth in one sector of the economy will generate attendant growth in other sectors. It is this principle which makes impact analysis worthwhile; the direct effects of development are self-evident, but the indirect effects are less obvious, and their prediction is aided by a model of some sort.

Model Choice:

There are three commonly accepted models of regional analysis: economic base, input-output, and econometric. Economic base models rely on the theory that a local economy can be divided into two producing sectors: One producing goods for sale outside the region (basic sector) and one producing goods for sale within the region (nonbasic, or service sector). It is a quick and relatively inexpensive method of analysis, but one which is quite limited.[4] The second method, input-output analysis, is far more elaborate than the economic base model. It relies on the theory that all sectors of the economy are interdependent, and consequently allows for the detailed mapping of multiplier effect throughout the entire local economy. The principal drawbacks of the method are the time and resources required to complete it and the fact that once it is completed, the model is tied to the assumptions regarding technology and relative prices prevailing at the time. The econometric approach falls somewhere between the other two, both with regard to the time and resources necessary to develop it, and to the depth of analysis it yields. An additional advantage of econometric models is the fact that they are not tied to any one theory, but rely instead on observed relationships among sets of data. Because they are empirically, rather than theoretically based, the econometric models are more responsive to changing conditions.[5]

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[4] Glickman, Norman J., Econometric Analysis of Regional Systems; Explorations in Model Building and Policy Analysis, Academic Press, New York, 1977. See pp. 20-27.

[5] Ibid., pp. 38-39.

Econometric techniques rely on least squares regression analysis to determine relationships between two or more variables. The outcome of least squares analysis is an equation in which the left hand variable (the dependent variable, or the one to be explained) is equal to the right hand variables (independent or explanatory variable) multiplied by some coefficient plus a constant plus some residual error. If values for the independent variables are known, values for the dependent variable can be determined, based on the relationship between the two as estimated by least squares regression analysis.

Econometric approaches to regional analysis are not without problems. They offer a relatively simplistic explanation of regional phenomena and rely on regional data which have a number of limitations. The necessary time series data are often incomplete or available for only a few years. Regional data are also generally available only on an annual basis, resulting in fewer observations. (A larger number of data points would enable us to estimate with greater confidence.) Econometric models generally treat regions as discreet and closed, thereby ignoring "leakage" and interrelationships across county planning district or state borders. Conclusions drawn from the model are tied not only to relationships which have existed in the past (and may not hold true into the future), but to national models as well (see Glickman for a more complete discussion). This last point is both detrimental and advantageous to regional analysis: it may result in erroneous comparisons, yet the regional economy does not operate in a vacuum and responds to many of the same factors as the state and national economies. Of course, the accuracy of the national model used is also a factor which must be considered.[6]

Geographic Boundaries:

As noted above, this project utilizes models for each of the three planning districts which fall (completely or partially) within the State's coastal zone.

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[6] Ascher, William, Forecasting: An Appraisal for Policy Makers and Planners, Johns Hopkins University Press, Baltimore, 1978, pp. 65-92.

Section 3(B) of the South Carolina Coastal Management Act of 1977 defines the coastal zone as:

> "all coastal waters and submerged lands seaward to the State's jurisdictional limits and all lands and waters in the counties of the State which contain any one or more of the critical areas. These counties are Beaufort, Berkeley, Charleston, Colleton, Dorchester, Horry, Jasper, and Georgetown."

Because the models employed here include entire planning districts, Williamsburg and Hampton counties are a part of the study without being a part of the coastal zone.

There are several reasons for carrying out the analysis on the basis of planning districts rather than separate coastal counties or the coastal zone as a whole. In the first place, economic activity often transcends legal and geographical boundaries. While the coastal zone boundary was designated on the basis of natural features, planning district boundaries were determined primarily on the basis of social, economic, and commercial factors. Thus, a new development in Georgetown County would be as likely to affect Williamsburg County as Horry. The effects of development may vary for each county in the planning district. A plant located in one county may impose certain infrastructure costs on that county, in the form of additional demands on water and sewage treatment facilities, for example, while many of its employees may live in a neighboring county. The second county must absorb the increased costs for schools, fire protection and other services demanded by residents. Both counties may share the indirect benefits brought on by increased demands for goods and services. Therefore, aggregation of economic information to the planning district level is necessary in order to capture more of the effects produced by a new industrial or energy-related development.

A second reason for aggregating counties into planning districts is that the Division of Research and Statistics is compiling similar econometric models for

each of the State's ten planning districts. Making the coastal zone models compatible with those for the rest of the state enables one to make useful comparisons between the various regions of the state. Local and regional growth will be constrained by the total growth predicted for the state; no one area of the state will show unreasonably depressed or inflated growth patterns, since all will be formulated on the same basis. Such a design also enables each planning district to serve as a check on the others since the cumulative growth totals for all the planning districts will not exceed those of the state. (More will be said about this in the section dealing with the accuracy of the models.)

Finally, aggregation of county data into planning districts is desirable from a statistical point of view. Forecasting generally becomes more accurate as the number of observations and size of the region studied increases. Thus, as we increase the observations by merging county data into planning districts, we increase the reliability of our forecasts; a tradeoff must be made between a relatively high degree of detail and a low degree of accuracy and less detail with greater confidence in the results.

Unit of Measurement:

Employment, rather than regional output or personal income, was chosen as the measure of impact for this study. Employment data are generally more useful for planners than overall output because employment is a more reliable indicator of total population change. Technological change may enable an industry to greatly increase its output while at the same time decreasing its number of employees. If changes in output were used as a measure of impact, these technological changes might go unnoticed by planners and lead to an inflated estimate of the number of people migrating into an area. Changes in population are vital to regional planners, since most costs (and a relatively large proportion of revenues) at the local level are a function of population rather than total economic activity. (For example, as the number of residents increases, the number of policemen needed to

serve them will increase. We would expect this increase to be the same regardless of the residents' income.

Employment data are generally easier to obtain than regional output data. This is especially true in the area of impact analysis, since a firm may not be able to accurately estimate its output, but should have a fairly good idea of its employment needs before its plant is even built.

Assumptions:

A number of assumptions have, of necessity, been made in the course of developing the models. One of the most troublesome is the inability of the models to allow for changes in income or cash outflow across planning district or state lines. In other words, the models assume that all economic and demographic effects of development will be distributed as they were in the years preceding the forecast period. In many cases, of course, residents of one planning district may be able to afford to travel to new areas in order to shop. This is particularly true in those areas of Planning District 10 which are close enough to Savannah to permit "shopping across state lines," particularly for luxury items. Many employees of one district may reside in newly developed suburbs located in another planning district or state, making the problem still more complex, since some level of service will have to be provided for these individuals in two different counties.

Another assumption made in the course of model-building is that relationships between sectors of the economy which were found in the early to mid-seventies will hold true into the nineties. The models assume that conditions will remain the same, and that no major perturbations will occur. Unfortunately, we have no way of knowing how relationships have changed (or will change between now and 1990), or even the direction of change. In fact, we do not know with any degree of certainty that the relationships will change.

Reliance upon state and national economic models forces us to accept another set of assumptions--those forecasts which are generated by the larger models.

For example, the national forecast which was used as the basis of the state and local forecasts used here projects growth in the Gross National Product (GNP) to average approximately 5.8% from 1980 to 1990, general inflation to average approximately 6.9%, and the unemployment rate to decline from 7.2% in 1980 to 5.6% by 1985 and to 5.4% by 1990. During this period, the U. S. economy is assumed to be relatively stable, and to be approaching growth trends which converge on its potential long-term rate of growth.[7]

III. METHODOLOGY

The effects of possible industrial or energy-related developments on the various regions of the coastal zone are estimated using an econometric model developed for each of the planning districts. The models are satellite models of the South Carolina Operations Planning and Evaluation model (SCOPE II), although less detail is found in the satellite models due to data limitations. The planning districts included in the analysis are Planning District 8: Waccamaw (Georgetown, Horry, and Williamsburg counties); Planning District 9: BCD (Berkeley, Charleston, and Dorchester counties); and Planning District 10: Lowcountry (Beaufort, Colleton, Hampton, and Jasper counties). As noted earlier, Williamsburg and Hampton counties are not a part of the coastal zone.

SCOPE II Model:

The South Carolina Operations Planning and Evaluation II (SCOPE II) Model is designed to forecast the performance of the major economic sectors in South Carolina. The forecasting models, a state model and a tax model, are maintained in a computer time-sharing arrangement with Data Resources, Incorporated (DRI), a Lexington, Massachusetts, firm, which is a leading consultant in the area of state forecasting models in the country.

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[7] Data Resources, Incorporated, June, 1979. National Forecast.

Data Resources supplies a forecast of the national market conditions which basically determine the level of activity for the manufacturing sector of the economy in the State. The level of nonmanufacturing activity in the economy is essentially determined by demands originating within the state. By estimating the level of personal income and combining this with demands in the manufacturing sector, the level of activity in the nonmanufacturing sector can be modeled. Hence, the interaction between the state and the national economies determines the level of manufacturing activity in the state and this interaction among sectors within the State determines the level of nonmanufacturing activity.

The SCOPE II Model disaggregates the economy of South Carolina to a degree that enables manufacturing and manufacturing demands to be determined more accurately. This is essential since the economy of South Carolina, especially the manufacturing economy, is significantly different in composition from the national economy. By estimating the nondurable and durable sectors separately, the model can forecast a more precise picture of the South Carolina economy. The forecasted levels of state economic activity are then used to estimate General Fund Revenues in the State.

The SCOPE II Model consists of 89 interdependent equations--46 behavioral equations and 43 identities. The model forecasts employment in the principal sectors of South Carolina's economy including the 2-digit SIC manufacturing industries personal income disaggregated into its components, population broken down by age and vital statistics, and several other major economic indicators in the state. These include prices, wages, deposits in savings and loans, a manufacturing production index, value of residential construction and retail sales.[8]

Planning District Models:

Each of the planning district submodels is simultaneous and contains eight equations and one identity. The planning district models are less disaggregated than the SCOPE II model due to data limitations. In addition, data are recorded on an annual basis, rather than a quarterly basis. The planning district

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[8] Cindy Stribling, Division of Research and Statistics, In-house publication, Spring 1979

models disaggregate employment into Manufacturing; Contract Construction; Finance, Insurance, Real Estate; Transportation, Communication, and Public Utilities; Service; Government; and Trade. In addition, a value for all nonagricultural employment is obtained by adding the values for all the employment sectors. Population and (real) personal income are also included. The results of the modeling activity are a series of forecasts for the years 1978 to 1990. There is a Baseline forecast showing the levels of economic activity which may be expected if no new industries or energy-related facilities are built in the coastal zone, and a series of impact forecasts which show what changes may be expected (in employment patterns) if new development occurs in the coastal zone.

Impact Assessment Methodology:

Impact forecasts were generated by increasing the number of employees in the appropriate sector for a given scenario. The model was then used to generate a new set of forecasts, which provide estimates of the additional effects arising from that development scenario.

For the baseline forecast, no impact values were added. To measure impacts, the anticipated level of employment, beginning with a low number in the year the plant construction was completed and increasing gradually until the total projected employment needs were reflected in the variable. In all cases, an increase in construction employment would precede employment in the sector under consideration. In all cases, hypothetical construction was completed within three years and the construction impact variable was returned to zero.

Impact variables for all sectors are as follows:

Manufacturing	= MFG
Contract construction	= CONSTRUCTION
Transportation, Communication and Public Utilities	= UTILITY
Trade	= TRADE

Finance, Insurance and Real Estate	= FINANCE
Service	= SERVICE
Government (Federal, State, and Local)	= GOVERNMENT
Population	= POP
(Real) Personal Income	= INCOME

As an example, suppose that an oil refinery (defined as a manufacturing plant) is proposed for the coastal zone. Refinery construction will require 1,000 people during peak periods. Construction is to begin in 1980 and will take approximately 3 years. During the last year of construction work, some production employees will be hired, with full operating employment leveling off at 300 by 1984. Values for the two impact variables of concern will be as follows:

	MFG	CONSTRUCTION
1978	0	0
1979	0	0
1980	0	500
1981	0	1,000
1982	100	300
1983	300	0
1984	300	0
1985	300	0
1986	300	0
1986	300	0
1987	300	0
1988	300	0
1989	300	0
1990	300	0

These values will be added to the forecasts for the proper years. In addition, because the model is simultaneous, indirect effects in various sectors will be reflected in the final forecasts. Therefore, even though the impact constants for all other sectors remain 0, there will be some increase in employment and income in other areas of the economy.

The impact on each sector may be determined by subtracting the level of employment in the Baseline forecast from the respective level in the impact forecast for any given year. For example, in Table 2, Appendix A, 300 manufacturing employees have been added to Planning District 8. The impact of this addition on the service sector in 1990 can be determined by subtracting 22.17 (Baseline employment, Table A-1) from 22.20 (impact employment, Table A-2). The additional manufacturing employees will generate a need for 30 new service employees.

The total nonagricultural employment impact may be determined by subtracting Baseline from impact values in each of the employment sectors and summing them. A general multiplier may then be generated by dividing the total (nonagricultural) employment impact by the initial direct employment, in this case 300. The resulting multiplier is 1.97. (See Table 31, Appendix A.) A simple formula for generating employment multipliers is:

$$\text{Multiplier} = \frac{\text{Change in total employment}}{\text{Change in direct employment}}$$

Infrastructure Methodology:

Like many of the other terms used in regional growth analysis, "infrastructure" is a word which means different things to different people. As used here, it will represent structures which provide services of one sort or another. In almost all cases, the term will refer to those structures or organizations which provide public services at the local level, such as fire and police departments, schools, and so on. Exceptions are "physicians" and "hospital beds," which were included in the analysis

even though the services they provide are not generally considered "public."

Infrastructure needs were determined from historical data. When available, time series data were used; however, several of the infrastructure equations are based on data for only one year. (The years considered are noted in the text.) Because of severe data limitations, the effects of development on area infrastructure were not determined by modeling, but were estimated by simple ratios instead. Each estimation is based on a ratio of the amount of service provided to the size of the population served. (In other words, three policemen may be required for every 1,000 new residents of a county.) In some cases, only one ratio is given for an entire planning district. However, when data at the county level were available, a separate ratio was developed for each county, as well as for the planning district as a whole. While county ratios cannot be used directly with the model (since population data generated by the model is not disaggregated to the county level), they can be used to give planners a more accurate idea of trends in individual counties. The estimate obtained using planning district data can be modified depending upon whether the planning district average is higher or lower than the figure for the specific county under study.

Assessing the Accuracy of the Models:

The regression equations used in each of the models were selected from a number of possible equations on the basis of various statistical indicators.[9] The statistic to which the most weight was attached was the R^2 value, which measures the amount of change in the left hand (dependent) variable which can be explained by changes in the right hand (independent, or explanatory) variable. If the R^2 is equal to 1.0, all of the variance in the dependent variable can be explained by variance in the independent variable. Summary of the R^2 values for each of the planning districts follows:

[9]See McLagan, Donald L., A Non-Econometrician's Guide to Econometrics, Business Economics, May, 1973, pp. 38-45, for further information.

Planning District 8:	81.8% of the R^2 values were	.95
	100% of the R^2 values were	.90
Planning District 9:	63.6% of the R^2 values were	.95
	81.8% of the R^2 values were	.90
	90.9% of the R^2 values were	.80
	100. % of the R^2 values were	.60
Planning District 10:	45.5% of the R^2 values were	.90
	81.8% of the R^2 values were	.85
	100% of the R^2 values were	.65

Another important factor used to select the "best" equations was a comparison between the actual historical values for the dependent variable and the "calculated" values, or those values which would have been predicted had the equation been used to estimate historical values. In particular, if an equation is sensitive to changes in trends, there is a reasonable chance that it will perform well in the future.

Table III-1 below, compares the average percent error for the years 1970-1977 for each dependent variable in the three planning districts. As can be seen, some equations are significantly better predictors than others.

Table III-1

Variable	P. D. 8	P. D. 9	P. D. 10
Manufacturing Employment	2.30	3.24	1.36
Construction Employment	3.71	1.50	5.95
Transportation, Communication, and Utilities Employment	2.24	.99	4.71
Trade Employment	1.74	.88	.83
Finance, Insurance, and Real Estate Employment	1.86	2.38	7.20
Service Employment	.96	1.51	4.14
Government Employment	.47	1.24	3.56
Population	.60	.20	1.82
Deflated (real) Personal Income	1.15	1.24	2.28
Average	1.6	1.6	3.5

Comparison with other Planning Districts and State Total:

As noted above, similar models were developed for each of the planning districts in the State. The values forecast by these models were summed and compared with the State total, which had been forecast independently. The two were very close, indicating that the values forecast by the various planning district models are at least

reasonable, if not exact. (Other possible explanations are that the State model and the planning district models err in the same direction, or that planning district model errors cancel each other out. We prefer the more optimistic approach, but cannot discount the others entirely.)

Of course, it must be remembered that even equations which perfectly reflect relationships between variables will not produce accurate forecasts if the exogenous variables are not predicted accurately. For this, the SCOPE (State) and DRI (National) models must be relied upon. There is no quick way of assessing the relative accuracy of the SCOPE model; the DRI model, on the other hand, has been exposed to extensive error analysis.[10] DRI's average absolute error of quarterly current-dollar (not corrected for inflation), GNP forecasts were approximately 3 billion (1958 dollars) if the forecast was made late in the quarter, and approximately 4.5 billion if the forecast was made early in the quarter. These figures compare favorably with many similar models; only two were more accurate than DRI's late-quarter forecasts. When GNP was corrected for inflation, DRI's model performed somewhat better for late-quarter forecasts, and somewhat worse for early-quarter forecasts. Four other models proved to be more accurate than DRI's late-quarter forecast for real GNP. (It must be remembered that even if the DRI model is relatively accurate, we have no measure of how accurate SCOPE, its submodel, is. This is significant, since most of the exogenous variables used in the planning district models are state variables.)

IV. RESULTS

Before proceeding with a discussion of the results of the study, it is necessary to define more fully the variable abbreviations used in the forecasts:

EM* Manufacturing Employment
EC* Contract Construction Employment
ER* Transportation, Communication, and Public Utilities Employment
ET* Wholesale and Retail Trade Employment
EFIR* Finance, Insurance, and Real Estate Employment

[10]Ascher, pp. 73-84.

ESV*	Service employment
EG*	Government employment
EEA*	Nonagricultural employment (this is a total of the preceding sectors.)
N*	Population
YPD*	Deflated (real) Personal Income (YP - PC)
1 LAG	Denotes a one-year lag in the variable

*May be followed by no suffix, indicating a U. S. variable, or by "SC," "D8," "D9," or "D10," indicating values for South Carolina, Planning District 8, Planning District 9, or Planning District 10, respectively.

Tables IV-1 and IV-2 present the equations used in each of the three models. Table IV-1 lists the implicit equations, while Table IV-2 lists the complete equations as used to solve the models.

A Baseline forecast was generated for each of the planning districts. Once these initial values were established, a number of different scenarios were introduced. It is hoped that the range of scenarios included here will enable the planner or local official to guage--albeit roughly--the effect of most new developments in the area. The scenarios are as follows:

Scenario 1 - Baseline. Present conditions prevail until 1990.

Scenario 2 - A manufacturing plant employing 300 people moves into an area. Construction begins in 1980, and 700 workers are employed during peak construction periods (1981). Construction tapers off in 1982, as the first production workers are hired. Full employment is reached in 1983. (This example is typical of a small refinery.)

Scenario 3 - Construction for a manufacturing plant which will employ 500 workers begins in 1980. 500 construction workers will be employed at peak construction (1981). Full employment will be reached in 1983.

Scenario 4 - Construction begins in 1980 for a plant employing 700 manufacturing employees at full capacity (1983). 1,000 construction workers will be employed during peak construction times (1981).

Scenario 5 - Construction begins in 1980 for a 1,000-employee manufacturing plant. 1,000 construction workers will be needed during peak construction periods in 1981. Production will begin gradually, starting in 1982 and reaching full capacity in 1984.

Table IV-1

IMPLICIT EQUATIONS

Dependent Variables	Independent Variables		
	Planning District 8 (Waccamaw)	Planning District 9 (Berkeley-Charleston Dorchester)	Planning District 10 (Low Country)
EEA	EMD8 + ECD8 + ERD8 + EFIRD8 + ESVD8 + EGD8	EMD9 + ECD9 + ERD9 + EFIRD9 + ESVD9 + EGD9	EMD10 + ECD10 + ERD10 + EFIRD10 + ESVD10 + EGD10
EM	YPDSC, ND8	YPDSC	EMSC
EC	ECSC	YPDSC, ND9	ECSC
ER	EFIRD8, ND8	YPDSC, ND9	YPDD10 ET
EFIR	EFIRSC, YPDD8	YPDSC, ND9	YPDD10
ESV	ESV, YPDD8	ESVSC, ND9	YPDD10
EG	EGSC, ND8	EGSC, ND9	1LAG EGSC, ND10
N	EEAD8	YPDD9	EEAD10
YPD	EEAD8	EEAD9	EEAD10

TABLE IV-2

EXPLICIT EQUATIONS

MODEL 8 (Waccamaw Region - Planning District 8

```
EMD8←¯1.4218 +   (1.3397 x   YPDSC) +   MFG
ECD8←¯1.1337 +   (59.444 x   ECSC) +   CONST
YPDD8←38.867 +   (10.457 x   EEAD8) +   INCOME
ND8←95808 +   (1310.4 x   EEAD8) +   POP
ETD8←¯17.767 +   (15.633 x   ETSC) +   (.00016336 x   ND8) +   TRADE
EFIRD8←.16106 +   (3.8272 x   EFIRSC) +   (.0024377 x   YPDD8) +   FINANCE
ESVD8←¯11.575 +   (1.2467 x   ESV) +   (.0049989 x   YPDD8) +   SERVICE
EGD8←¯7.1894 +   (33.491 x   EGSC) +   (.000058518 x   ND8) +   GOV
ERD8←¯.69847 +   (.70857 x   EFIRD8) +   (.0000078821 x   ND8) +   UTILITY
EEAD8←EMD8 +   ECD8 +   ERD8 +   ETD8 +   EFIRD8 +   ESVD8 +   EGD8
```

MODEL 9 (Berkeley-Charleston-Dorchester Region - Planning District 9)

```
EMD9 ←.2564 +   (1.4957 x   YPDSC) +   MFG
YPDD9←¯49.916 + (12.332 x EEAD9) + INCOME
ETD9←¯5.9543 +   (165.1 x   ETSC) +   (.00085212 x   YPDD9) +   TRADE
ND9←207100 + (116.17 x YPDD9) + POP
ECD9←¯5.765 +   (1.1189 x   YPDSC) +   (.000013464 x   ND9) +   CONST
ERD9←¯.11927 +   (.19356 x   YPDSC) +   (.000013464 x   ND9) +   UTILITY
EFIRD9←¯.63943 +   (.46348 x   YPDSC) +   (.0000014049 x   ND9) +   FINANCE
ESVD9←¯34.664 +   (33.489 x   ESVSC) +   (.00012647 x   ND9) +   SERVICE
EGD9←¯1.7458 +   (90.304 x   EGSC) +   (.000061016 x   ND9) +   GOV
EEAD9←EMD9 +   ECD9 +   ERD9 +   ETD9 +   EFIRD9 +   ESVD9 +   EGD9
```

MODEL 10 (Lowcountry Region - Planning District 10)

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EMD10←1.9617 +   (10.736 x   EMSC) +   MFG
ECD10←¯1.4947 +   (53.439 x   ECSC) +   CONST
ND10←76889 +   (1359.8 x   EEAD10) +   POP
YPDD10←30.576 + (14.112 x EEAD10) + INCOME
ERD10←¯1.3373 +   (.001285 x   YPDD10) +   (.10327 x   ET) +   UTILITY
ETD10←¯6.2724 +   (.56878 x   ET) +   (.000014416 x   ND10) +   TRADE
EFIRD10←¯1.968 +   (.0091512 x   YPDD10) +   FINANCE
ESVD10←¯2.2315 +   (.01445 x   YPDD10) +   SERVICE
EGD10←¯.5994 +   (36.881 x   (1 LOG EGSC)) +   (.000010489 x   ND10) +   GOV
EEAD10←EMD10 +   ECD10 +   ERD10 +   ETD10 +   EFIRD10 +   ESVD10 +   EGD10
```

Note: "←" is a computer symbol representing "="

Scenario 6 - A utility generating station will be built, beginning in 1980. 500 construction workers will be needed during peak construction activity in 1981. By 1982, construction will taper off and full production capacity (200 workers) will be reached. (This represents a typical 500 megawatt generating facility.)[11]

Scenario 7 - A larger utility facility, employing 300 workers, will be built, beginning in 1980. 700 construction workers will be needed during peak periods. By 1982, construction employment will taper off and peak full-time employment will be reached.

Scenario 8 - Gross Trade Employment [12] will be increased by 300 new jobs. Construction, beginning in 1980 will employ 500 workers at its peak. In 1982, construction will be completed, and some full-time workers will be hired. Full capacity will be reached in 1983.

Scenario 9 - Construction will begin in 1980 for a facility employing 1,500 "tradesmen." Construction will peak in 1981, with 1,000 workers, and taper off in 1982 as trade employees are hired. Full capacity will not be reached until 1985. (This is typical of a large shopping center, such as Columbia Mall[13] or Myrtle Beach Mall.)

Scenario 10 - Construction begins in 1980 for a government facility which will employ 900 people at full capacity. Construction will require 700 workers at its peak, and will be complete in 1982. Full employment will not be reached until 1984. (This represents a county hospital.)[14]

BASELINE FORECASTS

The baseline (Scenario 1) projections for each of the planning districts are shown in Appendix A. The values are listed in terms of thousands of employees (EEA - EG), millions of dollars (YPD) and actual numbers of residents (N). (See pages 7-8 for a discussion of relevant assumptions.)

Waccamaw Region: Between 1978 and 1990, it is projected that approximately 45,960 new jobs will be created in the Waccamaw region. This represents an increase of 80.7 percent, considerably higher than the 51 percent growth estimated for the State as a whole during the same period. Service, manufacturing, and trade are

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[11] Dr. Glen Rhyne, Research Economist Public Service Commission, personal communication.

[12] Competition for customers created by a new shopping center may reduce the need for employees in existing facilities. Therefore, the numbers of trade employees added to planning district economies by scenarios 8 and 9 represent the gross number of employees added, rather than the net addition once competition is accounted for. It is, of course, possible that a large influx of new residents could permit the opening of a new shopping center without a loss of trade employees in existing establishments.

[13] Columbia Mall Administrative Offices, personal communication.

[14] Lexington County Hospital Personnel Office, personal communication.

expected to be the fastest growing sectors, with increases of 92.6, 89.8 and 84.9 percent respectively. In each case, the planning district leads the corresponding State projection by a considerable margin. In spite of the rapid growth in employment, the District's personal income is projected to lag behind that of the State, showing a 70.4 percent increase, as opposed to the State's projected 82.4 percent increase. Population, on the other hand, is expected to increase by 35.3 percent by the year 1990. This is higher than the comparable State figure (18 percent), but reasonable in light of the many new jobs anticipated.

Berkeley-Charleston-Dorchester Region: The model projects that overall nonagricultural employment in this planning district will increase by 66.1 percent. This is a slower rate of growth than that projected for Planning District 8, but is still higher than that projected for the State as a whole. The projected increase represents the creation of approximately 86,500 new jobs by 1990. As is the case in the Waccamaw Region, the service and manufacturing sectors in the model show large gains, relative to both the State and the other sectors of the planning district. Finance, insurance, and real estate employment and construction employment also show large gains in the B-C-D Region. (Construction employment shows a 136.6 percent increase over the twelve-year period, which is undoubtedly attributable to the structure of the model. However, since our primary concern is with impact estimation and not baseline forecasting, the unusually high growth rate should have little bearing on relative differences between impact scenarios.) Population in Planning District 9 is projected to increase by 31.9 percent over the twelve-year period. Although this is a slower rate of increase than that projected for the Waccamaw Region, it is still greater than the projected State average. AS is the case in the Waccamaw Region, B-C-D's personal income is expected to increase at a slower rate than the State's (68.2 percent versus 82.4 percent for the State as a whole).

Lowcountry Region: Unlike Planning Districts 8 and 9, the Lowcountry Regional model projects slower growth, overall, than is anticipated for the State. Nonagricultural

employment is only projected to increase by 46.9 percent (as opposed to 51 percent for the State). The largest increase is expected to be in the finance, insurance, and real estate sector, which the model shows will grow by approximately 78.9 percent, versus a projected 51.9 percent in the corresponding state sector. Transportation, communication, and public utility employment is the only other sector in the District which is expected to grow at a rate faster than that of the State. Population growth is expected to be very close to that of the State (16.9 percent versus 18 percent for the State), but personal income is expected to grow only 43.9 percent, as opposed to the State's 82.4 percent projected growth.

IMPACT ASSESSMENT

The projected consequences of scenarios 2 through 10 are shown in Appendix A. The likely impacts, expressed numerically, can be readily determined by subtracting the values after the impact from those of the corresponding year of the baseline forecast. For example, the effect of an additional 900 government workers on the total nonagricultural employment in 1990 in Planning District 8 can be determined by subtracting the baseline value (Table A-1) from the Scenario 10 values (Table A-10).

$$\begin{array}{r} 104.33 \\ -102.89 \\ \hline 1.44 \end{array}$$

Thus, the numerical impact is 1,440 new jobs. If the same calculation is made for the year 1985, the total number of jobs is even larger--1,490. (Bear in mind that the projections are just that, and should not be viewed as factual.)

$$\begin{array}{r} 84.22 \\ -82.73 \\ \hline 1.49 \end{array}$$

This is probably a result of the secondary effects of construction employment--even though the construction workers are no longer employed, the sectors which benefitted from high construction employment may still show an increase in employees.

The projected effects of an impact on specific sectors can be determined in the same way, by subtracting the sector's baseline value from its value in the year under

study. This is a useful exercise, since impacts may affect some sectors far more than others.

A more convenient way of comparing the effects of various impacts is to examine multipliers. A multiplier is a ratio of the number of people directly employed to the number of new jobs which are ultimately created. For example, a multiplier of 1.5 indicates that for a given scenario in a given planning district, there will be 1.5 jobs created for each job which is a direct result of the new industry. If the industry employs 100 people, 150 jobs will be created in the planning district.

Tables A-31 through A-33 show the difference between baseline and impact scenarios, as well as the nonagricultural employment multipliers for each of the scenarios.

As can be seen, the multipliers for Planning District 8 are higher than those for either of the other two districts, with Planning District 9 having the lowest values of all.

It would seem that the B-C-D area, the most heavily developed of the regions discussed here, would have the highest multipliers. Generally, in a well-developed economy, manufacturing industries develop a number of linkages with related firms which supply materials, component parts, and other "factors of production." Service industries spring up to serve the expanding manufacturing base, as do shops, banks, etc. A dollar increase in the manufacturing sector will be passed along to many other sectors within the region. This may well explain the high multiplier projected for the Waccamaw COG region, where manufacturing accounted for approximately 25% of the total nonagricultural employment in 1978. In contrast, manufacturing in the Berkeley-Charleston-Dorchester region accounted for only 14% of the total nonagricultural employment in 1978. Service, on the other hand, accounted for approximately 15% of the total. Because the service industries in the Berkeley-Charleston-Dorchester area are geared toward the peak tourist seasons, they are able to accommodate a fairly large increase in demand before reaching a threshhold, beyond which expansion must occur. Thus, the B-C-D area has a lower multiplier as a result of a more elastic local economy. In other words, the District 9 economy is resilient

enough to absorb a large number of new (direct) employees before additional (secondary) employees are needed to serve them.

Because planning districts 8 and 10 depend to a greater degree on manufacturing, and at the same time have less well-developed service and trade economies, the impacts described here will have a greater effect than in the B-C-D region. Location of a manufacturing plant employing 700 people in rural Jasper County would necessitate the opening of a new restaurant, at the very least, and would probably provide the impetus for a number of more far-reaching developments. The Waccamaw Region may have the highest multipliers because, while it is still relatively undeveloped, it has the potential to become a more commercialized area by virtue of existing linkages. Georgetown is already a manufacturing center of some consequence, with port facilities, rail lines, and so forth. Adding to such a base would be easier than making a fresh start in an area without a strong manufacturing base.

In some scenarios, the multipliers are lower than they might otherwise be relative to the rest of the impacts, since full employment is not reached until one, or even two, years later than in the majority of cases. Because full employment has "been in effect" for one or two years less than it has in the other scenarios, the impact on other employment sectors will be somewhat less. This is true for scenarios 5 (1,000 manufacturing workers), 9 (1,500 trade employees, with full employment reached <u>two</u> years later than the standard), and 10 (900 government employees). Another way of looking at the problem is to say that the 1990 impact multipliers for scenarios 5 and 10 are the equivalent of 1989 multipliers in the rest of the scenarios. For Scenario 9, the equivalent year would be 1988.

Construction impacts have been determined separately from general employment impacts, because their effects are relatively short-lived. Construction impacts may pose special planning problems precisely because they are both temporary and involve a large number of workers. A small town may have difficulty accommodating 1,000 new workers, even if very few of them move into the municipality. (Even fast food restaurant owners may quake under the onslaught of the new lunch time crowd.) If the

additional workers necessitate changes in local service, trade, or other employment patterns, the effect of removing the workers should be considered as well. Of course, construction workers will be replaced by permanent full-time employees, who will be more likely to move into the area. The resulting increase in total population (as opposed to labor force) may fill the gap left by the larger number of construction employees. However, if the construction work force is primarily made up of commuters, and the full-time work force is drawn from people who already live in the area (as developers often suggest will be the case), the construction impact may be significant. Construction multipliers for each of the planning districts are shown in Table A-34.

INFRASTRUCTURE:

As noted earlier, infrastructure is used here to mean those structures or organizations which provide public services at the local level. The effects of industrial impacts on local infrastructure needs are more difficult to project than their effects on various employment sectors. There are a number of reasons for this, the most obvious being the lack of data at the local level. In some cases, reporting is not uniform from county to county, or even from year to year within the same county. In other cases, the necessary information has simply never been collected, due to a lack of funds, manpower, or both. Because the estimating ratios are based on figures for one year, or an average of two or three years, they are less reliable than they might be if more extensive time-series data were available.

Another very important factor making infrastructure needs estimation difficult is the uneven nature of public service growth. Because public service expenditures generally either lag or precede population growth, it is difficult to assess the accuracy of public service-to-population ratios based on historical data. Historical relationships may reflect several years of inadequate service, followed by a growth spurt, or, conversely, may reflect increased service levels in anticipation of an increased population. In using the results presented here, one should be aware of the recent trends in the area under study. If service levels have been inadequate, ratios should be somewhat higher than those reported here.

While there are many difficulties associated with estimating increased public personnel needs, there are infinitely more associated with general public expenditures. Capital expenditures are made in a step-wise fashion, generally following a period of inadequate capacity and preceding a short period of excess capacity. For example, a new school will probably not be built until classrooms are extremely crowded and all other avenues of expansion have been exhausted. Once built, the school should be large enough to accommodate an increasing number of pupils for several years to come. The decision about when to build the new school will depend as much, or perhaps more, on political and financial factors as it does on the number of pupils to be served. The latter can be estimated with some hope of success, but few are brave (or foolish) enough to attempt to predict the outcome of the former.

Still another factor leading to inaccurate estimations is the changing expectations of the local population. Greater disposable incomes and more prosperous lifestyles may lead residents to demand higher service levels in some areas. New services may also be demanded; a wealthier populace might expect public marinas or docks from which to launch their pleasure boats. A change in the age or racial distribution of the population may alter the emphasis on public service. For example, a shift toward a more mature population might bring about a shift in concerns from education to health care. In particular, new residents, accustomed to a higher standard of living, may require services heretofore not provided in the area.

New residents may have some effects on the local infrastructure which differ from patterns established by "old" residents. For example, an influx of "new" residents will have a more severe impact on water and sewer supply systems than the same number of "old" residents, since new lines will have to be constructed. Therefore, the estimates which follow may be low, because they are based on ratios between the existing or "old" population and the levels of service provided to them.[15]

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[15] Hite, James C., and James M. Stepp, "Estimates of State and Local Benefits of New Metal Fabrication Plant Industries at Port Victoria Site", Special Report, Department of Agricultural Economics and Rural Sociology, Clemson University, Clemson, S.C. March 1, 1973.

For all these reasons, the estimates which follow must be viewed as rough approximations and evaluated accordingly.

Education:

Table IV-3 shows the estimated number of additional pupils and schools needed for each 1,000 person increase in population. Figures are based on the 1976-77 school year. Since 1970, there has been a steady downward trend in the number of students enrolled in public schools relative to the size of the general population, and it is logical to assume that this trend will continue at some level into the future. Private school enrollment also declined during this period, but at a much slower rate.

Because it is impossible to predict when the decline in the school age populations will taper off, figures from the most recently tabulated year will be used; one should be aware, however, that they may be high and should try to obtain the most recent trend information possible for the specific area under study. For example, if classroom size has historically been smaller in one municipality than in the county as a whole, more schools may be needed to accommodate an influx of students there than in other areas of the county. (It must also be remembered that the ratios presented here assume that historical levels of service are desirable.)

Another important variable is the rural/urban nature of the county; schools in a rural area may be smaller and more widely dispersed, resulting in fewer students per school. A new industrial development might cause a large population concentration in one area of the country, making it feasible to build larger schools, with more students.

Table IV-3

EDUCATION

Location	Increase 1,000 new residents			
	Public Schools		Private Schools	
	Students	Schools	Students	Schools
Planning District 8 Average	220	.46	10	.05
Georgetown	240	.49	20	.14
Horry	210	.39	10	.05
Williamsburg	240	1.55	20	.08
Planning District 9 Average	220	.33	20	.08
Berkeley	280	.37	10	.06
Charleston	190	.30	30	.11
Dorchester	240	.33	20	.10
Planning District 10 Average	190	.41	20	.09
Beaufort	160	.33	20	.06
Colleton	210	.56	30	.17
Hampton	240	.53	20	.11
Jasper	230	.29	30	.13

Detailed data tables which show past trends are found in Tables 3 to 7, Appendix B.

Health Care

Table IV-4 shows the number of extra physicians needed for each increase of 10,000 in the general population, if the current level of physician availability is to remain constant. These figures have been obtained by averaging the corresponding figures over the years 1976, 1977, and 1978. No clear trend is evident, as can be seen from the primary data presented in Appendix B, Table 8.

It must be remembered that people may travel farther to obtain the care of a physician than they will to obtain education, police protection, etc. Therefore, a low physician-to-population ratio in one county may be quite reasonable in light of a high ratio in a neighboring county. This is particularly true of Berkeley and Dorchester counties, relative to Charleston County, which has a disproportionately high number of physicians.

Table VI-5 presents the number of new hospital beds required to maintain present levels of service for each increase of 1,000 people. The figures are based primarily on 1978 service levels, since these were the only figures available at the time of publication. A complete table is found in Appendix B, Table 9.

Table IV-6 shows the number of outpatient and public health centers which will be required to serve each additional 1,000 residents in a planning district. Note that in some cases the present number of facilities is lower than the prescribed national standard. Figures are for 1977 only. More complete data are found in Appendix B, Table 10.

Table IV-4

NEW PHYSICIANS PER 1,000 NEW RESIDENTS

Georgetown	.60
Horry	.64
Williamsburg	.29
Planning District 8	.56
Berkeley	.11
Charleston	.90
Dorchester	.27
Planning District 9	.66
Beaufort	.64
Colleton	.45
Jasper	.34
Hampton	.44
Planning District 10	.47

Table IV-5

NEW HOSPITAL BEDS PER 1,000 NEW RESIDENTS

Georgetown	3.3
Horry	4.3
Williamsburg	2.1
Planning District 8	3.6
Berkeley	---
Charleston	6.32
Dorchester	---
Planning District 9	4.3
Beaufort	3.2
Colleton	4.6
Hampton	4.0
Jasper	2.2
Planning District 10	3.5

Table IV-6

NEW OUTPATIENT AND PUBLIC HEALTH CENTERS
REQUIRED PER 1,000 NEW RESIDENTS

Planning District 8	1.6
Planning District 9	1.1
Planning District 10	2.8

Law Enforcement and Fire Protection

Law enforcement data is reported for planning districts only, since the information available was not extensive enough to justify a county-by-county breakdown. Municipal figures have been obtained by averaging yearly ratios from 1974 to 1978. County data is only available for the years 1977 and 1978; the figures presented here are an average of those two years. The total number of law enforcement personnel for each planning district is also based on an average of 1977 and 1978 figures.

It is important to note that the source of municipal data changes from the State Law Enforcement Division (1977-1978) to the Federal Bureau of Investigation (years preceding 1977). The ratios obtained appear to be consistent from one source to another, and as a consequence, it is assumed that reporting methods remain constant. Given this assumption, the number of law enforcement personnel required per 1,000 residents decreases steadily in Planning Districts 9 and 10 from 1974 to 1977. In 1978, the ratio begins to increase again, indicating that the downward trend may be changing. (However, this could be an aberation, or simply a function of a change in reporting or recording methods from one year to the next.)

Data for 1977 and 1978 includes a breakdown of civilian employees and sworn officers. The ratio of civilian personnel to sworn officers has been included to aid planners who must anticipate salary requirements, benefits, etc. The ratio presented in Table IV-7 is an average of the ratios in 1977 and 1978.

Table IV-7 displays the number of additional law enforcement personnel needed to serve an increase of 1,000 residents at the county and municipal levels. More detailed data is found in Appendix B, Table 11.

The figures presented in Table IV-7 have been extrapolated from the original data. The percentage of municipalities (or counties) reporting was calculated for each year, and the "missing percentage" was supplied based on the number of law enforcement personnel reported. No effort was made to generate more accurate

estimates based on the population of the counties and municipalities failing to report. It was felt that the value of the information to be gained did not warrant the amount of time which such a calculation would require.

Table IV-7

LAW ENFORCEMENT PERSONNEL

	Muncipal		County	
	Number per 1,000*	Civilian: Sworn Officers	Number per 1,000*	Civilian: Sworn Officers
Planning District 8	1.47	1:9	.53	1:2.85
Planning District 9	1.58	1:2.75	.75	1:2.75
Planning District 10	.96	1:4	.92	1:2.25

*Residents

Fire protection data was available for 1978 only. Paid and volunteer personnel were treated as a unit, since there are no paid firefighters at all in many of the smaller incorporated areas. Therefore, in utilizing these results, it is important to ascertain the present balance between paid and volunteer firefighters in the municipality under study. Obviously, an all-volunteer fire department will be less costly than one which is staffed on a full-time basis. However, an all-volunteer department may no longer be effective if an area's population increases sharply.

Table IV-8 shows the number of fire protection personnel which will be needed to maintain present levels of service if the population increases by 1,000. These figures are inaccurate to some degree, since approximately 100 fire departments throughout the state do not belong to the State Firemen's Association, from which these figures were obtained. The location and size of these fire departments is

unknown; presumably some of them are located within the coastal zone, making the figures listed here lower than they might otherwise be.

Table IV-8

FIRE PROTECTION PERSONNEL

Location	Paid and Volunteer Firemen	Population	Number per 1,000
Georgetown	128	40,300	3.2
Horry	147	95,400	1.5
Williamsburg	51	36,700	1.4
Planning District 8	326	172,400	1.9
Berkeley	254	78,000	3.3
Charleston	574	265,000	2.2
Dorchester	130	51,600	2.5
Planning District 9	958	394,500	2.4
Beaufort	125	60,900	2.9
Colleton	70	30,700	2.3
Hampton	62	17,000	3.6
Jasper	22	14,000	1.6
Planning District 10	279	122,600	2.3

Source: State Firemen's Association, Statistician's Report, January 1, 1978. Grady C. Hill, Statistician.

HOUSEHOLDS AND ELECTRIC UTILITIES

Table IV-9 shows the number of new electricity hookups necessitated by an increase of 1,000 in the area's population. This information is useful in and of itself, particularly if it indicates a possible strain on existing generating capabilities. However, it is also useful as a proxy for the number of dwelling units - and, consequently, number of households - which can be expected as a result of the increase in population. This should help planners to anticipate a housing shortage, in the event that one is likely.

There are some inaccuracies inherent in estimating households this way. Some older multiple-family units are serviced by only one electricity hookup, thereby lowering the estimate of households per unit of population. Conversely, many farms and other business/residences have several hookups, resulting in an artificially high estimate of households. The latter is a more common problem in the coastal counties. In some rural areas, not all households are serviced by public utilities, making the number of households higher than the number of hookups. The most recent tally of county households was done in 1970 as a part of the U. S. Census. Using electricity hookup data from 1970, the ratio of hookups to households was determined. This same ratio can be used to correct inter-census year utility data. (Unfortunately, there will be no way to assess the accuracy of this ratio beyond the year 1970 until the 1980 census data is released.)

The data from which Table IV-9 was drawn are found in Appendix B, Table 12. The ratios presented here are an average of 1976 and 1977 figures.

Table IV-9

HOUSEHOLD AND ELECTRICITY HOOKUPS

Location	Hookups per 1,000 Residents	Households per 1,000 Residents
Georgetown	360	289
Horry	425	330
Williamsburg	360	286
Planning District 8	396	315
Berkeley	345	323
Charleston	310	306
Dorchester	310	292
Planning District 9	318	300
Beaufort	215	246
Colleton	375	327
Hampton	250	321
Jasper	195	301
Planning District 10	256	312

WATER AND SEWER USAGE

Data on water and sewer usage for the three planning districts is limited and somewhat inconsistent. Therefore, only general "rules of thumb" will be used to estimate increased needs in this area. The Division of Water Supply of the State Department of Health and Environmental Control, which must certify new or expanding water supply systems, uses the following estimates to determine adequacy of supply:

100 gallons/day/person (residential and industrial use)
~~50 gallons/day/person~~* (residential use only)

Therefore, a 1,000-person increase in population would result in roughly a 100,000-gallon per day increase in water used. (50,000 gallons per day if only residential use is considered.)

Obviously, this amount will vary greatly, depending upon the area under study, to say nothing of the nature of the associated industrial development. In rural areas, nearly all water is supplied by private wells. This has been particularly true of Berkeley, Hampton, and Williamsburg counties in the past. A sudden influx of people could make construction of a new water supply system necessary. Some industries use considerably more water than others; this fact should be taken into account when estimating the impact of development on an area's water supply.

The Department of Health and Environmental Control's Division of Domestic Waste Water also employes "general guidelines" to estimate sewage use. The Guidelines for unit Contributory Loadings to Waste Water Treatment Facilities list the following rates of use for common wastewater - generating facilities:

Residence - 4 persons	100 gallons/day/person*
School (cafeteria, gym, showers)	~~20 gallons/day/person~~
Hotel (no restaurant)	20 gallons/day/bedroom
Apartment (2 bedroom, 3 persons)	100 gallons/day/person
Office (no restaurant)	25 gallons/day/person

The complete listing may be found in Appendix B, Table 13.

*Discrepancies between these two figures may be explained by amounts of water which filter into the system from the water table. In addition, wastewater estimates tend to be high as a safeguard against contamination of the receiving body of water.

A ratio which was developed for another planning district may also be used, with reservations. The Water and Sewer Study, Lower Savannah Region showed a need for an additional .175 million gallons/day capacity for each 1,000 new residents. However, it is reasonable to assume that water use varies from planning district to planning district and there is no way of determining the magnitude or direction of the difference.

V. USING THE MODEL: AN EXAMPLE

A small town in Planning District 10 has been proposed as the site for a new industrial development. Residents of the town, curious about the effects of the plant on the area's economy, hope to use this report to obtain an approximate idea of the impact.

The first step is to contact the firm's main office or its consultants, the State Development Board, and any other sources available to them, in order to find out as much as possible about the size and nature of the development proposed. In particular, they should try to obtain accurate estimates of the number and types of employees required both during construction and operation of the plant.

For the purposes of the example, assume that the proposed development will employ approximately the same number of people as projected for Scenario 4 (see page 16). In most cases, proposals will be close enough to one or another of the suggested scenarios to obtain an approximate impact forecast. (If a development is proposed which differs significantly from the scenarios presented here, contact the S. C. Coastal Council to discuss the possibility of preparing an impact scenario which will represent the new development.)

Since we are dealing with Planning District 10, turn to Table 21 of the Appendix A, which shows projected growth in the area without added impacts. Now turn to Table A-4 (Appendix A) to see the effects of impact Scenario 4. Total (nonagricultural) employment in the district will be increased by 1,135 people by 1985. (Remember that the numbers in these tables are in thousands.) The nonmanufacturing sectors, by and large, will be affected more than the manufacturing sector.

While this information is only an estimation of possible effects, it may be useful to anyone debating the wisdom of opening a new store, for example. The new business generated by developments in the manufacturing sector may be sufficient to justify additional investment in the nonmaufacturing sector.

By 1990, the actual numbers of employees caused, directly or indirectly, by the new plant will have increased very slightly, to 1,140. Once again, the primary impact will be in the manufacturing sector, which will gain the original 700 employees, the finance, insurance, and real estate sector, which is expected to gain 142 employees, and the service sector, which will increase by 231 new employees.

Turning to Table A-33, we can see that the multiplier for Scenario 4 in Planning District 10 is 1.62 for the year 1990. This means that by 1990, each employee added to the manufacturing sector will result in 1.62 new employees overall. Said another way, total nonagricultural employment will increase by 162 for every 100 employees added to the manufacturing sector. (This should also hold true in 1985, since the actual numbers of employees differed so slightly from the 1990 totals.)

As noted earlier, construction employment is analyzed separately from long-term employment. If we return to Table 34 in Appendix A, we can see that in 1981, the year in which construction employment peaks, 1,630 new employees will be added to the total of nonagricultural employees in the District. Because there are 1,000 employees added as a direct result of the impact, we can divide the number of total employees by the number of "direct" employees, to obtain a multiplier of 1.63. In other words, for every 100 employees added to the construction sector, 163 employees will be added to the total of District (nonagricultural) employees. The influx of construction workers will place demands on other sectors of the economy, but these demands may be short-lived. For example, 330 new service employees will be needed to accommodate the additional construction employees in 1981. By 1982, when construction is tapering off and full operating employment has not yet been reached, only 250 service employees will be needed. By 1983, when full operating capacity

has been reached, and construction work has ceased, the numbers of additional service employees will have fallen still further, to 230, where they will remain until at least 1990. Thus, planners should beware of encouraging significant increases in any of the employment sectors on the basis of demands created by construction employment alone. In this example, if large-scale, permanent changes were made in 1981, there would be a surplus of 100 workers in the service sector by 1985. Obviously, employment patterns are more complex than this; however, the example should illustrate the dangers of failing to discriminate between short and long-term employment.

Infrastructure needs may cause the greatest concern to those evaluating a proposed development, since increased needs may result in increased public expenditures. As noted in the methodology section, infrastructure needs are determined on the basis of population. Comparing Tables A-21 and A-24 once again, we find that the proposed impact will increase the District's projected population by 1,535 in the year 1990. This figure must be multiplied by the appropriate factor from Table 2, Appendix B, in order to make it conform to the most recent official State estimates. When we multiply 1,535 by 1.042, the conversion factor for 1990, we obtain the corrected population increase of 1,599. This figure will be used to determine infrastructure needs using Tables III-3 through III-9 in the "Results" section.

As is evident from Table IV-3, page 26, each additional 1,000 residents will result in approximately 190 new public school students, 20 additional private school students, .41 public schools and .09 private schools. Multiplying each of these figures by the expected increase in population results in the following:

Additional public school students	= 190 x 1.6 = 304 students
Additional public schools	= .41 x 1.6 = .66 schools
Additional private school students	= 20 x 1.6 = 32 students
Additional private schools	= .09 x 1.6 = .14 schools

More accurate estimates can be obtained by examining the supporting tables in Appendix B which show recent trends for each of the counties in the planning district.

Obviously, an individual county may behave quite differently from the weighted average of all the counties in the planning district. The actual need for a new school will depend largely on how crowded existing schools are, the age distribution of the new students and the financial situation of the school district involved.

Health care needs are displayed in Tables IV-4, 5, and 6. The following results are likely from the impacts of Scenario 4:

Additional physicians	= .47 x 1.6 = .75
Additional hospital beds	= 3.5 x 1.6 = 5.6
Additional outpatient/public health facilities	= 2.8 x 1.6 = 4.48

(Note that some planning districts already fall below national standards.)

Again, the exact effects will depend on trends in the county under study, the availability of health care in nearby counties or planning districts, and the degree to which health care needs have been met in the past. (The years on which these figures are based may have been years in which a large number of physicians moved to the area, causing a slight surplus. On the other hand, the period studied may have been one of relative scarcity, meaning that the numbers shown here are lower than the actual numbers which will be needed to adequately serve the new population.

Scenario 4 will have the following impacts on law enforcement and fire protection personnel needs:

Additional municipal law enforcement personnel (ratio of civilian to sworn officers = 1:4)	= .96 x 1.6 = 1.47
Additional county law enforcement personnel (ratio of civilian to sworn officers = 1:2.25)	= .92 x 1.6 = 1.39
Additional fire protection personnel	= 2.3 x 1.6 = 3.68

When the total numbers involved are relatively small, as they are here, the ratio of civilian to sworn officers is probably not important. However, in the case of a larger development, or several concurrent developments, it would be well to note the likely distribution of civilian and sworn personnel, since the pay scales are presumably different.

As noted earlier, volunteer and paid firemen were not separated, due to the fact that many rural areas are served only by volunteer firefighting personnel. In

this instance, the specific location under study dictates the amount of public expense involved--if the area is served strictly by volunteers, the cost will be considerably less than if the personnel are full-time employees.

Table 9 on page 30 displays the average number of households and utility hookups which may be expected for each increase of 1,000 in the population. When the average figures are multiplied by the expected population increase, the following figures are obtained:

Additional utility hookups	= 256 x 1.6 = 410
Additional households	= 312 x 1.6 = 499

(The discrepancy between the two numbers may be explained by the fact that many older multiple-family units have only one utility hookup.)

Water and sewer usage statistics are presented on page 35. Using DHEC guidelines, we can see that Scenario 4 will create the need for an additional 160,000 gallons of water per day for residential and industrial use. (80,000 gallons for residential use only.)

There is no quick way of estimating sewage use on a per person basis, unless the Lower Savannah Planning District figure of .175 million gallons per day capacity is used. (This is the equivalent of 175,000 gallons.) In that case, Scenario 4 will require a .28 million (280,000) gallon/day/capacity increase over what would normally be required. A better sense of what will be needed may come from the Guidelines used by DHEC to determine waste water facility loading capabilities. If households are used as a proxy for residences, and all residences are assumed to house four people, residential sewage use may be determined as follows:

499 households x (100 gallons/day/person) x 4 = 199,600 gallons/day.

However, the number of assumptions necessitated by the latter method makes its reliability as doubtful as that of the former method.

VI. CONCLUDING REMARKS

At this juncture, it is important to reiterate the cautions which have been voiced throughout this paper. Modeling is not an exact science; while some models are more accurate than others, none is completely reliable.

A number of factors limit this model's accuracy. In the first place, there is a serious lack of adequate data at the planning district level. This not only leaves gaps in our knowledge, but reduces the confidence with which we may forecast because our forecasts are based on fewer observations. Because the planning district models are based on both the SCOPE and DRI (national) models, inaccuracies in either of the latter are likely to be incorporated into the former. We do not know the direction or magnitude of such error, so it is entirely possible that the effects on the planning district models are minimal. (It is also possible that several errors have canceled each other out.) However, the possibility of a serious error cannot be discounted.

Time horizons pose problems as well. In some cases, the length of time covered by the forecasts is not sufficient to uncover the full impact of new development. Unfortunately, econometric models perform best when they are used to forecast very short periods into the future. Ascher notes that:

> "Prediction of short-term economic trends depends on the capacity to understand the intricacies of the existing economic structure...In long-range economic forecasting, these short-term fluctuations need not be accounted for so carefully. What is most crucial for the long-term is anticipation of <u>changes</u> (or lack of changes) in economic structure." [16]

Thus, we are using a method which may be ideal for short-term forecasting to predict long-term change, thereby risking the possibility of error increasing dramatically as the length of time increases. However, as Ascher points out, econometric models are very useful tools for policy analysis, in that they are valuable for comparative purposes.[17] Even though the baseline forecast may be

[16] Ascher, p. 85

[17] <u>Ibid</u>, pp. 83-84

inaccurate, the relative effects of two or more courses of action will remain constant.

There are also problems within the models themselves which may reduce accuracy. As noted in the text, some equations are considerably more accurate than others. The simultaneous nature of the models may also be troublesome, in that measurement errors may be multiplied. There is no evidence that simultaneous models are more accurate than others.[18]

The assumptions inherent in the models have been discussed in detail on pages 7 and 8. However, the fact that historic conditions may not prevail in coming years is so important that it bears further discussion. There has been another period of high gasoline prices and high levels of inflation within the historical segment included in the models. This might lead us to conclude that if the model reflected the 1973 economic downturn, it also should have a reasonable chance of predicting future downturns. However, every change in the economy is unique in at least some major respects, meaning that this model may be very restricted in the types of recessions (or periods of increased prosperity) it is able to project.

There is an additional problem inherent in estimating infrastructure needs, in that a static relationship (based on one year's data) is used to predict a constantly changing relationship. As noted in the text, population grows fairly gradually, and at a relatively even rate. Infrastructure needs, on the other hand, tend to grow in stepwise fashion, building up to a threshhold before action is taken. There is virtually no way of knowing at what stage of the "threshhold building process" the infrastructure data was acquired.

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[18] Armstrong, J. Scott, Long-Range Forecasting: From Crystal Ball to Computer, Wiley, N. Y., 1978. p. 179.

VII. FUTURE DIRECTIONS

At present, the model includes only economic forecasts and estimates of some public personnel needs. It does not include estimates of capital expenditures, or a number of other possible public expenditures necessitated by development. It also does not include estimates of revenues generated by new development. Each of these areas could, and should, be explored further, even though the number of possible contingencies makes the exercise resemble augury rather than forecasting.

Another major subject needing elaboration is the specific economic climate of each county and municipality. There are a number of factors which may be applicable to only a few areas, yet which have profound effects on the economics of the specific areas in question. A list of questions should be developed which will help reveal these special conditions to planners and decision-makers.

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APPENDIX A

Baseline and Scenario Forecasts

Economic Impacts

Table A - 1

Planning District 8, Scenario 1

(Baseline Forecast)
(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
EEAD8	56.93178	59.34892	61.64590	65.52609	69.16727	73.27280	78.01733	82.73060
EMD8	14.69479	15.25746	15.71296	16.75793	17.76270	18.88805	20.25455	21.63444
ECD8	3.40901	3.46548	3.55405	3.78054	3.86138	4.09143	4.37022	4.58184
ERD8	1.96953	2.04244	2.11266	2.22879	2.33809	2.46022	2.60072	2.73995
ETD8	13.36111	13.98562	14.53966	15.49170	16.41469	17.43777	18.61878	19.79656
EFIRD8	1.87132	1.93905	2.00474	2.11218	2.21347	2.32610	2.45537	2.58330
ESVD8	11.50671	12.33096	13.14022	14.17794	15.15581	16.10181	17.11356	18.11620
EGD8	10.11931	10.32791	10.58160	10.97701	11.42112	11.96741	12.60413	13.27831
ND8	170263.84614	173425.00157	176428.99738	181503.54677	186265.49200	191634.73503	197839.65754	204003.69988
YPDD8	633.02511	658.25115	682.22305	722.71799	760.71834	803.56493	853.08025	902.26935

	1986	1987	1988	1989	1990
EEAD8	87.07860	91.15260	95.16418	99.10968	102.89246
EMD8	22.93395	24.17987	25.43918	26.68511	27.90423
ECD8	4.71678	4.80654	4.88738	4.97536	5.04372
ERD8	2.86824	2.98820	3.10607	3.22176	3.33247
ETD8	20.87499	21.87699	22.85457	23.81046	24.72349
EFIRD8	2.70109	2.81112	2.91912	3.02498	3.12620
ESVD8	19.03121	19.87209	20.67605	21.44789	22.16636
EGD8	13.95234	14.61779	15.28181	15.94412	16.59599
ND8	209690.04457	215018.03665	220264.41121	225424.34687	230371.49100
YPDD8	947.64641	990.16382	1032.02992	1073.20624	1112.68448

Table A - 2

Planning District 8, Scenario 2

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.20000	.30000	.30000	.30000
CONST	.00000	.00000	.30000	.70000	.30000	.00000	.00000	.00000
EEAD8	56.99421	59.41401	62.13257	66.69417	70.02890	73.82856	78.57888	83.29790
EMD8	14.69479	15.25746	15.71296	16.75793	17.96270	19.18805	20.55455	21.93444
ECD8	3.40901	3.46548	3.85405	4.48054	4.16138	4.09143	4.37022	4.58184
ERD8	1.97399	2.04709	2.12601	2.26227	2.36396	2.47852	2.61943	2.75987
ETD8	13.39478	14.02072	14.64034	15.74415	16.60973	17.57572	18.75984	19.94073
EFIRD8	1.87533	1.94323	2.01673	2.14225	2.23670	2.34253	2.47217	2.60046
ESVD8	11.51493	12.33953	13.16481	14.23959	15.20344	16.13550	17.14801	18.15141
EGD8	10.13137	10.34048	10.61766	11.06744	11.49098	12.01682	12.65466	13.32996
ND8	170469.96325	173639.88029	177045.31999	183048.91479	187459.44648	192479.13961	198703.18802	204886.23470
YPDD8	634.66992	659.96588	687.14131	735.05003	770.24610	810.30328	859.97123	909.31198

	1986	1987	1988	1989	1990
MFG	.30000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD8	87.65122	91.73019	95.74668	99.69700	103.48440
EMD8	23.23395	24.47987	25.73918	26.98511	28.20423
ECD8	4.71678	4.80654	4.88738	4.97536	5.04372
ERD8	2.88774	3.00806	3.12628	3.24231	3.35335
ETD8	21.02203	22.02671	23.00693	23.96542	24.88094
EFIRD8	2.71860	2.82895	2.93726	3.04344	3.14495
ESVD8	19.06712	19.90865	20.71326	21.48573	22.20481
EGD8	14.00501	14.67142	15.33639	15.99963	16.65239
ND8	210590.11504	215934.54017	221197.09656	226372.94686	231335.35041
YPDD8	954.82898	997.47752	1039.47276	1080.77607	1120.37608

Table A - 3

Planning District 8, Scenario 3

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.25000	.50000	.50000	.50000
CONST	.00000	.00000	.20000	.50000	.20000	.00000	.00000	.00000
EEAD8	57.00559	59.42587	62.05962	66.44675	70.00409	74.18810	78.93880	83.65820
EMD8	14.69479	15.25746	15.71296	16.75793	18.01270	19.38805	20.75455	22.13444
ECD8	3.40901	3.46548	3.75405	4.28054	4.06138	4.09143	4.37022	4.58184
ERD8	1.97481	2.04794	2.12795	2.25888	2.36576	2.48993	2.63087	2.77054
ETD8	13.40092	14.02712	14.65493	15.71858	16.62332	17.66176	18.84609	20.02718
EFIRD8	1.87606	1.94399	2.01847	2.13920	2.23831	2.35278	2.48244	2.61076
ESVD8	11.51643	12.34110	13.16837	14.23334	15.20676	16.15651	17.16907	18.17252
EGD8	10.13357	10.34278	10.62289	11.05828	11.49585	12.04764	12.68556	13.36092
ND8	170507.54864	173679.06336	177134.62385	182892.35381	187542.62262	193005.86756	199231.15993	205415.44266
YPDD8	634.96985	660.27856	687.85395	733.80068	770.90985	814.50658	864.18445	913.53506

	1986	1987	1988	1989	1990
MFG	.50000	.50000	.50000	.50000	.50000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD8	88.01186	92.09115	96.10796	100.05859	103.84630
EMD8	23.43395	24.67987	25.93918	27.18511	28.40423
ECD8	4.71678	4.80654	4.88738	4.97536	5.04372
ERD8	2.89923	3.01957	3.13782	3.25387	3.36494
ETD8	21.10867	22.11352	23.09391	24.05257	24.96826
EFIRD8	2.72892	2.83929	2.94762	3.05382	3.15535
ESVD8	19.08828	19.92985	20.73450	21.50701	22.22613
EGD8	14.03604	14.70252	15.36755	16.03085	16.68367
ND8	211120.46353	216465.95748	221729.56634	226906.45174	231869.84777
YPDD8	959.06116	1001.71824	1043.72187	1085.03345	1124.64138

Table A - 4

Planning District 8, Scenario 4

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.25000	.70000	.70000	.70000
CONST	.00000	.00000	.50000	1.00000	.50000	.00000	.00000	.00000
EEAD8	57.00583	59.42613	62.47713	67.13989	70.42263	74.47519	79.22589	83.94530
EMD8	14.69479	15.25746	15.71296	16.75793	18.01270	19.58805	20.95455	22.33444
ECD8	3.40901	3.46548	4.05405	4.78054	4.36138	4.09143	4.37022	4.58184
ERD8	1.97482	2.04796	2.13635	2.27270	2.37424	2.49616	2.63710	2.77677
ETD8	13.40105	14.02726	14.71831	15.82275	16.68725	17.70873	18.89307	20.07416
EFIRD8	1.87608	1.94401	2.02601	2.15161	2.24593	2.35837	2.48803	2.61635
ESVD8	11.51646	12.34113	13.18385	14.25878	15.22237	16.16798	17.18054	18.18399
EGD8	10.13362	10.34282	10.64559	11.09560	11.51875	12.06447	12.70238	13.37775
ND8	170508.35445	173679.90342	177522.58017	183530.04069	187933.98672	193293.39679	199518.71583	205703.02506
YPDD8	634.97628	660.28526	690.94985	738.88942	774.03294	816.80106	866.47915	915.82997

	1986	1987	1988	1989	1990
MFG	.70000	.70000	.70000	.70000	.70000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD8	88.29897	92.37827	96.39509	100.34572	104.13343
EMD8	23.63395	24.87987	26.13918	27.38511	28.60423
ECD8	4.71678	4.80654	4.88738	4.97536	5.04372
ERD8	2.90546	3.02580	3.14405	3.26010	3.37117
ETD8	21.15565	22.16051	23.14090	24.09957	25.01526
EFIRD8	2.73451	2.84488	2.95321	3.05941	3.16094
ESVD8	19.09975	19.94133	20.74597	21.51849	22.23761
EGD8	14.05287	14.71935	15.38438	16.04768	16.70051
ND8	211408.07039	216753.58724	222017.21867	227194.12627	232157.54358
YPDD8	961.35627	1004.01352	1046.01734	1087.32909	1126.93719

Table A - 5

Planning District 8, Scenario 5

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.30000	.50000	1.00000	1.00000
CONST	.00000	.00000	.50000	1.00000	.50000	.00000	.00000	.00000
EEAD8	57.00587	59.42617	62.54290	67.24909	70.55841	74.24103	79.69019	84.40960
EMD8	14.69479	15.25746	15.71296	16.75793	18.06270	19.38805	21.25455	22.63444
ECD8	3.40901	3.46548	4.05405	4.78054	4.36138	4.09143	4.37022	4.58184
ERD8	1.97483	2.04796	2.14106	2.28051	2.38038	2.49372	2.64885	2.78852
ETD8	13.40107	14.02728	14.75378	15.88164	16.73352	17.69031	18.98168	20.16277
EFIRD8	1.87608	1.94401	2.03024	2.15862	2.25144	2.35618	2.49858	2.62690
ESVD8	11.51647	12.34114	13.19251	14.27316	15.23367	16.16348	17.20218	18.20563
EGD8	10.13363	10.34283	10.65830	11.11669	11.53533	12.05787	12.73413	13.40950
ND8	170508.48139	173680.03576	177739.72715	183890.54918	188217.19053	193180.63284	200061.15608	206245.46949
YPDD8	634.97730	660.28632	692.68268	741.76628	776.29290	815.90120	870.80782	920.15868

	1986	1987	1988	1989	1990
MFG	1.00000	1.00000	1.00000	1.00000	1.00000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD8	88.76327	92.84258	96.85939	100.81003	104.59774
EMD8	23.93395	25.17987	26.43918	27.68511	28.90423
ECD8	4.71678	4.80654	4.88730	4.97536	5.04372
ERD8	2.91722	3.03756	3.15580	3.27186	3.38292
ETD8	21.24426	22.24912	23.22952	24.18818	25.10387
EFIRD8	2.74506	2.85544	2.96377	3.06996	3.17150
ESVD8	19.12139	19.96296	20.76761	21.54013	22.25925
EGD8	14.08462	14.75109	15.41612	16.07943	16.73225
ND8	211950.51866	217296.03913	222559.67411	227736.58520	232700.00587
PDD8	965.68501	1008.34229	1050.34613	1091.65792	1131.26604

Table A - 6

Planning District 8, Scenario 6

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
UTILITY	.00000	.00000	.00000	.00000	.20000	.20000	.20000	.20000
CONST	.00000	.00000	.20000	.50000	.20000	.00000	.00000	.00000
EEAD8	56.93178	59.34892	61.97622	66.35191	69.82792	73.60313	78.34765	83.06092
END8	14.69479	15.25746	15.71296	16.75793	17.76270	18.88805	20.25455	21.63444
ECD8	3.40901	3.46548	3.75405	4.28054	4.06138	4.09143	4.37022	4.58184
ERD8	1.96953	2.04244	2.12198	2.25210	2.55674	2.66954	2.81005	2.94928
ETD8	13.36111	13.98562	14.60995	15.66743	16.55527	17.50806	18.68907	19.86685
EFIRD8	1.87132	1.93905	2.01311	2.13311	2.23021	2.33447	2.46374	2.59167
ESVD8	11.50671	12.33096	13.15739	14.22085	15.19014	16.11898	17.13073	18.13337
EGD8	10.11931	10.32791	10.60677	11.03996	11.47147	11.99259	12.62931	13.30349
ND8	170263.84614	173425.00157	176859.27498	182579.24077	187126.04720	192065.01263	198269.93514	204433.97748
YPDD8	633.02511	658.25115	685.65667	731.30203	767.58557	806.99855	856.51387	905.70296

	1986	1987	1988	1989	1990
UTILITY	.20000	.20000	.20000	.20000	.20000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD8	87.40893	91.48292	95.49451	99.44000	103.22279
END8	22.93395	24.17987	25.43918	26.68511	27.90423
ECD8	4.71678	4.80654	4.88738	4.97536	5.04372
ERD8	3.07756	3.19752	3.31540	3.43108	3.54179
ETD8	20.94528	21.94728	22.92486	23.88975	24.79378
EFIRD8	2.70946	2.81949	2.92749	3.03335	3.13457
ESVD8	19.04838	19.88926	20.69322	21.46505	22.18352
EGD8	13.97752	14.64297	15.30699	15.96930	16.62117
ND8	210120.32217	215448.31425	220694.68881	225854.62447	230801.76860
YPDD8	951.08003	993.59744	1035.46354	1076.63986	1116.11810

Table A - 7

Planning District 8, Scenario 7

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
UTILITY	.00000	.00000	.00000	.00000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.30000	.70000	.30000	.00000	.00000	.00000
EEAD8	56.99421	59.41401	62.18461	66.70588	70.21136	73.85029	78.60002	83.31847
EMD8	14.69479	15.25746	15.71296	16.75793	17.76270	18.88805	20.25455	21.63444
ECD8	3.40901	3.46548	3.85405	4.48054	4.16138	4.09143	4.37022	4.58184
ERD8	1.97399	2.04709	2.12973	2.26311	2.66986	2.78007	2.92094	3.06055
ETD8	13.39478	14.02072	14.66841	15.75047	16.65421	17.58744	18.77125	19.95182
EFIRD8	1.87533	1.94323	2.02007	2.14300	2.24199	2.34393	2.47353	2.60178
ESVD8	11.51493	12.33953	13.17166	14.24113	15.21430	16.13836	17.15079	18.15411
EGD8	10.13137	10.34048	10.62772	11.06971	11.50692	12.02102	12.65875	13.33393
ND8	170469.96325	173639.88029	177217.12362	183087.59504	187731.69896	192550.89183	198773.00194	204954.12264
YPDD8	634.66992	659.96588	688.51230	735.35870	772.41868	810.87587	860.52834	909.85372

	1986	1987	1988	1989	1990
UTILITY	.30000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD8	87.67125	91.74971	95.76571	99.71553	103.50247
EMD8	22.93395	24.17987	25.43918	26.68511	27.90423
ECD8	4.71678	4.80654	4.88738	4.97536	5.04372
ERD8	3.18917	3.30945	3.42764	3.54364	3.65465
ETD8	21.03283	22.03723	23.01719	23.97542	24.89069
EFIRD8	2.71989	2.83021	2.93848	3.04463	3.14611
ESVD8	19.06976	19.91122	20.71576	21.48817	22.20719
EGD8	14.00888	14.67519	15.34006	16.00321	16.65588
ND8	210656.22585	215998.98558	221259.90204	226434.13949	231394.99658
YPDD8	955.35654	997.99180	1039.97394	1081.26439	1120.85206

Table A - 8

Planning District 8, Scenario 8

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
TRADE	.00000	.00000	.00000	.00000	.10000	.30000	.30000	.30000
CONST	.00000	.00000	.20000	.50000	.20000	.00000	.00000	.00000
EEAD8	56.99421	59.41401	62.04492	66.42650	69.76627	73.82427	78.57401	83.29245
EMD8	14.69479	15.25746	15.71296	16.75793	17.76270	18.88805	20.25455	21.63444
ECD8	3.40901	3.46548	3.75405	4.28054	4.06138	4.09143	4.37022	4.58184
ERD8	1.97399	2.04709	2.12690	2.25743	2.35948	2.47821	2.61908	2.75868
ETD8	13.39478	14.02072	14.64700	15.70766	16.67596	17.87340	19.05722	20.23778
EFIRD8	1.87533	1.94323	2.01752	2.13790	2.23267	2.34226	2.47185	2.60011
ESVD8	11.51493	12.33953	13.16643	14.23068	15.19519	16.13493	17.14737	18.15069
EGD8	10.13137	10.34048	10.62005	11.05437	11.47889	12.01599	12.65372	13.32890
ND8	170469.96325	173639.88029	177086.08362	182825.51504	187252.67715	192464.99001	198687.10012	204868.22082
YPDD8	634.66992	659.96588	687.46660	733.26730	768.59608	810.19037	859.84285	909.16823

	1986	1987	1988	1989	1990
TRADE	.30000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD8	87.64523	91.72369	95.73969	99.68951	103.47645
EMD8	22.93395	24.17987	25.43918	26.68511	27.90423
ECD8	4.71678	4.80654	4.88738	4.97536	5.04372
ERD8	2.88731	3.00759	3.12578	3.24178	3.35279
ETD8	21.31879	22.32320	23.30316	24.26138	25.17665
EFIRD8	2.71822	2.82853	2.93681	3.04296	3.14444
ESVD8	19.06633	19.90780	20.71234	21.48475	22.20376
EGD8	14.00385	14.67016	15.33504	15.99818	16.65086
ND8	210570.32403	215913.08376	221174.00022	226348.23767	231309.09477
YPDD8	954.67105	997.30630	1039.28845	1080.57889	1120.16656

Table A - 9

Planning District 8, Scenario 9

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
GOV	.00000	.00000	.00000	.00000	.30000	.50000	.90000	.90000
CONST	.00000	.00000	.30000	.70000	.30000	.00000	.00000	.00000
EEAD8	57.02071	59.28073	62.09643	66.67660	70.12263	74.02884	79.52319	84.22415
EMD8	14.69479	15.25746	15.71296	16.75793	17.76270	18.88805	20.25455	21.63444
ECD8	3.40901	3.46548	3.85405	4.48054	4.16138	4.09143	4.37022	4.58184
ERD8	1.97589	2.03756	2.12343	2.26103	2.36351	2.47854	2.64406	2.78241
ETD8	13.40907	13.94884	14.62085	15.73479	16.60635	17.57587	18.94555	20.11669
EFIRD8	1.87703	1.93467	2.01441	2.14113	2.23629	2.34255	2.49428	2.62142
ESVD8	11.51842	12.32198	13.16005	14.23730	15.20262	16.13554	17.19336	18.19437
EGD8	10.13649	10.31473	10.61068	11.06409	11.78977	12.51687	13.62118	14.29299
ND8	170557.45727	173199.86501	176925.98117	182991.59040	187438.75114	192480.07718	199839.95816	205963.35783
YPDD8	635.36813	656.45456	686.18898	734.59258	770.08095	810.31077	869.04266	917.90743

	1986	1987	1988	1989	1990
GOV	.90000	.90000	.90000	.90000	.90000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD8	88.56080	92.62416	96.62527	100.56046	104.33337
EMD8	22.93395	24.17987	25.43918	26.68511	27.90423
ECD8	4.71678	4.80654	4.88738	4.97536	5.04372
ERD8	2.90989	3.02909	3.14621	3.26116	3.37116
ETD8	21.18900	22.18525	23.15718	24.10752	25.01522
EFIRD8	2.73848	2.84783	2.95515	3.06036	3.16094
ESVD8	19.10789	19.94737	20.74995	21.52043	22.23760
EGD8	14.96482	15.62821	16.29021	16.95053	17.60049
ND8	211612.21389	216905.08250	222116.87217	227242.79215	232157.32453
YPDD8	962.98533	1005.22246	1046.81257	1087.71744	1126.93544

Table A - 10

Planning District 8, Scenario 10

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
TRADE	.00000	.00000	.00000	.00000	.50000	.80000	1.00000	1.50000
CONST	.00000	.00000	.50000	1.00000	.50000	.00000	.00000	.00000
EEAD8	57.00559	59.42587	62.47998	67.18950	70.76592	74.54169	79.57175	85.19216
EMD8	14.69479	15.25746	15.71296	16.75793	17.76270	18.88805	20.25455	21.63444
ECD8	3.40901	3.46548	4.05405	4.78954	4.36138	4.09143	4.37022	4.58184
ERD8	1.97481	2.04794	2.13656	2.27624	2.38091	2.49376	2.64038	2.80873
ETD8	13.40092	14.02712	14.71985	15.84951	17.23757	18.49067	19.91780	21.81517
EFIRD8	1.87606	1.94399	2.02620	2.15479	2.25192	2.35622	2.49098	2.64505
ESVD8	11.51643	12.34110	13.18422	14.26531	15.23466	16.16357	17.18658	18.24284
EGD8	10.13357	10.34278	10.64614	11.10518	11.53678	12.05800	12.71124	13.46409
ND8	170507.54864	173679.06336	177532.00744	183693.82068	188241.96563	193182.80778	199670.13205	207178.36172
YPDD8	634.96985	660.27856	691.02508	740.19639	776.49061	815.91856	867.68745	927.60317

	1986	1987	1988	1989	1990
TRADE	1.50000	1.50000	1.50000	1.50000	1.50000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD8	89.54582	93.62512	97.64193	101.59256	105.38026
EMD8	22.93395	24.17987	25.43918	26.68511	27.90423
ECD8	4.71678	4.80654	4.88738	4.97536	5.04372
ERD8	2.93743	3.05777	3.17601	3.29207	3.40313
ETD8	22.89666	23.90151	24.88190	25.84056	26.75625
EFIRD8	2.76321	2.87358	2.98191	3.08811	3.18964
ESVD8	19.15860	20.00018	20.80482	21.57734	22.29645
EGD8	14.13921	14.80568	15.47071	16.13401	16.78683
ND8	212883.38260	218228.87654	223492.48540	228669.37080	233632.76684
YPDD8	973.12927	1015.78634	1057.78997	1099.10155	1138.70948

Table A - 11

Planning District 9, Scenario 1

(Baseline Forecast)

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
EEAD9	130.93126	134.65980	137.70210	144.11409	150.96397	158.47512	167.43004	176.67844
EMD9	18.74967	18.87786	19.38640	20.55305	21.67482	22.93121	24.45683	25.99740
ECD9	8.21895	8.69608	9.08255	9.96789	10.82016	11.77441	12.93296	14.10327
ERD9	7.44510	7.59832	7.72457	8.09156	8.27767	8.58397	8.95412	9.33186
ETD9	30.37613	31.55698	32.25856	33.62698	35.23035	36.85018	38.71183	40.61306
EFIRD9	5.48257	5.68473	5.84862	6.22329	6.58456	6.98888	7.47965	7.97505
ESVD9	19.37153	20.06890	20.74048	22.24400	23.83946	25.53247	27.56014	29.66908
EGD9	41.78731	42.17692	42.66089	43.49742	44.53694	45.81400	47.33451	48.98812
ND9	388877.19283	394219.16361	398708.54321	408067.28286	417792.96578	428466.36602	441294.57458	454542.99779
YPDD9	1564.75160	1610.73568	1649.38059	1729.94132	1813.65986	1905.53814	2015.96432	2130.00773

	1986	1987	1988	1989	1990
EEAD9	185.38190	193.62699	201.74884	209.70725	217.43411
EMD9	27.44823	28.83923	30.24518	31.63619	32.99727
ECD9	15.20539	16.26186	17.32930	18.38522	19.41832
ERD9	9.68748	10.02652	10.36511	10.69862	11.02379
ETD9	42.28353	43.76014	45.11840	46.39504	47.58372
EFIRD9	8.44274	8.89037	9.34239	9.78944	10.22676
ESVD9	31.64549	33.50554	35.33259	37.11959	38.84862
EGD9	50.66905	52.34332	54.01586	55.68315	57.33562
ND9	467010.70222	478821.78293	490456.39220	501856.93738	512925.93080
YPDD9	2237.33066	2339.00132	2439.15290	2537.26964	2632.57236

Table A - 12

Planning District 9, Scenario 2

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.20000	.30000	.30000	.30000
CONST	.00000	.00000	.30000	.70000	.30000	.00000	.00000	.00000
EEAD9	130.93052	134.65894	138.05594	144.94136	151.55485	158.82945	167.78456	177.03321
EMD9	18.24967	18.87786	19.38640	20.55305	21.87482	23.23121	24.75683	26.29740
ECD9	8.21895	8.69608	9.38290	10.66871	11.12074	11.77476	12.93331	14.10362
ERD9	7.44505	7.59826	7.72801	8.00768	8.28347	8.58744	8.95760	9.33556
EID9	30.37610	31.55695	32.26044	33.63130	35.23350	36.85206	38.71373	40.61496
EFIRD9	5.48256	5.68473	5.84898	6.22413	6.58517	6.98924	7.48001	7.97601
ESVD9	19.37108	20.06838	20.77275	22.32027	23.89393	25.56503	27.59281	29.70190
EGD9	41.78710	42.17667	42.67646	43.53422	44.56322	45.82971	47.35027	49.00396
ND9	388873.67018	394215.07310	398963.68494	408670.34559	418223.50310	428723.82953	441552.93085	454802.53649
YPDD9	1564.72127	1610.70047	1651.57687	1735.13253	1817.36682	1907.75441	2018.18827	2132.24186

	1986	1987	1988	1989	1990
MFG	.30000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD9	185.73694	193.98227	202.10434	210.06296	217.78998
EMD9	27.74823	29.13923	30.54518	31.93619	33.29727
ECD9	15.20574	16.26222	17.32965	18.38558	19.41868
ERD9	9.69099	10.03005	10.36865	10.70217	11.02736
EID9	42.28544	43.76206	45.12033	46.39697	47.58566
EFIRD9	8.44311	8.89074	9.34276	9.78981	10.22713
ESVD9	31.67840	33.53867	35.36586	37.15298	38.88210
EGD9	50.68496	52.35931	54.03191	55.69926	57.35178
ND9	467271.48914	479083.73538	490719.41301	502120.92233	513190.66560
YPDD9	2239.57553	2341.25622	2441.41700	2539.56204	2634.85121

Table A - 13

Planning District 9, Scenario 3

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.25000	.50000	.50000	.50000
CONST	.00000	.00000	.20000	.50000	.20000	.00000	.00000	.00000
EEAD9	130.93045	134.65886	137.95805	144.75651	151.54374	159.12231	168.07743	177.32610
EMD9	18.24967	18.87784	19.38640	20.55305	21.92482	23.43121	24.95683	26.49740
ECD9	8.21895	8.69608	9.28291	10.46880	11.02099	11.77535	12.93390	14.10421
ERD9	7.44505	7.59826	7.72814	8.01064	8.28595	8.59336	8.96352	9.34129
ETD9	30.37610	31.55695	32.26051	33.63183	35.23486	36.85529	38.71696	40.61819
EFIRD9	5.48256	5.68473	5.84900	6.22424	6.58542	6.98986	7.48063	7.97663
ESVD9	19.37104	20.06833	20.77402	22.32935	23.91723	25.62068	27.64847	29.75757
EGD9	41.78708	42.17665	42.67707	43.53860	44.57446	45.85656	47.37713	49.03082
ND9	388873.34820	394214.69921	398973.68256	408742.13374	418407.79715	429163.82191	441993.00484	455242.71855
YPDD9	1564.71850	1610.69725	1651.66293	1735.75048	1818.95323	1911.54189	2021.97646	2136.03098

	1986	1987	1988	1989	1990
MFG	.50000	.50000	.50000	.50000	.50000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD9	186.02986	194.27521	202.39730	210.35594	218.08297
EMD9	27.94823	29.33923	30.74518	32.13619	33.49727
ECD9	15.20633	16.26281	17.33024	18.38617	19.41927
ERD9	9.69692	10.03597	10.37459	10.70811	11.03329
ETD9	42.28867	43.76529	45.12356	46.40021	47.58890
EFIRD9	8.44372	8.89136	9.34337	9.79043	10.22775
ESVD9	31.73416	33.59437	35.42157	37.20870	38.93783
EGD9	50.71183	52.38618	54.05879	55.72614	57.37866
ND9	467711.78529	479524.13807	491159.91335	502561.51080	513631.32261
YPDD9	2243.36563	2345.04724	2445.20886	2543.35466	2638.64442

Table A - 14

Planning District 9, Scenario 4

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.25000	.70000	.70000	.70000
CONST	.00000	.00000	.50000	1.00000	.50000	.00000	.00000	.00000
EEAD9	130.93044	134.65885	138.33980	145.39078	151.93343	159.40954	168.36467	177.61334
EMD9	18.24967	18.87784	19.38640	20.55305	21.92482	23.63121	25.15683	26.69740
ECD9	8.21895	8.69608	9.58343	10.96966	11.32156	11.77591	12.93446	14.10476
ERD9	7.44505	7.59826	7.73336	8.01921	8.29167	8.59893	8.96909	9.34685
ETD9	30.37610	31.55695	32.26335	33.63650	35.23797	36.85832	38.71999	40.62122
EFIRD9	5.48256	5.68473	5.84954	6.22513	6.58602	6.99044	7.48121	7.97721
ESVD9	19.37104	20.06833	20.82301	22.40982	23.97098	25.67296	27.70075	29.80985
EGD9	41.78708	42.17665	42.70071	43.57742	44.60039	45.88178	47.40235	49.05604
ND9	389873.31877	394214.66504	399361.06651	409378.37492	418832.76886	429577.18592	442406.37630	455656.09990
YPDD9	1564.71825	1610.69695	1654.99756	1741.22730	1822.61142	1915.10016	2025.53479	2139.58939

	1986	1987	1988	1989	1990
MFG	.70000	.70000	.70000	.70000	.70000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD9	186.31710	194.56245	202.68455	210.64318	218.37022
EMD9	28.14823	29.53923	30.94518	32.33619	33.69727
ECD9	15.20689	16.26337	17.33080	18.38673	19.41983
ERD9	9.70249	10.04154	10.38015	10.71367	11.03886
ETD9	42.29170	43.76832	45.12659	46.40324	47.59193
EFIRD9	8.44431	8.89194	9.34396	9.79101	10.22863
ESVD9	31.78644	33.64665	35.47385	37.26098	38.99011
EGD9	50.73705	52.41140	54.08401	55.75136	57.40389
ND9	468125.17707	479937.53958	491573.32379	502974.92930	514044.74737
YPDD9	2246.92414	2348.60583	2448.76753	2546.91340	2642.20321

Table A - 15

Planning District 9, Scenario 5

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.30000	.50000	1.00000	1.00000
CONST	.00000	.00000	.50000	1.00000	.50000	.00000	.00000	.00000
EEAD9	130.93044	134.65885	138.37470	145.44676	152.03416	159.17533	168.78162	178.06029
EMD9	18.24967	18.87786	19.38640	20.55305	21.97482	23.43121	25.45683	26.99740
ECD9	8.21895	8.69608	9.58365	10.97003	11.32189	11.77569	12.93520	14.10551
ERD9	7.44505	7.59826	7.73559	8.02291	8.29491	8.59674	8.97655	9.35431
ETD9	30.37610	31.55695	32.26456	33.63851	35.23974	36.85713	38.72405	40.62529
EFIRD9	5.48256	5.68473	5.84977	6.22552	6.58636	6.99021	7.48179	7.97799
ESVD9	19.37104	20.06833	20.84392	22.44456	24.00139	25.65245	27.77084	29.87994
EGD9	41.78708	42.17665	42.71080	43.59418	44.61506	45.87189	47.43616	49.08985
ND9	388873.31608	394214.66191	399526.41257	409653.09260	419073.18106	429415.07259	442960.56787	456210.29237
YPDD9	1564.71822	1610.69693	1656.42087	1743.59209	1824.68091	1913.70468	2030.30531	2144.35992

	1986	1987	1988	1989	1990
MFG	1.00000	1.00000	1.00000	1.00000	1.00000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD9	186.73405	194.97941	203.10150	211.06014	218.78718
EMD9	28.44823	29.83923	31.24518	32.63619	33.99727
ECD9	15.20763	16.26411	17.33155	18.38747	19.42058
ERD9	9.70995	10.04900	10.38761	10.72113	11.04632
ETD9	42.29577	43.77239	45.13066	46.40730	47.59599
EFIRD9	8.44508	8.89272	9.34473	9.79179	10.22911
ESVD9	31.85653	33.71674	35.54394	37.33107	39.06020
EGD9	50.77086	52.44522	54.11783	55.78518	57.43770
ND9	468679.37049	480491.73390	492127.51092	503529.12517	514598.94381
YPDD9	2251.69468	2353.37638	2453.53808	2551.60396	2646.97378

Table A - 16

Planning District 9, Scenario 6

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
UTILITY	.00000	.00000	.00000	.00000	.20000	.20000	.20000	.20000
CONST	.00000	.00000	.20000	.50000	.20000	.00000	.00000	.00000
EEAD9	130.93052	134.65894	137.94952	144.74041	151.47223	158.72303	167.67814	176.92678
EMD9	18.24967	18.87786	19.38640	20.55305	21.67482	22.93121	24.45683	25.99740
ECD9	8.21895	8.69608	9.28285	10.46870	11.02086	11.77472	12.93327	14.10357
ERD9	7.44505	7.59826	7.72760	8.00962	8.48458	8.78703	9.15719	9.53495
ETD9	30.37610	31.55695	32.26021	33.63127	35.23411	36.85184	38.71350	40.61474
EFIRD9	5.48256	5.68473	5.84894	6.22413	6.58528	6.98920	7.47997	7.97597
ESVD9	19.37108	20.06838	20.76890	22.31971	23.90434	25.56118	27.58896	29.69805
EGD9	41.78710	42.17667	42.67460	43.53394	44.56824	45.82785	47.34842	49.00210
ND9	388873.67018	394215.07310	398933.23843	408665.85974	418305.87093	428693.38302	441522.48435	454772.08999
YPDD9	1564.72127	1610.70047	1651.31478	1735.07391	1818.07585	1907.49232	2017.92618	2131.97977
YPMFGD9	218.25212	229.24931	239.39423	259.80506	279.18529	300.53150	326.88941	354.10487
YPNMFGD9	1572.30583	1660.90910	1742.64562	1907.09353	2063.23795	2235.22215	2447.58505	2666.85715

	1986	1987	1988	1989	1990
UTILITY	.20000	.20000	.20000	.20000	.20000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD9	185.63051	193.87584	201.99792	209.95653	217.68355
EMD9	27.44823	28.83923	30.24518	31.63619	32.99727
ECD9	15.20570	16.26218	17.32961	18.38554	19.41864
ERD9	9.89058	10.22964	10.56824	10.90176	11.22695
ETD9	42.28522	43.76184	45.12011	46.39675	47.58544
EFIRD9	8.44306	8.89069	9.34271	9.78977	10.22709
ESVD9	31.67463	33.53482	35.36201	37.14913	38.87825
EGD9	50.68310	52.35745	54.03005	55.69740	57.34992
ND9	487241.04263	479053.28887	490688.96650	502090.47583	513160.21909
YPDD9	2239.31344	2340.99414	2441.15492	2539.29996	2634.58913
YPMFGD9	379.71350	403.97380	427.87343	451.29410	474.03784
YPNMFGD9	2873.18316	3068.64589	3261.20262	3449.90051	3633.14443

DEX SHAPE ALLVARB

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Table A - 17

Planning District 9, Scenario 7

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
UTILITY	.00000	.00000	.00000	.00000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.30000	.70000	.30000	.00000	.00000	.00000
EEAD9	130.93044	134.65885	138.09037	145.02234	151.75854	158.89437	167.89933	177.15345
EMD9	18.24967	18.87786	19.38640	20.55305	21.67482	22.93121	24.45683	25.99740
ECD9	8.21895	8.69608	9.38312	10.66922	11.12141	11.77517	12.93404	14.10438
ERD9	7.44505	7.59826	7.73021	8.01484	8.59009	8.89158	9.26492	9.64303
ETD9	30.37610	31.55695	32.26163	33.63412	35.23711	36.85432	38.71772	40.61914
EFIRD9	5.48256	5.68473	5.84921	6.22467	6.58586	6.98967	7.48078	7.97681
ESVD9	19.37104	20.06833	20.79338	22.36880	23.95606	25.60393	27.66159	29.77396
EGD9	41.78708	42.17665	42.68642	43.55763	44.59319	45.84848	47.38346	49.03872
ND9	388973.31581	394214.66160	399126.82775	409054.05875	418714.82107	429031.43585	442096.78284	455372.28691
YPDD9	1564.71822	1610.69692	1652.98122	1738.43556	1821.59612	1910.40231	2022.86978	2137.14631

	1986	1987	1988	1989	1990
UTILITY	.30000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD9	185.85720	194.10256	202.22466	210.18329	217.91033
EMD9	27.44823	28.83923	30.24518	31.63619	32.99727
ECD9	15.20650	16.26298	17.33042	18.38635	19.41945
ERD9	9.99867	10.33772	10.67633	11.00985	11.33504
ETD9	42.28962	43.76624	45.12451	46.40116	47.58985
EFIRD9	8.44391	8.89154	9.34356	9.79061	10.22793
ESVD9	31.75055	33.61076	35.43796	37.22509	38.95422
EGD9	50.71973	52.39409	54.06670	55.73405	57.38657
ND9	467841.36512	479653.72862	491289.51372	502691.12004	513760.93874
YPDD9	2244.48106	2346.16277	2446.32417	2544.47035	2639.76017

Table A - 18

Planning District 9, Scenario 8

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
TRADE	.00000	.00000	.00000	.00000	.10000	.30000	.30000	.30000
CONST	.00000	.00000	.20000	.50000	.20000	.00000	.00000	.00000
EEAD9	130.93045	134.65886	137.94832	144.73814	151.34084	158.85211	167.80724	177.05591
EMD9	18.24967	18.87786	19.38640	20.55305	21.67482	22.93121	24.45683	25.99740
ECD9	8.21895	8.69608	9.28285	10.46869	11.02065	11.77490	12.93345	14.10376
ERD9	7.44505	7.59826	7.72752	8.00947	8.28258	8.58888	8.95905	9.33681
ETD9	30.37610	31.55695	32.26017	33.63119	35.33302	37.15285	39.01452	40.91575
EFIRD9	5.48256	5.68473	5.84893	6.22411	6.58507	6.98939	7.48017	7.97616
ESVD9	19.37104	20.06833	20.76819	22.31835	23.88553	25.57861	27.60640	29.71551
EGD9	41.78708	42.17665	42.67426	43.53329	44.55916	45.83626	47.35683	49.01052
ND9	388873.34820	394214.69921	398927.58718	408655.09888	418157.12230	428831.20484	441660.38777	454910.10149
YPDD9	1564.71850	1610.69725	1651.26614	1735.00128	1816.79541	1908.87870	2019.11326	2133.16778
YPMFGD9	218.25212	229.24931	239.39423	259.80506	279.18529	300.53150	326.88941	354.10487
YPNMFGD9	1572.30583	1660.90910	1742.64562	1907.09353	2063.23795	2235.22215	2447.58505	2666.85715

	1986	1987	1988	1989	1990
TRADE	.30000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD9	185.75966	194.00502	202.12711	210.08574	217.81278
EMD9	27.44823	28.83923	30.24518	31.63619	32.99727
ECD9	15.20588	16.26236	17.32979	18.38572	19.41883
ERD9	9.69244	10.05150	10.37011	10.70363	11.02881
ETD9	42.58623	44.06285	45.42112	46.69777	47.88646
EFIRD9	8.44326	8.89089	9.34291	9.78996	10.22728
ESVD9	31.69209	33.55231	35.37950	37.16663	38.89576
EGD9	50.69153	52.36588	54.03849	55.70584	57.35837
ND9	467379.16823	479191.52100	490827.29628	502228.89374	513298.70555
YPDD9	2240.50244	2342.18405	2442.34567	2540.49147	2635.78123
YPMFGD9	379.71350	403.97380	427.87343	451.29410	474.03784
YPNMFGD9	2873.18316	3068.64589	3261.20262	3449.90051	3633.14443

Table A - 19

Planning District 9, Scenario 9

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
TRADE	.00000	.00000	.00000	.00000	.50000	.80000	1.00000	1.50000
CONST	.00000	.00000	.20000	.50000	.20000	.00000	.00000	.00000
EEAD9	130.93044	134.65885	137.95177	144.75576	151.86636	159.51886	168.73989	178.63973
EMD9	18.24967	18.87786	19.38640	20.55305	21.67482	22.93121	24.45683	25.99740
ECD9	8.21895	8.69608	9.28287	10.46980	11.02146	11.77597	12.93494	14.10621
ERD9	7.44505	7.59826	7.72774	8.01060	8.29058	8.59952	8.97389	9.36129
ETD9	30.37610	31.55695	32.26029	33.63180	35.73738	37.65865	39.72260	42.12909
EFIRD9	5.48256	5.68473	5.84896	6.22423	6.58591	6.99050	7.48171	7.97872
ESVD9	19.37104	20.06833	20.77025	22.32890	23.96075	25.67854	27.74503	29.94552
EGD9	41.78798	42.17665	42.67526	43.53838	44.59546	45.88447	47.42410	49.12149
ND9	388873.31581	394214.66160	398943.90343	408738.56550	418751.91071	429621.32561	442762.81791	456723.84672
YPDD9	1564.71822	1610.69692	1651.40659	1735.71977	1821.91539	1915.48012	2028.60306	2148.82368

	1986	1987	1988	1989	1990
TRADE	1.50000	1.50000	1.50000	1.50000	1.50000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD9	187.34349	195.58884	203.71094	211.66957	219.39661
EMD9	27.44823	28.83923	30.24518	31.63619	32.99727
ECD9	15.20833	16.26481	17.33224	18.38817	19.42128
ERD9	9.71693	10.05598	10.39459	10.72812	11.05330
ETD9	43.79957	45.27619	46.63446	47.91111	49.09980
EFIRD9	8.44581	8.89344	9.34546	9.79252	10.22984
ESVD9	31.92211	33.78233	35.60952	37.39665	39.12578
EGD9	50.80250	52.47686	54.14947	55.81682	57.46934
ND9	469197.92493	481010.28843	492646.07353	504047.67985	515117.49855
YPDD9	2256.15843	2357.84013	2458.00184	2556.14771	2651.43754

Table A - 20

Planning District 9, Scenario 10

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
GOV	.00000	.00000	.00000	.00000	.30000	.50000	.90000	.90000
CONST	.00000	.00000	.30000	.70000	.30000	.00000	.00000	.00000
EEAD9	130.93044	134.65885	138.07876	145.00001	151.76757	159.18532	168.68569	177.99388
EMD9	18.24967	18.87786	19.38640	20.55305	21.67482	22.93121	24.45683	25.99740
ECD9	8.21895	8.69608	9.38304	10.66908	11.12146	11.77575	12.93523	14.10592
ERD9	7.44505	7.59826	7.72947	8.01342	8.29066	8.59738	8.97681	9.35837
ETD9	30.37610	31.55695	32.26123	33.63334	35.23742	36.85748	38.72419	40.62750
EFIRD9	5.48256	5.68473	5.84914	6.22453	6.58592	6.99028	7.48202	7.97841
ESVD9	19.37104	20.06833	20.78643	22.35542	23.96148	25.65844	27.77327	29.91805
EGD9	41.78708	42.17665	42.68306	43.55118	44.87580	46.37478	48.33734	50.00824
ND9	388873.31581	394214.66160	399071.82286	408948.26623	418757.61233	429462.41959	442979.82481	456511.58524
YPDD9	1564.71822	1610.69692	1652.50773	1737.52489	1821.96447	1914.11225	2030.47108	2146.95348

	1986	1987	1988	1989	1990
GOV	.90000	.90000	.90000	.90000	.90000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD9	186.49764	194.94299	203.06509	211.02372	218.75076
EMD9	27.44823	28.83923	30.24518	31.63619	32.99727
ECD9	15.20804	16.26452	17.33195	18.38788	19.42098
ERD9	9.71401	10.05306	10.39167	10.72519	11.05038
ETD9	42.29798	43.77460	45.13287	46.40951	47.59820
EFIRD9	8.44551	8.89314	9.34516	9.79221	10.22953
ESVD9	31.89464	33.75485	35.58205	37.36918	39.09831
EGD9	51.68925	53.36360	55.03621	56.70356	58.35609
ND9	468980.66346	480793.02695	492428.81206	503830.41838	514900.23708
YPDD9	2254.28823	2355.96993	2456.13164	2554.27751	2649.56733

Table A - 21

Planning District 10, Scenario 1

(Baseline Forecast)

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
EEAD10	32.27089	33.51137	33.99046	35.23484	36.26002	37.64240	39.39599	41.07[illegible]
EMD10	6.15142	6.22648	6.22893	6.39543	6.53700	6.68499	6.90178	7.09826
ECD10	2.58911	2.63988	2.71950	2.92310	2.99578	3.20259	3.45322	3.64346
ERD10	1.28952	1.36880	1.40626	1.47662	1.54272	1.61620	1.70298	1.78677
ETD10	6.50086	6.83845	7.00648	7.29466	7.57686	7.87114	8.20907	8.53644
EFIRD10	2.47294	2.63230	2.69385	2.85371	2.98541	3.16300	3.38828	3.60404
ESVD10	4.78086	5.03250	5.12968	5.38211	5.59007	5.87049	6.22622	6.56691
EGD10	8.48617	8.77297	8.80576	8.90921	9.03218	9.23399	9.51445	9.83960
ND10	120703.69033	122381.68721	123029.75105	124713.02589	126099.78753	127969.72913	130341.81070	132613.65106
YPDD10	485.28471	502.69896	509.42457	526.89359	541.28539	560.69164	585.30910	608.18625

	1986	1987	1988	1989	1990
EEAD10	42.51118	43.79763	45.03720	46.25020	47.39270
EMD10	7.23861	7.34929	7.45768	7.55974	7.65309
ECD10	3.76477	3.84546	3.91814	3.99723	4.05838
ERD10	1.85552	1.91353	1.96574	2.01436	2.05852
ETD10	8.80049	9.01725	9.20580	9.37677	9.52873
EFIRD10	3.78848	3.95375	4.11299	4.26882	4.41560
ESVD10	6.85814	7.11910	7.37055	7.61661	7.84838
EGD10	10.20518	10.59925	11.00630	11.41666	11.82971
ND10	134555.71473	136295.89876	137972.66147	139613.47736	141158.94522
YPDD10	629.04098	647.10060	664.50204	681.53042	697.56928

Table A - 22

Planning District 10, Scenario 2

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.20000	.30000	.30000	.30000
CONST	.00000	.00000	.30000	.70000	.30000	.00000	.00000	.00000
EEAD10	32.27089	33.51137	34.47672	36.36945	37.07046	38.12866	39.88226	41.56174
EMD10	6.15142	6.22648	6.22893	6.39543	6.73700	6.98499	7.20178	7.39826
ECD10	2.58911	2.63988	3.01950	3.62310	3.29578	3.20259	3.45322	3.64346
ERD10	1.28952	1.36880	1.41503	1.49709	1.55734	1.62497	1.71175	1.79554
ETD10	6.50086	6.83845	7.01596	7.31678	7.59266	7.88062	8.21855	8.54593
EFIRD10	2.47294	2.63230	2.75631	2.99947	3.08953	3.22547	3.45075	3.66651
ESVD10	4.78086	5.03250	5.22832	5.61227	5.75447	5.96913	6.32486	6.66555
EGD10	8.48617	8.77297	8.81266	8.92530	9.04368	9.24089	9.52135	9.84650
ND10	120703.69033	122381.68721	123687.51699	126247.81309	127196.06411	128627.49508	130999.57665	133271.41701
YPDD10	485.28471	502.69896	516.25086	542.82160	552.66255	567.51793	592.13539	615.71254

	1986	1987	1988	1989	1990
MFG	.30000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD10	42.99744	44.28389	45.52346	46.73646	47.87896
EMD10	7.53861	7.64929	7.75768	7.85974	7.95309
ECD10	3.76477	3.84546	3.91814	3.99723	4.05868
ERD10	1.86429	1.92230	1.97451	2.02314	2.06729
ETD10	8.80997	9.02673	9.21528	9.38625	9.53821
EFIRD10	3.85095	4.01622	4.17546	4.33129	4.47806
ESVD10	6.95678	7.21774	7.46919	7.71525	7.94702
EGD10	10.21208	10.60615	11.01320	11.42356	11.83661
ND10	135213.48068	136953.66471	138630.42742	140271.24331	141816.71116
YPDD10	635.86727	653.92690	671.32833	688.35672	704.39558

Table A - 23

Planning District 10, Scenario 3

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.25000	.50000	.50000	.50000
CONST	.00000	.00000	.20000	.50000	.20000	.00000	.00000	.00000
EEAD10	32.27089	33.51137	34.31463	36.04528	36.98942	38.45284	40.20643	41.88592
EMD10	6.15142	6.22648	6.22893	6.39543	6.78700	7.18499	7.40178	7.59826
ECD10	2.58911	2.63988	2.91950	3.42310	3.19578	3.20259	3.45322	3.64346
ERD10	1.28952	1.36880	1.41210	1.49124	1.55508	1.63082	1.71760	1.80155
ETD10	6.50686	6.83845	7.01280	7.31046	7.59108	7.88695	8.22487	8.55225
EFIRD10	2.47294	2.63230	2.73549	2.95782	3.07911	3.26712	3.49240	3.70815
ESVD10	4.78086	5.03250	5.19544	5.54651	5.73803	6.03489	6.39062	6.73161
EGD10	8.48517	8.77297	8.81036	8.92076	9.64253	9.24549	9.52595	9.85110
MD10	120703.69033	122381.68721	123468.26168	125809.30246	127086.43645	129066.00571	131438.08728	133700.92764
YPDD10	485.28471	502.69896	513.97543	538.27074	551.52483	572.06380	596.08625	620.26740

	1986	1987	1988	1989	1990
MFG	.50000	.50000	.50000	.50000	.50000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD10	43.32161	44.60807	45.84764	47.06063	48.20314
EMD10	7.73861	7.84929	7.95768	8.05974	8.15309
ECD10	3.76477	3.84546	3.91814	3.99723	4.05868
ERD10	1.87014	1.92815	1.98066	2.02898	2.07314
ETD10	8.81629	9.03305	9.22160	9.39257	9.54453
EFIRD10	3.89259	4.05786	4.21711	4.37294	4.51971
ESVD10	7.02254	7.28350	7.53195	7.78101	8.01278
EGD10	10.21668	10.61075	11.01780	11.42816	11.84121
MD10	135651.99131	137392.17534	139068.93805	140709.75394	142255.22179
YPDD10	640.41813	658.47776	675.87920	692.96758	708.94644

Table A - 24

Planning District 10, Scenario 4

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.25000	.70000	.70000	.70000
CONST	.00000	.00000	.50000	1.00000	.50000	.00000	.00000	.00000
EEAD10	32.27089	33.51137	34.80089	36.13571	37.47568	38.77701	40.53961	42.21009
EMD10	6.15142	6.22648	6.22893	6.39543	6.78706	7.38499	7.60178	7.79026
ECD10	2.58911	2.63988	3.21950	3.92310	3.49578	3.20259	3.45322	3.64346
ERD10	1.28952	1.36880	1.42088	1.50536	1.56465	1.63666	1.72344	1.80733
ETD10	6.50086	6.83845	7.03228	7.32627	7.60056	7.89327	8.23119	8.55857
EFIRD10	2.47294	2.63230	2.79796	3.06194	3.14158	3.30876	3.53404	3.74930
ESVD10	4.78086	5.03250	5.29408	5.71091	5.83667	6.19665	6.45638	6.79797
EGD10	8.48617	8.77297	8.81726	8.93220	9.04943	9.25009	9.53055	9.85570
ND10	120793.69033	122381.68721	124126.02762	126905.57904	127744.20239	129504.51634	131876.59791	134148.45827
YPDD10	485.28471	502.69896	520.80172	549.64790	558.35113	576.61966	601.23711	624.81427

	1986	1987	1988	1989	1990
MFG	.70000	.70000	.70000	.70000	.70000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD10	43.64579	44.93224	46.17181	47.38481	48.52731
EMD10	7.93861	8.04929	8.15758	8.25974	8.35309
ECD10	3.76477	3.84546	3.91814	3.99723	4.05868
ERD10	1.87599	1.93400	1.98620	2.03483	2.07899
ETD10	8.82261	9.03938	9.22793	9.39089	9.55086
EFIRD10	3.93424	4.09951	4.25875	4.41458	4.56136
ESVD10	7.08830	7.34926	7.60071	7.84677	8.07854
EGD10	10.23128	10.61535	11.02240	11.43276	11.84581
ND10	136090.50194	137830.68597	139507.44868	141148.26457	142693.73242
YPDD10	644.96900	663.02862	680.43006	697.45844	713.49730

Table A - 25

Planning District 10, Scenario 5

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
MFG	.00000	.00000	.00000	.00000	.30000	.50000	1.00000	1.00000
CONST	.00000	.00000	.50000	1.00000	.50000	.00000	.00000	.00000
EEAD10	32.27089	33.51137	34.80089	36.85571	37.55672	38.45284	41.01697	42.69636
EMD10	6.15142	6.22648	6.22893	6.39543	6.83700	7.18499	7.90178	8.09826
ECD10	2.58911	2.63988	3.21950	3.92310	3.49578	3.20259	3.45322	3.64346
ERD10	1.28952	1.36880	1.42088	1.50586	1.56611	1.63082	1.73221	1.81601
ETD10	6.50086	6.83845	7.02228	7.32627	7.60214	7.88695	8.24067	8.56805
EFIRD10	2.47294	2.63230	2.79796	3.06194	3.15199	3.26712	3.59651	3.81227
ESVD10	4.78086	5.03250	5.29408	5.71091	5.85311	6.03489	6.55502	6.89571
EGD10	8.48617	8.77297	8.81726	8.93220	9.05058	9.24549	9.53745	9.86260
ND10	120703.69033	122381.68721	124128.02762	126905.57904	127853.83005	129086.00571	132534.36386	134806.20421
YPDD10	485.28471	502.69896	520.80172	549.64790	559.48884	572.06880	608.06341	631.64056

	1986	1987	1988	1989	1990
MFG	1.00000	1.00000	1.00000	1.00000	1.00000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD10	44.13205	45.41851	46.65807	47.87107	49.06629
EMD10	8.23861	8.34929	8.45768	8.55974	8.65309
ECD10	3.76477	3.84546	3.91814	3.99723	4.05868
ERD10	1.88476	1.94277	1.99498	2.04360	2.09024
ETD10	8.83209	9.04886	9.23741	9.40838	9.56302
EFIRD10	3.99671	4.16198	4.32122	4.47705	4.64151
ESVD10	7.18694	7.44790	7.69935	7.91541	8.20509
EGD10	10.22817	10.62224	11.02930	11.43966	11.85466
ND10	136748.26789	138488.45191	140165.21462	141806.03051	143537.66139
YPDD10	651.79529	669.85491	687.25635	704.28473	722.25559

Table A - 26

Planning District 10, Scenario 6

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
UTILITY	.00000	.00000	.00000	.00000	.20000	.20000	.20000	.20000
CONST	.00000	.00000	.20000	.50000	.20000	.00000	.00000	.00000
EEAD10	32.27089	33.51137	34.31463	36.04528	36.90837	37.96658	39.72017	41.39966
EMD10	6.15142	6.22648	6.22893	6.39543	6.53700	6.68499	6.90178	7.09826
ECD10	2.58911	2.63988	2.91950	3.42310	3.19578	3.20259	3.45322	3.64346
ERD10	1.28952	1.36880	1.41210	1.49124	1.75442	1.82204	1.90882	1.99261
ETD10	6.50086	6.83845	7.01280	7.31046	7.58950	7.87746	8.21539	8.54277
EFIRD10	2.47294	2.63230	2.73549	2.95782	3.06870	3.20465	3.42993	3.64569
ESVD10	4.78086	5.03250	5.19544	5.54651	5.72159	5.93625	6.29178	6.63267
EGD10	8.48617	8.77297	8.81036	8.92070	9.04138	9.23859	9.51905	9.84420
ND10	120703.69033	122391.68721	123468.26168	125809.30246	126976.80879	128408.23976	130780.32133	133052.16169
YPDD10	485.28471	502.69896	513.97543	539.27074	550.38712	565.24250	589.85996	613.43711

	1986	1987	1988	1989	1990
UTILITY	.20000	.20000	.20000	.20000	.20000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD10	42.83535	44.12181	45.36138	46.57437	47.71688
EMD10	7.23861	7.34929	7.45768	7.55974	7.65309
ECD10	3.76477	3.84546	3.91814	3.99723	4.05868
ERD10	2.06137	2.11938	2.17158	2.22021	2.26437
ETD10	8.80681	9.02357	9.21212	9.38309	9.53505
EFIRD10	3.83013	3.99539	4.15464	4.31047	4.45724
ESVD10	6.92390	7.18486	7.43631	7.68237	7.91414
EGD10	10.20978	10.60385	11.01090	11.42126	11.83431
ND10	134994.22536	136734.40939	138411.17210	140051.98799	141597.45585
YPDD10	633.59184	651.65147	669.05290	686.08128	702.12015

Table A - 27

Planning District 10, Scenario 7

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
UTILITY	.00000	.00000	.00000	.00000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.30000	.70000	.30000	.00000	.00000	.00000
EEAD10	32.27089	33.51137	34.47672	36.36945	37.23255	38.12866	39.88226	41.56174
EMD10	6.15142	6.22648	6.22893	6.39543	6.53700	6.68499	6.90178	7.09826
ECD10	2.58911	2.63988	3.01950	3.62310	3.29578	3.20259	3.45322	3.64346
ERD10	1.28952	1.36880	1.41503	1.49709	1.86027	1.92497	2.01175	2.09554
ETD10	6.50086	6.83845	7.01596	7.31678	7.59582	7.88062	8.21855	8.54593
EFIRD10	2.47294	2.63230	2.75631	2.99947	3.11035	3.22547	3.45075	3.66651
ESVD10	4.78086	5.03250	5.22832	5.61227	5.78735	5.96913	6.32486	6.66555
EGD10	8.48617	8.77297	8.81266	8.92530	9.04598	9.24089	9.52135	9.84650
ND10	120703.69033	122381.68721	123687.51699	126247.81309	127415.31942	128627.49508	130999.57665	133271.41701
YPDD10	485.28471	502.69896	516.25086	542.82160	554.93798	567.51793	592.13539	615.71254

	1986	1987	1988	1989	1990
UTILITY	.30000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD10	42.99744	44.28389	45.52346	46.73646	47.87896
EMD10	7.23861	7.34929	7.45768	7.55974	7.65309
ECD10	3.76477	3.84546	3.91814	3.99723	4.05868
ERD10	2.16429	2.22230	2.27451	2.32314	2.36729
ETD10	8.80997	9.02673	9.21528	9.38625	9.53821
EFIRD10	3.85095	4.01622	4.17546	4.33129	4.47806
ESVD10	6.95678	7.21774	7.46919	7.71525	7.94702
EGD10	10.21208	10.60615	11.01320	11.42356	11.83661
ND10	135213.48068	136953.66471	138630.42742	140271.24331	141816.71116
YPDD10	635.86727	653.92690	671.32833	688.35672	704.39558

Table A - 28

Planning District 10, Scenario 8

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
TRADE	.00000	.00000	.00000	.00000	.10000	.30000	.30000	.30000
CONST	.00000	.00000	.20000	.50000	.20000	.00000	.00000	.00000
EEAD10	32.27089	33.51137	34.31463	36.04528	36.74628	38.12866	39.88226	41.56174
EMD10	6.15142	6.22648	6.22893	6.39543	6.53700	6.68499	6.90178	7.09826
ECD10	2.58911	2.63988	2.91950	3.42310	3.19578	3.20259	3.45322	3.64346
ERD10	1.28952	1.36880	1.41210	1.49124	1.55149	1.62497	1.71175	1.79554
ETD10	6.50086	6.83845	7.01280	7.31046	7.68634	8.18062	8.51855	8.84593
EFIRD10	2.47294	2.63230	2.73549	2.95782	3.04708	3.22547	3.45075	3.66651
ESVD10	4.78086	5.03250	5.19544	5.54651	5.68871	5.96913	6.32486	6.66555
EGD10	8.48617	8.77297	8.81036	8.92070	9.03908	9.24089	9.52135	9.84650
ND10	120703.69033	122381.68721	123468.26168	125809.30246	126757.55348	128627.49508	130999.57665	133271.41701
YPDD10	485.28471	502.69896	513.97543	538.27074	548.11169	567.51793	592.13539	615.71254

	1986	1987	1988	1989	1990
TRADE	.30000	.30000	.30000	.30000	.30000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD10	42.99744	44.28389	45.52346	46.73646	47.87896
EMD10	7.23861	7.34929	7.45768	7.55974	7.65309
ECD10	3.76477	3.84546	3.91814	3.99723	4.05868
ERD10	1.86429	1.92230	1.97451	2.02314	2.06729
ETD10	9.10997	9.32673	9.51528	9.68625	9.83821
EFIRD10	3.85095	4.01622	4.17546	4.33129	4.47806
ESVD10	6.95678	7.21774	7.46919	7.71525	7.94702
EGD10	10.21208	10.60615	11.01320	11.42356	11.83661
ND10	135213.48068	136953.66471	138630.42742	140271.24331	141816.71116
YPDD10	635.86727	653.92690	671.32833	688.35672	704.39558

Table A - 29

Planning District 10, Scenario 9

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
TRADE	.00000	.00000	.00000	.00000	.30000	.50000	.80000	1.50000
CONST	.00000	.00000	.50000	1.00000	.50000	.00000	.00000	.00000
EEAD10	32.27089	33.51137	34.80089	36.05571	37.55672	38.45284	40.69269	43.50679
EMD10	6.15142	6.22648	6.22893	6.39543	6.53700	6.68499	6.90178	7.09826
ECD10	2.58911	2.63938	3.21950	3.92310	3.49578	3.20259	3.45322	3.64346
ERD10	1.28952	1.36880	1.42088	1.50586	1.56611	1.63082	1.72637	1.83063
ETD10	6.50086	6.83845	7.02228	7.32627	7.90214	8.38695	9.03435	10.08386
EFIRD10	2.47294	2.63230	2.79796	3.06194	3.15199	3.26712	3.55486	3.91638
ESVD10	4.78086	5.03250	5.29408	5.71091	5.85311	6.03489	6.48926	7.06011
EGD10	8.48617	8.77297	8.81726	8.93220	9.05058	9.24549	9.53285	9.87410
ND10	120703.69033	122381.68721	124126.02762	126905.57904	127853.83005	129066.00571	132095.85322	135902.48079
YPDD10	485.28471	502.69896	520.80172	549.64790	559.48884	572.06880	603.51254	643.01771

	1986	1987	1988	1989	1990
TRADE	1.50000	1.50000	1.50000	1.50000	1.50000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD10	44.94249	46.22894	47.46851	48.68151	49.87836
EMD10	7.23861	7.34929	7.45768	7.55974	7.65309
ECD10	3.76477	3.84546	3.91814	3.99723	4.05868
ERD10	1.89938	1.95739	2.00960	2.05822	2.10494
ETD10	10.34790	10.56466	10.75321	10.92418	11.07891
EFIRD10	4.10082	4.26609	4.42533	4.58117	4.74617
ESVD10	7.35134	7.61230	7.86375	8.10981	8.37036
EGD10	10.23967	10.63374	11.04079	11.45116	11.86622
ND10	137844.54446	139584.72849	141261.49120	142902.30709	144639.69651
YPDD10	663.17244	681.23207	698.63351	715.66189	733.69248

Table A - 30

Planning District 10, Scenario 10

(Numbers are in thousands)

	1978	1979	1980	1981	1982	1983	1984	1985
GDV	.00000	.00000	.00000	.00000	.30000	.50000	.90000	.90000
CONST	.00000	.00000	.30000	.70000	.30000	.00000	.00000	.00000
EEAD10	32.27089	33.51137	34.47672	36.36945	37.23255	38.45284	40.85478	42.53427
EMD10	6.15142	6.22648	6.22893	6.39543	6.53700	6.68499	6.90178	7.09826
ECD10	2.58911	2.63988	3.01950	3.62310	3.29578	3.20259	3.45322	3.64346
ERD10	1.28952	1.36880	1.41503	1.49709	1.56027	1.63082	1.72929	1.81308
ETD10	6.50086	6.83845	7.01596	7.31678	7.59582	7.88695	8.23751	8.56489
EFIRD10	2.47294	2.63230	2.75631	2.99947	3.11035	3.26712	3.57569	3.79145
ESVD10	4.78086	5.03250	5.22832	5.61227	5.78765	6.03489	6.52214	6.86283
EGD10	8.48617	8.77297	8.81266	8.92530	9.34598	9.74549	10.43515	10.76030
ND10	120703.69033	122381.60721	123687.51699	126247.81309	127415.31942	129066.00571	132315.10854	134586.94890
YPDD10	485.28471	502.69896	516.25086	542.82160	554.93798	572.06880	605.78798	629.36513

	1986	1987	1988	1989	1990
GDV	.90000	.90000	.90000	.90000	.90000
CONST	.00000	.00000	.00000	.00000	.00000
EEAD10	43.96996	45.25642	46.49599	47.70398	48.90388
EMD10	7.23861	7.34929	7.45768	7.55974	7.65309
ECD10	3.76477	3.84546	3.91814	3.99723	4.05868
ERD10	1.88184	1.93985	1.99205	2.04068	2.08730
ETD10	8.82893	9.04570	9.23425	9.40522	9.55984
EFIRD10	3.97589	4.14115	4.30040	4.45623	4.62057
ESVD10	7.15406	7.41502	7.66647	7.91253	8.17204
EGD10	11.12587	11.51994	11.92700	12.33736	12.75235
ND10	136529.01257	138269.19660	139945.95931	141586.77520	143317.25497
YPDD10	649.51986	667.57948	684.98092	702.00930	719.96822

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Table A - 31

Planning District 8

1990 Employment Impacts from Scenarios Beginning in 1982

Sector	Baseline Employment Forecast	Additional Employees Caused by Each Scenario								
		2 300 Mfg. employees	3 500 Mfg. employees	4 700 Mfg. employees	5 1,000 Mfg. employees	6 200 Util. employees	7 300 Util. employees	8 300 Trade employees	9 1,500 Trade Employees	10 900 Gov't. employees
Manufacturing	27,900	300	500	700	1,000	0	0	0	0	0
Construction	3,040	----------No Construction Employment in 1990----------								
Transportation, Communication, Utils.	3,330	20	30	40	50	210	320	20	70	40
Trade	24,720	160	240	290	380	70	170	450	2,030	290
Finance, Insurance, Real Estate	3,310	10	20	30	40	0	10	10	50	30
Service	22,170	30	50	60	80	10	30	30	120	60
Government	16,600	50	80	100	130	20	50	50	180	1,000
Non-Agricultural Employment[a]	102,890	590	960	1,230	1,710[b]	330	610	590	2,490[c]	1,440[b]
Employment Multipliers		1.97	1.92	1.99	1.71	1.60	2.03	1.90	1.66	1.60

[a]Totals may not add due to rounding [b]Peak impact 1 year later than normal [c]Peak impact 2 years later than normal

Table A - 32

Planning District 9

1990 Employment Impacts from Scenarios Beginning in 1982

Sector	Baseline Employment Forecast	Additional Employees Caused by Each Scenario								
		2 300 Mfg. employees	3 500 Mfg. employees	4 700 Mfg. employees	5 1,000 Mfg. employees	6 200 Util. employees	7 300 Util. employees	8 300 Trade employees	9 1,500 Trade Employees	10 900 Gov't. employees
Manufacturing	33,00	290	490	690	990	0	0	0	0	0
Construction	19,420	----------No Construction Employment in 1990----------								
Transportation, Communication, Utils.	11,020	0	10	10	20	200	310	0	30	30
Trade	47,580	0	0	10	10	0	0	300	1,510	10
Finance, Insurance, Real	10,230	0	0	0	0	0	0	0	0	0
Service	38,850	30	80	140	210	20	100	40	270	240
Government	57,340	10	30	60	90	0	40	10	120	1,010
Non-Agricultural Employment[a]	217,430	360	650	940	1,350[b]	250	480	380	1,930[c]	1,320[b]
Employment Multipliers		1.97	1.92	1.99	1.71	1.60	2.03	1.90	1.66	1.60

[a]Totals may not add due to rounding [b]Peak impact 1 year later than normal [c]Peak impact 2 years later than normal

Table A - 33

Planning District 10

1990 Employment Impacts from Scenarios Beginning in 1982

Sector	Baseline Employment Forecast	Additional Employees Caused by Each Scenario								
		2 300 Mfg. employees	3 500 Mfg. employees	4 700 Mfg. employees	5 1,000 Mfg. employees	6 200 Util. employees	7 300 Util. employees	8 300 Trade employees	9 1,500 Trade Employees	10 900 Gov't. employees
Manufacturing	7,650	300	500	700	1,000	0	0	0	0	0
Construction	4,060	----------No Construction Employment in 1990----------								
Transportation, Communication, Utils.	2,060	0	10	20	30	200	300	10	40	30
Trade	9,530	0	10	20	30	10	10	310	1,550	30
Finance, Insurance, Real Estate	4,420	60	100	140	220	40	60	60	330	200
Service	7,850	100	150	230	350	60	100	100	520	220
Government	11,830	10	10	20	20	0	10	10	40	920
Non-Agricultural Employment[a]	47,390[a]	490	810	1,140	1,680[b]	330	480	480	2,490[c]	1,510[b]
Employment Multipliers		1.97	1.92	1.99	1.71	1.60	2.03	1.90	1.66	1.60

[a]Totals may not add due to rounding [b]Peak impact 1 year later than normal [c]Peak impact 2 years later than normal

Table A - 34

Construction Multipliers

(Beginning 1980, ending 1982)

Planning District	500 Construction Workers	700 Construction Workers	1,000 Construction Workers
Non-Agricultural Employment Planning District 8	920	1,160	1,610
Multiplier	1.84	1.66	1.61
Non-Agricultural Employment Planning District 9	650	830	1,280
Multiplier	1.30	1.19	1.28
Non-Agricultural Employment Planning District 10	820	1,140	1,630
Multiplier	1.64	1.63	1.63

APPENDIX B

Table B -1

TOTAL RESIDENT POPULATION 1970 - 1978

COUNTY	POPULATION								
	1970	1971	1972	1973	1974	1975	1976	1977	1978
Georgetown	33,500	33,800	35,000	35,800	36,500	37,600	38,200	39,300	40,300
Horry	69,992	74,300	77,600	79,900	82,300	84,600	88,900	91,700	95,400
Williamsburg	34,243	34,200	34,500	34,300	34,400	34,400	35,900	36,300	36,700
Planning District 8 - Total	137,735	142,300	147,100	150,000	153,200	156,600	163,000	167,000	172,400
Berkeley	56,199	57,200	58,800	60,000	61,100	66,100	71,400	74,800	78,000
Charleston	247,561	248,000	252,300	252,400	261,300	260,000	263,000	261,900	265,000
Dorchester	32,276	32,276	34,700	39,600	41,100	45,000	46,700	48,700	51,500
Planning District 9 - Total	336,036	337,476	345,800	352,000	363,500	371,100	381,100	385,400	394,500
Beaufort	51,136	52,100	55,600	53,800	50,800	58,000	60,100	59,400	60,900
Colleton	27,711	27,500	27,800	28,200	28,300	28,900	29,500	30,200	30,700
Hampton	15,878	15,800	15,800	16,300	16,700	17,000	16,700	16,800	17,000
Jasper	11,885	11,500	11,700	12,500	12,700	13,200	13,200	13,700	14,000
Planning District 10 - Total	106,610	106,900	110,900	110,800	108,500	117,100	119,500	120,100	122,600

Source: Division of Research and Statistical Services, June, 1979.

Table B - 2

POPULATION CONVERSION FACTORS

Planning District	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Waccamaw Planning District 8	1.037	1.03	1.03	1.026	1.02	1.01	1.00	.997	.993	.989	.985
Berkeley, Charleston, Dorchester - Planning District 9	1.035	1.03	1.02	1.02	1.01	.993	.982	.972	.963	.955	.948
Lowcountry - Planning District 10	1.038	1.04	1.046	1.047	1.044	1.042	1.041	1.042	1.043	1.045	1.047

Table B - 3

SCHOOL YEAR 1972-73

COUNTY	PUBLIC SCHOOLS			PRIVATE SCHOOLS		
	NUMBER	ENROLLMENT*	STUDENT PER SCHOOL	NUMBER	ENROLLMENT*	STUDENT PER SCHOOL
Horry	37	19,399	524	3	580	193
Georgetown	19	9,410	495	6	1,074	179
Williamsburg	20	9,451	472	3	768	256
TOTAL	76	38,260	1,491	12	2,422	628
Berkeley	23	19,064	829	4	713	178
Charleston	80	57,235	715	31	8,306	268
Dorchester	15	10,241	683	5	863	173
TOTAL	118	86,540	2,227	40	9,882	619
Beaufort	19	10,056	529	5	1,266	253
Colleton	17	6,966	410	4	827	207
Hampton	10	4,345	435	1	229	229
Jasper	4	3,104	776	2	491	246
TOTAL	50	24,471	2,150	12	2,813	935

*Grades K-12

Source: S. C. Statistical Abstract, 1974

Table B - 4

SCHOOL YEAR 1973-74

COUNTY	PUBLIC SCHOOLS NUMBER	PUBLIC SCHOOLS ENROLLMENT*	PUBLIC SCHOOLS STUDENT PER SHCOOL	PRIVATE SCHOOLS NUMBER	PRIVATE SCHOOLS ENROLLMENT*	PRIVATE SCHOOLS STUDENT PER SCHOOL
Horry	39	19,244	493	3	585	195
Georgetown	20	9,162	458	6	1,053	176
Williamsburg	21	8,883	423	3	806	269
TOTAL	80	37,289	1,374	12	2,444	640
Berkeley	23	18,961	824	6	743	124
Charleston	81	54,893	678	28	8,044	287
Dorchester	16	10,443	653	5	891	178
TOTAL	120	84,297	2,155	39	9,678	589
Beaufort	20	9,778	489	6	1,296	216
Colleton	17	6,763	398	4	812	203
Hampton	10	4,068	407	1	320	320
Jasper	4	3,100	775	2	467	234
TOTAL	51	23,709	2,069	13	2,895	973

*Grades K-12

Source: S. C. Statistical Abstract, 1975.

Table B - 5

SCHOOL YEAR 1974-75

COUNTY	PUBLIC SCHOOLS			PRIVATE SCHOOLS		
	NUMBER	ENROLLMENT *	STUDENT PER SCHOOL	NUMBER	ENROLLMENT *	STUDENT PER SHCOOL
Horry	38	18,972	499	4	612	153
Georgetown	20	9,143	457	6	856	143
Williamsburg	22	8,795	400	3	775	258
TOTAL	80	36,910	1,356	13	2,243	554
Berkeley	26	19,712	758	5	691	138
Charleston	82	53,461	652	28	7,354	263
Dorchester	16	11,088	693	4	807	202
TOTAL	124	84,261	2,103	37	8,852	603
Beaufort	19	9,677	509	6	1,205	201
Colleton	17	6,633	390	3	852	284
Hampton	10	4,062	406	1	302	302
Jasper	4	3,048	762	2	476	238
TOTAL	50	23,420	2,067	12	2,835	1,025

*Grades K-12

Source: S. C. Statistical Abstract, 1976.

Table B - 6

SCHOOL YEAR 1975-76

COUNTY	PUBLIC SCHOOLS			PRIVATE SCHOOLS		
	NUMBER	ENROLIMENT*	STUDENT PER SCHOOL	NUMBER	ENROLIMENT*	STUDENT PER SCHOOL
Horry	38	18,819	495	4	702	176
Georgetown	20	9,127	456	6	918	153
Williamsburg	22	8,669	394	3	797	265
TOTAL	80	36,615	1,345	13	2,417	598
Berkeley	28	20,515	733	5	708	142
Charleston	84	52,265	622	28	7,577	271
Dorchester	16	11,435	715	4	810	202
TOTAL	128	84,215	2,070	37	9,095	615
Colleton	17	6,445	379	3	900	300
Beaufort	19	9,562	503	6	1,104	184
Jasper	4	3,080	770	2	474	237
Hampton	10	4,609	461	1	337	337
TOTAL	50	30,141	2,113	12	2,815	1,058

*Grades K-12

Source: S. C. Statistical Abstract, 1977.

Table B - 7

SCHOOL YEAR 1976-77

COUNTY	PUBLIC SCHOOLS			PRIVATE SCHOOLS		
	NUMBER	ENROLLMENT*	STUDENT PER SCHOOL	NUMBER	ENROLLMENT*	STUDENT PER SCHOOL
Horry	35	19,011	543	4	847	212
Georgetown	19	9,356	492	6	847	141
Williamsburg	23	8,590	373	3	749	250
Totals	77	36,957	1,408	13	2,443	603
Charleston	81	50,998	630	29	7,604	262
Berkeley	28	21,073	753	4	714	179
Dorchester	16	11,798	737	4	807	202
Totals	125	83,860	2,120	37	9,125	643
Jasper	4	3,155	788	2	468	234
Colleton	17	6,357	374	3	1,014	338
Hampton	9	4,049	450	2	359	180
Beaufort	19	9,315	490	6	1,094	182
Totals	49	22,876	2,102	13	2,935	934

*Grades K-12

Source: S. C. Statistical Abstract, 1978.

Table B - 8

PHYSICIANS (PRIVATE OFFICE)

1976 - 1978

Year	Location	Population	Physicians	Physicians/ 1,000 Residents
1976	Horry	88,900	57	.64
	Georgetown	38,200	23	.60
	Williamsburg	35,900	10	.27
	Planning District 8	163,000	90	.55
	Berkeley	71,400	7	.10
	Charleston	263,000	218	.83
	Dorchester	46,700	13	.28
	Planning District 9	381,100	238	.62
	Beaufort	60,100	34	.57
	Colleton	29,500	13	.44
	Jasper	13,200	4	.30
	Hampton	16,700	7	.42
	Planning District 10	119,500	58	.43
1977	Horry	91,700	60	.65
	Georgetown	39,300	23	.59
	Williamsburg	36,300	10	.27
	Planning District 8	167,300	93	.56
	Berkeley	74,800	8	.11
	Charleston	261,900	246	.94
	Dorchester	48,700	13	.27
	Planning District 9	385,400	267	.69
	Beaufort	59,400	46	.77
	Colleton	30,200	14	.46
	Jasper	13,700	4	.29
	Hampton	16,800	7	.42
	Planning District 10	120,100	71	.49
1978	Horry	95,400	59	.62
	Georgetown	40,300	25	.62
	Williamsburg	36,700	12	.33
	Planning District 8	172,400	96	.56
	Berkeley	78,000	9	.12
	Charleston	265,000	244	.92
	Dorchester	51,500	14	.27
	Planning District 9	394,500	267	.68
	Beaufort	60,900	36	.59
	Colleton	30,700	14	.46
	Jasper	14,000	6	.43
	Hampton	17,000	8	.47
	Planning District 10	122,600	64	.49

Source: S. C. Statistical Abstract, 1978

Table B - 9

HOSPITAL BEDS (1978)*

County	Number of Beds	Population
Georgetown	133	40,300
Horry	417	95,400
Williamsburg	78	36,700
Planning District 8 Total	628	172,400
Berkeley	---	78,000
Charleston	1,687	265,000
Dorchester	---	51,500
Planning District 9 Total	1,687	394,500
Beaufort	195	60,900
Colleton	142	30,700
Hampton	68	17,000
Jasper	31	14,000
Planning District 10 Total	436	122,600

*Includes some 1977 (non-licensed) figures from State Health Plan.

Source: DHEC Licensing Division (1979).
DHEC, Office of State Health Planning & Development, State Health Plan (1979).

Table B - 10

OUTPATIENT AND PUBLIC HEALTH CENTERS (1977)

County	Outpatient	Public Health	Total	Population	Increase/ 1,000
Georgetown	2				
Horry	5				
Williamsburg	3				
Planning District 8 Total	10	*17	27	167,300	1.6
Berkeley	*0				
Charleston	13				
Dorechester	*1				
Planning District 9 Total	14	+28	42	385,400	1.1
Beaufort	6				
Colleton	2				
Hampton	2				
Jasper	4				
Planning District 10 Total	14	*20	34	120,100	2.8

*1 facility below standard +2facilities below standard

Source: DHEC, Office of State Health Planning & Development, State Health Plan (1977)

Table B - 11

Full-Time Law Enforcement Personnel

	1974	1975	1976	1977		1978	
	Municipal	Municipal	Municipal	Municipal	County	Municipal	County
Planning District 8 Total	196	229	208	259+	89	292	97
Sworn Officers	-	-	-	226	69	268	68
Civilian Officers	-	-	-	32.8	20	24	29
Civilian: Sworn ratio	-	-	-	1:7	1:3.5	1:11	1:2
Planning District 9 Total	680	518	405	406	243	951	342
Sworn Officers	-	-	-	297	181	690	246
Civilian Officers	-	-	-	109	62	261	96
Civilian: Sworn ratio	-	-	-	1:3	1:3	1:2.5	1:2.5
Planning District 10 Total	119	115	96	94+	108	132	115
Sworn Officers	-	-	-	78	78	96	81
Civilian Officers	-	-	-	17	30	36	34
Civilian: Sworn ratio	-	-	-	1:5	1:2.5	1:3	1:2

+Totals may not add due to rounding

Source: (1977-1978) SLED, Uniform Crime Reporting Division
(1974-1976) F.B.I., Uniform Crime Reports

Table B - 12

UTILITY HOOKUPS AND HOUSEHOLDS

(1976)

	Utility Hookups	1970 Hookup: Household Ratio	Estimated Households	Utility Hookups/1,000	Estimated Households/1,000
Georgetown	13,654	.806	11,005	360	288
Horry	37,442	.777	29,092	420	327
Williamsburg	12,989	.787	10,222	360	285
Planning District 8	64,085	.790	51,196	393	314
Berkeley	25,187	.939	23,651	350	331
Charleston	80,318	.993	79,756	310	303
Dorchester	15,060	.896	13,494	320	289
Planning District 9	120,565	.943	113,693	316	298
Beaufort	12,529	1.157	14,496	210	241
Colleton	11,049	.873	9,646	370	327
Hampton	4,150	1.294	5,370	250	322
Jasper	2,590	1.551	4,017	200	304
Planning District 10	30,318	1.219	36,958	254	309

Source: Division of Research and Statistical Services, 1978.

Table B - 12 (continued)

UTILITY HOOKUPS AND HOUSEHOLDS

(1977)

	Utility Hookups	1970 Hookup Household Ratio	Estimated Households	Utility Hookups/1,000	Estimated Households/1,000
Georgetown	14,071	.806	11,341	360	289
Horry	39,353	.777	30,577	430	333
Williamsburg	13,243	.787	10,422	360	287
Planning District 8	66,667	.790	52,667	398	315
Berkeley	25,181	.939	23,645	340	316
Charleston	81,874	.993	81,301	310	310
Dorchester	15,961	.896	14,301	300	294
Planning District 9	123,016	.943	116,004	319	301
Beaufort	12,820	1.157	14,833	220	250
Colleton	11,325	.873	9,887	380	327
Hampton	4,145	1.294	5,364	250	319
Jasper	2,645	1.551	4,102	190	299
Planning District 10	30,935	1.219	37,710	258	314

Source: Division of Research & Statistical Services, 1978

Table B - 13

SCPCA-WDG-4

GUIDELINES
for
UNIT CONTRIBUTORY LOADINGS
to
WASTEWATER TREATMENT FACILITIES

WATER POLLUTION CONTROL DIVISION

South Carolina

Pollution Control Authority

1972

Table B - 13 (continued)
SCPCA-WDG-4

SOUTH CAROLINA POLLUTION CONTROL AUTHORITY

Water Pollution Control Division

Guidelines for

Unit Contributory Loadings to Wastewater Treatment Facilities

The following are guidelines for the *minimum* design loadings for waste treatment facilities. These guidelines will be used by the South Carolina Pollution Control Authority in evaluating proposed facilities.

Type of Establishment	*Gallons Per Day Per Person*	*Lbs. 5-Day BOD Per Day Per Person*
Airport — Each Employee	10	.06
— Each Passenger	5	.02
Apartments — 3 Bedroom 4 Persons Each	100	.17
— 2 Bedroom 3 Persons Each	100	.17
— 1 Bedroom 2 Persons Each	100	.17
— With Garbage Disposal Units	100	.23
Bars — Each Employee	10	.06
— Each Seat (Excluding Restaurant)	40	.01
Boarding House — Resident	50	.10
Bowling Alley — Per Lane (No Restaurant)	125	.20
— Additional For Bars and Cocktail Lounges	3	.02
Camps — Resort (Luxury)	100	.17
— Summer	50	.12
— Day (With Central Bathhouse)	35	.10
— Per Travel Trailer Site	175	.28
Churches — Per Seat	3	.02
Clinics — Per Staff	15	.03
— Per Patient	5	.02
Country Club — Each Member	50	.10
Factories — Each Employee (No Showers)	25	.06
— Each Employee (With Showers)	35	.08
— Each Employee (With Kitchen Facilities)	40	.10
Fairgrounds — Average Attendance	5	.03
Food Service Operations —		
Ordinary Restaurant (Not 24 Hours) (Per Seat)	70	.20
24-Hour Restaurant (Per Seat)	100	.30
Curb Service (Drive-in) (Per Car Space)	100	.20
Vending Machine Restaurant	70	.12

Table B - 13 (continued)

Type of Establishment	*Gallons Per Day Per Person*	*Lbs. 5-Day BOD Per Day Per Person*
Hospitals — Per Bed	200	.30
— Per Resident Staff	100	.17
Hotels — Per Bedroom (No Restaurant)	100	.17
Institutions — Per Resident	100	.17
Laundries — Self Service — Per Machine	400	.68
Mobile Homes — 3 Persons Each	100	.17
Motels — Per Unit (No Restaurant)	100	.17
Nursing Homes — Per Bed (No Laundry)	100	.17
— Per Bed (With Laundry)	150	.20
Offices — Per Person (No Restaurant)	25	.05
Picnic Parks — Average Attendance	10	.06
Residences — 4 Persons Each	100	.17
— With Garbage Disposal Units	100	.23
Rest Homes — Per Bed (No Laundry)	100	.17
— Per Bed (With Laundry)	150	.20
Schools — Per Person (No Showers, Gym, Cafeteria)	10	.04
— Per Person With Cafeteria (No Gym, Showers)	15	.05
— Per Person With Cafeteria, Gym & Showers	20	.06
Service Stations — Each Car Served	10	.06
— Each Car Washed	75	.03
— First Bay (Per Day)	1000	2.0
— Each Additional Bay (Per Day)	500	1.0
Shopping Centers — Per 1,000 Sq. Ft. Space (No Restaurant)	200	.40
Stadiums — Per Seat (No Restaurant)	2	.008
Swimming Pools — Per Person (With Sanitary Facilities and Showers)	10	.04
Theatres — Drive-In — Stall	5	.03
— Indoor — Seat	5	.03

Any major deviation from the above guidelines should be so noted and substantiated by the Engineer in the project report.

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