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PASCAGOULA RIVER COMPREHENSIVE BASIN STUDY. VOLUME IV. APPENDIX--ETC(U)
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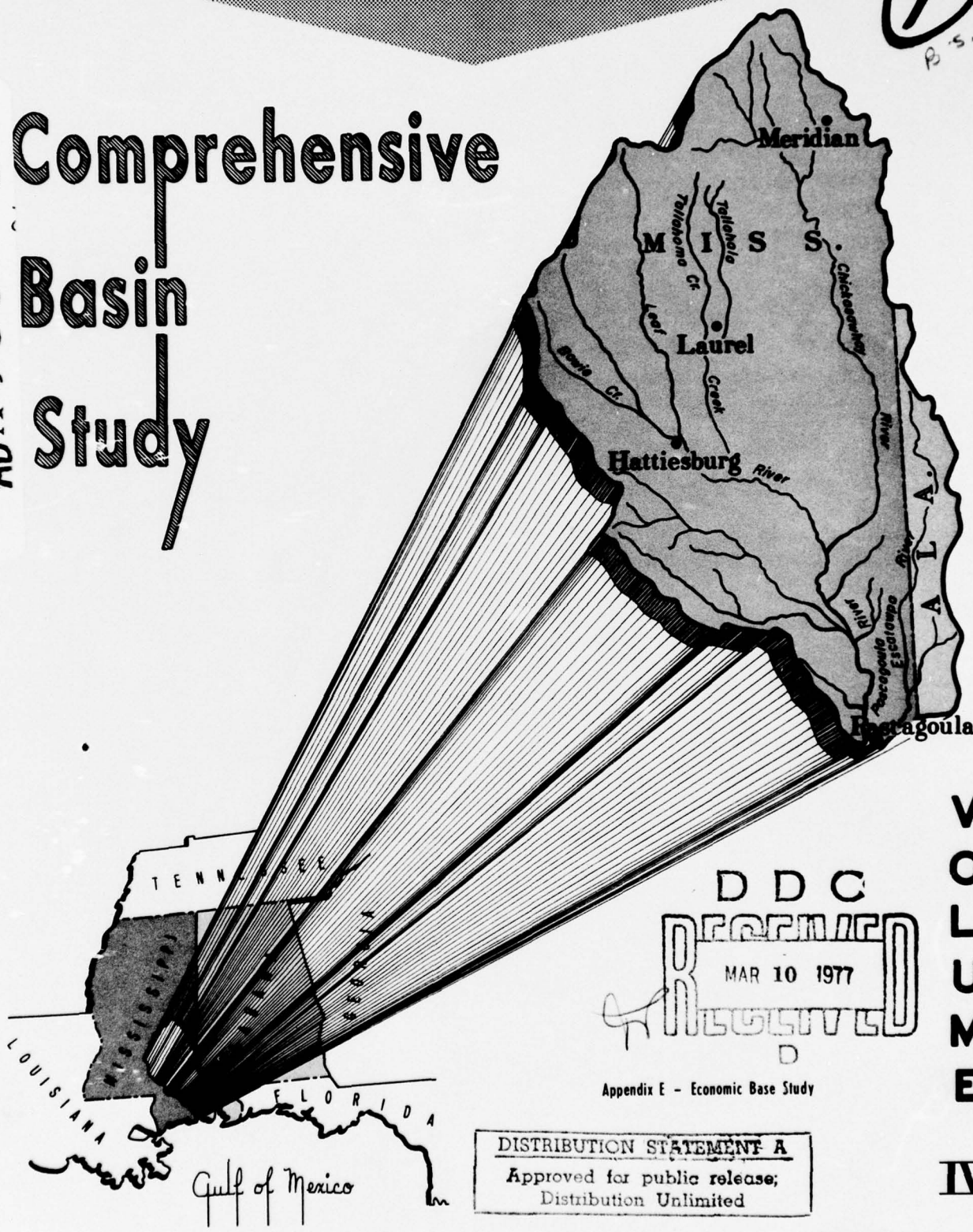
PASCAGOULA RIVER

Comprehensive Basin Study



VOLUME IV

Appendix E - Economic Base Study

PASCAGOULA RIVER COMPREHENSIVE BASIN STUDY

VOLUME INDEX

(6)

PASCAGOULA RIVER COMPREHENSIVE BASIN STUDY. Volume IV.

APPENDIX E.

ECONOMIC BASE STUDY

(11) 1965

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Prepared in collaboration with Economic Research Service, Forest Service, and Soil Conservation Service, U. S. Department of Agriculture

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U. S. ARMY ENGINEER DISTRICT, MOBILE
Mobile, Alabama

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INTRODUCTION

This appendix contains the results of an economic base study of the Pascagoula River Basin, and was prepared by the Corps of Engineers and U. S. Department of Agriculture. Chapters 1-3 are essentially abstracted from the "Economic Base Study of the Pascagoula, Pearl, and Big Black River Basins Study Area,"* December 1964, prepared under contract to the Corps of Engineers by Michael Baker, Jr., Inc., of Jackson, Mississippi. Chapter 4 is based on the "Agricultural Economic Base Study of the Pascagoula River Basin Study Area," dated June 1965, prepared by the Economic Research Service and the Forest Service of the U. S. Department of Agriculture.

The purpose of this study was to project the economic growth of the basin to 1965, 1980 and 2015 for guidance in the preparation of a plan of development for the water and related land resources of the basin and for use in the evaluation of benefits that would accrue from such development. The need for water and related land resource development is dependent upon the size of the population of the basin and the economic activity in which the population is engaged. Major parameters of the general economic activity included in this economic base study are population, households, labor force, employment and personal income. The agricultural economy of the basin is broken down into agricultural land resource base, farm characteristics and types, agricultural production, forest production and cash receipts from farm marketings.

* This joint economic base study was made to avoid duplication of effort and provide consistency in concurrent type II comprehensive studies of the three basins.

CHAPTER 1

DESCRIPTION
BASE STUDY AREA AND PASCAGOULA RIVER BASIN STUDY AREA

SECTION 1. BASE STUDY AREA

The "Base Study Area" is the area treated in the "Economic Base Study of the Pascagoula, Pearl, and Big Black River Basins Study Area." It lies in the southeastern part of the United States and includes all of the State of Mississippi, nineteen counties in central and western Alabama and twelve parishes in southeastern Louisiana (Chart 1). To the west of this 70,000-square-mile area lie Arkansas and the remainder of the State of Louisiana, with the Mississippi River forming the boundary line; to the north the State of Tennessee and a portion of northern Alabama; to the east the remainder of Alabama. The Gulf of Mexico borders the base study area along its entire southern boundary. From north to south, the area's greatest length is 411 miles; across the main part, its greatest width is 304 miles. The base study area was divided into seven components approximating drainage areas. The Pascagoula River Basin is one of the principal components of the base study area.

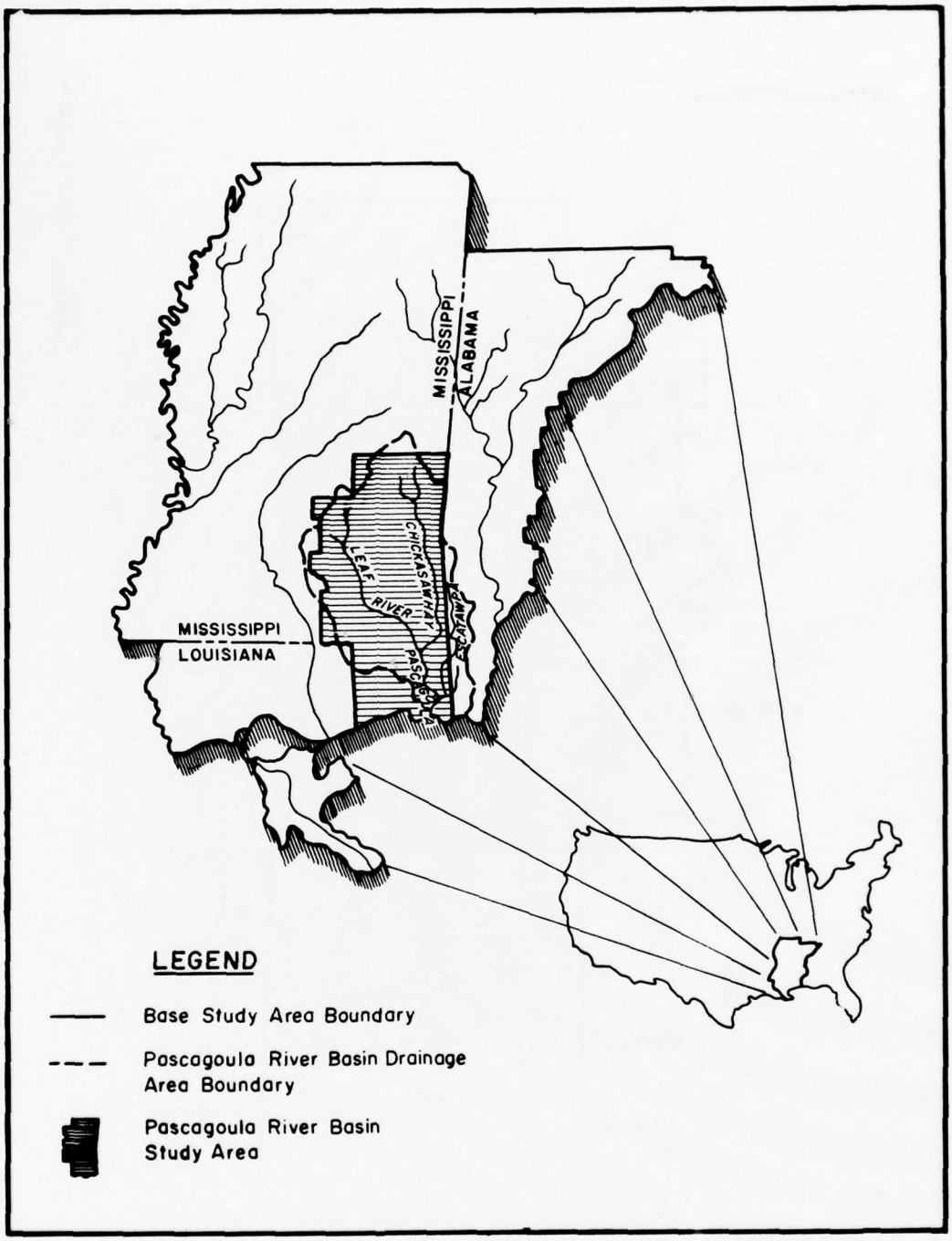
SECTION 2. PASCAGOULA RIVER BASIN STUDY AREA

The Pascagoula River system drains most of southern Mississippi and a small part of southwest Alabama, a drainage area of 9,700 square miles, and empties into the Gulf of Mexico at Pascagoula, Mississippi. The basin study area boundary follows the county lines nearest the basin's physical boundary and includes 16 counties, all in Mississippi. Division of the basin into subareas (Leaf, Chickasawhay, and Coastal) was accomplished by grouping together those counties that are strongly related by watershed factors, water needs, and economic activity (Chart 2).

Counties were used as the unit for forming subareas within the basin for several reasons:

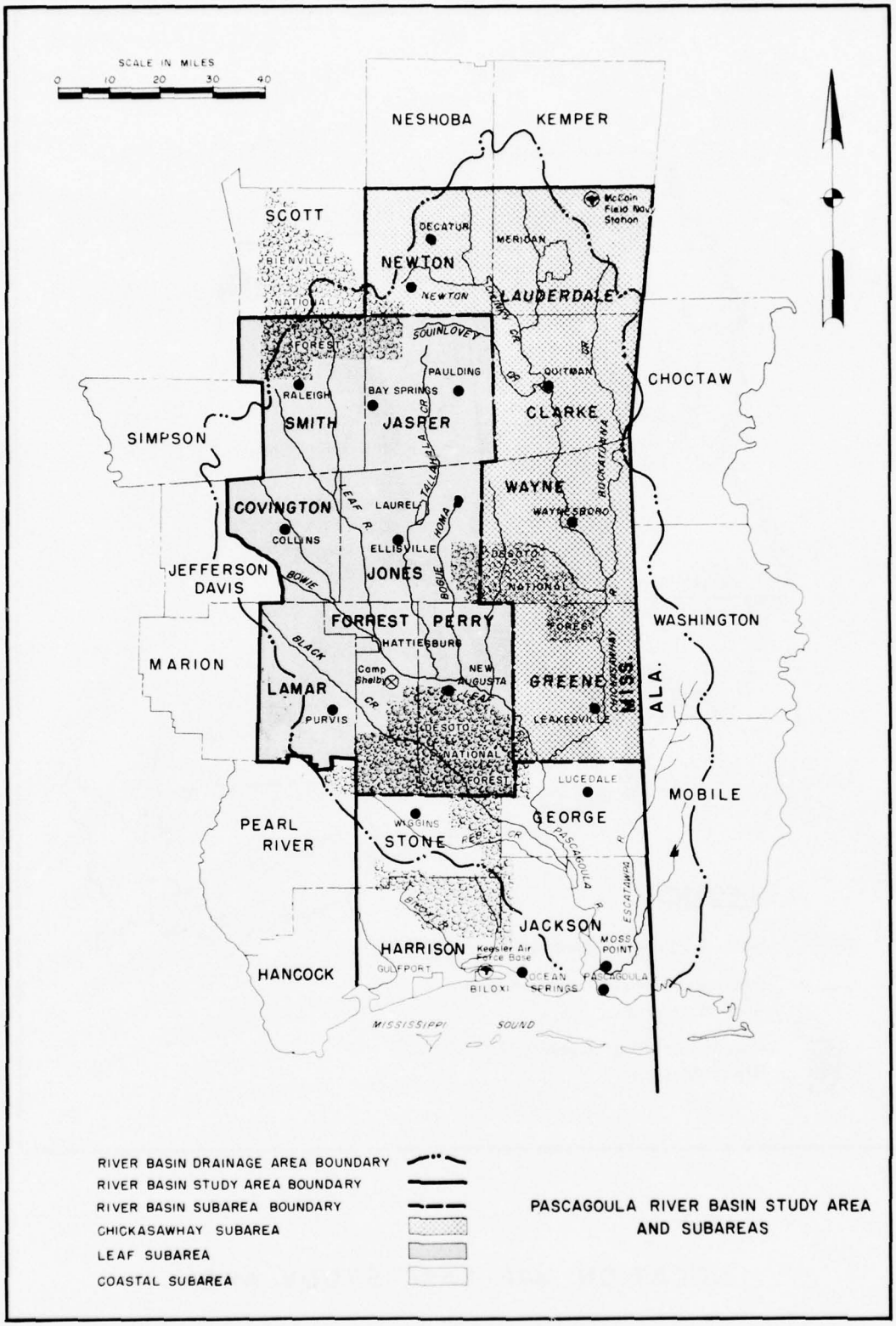
(1) They are the smallest political unit for which large quantities of statistical information were available on many different subjects. By combining data on counties from earlier censuses, it was possible to establish historical trends which permitted optimum understanding and analysis of the present economy.

(2) County units are recognized as record-keeping units by numerous organizations, whereas towns or other small units are not. The use of county units permitted comparison of a wide variety of data.



LOCATION MAP BASE STUDY AREA

CHART 1



PASCAGOULA RIVER BASIN STUDY AREA AND SUBAREAS

CHART 2

(3) County units are sufficiently small to provide a satisfactory reflection of leading regional, subregional and local economic variations.

(4) County boundaries are quite stable.

The Leaf subarea contains seven counties draining into the Leaf River: Covington, Forrest, Jasper, Jones, Lamar, Perry and Smith. The Chickasawhay River serves as a drainage system for five counties which make up the Chickasawhay subarea: Clarke, Greene, Lauderdale, Newton and Wayne. The remaining counties, George, Harrison, Jackson and Stone, comprise the Coastal subarea. They are located south of the juncture of the Leaf and Chickasawhay Rivers and drain into the Pascagoula River and the Gulf of Mexico.

Leaf subarea. Forest products, processed by many small wood-fabricating operations using raw wood supplied by numerous tree farms, play a significant role in the economy of the Leaf subarea. Population in the seven-county subarea grew by a scant 2 percent during the 1950's.

Hattiesburg, with 34,989 inhabitants in 1960, is the largest city and the dominant trade center of this section of Mississippi. It is also the site of the campus of the University of Southern Mississippi. Significant manufacturing employment is provided by firms producing naval stores, concrete pipe, processed poultry, chemical and resinous products, envelopes, processed meat products and men's clothing.

Masonite, Inc., the nation's leading producer of hardboard products, is located at Laurel. Through its purchases of cutwood, this firm provides ancillary employment for hundreds of logging workers and suppliers. Large-scale oil field discoveries have made Laurel the oil exploration center of south central Mississippi.

Chickasawhay subarea. While the population of the five-county Chickasawhay subarea declined 3 percent during the 1950's, the population of Meridian, the State's second largest city, increased 18 percent, to 49,374 inhabitants in 1960. The economic vitality of the subarea, exclusive of farming and harvesting of pulpwood, is centered in Meridian (Lauderdale County). Meridian is a major railroad center and ranks second to Jackson as a retail and wholesale center. The Meridian Naval Air Base injects a major payroll into the subarea's economy. Manufacturing is an important segment of the City's economic base, and a variety of commodities are produced, ranging from aluminum windows to vitrified clay products.

The remaining counties in the subarea have failed to record advances in nonagricultural employment and payrolls. Industrial growth has not been equated with the growth in the labor force, and outmigration has restricted the economic advancement of the subarea.

Coastal subarea. This subarea attained a 47 percent population growth between 1950 and 1960, the highest of any subarea in the base study area.

Biloxi and Gulfport form a strip city with a combined population of 74,257 in 1960. The seafood industry provides somewhat seasonal employment for about 5,000 workers. The Keesler Air Force Base outside Biloxi is a primary employer, as evidenced by the fact that almost 25 percent of Biloxi's residents are classified as members of the armed forces. Foreign trade has developed as a major industry as a result of recent expansions in terminal warehousing and dockage facilities at the Port of Gulfport, owned by the State of Mississippi. Large industrial plants are gravitating to this subarea along the industrial waterway.

The population of Pascagoula jumped 59 percent between 1950 and 1960. The economy of the City is well diversified with high-paying, technologically advanced industries. The Ingalls Shipbuilding Corporation, a major producer of nuclear power submarines, is located in Pascagoula. The $125 million Standard Oil of Kentucky refinery with a refining capacity of 100,000 barrels of oil daily was completed in the fall of 1963 in the Bayou Casotte Industrial Area. This area holds substantial promise for the development of a massive petrochemical complex. Paper and menhaden processing plants add further diversification to Pascagoula's industrial economy.

CHAPTER 2

APPROACH, ASSUMPTIONS, GENERAL METHODOLOGY, AND LIMITATIONS

SECTION 1. APPROACH

In implementing the contract economic base study, the procedure consisted of several correlated steps: (1) inventory of available historical and related economic data pertaining to the base study area; (2) the delimitation of drainage basins and subareas in the base study area; (3) statistical analysis of past growth and the present economy, including a determination of dominant trends and a review of the principal factors and conditions that induced changes; (4) analysis of the national and regional economies to determine dominant trends affecting the base study area and to establish relationships of growth in the Nation and region to growth of the base study area, its basins and subareas; (5) identification and analysis of employment in, and income from, major water-using industries and other industries in the base study area, each basin and subarea; (6) development of statistical and other projection methods to be used in estimating the future demographic and economic change in the base study area, its basins and subareas; (7) an appraisal of the principal factors and conditions likely to affect economic change in these areas during the projection period; (8) adaptation of the historical economic data for computer processing and

programing, and execution of the projection methods to develop various projections of economic indicators in the base study area, its basins and subareas, and (9) development of the final projection of each economic indicator.

While the statistical projection methods were basic to all projections, judgment was used in adjusting the answers thus obtained to provide for anticipated economic and industrial development potentials of the future.

To facilitate the determination of trends and prospective changes in the Nation which would influence the economic future of the base study area, national projections of population, employment, income, labor force and households were based on "National Economic Growth Projections, 1980, 2000, 2020," dated July 1963, a report by the Economic Task Group of the Ad Hoc Water Resources Council Staff.

Methodology and procedures for final projections of agricultural employment and farm population in the base study area were coordinated with representatives of the U. S. Department of Agriculture. Projections of rural land use and agricultural production are compatible with the projections made of the other parameters in the economic base study. There was an effective liaison maintained throughout the course of the study with representatives of Federal and State governmental agencies.

SECTION 2. ASSUMPTIONS

Projections of economic growth in the base study area were developed under the following general assumptions:

(1) There will be a high degree of continuity in the political, social and economic institutions that set the patterns of life in the United States and the base study area. Changes in such basic conditions evolve slowly over a period of time, for the most part, and no reasons are seen for anticipating sudden shifts. For this study, the assumption of continuity includes stability in the manner in which economic functions are divided between the public and private sectors of the economy and among the various components of these sectors.

(2) The economies of the base study area and the Nation will be based on a free enterprise system with the Federal government and non-Federal interests cooperating in encouraging and implementing economic growth and development through all segments of society.

(3) A continued trend toward relative stability of the international situation, with no significant worsening of the "cold war" and no widespread outbreak of hostilities, will characterize the projection period.

(4) Sufficient quantities of water of an acceptable quality will be made available by timely development in such a manner as to avoid becoming a constraint to economic growth. However, ample water is a resource which provides an area with a locational, competitive advantage which may serve to attract industry from water scarce regions. Since water facilities will be constructed throughout the country over the next fifty years, there is no way of anticipating which other regions, if any, will be faced with the serious problem of water shortages. Therefore, it is also necessary to assume that every region will have a future water supply ample to meet its economic growth prospects. Consequently, consistency between the base study area and national projections was maintained.

(5) Conditions of prosperity will be maintained without a major business depression, and a stable general price level will prevail.

(6) Government policies and programs will be consistent with the preceding assumptions to the extent that economic growth and development of resources necessary to that growth will continue to be implemented and encouraged.

(7) Reasonably full employment will be maintained for the Nation without government action on a scale that would drastically alter the overall pattern of production and demand for goods and services.

(8) A continued upward trend in population, employment and per capita income, accompanied by upward trends in total volume of consumption and international trade are anticipated.

(9) The level of educational training, skills of the people generally, and the labor force specifically, will continue to improve.

(10) Investment capital required to attain projected industrial growth and resource development will be available.

(11) A time span of thirty years is sufficiently long enough to indicate the occurrences of major socio-economic trends, for example, the relative decline of agriculture in the economy, the rising importance of the white collar occupation, rising worker productivity, increased social security and pension programs, and a rising standard of living. It is expected that these broad trends will continue into the future, though probably at different rates.

Specific assumptions applicable to particular economic indicators are enumerated in chapter 3.

SECTION 3. GENERAL METHODOLOGY *

Historical data. Generally, the historical data for each economic indicator were extracted from county or parish enumerations contained in the 1930, 1940, 1950 and 1960 Censuses of Population and Housing. Data for those counties and parishes included in the base study area were combined by appropriate subarea and basin groupings to produce historical indicators for the base study area, its basins and subareas. Deviations were necessary in the case of employment, because employment data were desired by place of work rather than by place of residence, as presented in these decennial censuses. In the case of income, data were available only by states.

To convert the census employment data to acceptable indicators of employment by place of work, close cooperation and assistance were provided by the Employment Security Commissions of the States of Alabama, Mississippi and Louisiana. These agencies provided satisfactory employment data for 1960, and adjustments were made in the data for earlier census years in accordance with the procedure devised for adjustment of the 1960 census data.

Personal income data for the States of Alabama, Mississippi and Louisiana were obtained from published and unpublished materials supplied by the Office of Business Economics of the U. S. Department of Commerce. Estimates of personal income for the basins and subareas, tied directly to the Department of Commerce official estimates by states, were prepared. The state total for each income component was broken down or allocated to the various counties or parishes of the state in accordance with each county's or parish's proportionate share of some related series available on a county or parish basis.

After historical data had been gathered, adjusted and tabulated by subareas and basins, an analysis of each economic indicator, utilizing both computer and graphical methods, was conducted for each subarea and basin. This analysis covered past rates of growth (or decline); changing relationships of the subareas to the parent basin, and the basin to the base study area; magnitude and direction of growth; composition and characteristics of each indicator; secular and cyclical trends; inter-relationships and interdependencies of the various indicators; and changes in the socio-economic structure of each subarea and basin. The statistical and graphical analyses were supplemented by personal interviews and correspondence with: (1) representatives of Federal, State, and local agencies having an interest in the

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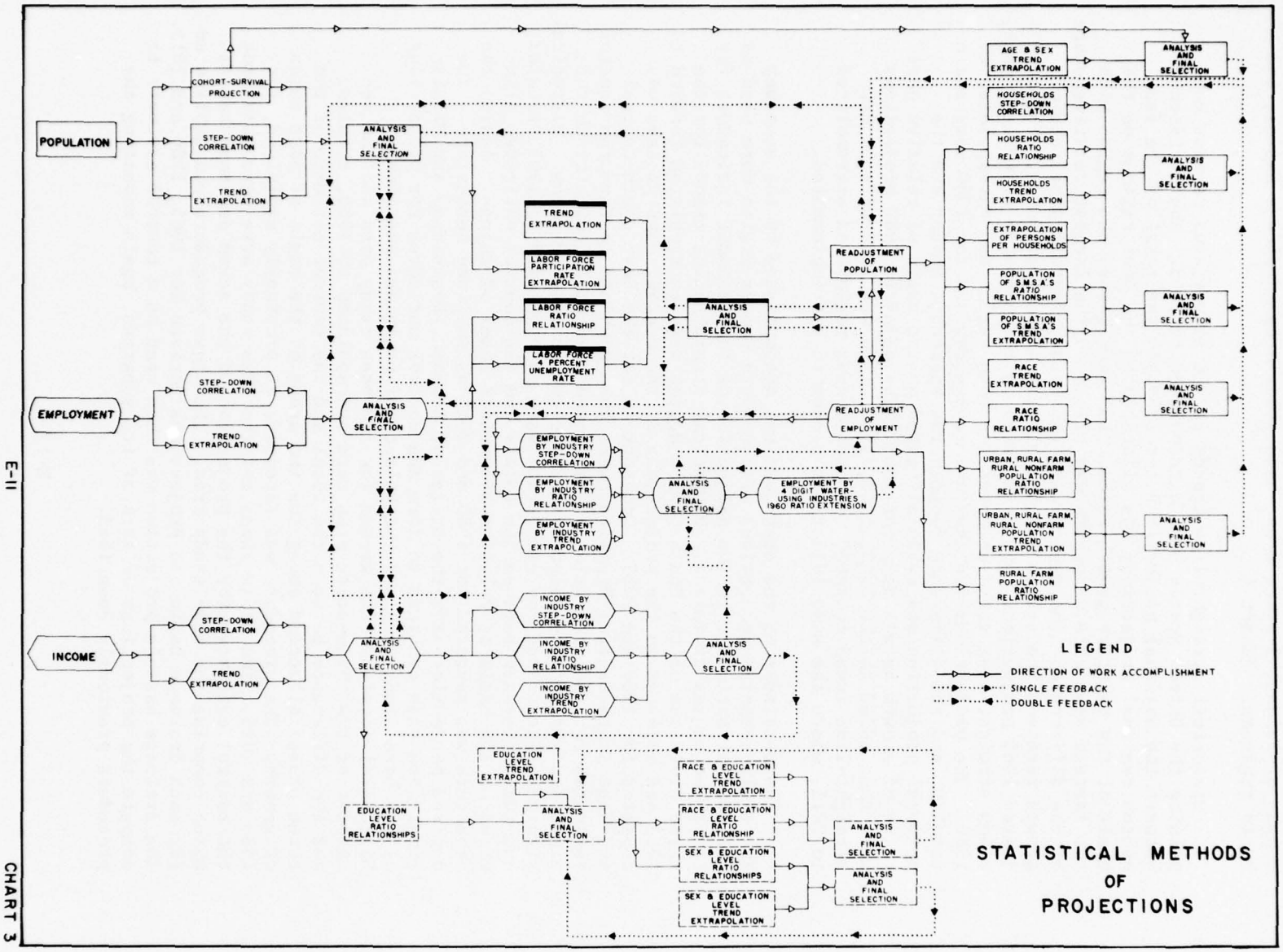
* For a detailed description of how the general methodology was applied in developing projection of each specific indicator, see "Economic Base Study of the Pascagoula, Pearl, and Big Black River Basins Study Area," December 1964, Volumes 1 and 2, U. S. Army Engineer District, Mobile.

economic growth and development of the base study area; (2) State and area industrial development organizations, especially the Mississippi Agricultural and Industrial Board, the Alabama Planning and Industrial Board and the Louisiana Department of Commerce and Industry; (3) Chambers of Commerce officials, public officials, and area redevelopment committees in cities and communities throughout the base study area; (4) managers of major industries in the base study area; (5) representatives of research organizations knowledgable of the base study area's past growth, economic problems and potentials, such as bureaus of business research of the major universities located within the base study area and the research departments of the Atlanta and St. Louis Federal Reserve Banks.

Projections. With the knowledge gained from this analysis, procedures were activated to project the economic growth of the base study area, its basins and subareas. Projection methods were formalized and programed for computer processing. The statistical projection methods that were used and the relationship of the broad economic indicators that were projected are illustrated in Chart 3. A total of 188 economic indicators were projected to present an aggregate framework of future economic growth.

Step-down correlation. Examination of Chart 3 reveals that three methods of projection, namely, step-down correlation, ratio relationship, and trend extrapolation,were used quite frequently throughout the total procedure. The first of these three, the step-down correlation method, was used in projecting population, employment, personal income and households. A primary consideration in the development of projections of the comparative growth of the base study area, its basins and subareas was the progress of the Nation. Changes in the economic activity of the base study area were found to be influenced fundamentally by the course of the Nation's overall economy. The same basic forces which effectuate national growth or business cycles affect, in important degrees, the activity of the base study area, although frequently there are significant departures among different basins in the base study area as well as among different economic indicators. Just as the base study area grew in the past concurrently with the national economy, though at differential rates which varied from period-to-period, the basins progressed at varying rates in relation to the base study area; the subareas in relation to basins; and all in relation to each other. Using this criterion, the projections for the base study area were tied to projections of national economic activity, as contained in the report produced by the Economic Task Group of the Ad Hoc Water Resources Council Staff. Using these projections of the national economy for 1980, 2000, and 2020 as a base, the national projections for 1965 and 2015, required for this economic base study, were derived by graphical interpolation.

The step-down correlation method included six successive step-downs of major economic indicators, from the Nation to census regions,


POPULATION
COHORT-SURVIVAL PROJECTION
STEP-DOWN CORRELATION
TREND EXTRAPOLATION
ANALYSIS AND FINAL SELECTION
TREND EXTRAPOLATION
LABOR FORCE PARTICIPATION RATE EXTRAPOLATION
LABOR FORCE RATIO RELATIONSHIP
LABOR FORCE 4 PERCENT UNEMPLOYMENT RATE
ANALYSIS AND FINAL SELECTION
READJUSTMENT OF POPULATION
AGE & SEX TREND EXTRAPOLATION
ANALYSIS AND FINAL SELECTION
HOUSEHOLDS STEP-DOWN CORRELATION
HOUSEHOLDS RATIO RELATIONSHIP
HOUSEHOLDS TREND EXTRAPOLATION
ANALYSIS AND FINAL SELECTION
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ANALYSIS AND FINAL SELECTION
RACE TREND EXTRAPOLATION
RACE RATIO RELATIONSHIP
ANALYSIS AND FINAL SELECTION
URBAN, RURAL FARM, RURAL NONFARM POPULATION RATIO RELATIONSHIP
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ANALYSIS AND FINAL SELECTION
ANALYSIS AND FINAL SELECTION
LEGEND
DIRECTION OF WORK ACCOMPLISHMENT
SINGLE FEEDBACK
DOUBLE FEEDBACK
STATISTICAL METHODS OF PROJECTIONS

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CHART 3

census divisions, 3-state area, base study area, drainage basins, and basin subareas. (Chart 4).

Historical straight-line trends in the four census regions comprising the United States were extrapolated to 1965. The difference between the national projections for 1965 and the total of the four census regions' projections was allocated to the four regions on the basis of the relative growth rates. In other words, the region with the fastest past rate of growth was allocated the largest relative share of the difference. The region with the second fastest past rate of growth received the second largest allocation, and so forth. The adjusted 1965 projections were then added to the previous historical data, a new straight-line trend computed for each region and extrapolated to 1980. The projections for the four census regions for 1980 were again totaled, and the difference between the aggregate amount and the national projection was again allocated on the basis of relative past rates of growth as was done for 1965. The adjusted 1980 projections were then added to the 1930, 1940, 1950, 1960 and 1965 data, a new straight-line trend computed for each census region and extrapolated to 2015, where the same adjustment procedure was implemented.

The remainder of the step-down was accomplished in the same way. The newly computed projections of the South Census Region were used as the control estimates in the projection of the economic indicators for its three census divisions. Historical straight-line trends for the three divisions of the South Census Region were extrapolated forward to 1965 and adjusted to the projections of the region. The process was repeated for 1980 and 2015. Projections for the East South-Central and West South-Central Divisions were then combined to form the control estimates for the projection of each major economic indicator in the eight southern states comprising these two census divisions. Historical straight-line trends for each state were extrapolated to 1965, totaled, and the difference between the totals and the control estimates allocated on the basis of relative historical rates of change. Again, the procedure was repeated for 1980 and 2015 as outlined heretofore. The derived projections for the States of Alabama, Louisiana, and Mississippi were then combined to form the control estimates for projections of the base study area and the balance of Louisiana and Alabama. Historical straight-line trends for the base study area and the remainder of the three-state area were extrapolated to 1965, totaled, and the difference between the total and the control estimate of the three states allocated among the two areas on the basis of past rates of growth. The procedure was repeated, as previously explained, for 1980 and 2015. The projections for the base study area were then made the control estimates for the projection of the seven drainage basins which comprise the base study area. The above procedure was duplicated for each drainage basin and projections derived for 1965, 1980 and 2015. The drainage basin's projection was then used as a control estimate to compute the projections of each of its subareas, again repeating the procedure previously described.

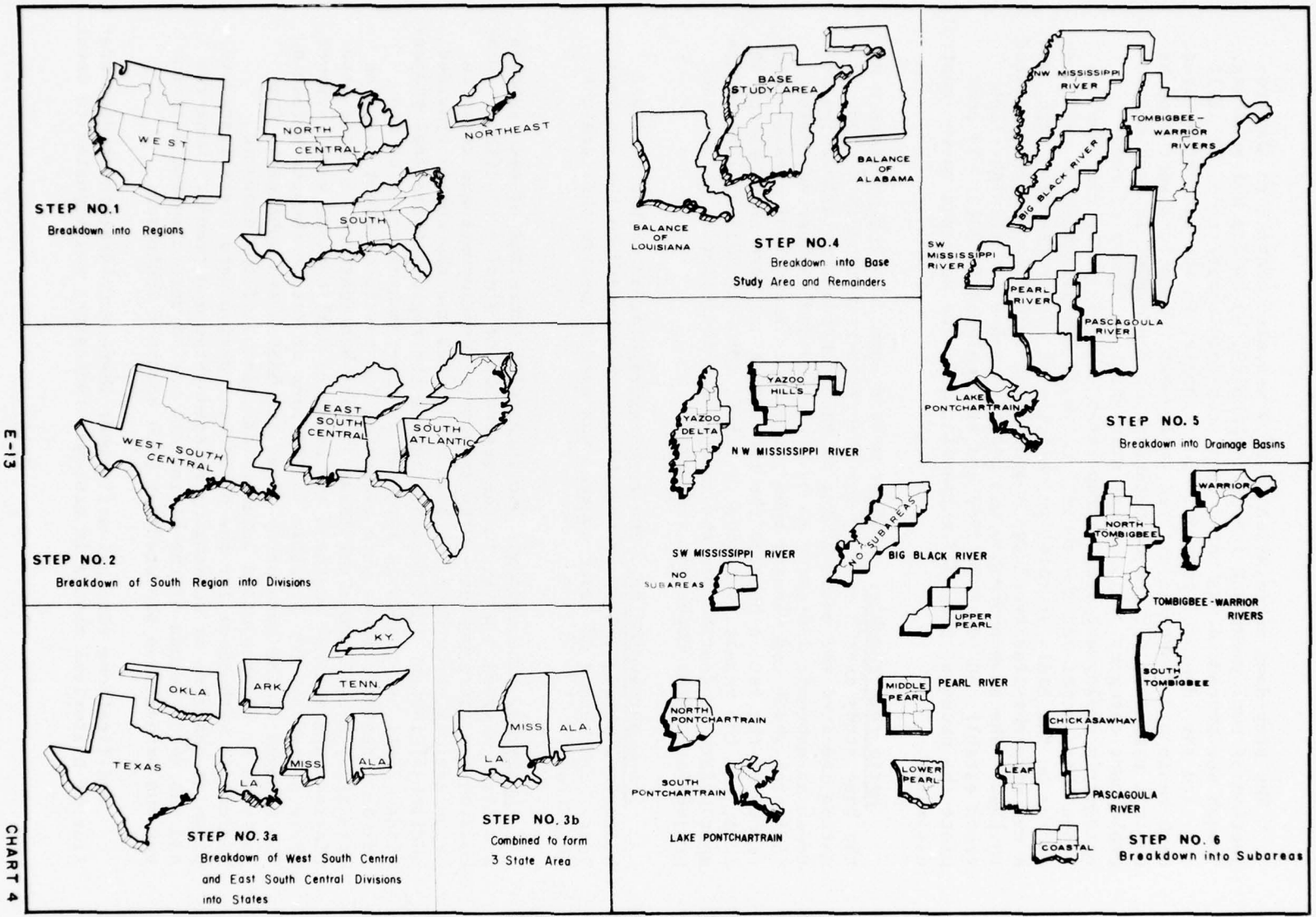

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CHART 4

STEP-DOWN CORRELATION PROJECTION METHOD

The step-down correlation process was also adapted to the projection of employment and income components, by basins and subareas. Though the procedure was not a true step-down correlation, it still utilized the identical program. For example, in the base study area, each basin's and subarea's total employment projections were used as control estimates for the computations of employment in each major employment category. Historical straight-line trends of each category's employment were extrapolated to 1965, the difference between their total and the control estimate was allocated to the categories on the basis of relative velocity of past rates of growth, and a new straight-line trend was computed for 1930-1965 and extrapolated to 1980. The same procedure was repeated and a new straight-line trend established for 1930-1980 and extrapolated to 2015. To complete the process, the 2015 extrapolations were adjusted to the control estimates.

Ratio relationship. Another method common to the projection of the base study area's economy was the ratio-relationship method. This method involved the ascertaining of past dependent relationships between an economic indicator to be projected and another economic indicator which had already been projected. Historical straight-line trends of the ratios between the two indicators were extrapolated to 2015, and the resulting ratios for 1965, 1980 and 2015 applied to the appropriate projection for the independent indicator to derive each projection of the dependent indicator.

Trend extrapolation. The trend extrapolation method utilized historical straight-line trends which were extended to the terminal year. The method of least squares was used to derive the straight-line trend.

Analysis. The economic and industrial potential of each subarea and basin weighed heavily in the selection of final projections. Discussion and correspondence with industrial development and research organizations throughout the base study area and the region provided additional insight into modification of the rigid mathematical projections. National trends as foreseen by governmental agencies and national research firms were evaluated for possible impact upon the base study area. Technical trade journal publications of trade associations and general business and economic publications were reviewed, where necessary, for possible indications of future changes affecting the economy of the base study area, its basins and subareas. Comparisons of the projected inter-relationships of the economic indicators with those for the historical period were investigated to pinpoint changing or unchanging relationships and trends. Long-run and short-run trends of the historical period were compared with the various projections produced for each economic indicator.

Modifications were primarily made where acceleration or deceleration of historical change in economic indicators was expected to occur.

Such expectations were founded upon recent developments of large-scale economic impact in some subareas and the expected stabilizing of other subareas which had experienced historical declines.

Graphical analysis of relative historical trends provided important guidance in the adjustment of many economic indicator projections and in making final determinations of selected projections. Since historical employment data were developed on the basis of place of work rather than of residence, some adjustments had to be made in the relationships to properly allow for future commuting between the various subareas. In the case of income and population, adjustments were dictated by the expected "spillover" of growing populations from certain subareas into other subareas or into areas lying outside the base study area.

Continual recognition of the interdependencies of the various economic indicators provided checks of various projections. These interdependencies were responsible in many instances for modifications being made in one economic indicator based on another, for example, the close interdependency of population, employment and income in a subarea or basin permitted statistical comparison between changes in the indicators. In those subareas experiencing past population decline, for example, stabilization of the subarea's population within the next several decades was supported by the rising nonagricultural employment, especially for 1950 to 1960, that was revealed in the analysis of employment. In general, the findings did not result in any important changes in the analysis or the overall projections, though they did modify specific parts. In fact, these findings contributed more to substantiation than to modification of the projections.

In short, the estimates were derived from a series of what were considered realistic assumptions, and from extension of past trends and relationships, and modified where necessary. If the assumptions do not materialize, or if the relationships are altered in the future, then the actual developments could differ materially from those projected.

SECTION 4. LIMITATIONS

The estimates of future growth presented in this economic base study are projections in the sense that they possess an empirical foundation; i.e., are based on past events; at the same time, they reflect application of professional judgment. Judgment, reflecting economic insights and knowledge of the area, was required throughout the study in selecting the most effective method of projection, in appraising the effects of the factors that have induced are likely to induce economic changes, and in modifying the statistically derived projections.

To predict what will happen in the base study area over the next 50 years is a feat beyond the powers of social science. The projections should not be thought of as being precise figures for specific years. Rather, they should be utilized as the magnitudes, directions and patterns that can be expected to prevail under the given set of assumptions.

Economic analysis and projections were more easily accomplished for the base study area and the larger basins than for the subareas and the smaller basins because of a more noticeable degree of stability in the indicator trends and the accompanying larger size of the universe. For the smaller basins and the subareas, as well as for the detailed sub-components of the economic indicators, analysis and projection were complex since in many instances there have been sharp fluctuations in the direction or rate of economic change, providing no satisfactory statistical long-run trend. It is expected that such fluctuations will continue to occur in these areas among the smaller economic components, thus emphasizing the necessity of evaluating such projections as general long-range trends past 1965, rather than specific projections for 1980 and 2015. The projections presented for 1965 should be viewed as representing the situation existing in the 1960's rather than as specific to one particular year. It is possible to deal only in average conditions, and the short-term influences of a single future year may not be analyzed. However, projections for 1965 should be considerably more reliable as an indication of what will actually occur in the designated year than those for 1980 and 2015.

CHAPTER 3

GENERAL ECONOMIC DEVELOPMENT

SECTION 1. MAJOR PARAMETERS

Consideration of the economic environment in which water resource development is being planned is basic to the determination of needs and the evaluation of benefits to be derived from fulfilling those needs. The need for water and related land resource development is, for the most part, dependent upon the size and characteristics of the basin population and the level and mix of the economic activities. Major parameters of the general economic activity included in this chapter are population, households, labor force, employment and personal income.

SECTION 2. TOTAL POPULATION

General. One of the primary measures of an area's economy is the number of persons living in the area. People reflect the opportunities and problems of the area in which they live. They constitute the market for consumer goods and services. They provide the labor force that

responds to industrial, commercial and agricultural employment demands. They represent the social needs of an area such as schools, hospitals, transportation facilities, recreational facilities and other social services. They are also one of the principal factors that determine an area's future water needs. Effective river basin planning is based upon a full understanding of these water needs and is dedicated to the satisfaction of these needs through the implementation of timely and beneficial water resource developments.

Definition. Total population in a specified area includes all those persons as reported by the Census of Population who resided within the boundaries of that area; e.g., the United States, the base study area, its basins and subareas. Each person enumerated in the Census was counted as an inhabitant of his usual place of residence, which was generally construed to mean the place where he lived and slept most of the time. Persons in the Armed Forces and quartered on military installations were enumerated as residents of the basins and subareas in which such installations were located. Members of their families were enumerated where they actually resided. College students were considered residents of the community in which they were residing while attending college. Inmates of institutions who ordinarily lived in the institutions for long periods of time were counted as inhabitants of the place in which the institution was located. Patients in general hospitals who ordinarily remained in hospitals for short periods of time were counted as living at their homes. Persons without a usual place of residence were counted where they were enumerated. Citizens of the base study area who were overseas for an extended period, such as persons in the Armed Forces, those working at civilian jobs or those studying in foreign universities, were not included in population of the base study area, its basins or subareas. However, the crews of vessels of the U. S. Navy and the U. S. Merchant Marine were counted as part of the population of the ports at which their vessels were docked at the time of census enumeration. Persons temporarily abroad on vacations, business trips, etc., were enumerated at their usual place of residence on the basis of information received from members of their families or neighbors.

Analysis and Interpretation

The United States and the base study area. There were approximately 178.5 million persons in the continental United States in 1960, almost five times the number that resided within its borders in the post Civil War year of 1870. During this 90-year span (1870-1960), the Nation's population had its most rapid decade of growth from 1870 to 1880 when it increased at a rate of 3 percent per year. However, the growth rate began to decelerate after 1880 and fluctuated downward to a low of 0.7 percent per year during 1930 to 1940, the decade of slowest growth. The aggregate population passed the 100 million mark between 1910 and 1920, as can be seen in Table 1. World War II brought about a population explosion that raised the Nation's growth rate to

Table 1

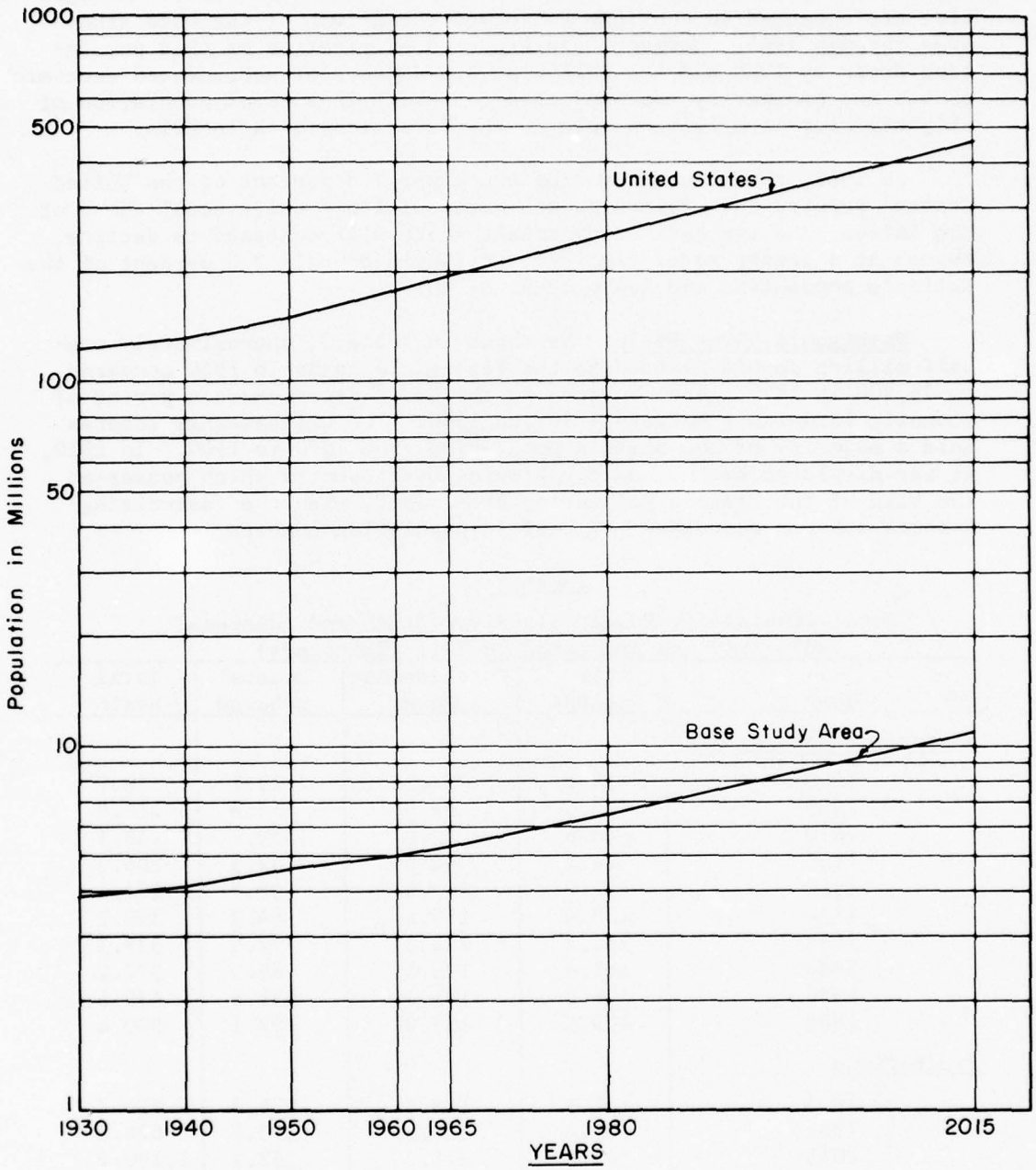
Total population[1]
United States and base study area
(Thousands)

Year	United States	Base study area
1870	38,558.4	1,394.4
1880	50,155.8	1,809.3
1890	62,947.7	2,139.9
1900	75,994.6	2,599.4
1910	91,972.3	3,090.6
1920	105,710.6	3,279.1
1930	122,775.0	3,833.7
1940	131,669.3	4,186.2
1950	150,497.4	4,603.2
1960	179,325.7[2]	5,034.2
1965	197,000.0[3]	5,315.5
1980	254,000.0[3]	6,553.6
2015	461,000.0[3]	11,004.4

[1] Population at time of census enumeration.
[2] Alaska and Hawaii included for 1960 and projected years.
[3] "National Economic Growth Projections 1980, 2000, 2020", preliminary report of the Economic Task Group of the Ad Hoc Water Resources Council Staff; 1965 and 2015 figures derived by interpolation.

1.4 percent per year from 1940 to 1950, and prosperity maintained this growth increase from 1950 to 1960 as the Nation's population rose at an average annual rate of 1.8 percent. This growth rate is expected to increase to 2.1 percent per year from 1960 to 1965, recede slightly to 1.9 percent per year from 1965 to 1980, and then boom upward to 2.3 percent per year from 1980 to 2015. At these projected growth rates, total population in the United States in 2015 should approach 461 million people, approximately two and one-half times its 1960 population (Chart 5).

Between 1870 and 1960 population in the base study area grew from almost 1.4 million to 5 million, an increase of 261 percent but still somewhat below the national rate of growth. The base study area's greatest decade of growth occurred simultaneously with that of the Nation during the 1870 to 1880 period, when population increased 30 percent. During the decade of World War I, the base study area experienced its decade of least population growth. From 1940 to 1960, its population grew at a steady annual rate of 1 percent without any evidence of a post World War II baby boom. However, upon analysis it is evident that such a boom did occur, but its effects on total



TOTAL POPULATION
UNITED STATES AND BASE STUDY AREA

population were neutralized by the heavy out-migration of the 20-44 year age groups. The mechanization of farms in a largely agricultural area contributed to this out-migration. The effects of this out-migration are expected to continue to retard the growth of the base study area through 1965. However, the expected elimination of this population drain by 1980 and the following 3.5 decades of accelerated economic growth and prosperity are projected to result in a total population of slightly over 11 million people in the base study area in 2015.

In 1960, the base study area contained 2.8 percent of the United States' population. Future growth rates will not quite equal those of the Nation, and the base study area's share will continue to decline, though at a lesser rate. In 1980, it should contain 2.6 percent of the Nation's population and 2.4 percent by 2015.

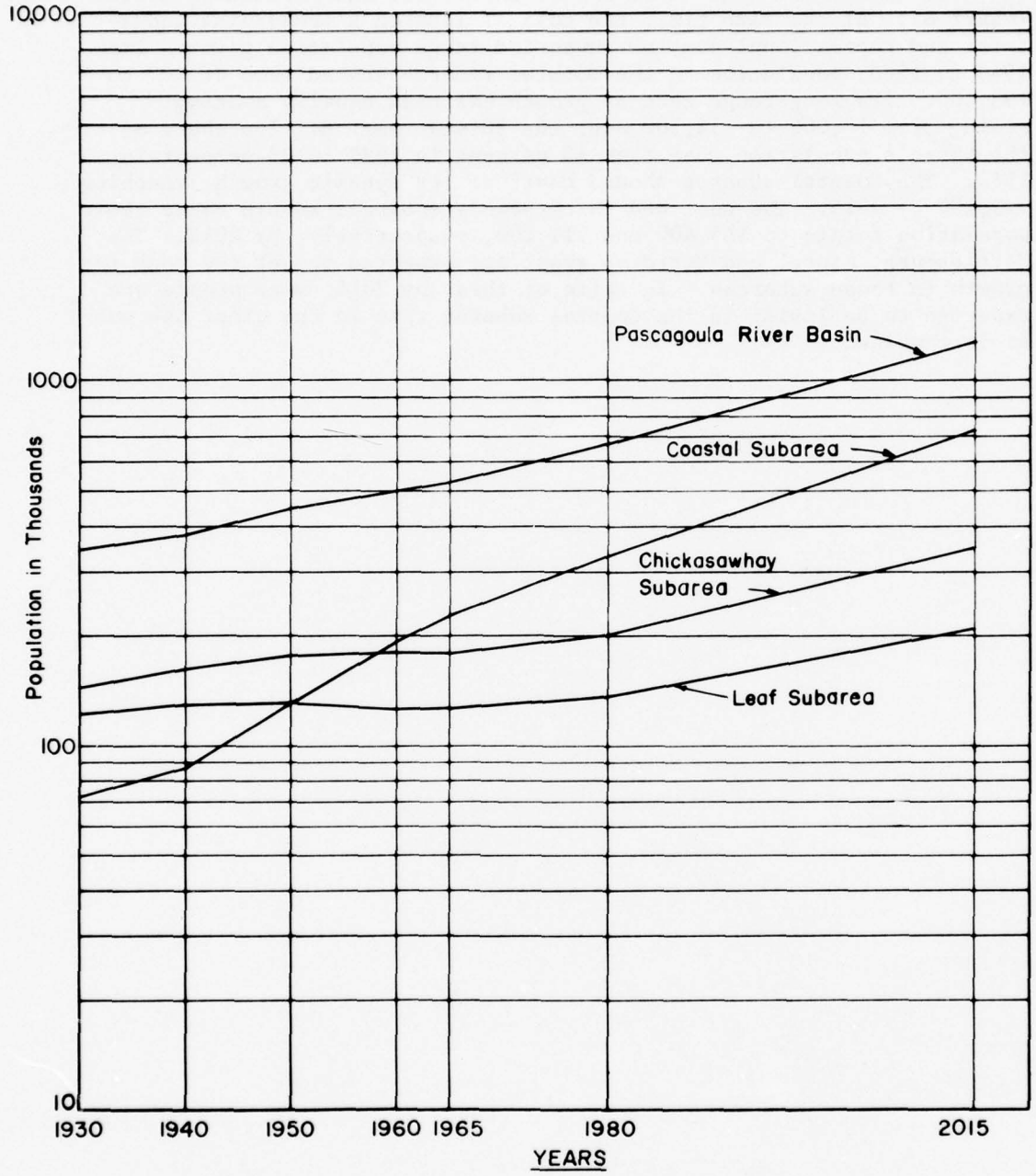
Pascagoula River Basin. As shown in Table 2, approximately one-half million people resided in the Pascagoula Basin in 1960 compared to 76,200 in 1870. Each subarea in the basin experienced a period of economic leadership between 1870 and 1960. The Chickasawhay subarea held a majority of the basin's population from 1870 to 1900. In 1910, it was displaced by the rapidly growing Leaf subarea which possessed the bulk of the basin's population until 1960, when the fast-rising Coastal subarea surpassed the Leaf in population numbers.

Table 2

Total population, Pascagoula River Basin and subareas, 1870-1960 and projected to 2015 (Thousands)

Year	Leaf subarea	Chickasawhay subarea	Coastal subarea	Total basin
Historical Census Data				
1870	28.8	37.3	10.1	76.2
1880	33.5	61.9	15.5	110.9
1890	48.6	75.8	23.7	148.1
1900	74.1	94.9	37.5	206.5
1910	122.0	112.4	56.7	291.1
1920	125.6	110.4	64.2	300.2
1930	144.7	121.3	73.3	339.3
1940	161.4	129.5	86.3	377.2
1950	176.3	131.4	131.8	439.5
1960	179.5	127.8	193.1	500.4
Projections				
1965	181.3	128.8	226.6	536.7
1980	203.4	138.5	332.2	674.1
2015	345.8	211.2	333.2	1,290.2

During the decade of the 1950's, the Leaf's agricultural and forestry-oriented economy was yielding to technological progress and the consequent shrinkage in available employment and population growth (Chart 6). At the same time, the Coastal subarea's broadening industrial and recreational complex supported large population gains. From 1940 to 1960, population in the Coastal subarea jumped from 86,300 to 193,100. Its long-range rate of growth has been equally amazing – rising from 10,000 to 193,100 over the 90-year period. Its share of the basin's population rose from 13 percent in 1870 to 39 percent in 1960. The Coastal subarea should continue its dynamic growth, reaching 733,200 by 2015. The Leaf and Chickasawhay subareas should raise their population totals to 345,800 and 211,200, respectively, by 2015. The Hattiesburg, Laurel and Meridian areas are expected to set the pace for growth in these subareas. In spite of this, by 2015, more people are expected to be living in the Coastal subarea than in the other two subareas combined.



TOTAL POPULATION
PASCAGOULA RIVER BASIN & SUBAREAS

E-22 CHART 6

SECTION 3. URBAN, RURAL NONFARM AND RURAL FARM POPULATION

General. There are several characteristics of population other than total size that exert important influences upon the shape and movement of the base study area's economy. One is the extent of urbanization. Urbanization has become almost synonymous with economic growth, for as an area becomes more urban its rate of economic growth tends to increase.

The population of the base study area has developed from one of about 33 percent urban in 1930 to one of almost 60 percent urban in 1960. More people are moving to the cities, and rural inhabitants are adopting urbanized modes of living. This trend is expected to continue. Thus, with the trend of accelerated growth in the urbanized areas and the attendant population contraction in the most rural areas, future growth in the base study area is encouraging.

Definition. Generally, as defined in the Census of Population in 1950 and 1960, the urban population comprised all persons living in: (a) places of 2,500 inhabitants or more, incorporated as cities, boroughs, villages and towns; (b) densely settled urban fringe areas, whether incorporated or not; (c) counties having no incorporated municipalities within their boundaries but having a density of 1,500 persons or more per square mile; and (d) unincorporated places of 2,500 or more inhabitants.

Prior to 1950, the definition of urban territory excluded a number of large and densely settled places because they were not incorporated. Even though an effort was made to avoid some of the more obvious omissions, by the inclusion of selected places which were classified as urban under special rules, many large and heavily built-up areas were excluded from the urban category. The population not classified as urban constituted the rural population. It was subdivided into the rural farm population, comprising all rural residents living on farms, and the rural nonfarm population, comprising the remainder of the rural population. In 1960, rural farm population consisted of persons living in rural areas, on sites of 10 or more acres from which sales of farm products in 1959 amounted to $50.00 or more or on sites of less than 10 acres from which sales of farm products in 1959 amounted to $250.00 or more. If the reported value of sales was in agreement with specified standards for that size site, the household was classified as a rural farm residence. All other rural area population was classified as rural nonfarm residents.

Prior to 1960, the Census of Population defined rural farm and rural nonfarm residence solely by whether or not the rural resident considered his home a farm or a ranch*. There were no specific criteria or standards. The net effect of the 1960 definition was to

*This definition is not to be confused with the definition of a farm as enumerated in the Census of Agriculture, which before 1959 classified farms solely on production, but after 1959 classified them based on the sale of farm products and size of land tract.

exclude from the farm population persons living on places considered farms by the occupants but from which agricultural products were not sold or from which sales were below the specified minimum. Therefore, a substantial part of the decline in rural farm population and the increase in rural nonfarm population from 1950 to 1960 can be attributed to the change in definition.

In making projections of urban, rural nonfarm and rural farm population in the base study area for 1965, 1980 and 2015, it was necessary to assume that the 1960 definitions would prevail during the forecast period. Looking into the future, one obviously cannot apply static concepts to a dynamic unit. Continually changing patterns of population within the base study area and the United States will require periodic updatings of the definitions of urban, rural nonfarm and rural farm populations for ...

> What was once a clear distinction between "urban" and "rural" with rather well-defined differences in way of life, has increasingly lost meaning. The rapidly advancing homogenization of the American people and the radical growth in suburbanization has been erasing many of the differences in consumption habits between the county and the city ... the distinction between urban and rural, between town and country, between city and suburb will become hazier and may well necessitate such further periodic revisions of concept as those which the Census Bureau has had to make from time to time in the past.*

Analysis and Interpretation

The base study area. Urban population in the base study area increased from 1,333,900 in 1930 to 2,967,400 in 1960. (Table 3) Its greatest advance occurred from 1940 to 1950 when it grew almost five times as fast as the total population of the base study area.

While urban population in the base study area increased from 1930 to 1960, population in the rural areas decreased (Table 4). Rural population fell during this period from 65 percent of the total population in 1930 to 40 percent in 1960. Unusual shifts occurred within rural population during this period. Rural nonfarm population rose over 100 percent, while rural farm declined to one-third its original size; however, the rural farm exodus was so massive that total rural population fell almost one-fifth. These shifts caused rural nonfarm population to account for approximately two-thirds of total rural population by 1960, compared with slightly over one-fourth in 1930.

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*Resources for the Future, RESOURCES FOR AMERICA'S FUTURE. (Johns Hopkins Press, 1963).

Table 3

Urban population - Base study area, Pascagoula River Basin, and subareas 1930-1960 and projected to 2015
(Thousands)

Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
Base study area	1,333.9	1,516.8	2,245.9	2,967.4	3,340.2	4,610.8	8,805.4
Pascagoula							
Leaf	36.6	44.2	58.1	71.5	76.7	100.9	231.0
Chickasawhay	32.0	35.5	48.2	56.4	60.8	72.6	123.4
Coastal	34.7	45.0	87.3	126.5	155.0	248.0	580.7
Total Pascagoula	103.3	124.7	193.6	254.4	292.5	421.5	935.1

Table 4

Rural population - Base study area, Pascagoula River Basin, and subareas 1930-1960 and projected to 2015
(Thousands)

Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
BASE STUDY AREA							
Total	2,499.8	2,670.1	2,357.3	2,066.8	1,975.3	1,942.8	2,199.0
Nonfarm	675.2	781.4	890.0	1,387.6	1,426.0	1,582.8	1,909.4
Farm	1,824.6	1,888.7	1,467.3	679.2	549.3	360.0	289.6
PASCAGOULA							
Leaf							
Total	108.1	117.2	118.2	108.0	104.6	102.5	114.8
Nonfarm	29.4	29.6	45.6	75.0	77.8	85.8	102.3
Farm	78.7	87.6	72.6	33.0	26.8	16.7	12.5
Chickasawhay							
Total	89.3	94.1	83.2	71.4	68.0	65.9	87.8
Nonfarm	25.3	28.4	31.7	52.3	52.4	56.1	80.6
Farm	64.0	65.7	51.5	19.1	15.6	9.8	7.2
Coastal							
Total	38.6	41.2	44.5	66.6	71.6	84.2	152.5
Nonfarm	23.5	25.0	29.6	60.3	66.2	80.1	149.2
Farm	15.1	16.2	14.9	6.3	5.4	4.1	3.3
Pascagoula Basin							
Total	236.0	252.5	245.9	246.0	244.2	252.6	355.1
Nonfarm	78.2	83.0	106.9	187.6	196.4	222.0	332.1
Farm	157.8	169.5	139.0	58.4	47.8	30.6	23.0

Continuing urbanization in the base study area should raise urban population to 8,805,400 by 2015. In that year approximately 80 percent of the base study area's total population will reside in urban areas, and only one out of every eight in the remaining 20 percent will live on a farm.

Pascagoula River Basin. In 1960, one-half the Pascagoula Basin's urban population was concentrated in the four-county Coastal subarea. This subarea was the only one in the basin that had a majority of urban population as early as 1940. From 1940 to 1960, population in the subarea's urban areas, Pascagoula-Biloxi-Gulfport, increased three times as fast as population in the rural areas. Only two subareas in the base study area, the Coastal and the Lower Pearl, registered gains in rural population from 1940 to 1960. However, the Lower Pearl's gain of 19 percent is practically overshadowed by the Coastal's 62 percent increase. It is noteworthy that the major part of the rural population increase was concentrated in rural nonfarm. Rural nonfarm population in the Coastal subarea increased from 25,000 in 1940 to 60,300 in 1960 — almost equaling the urban population's rate of increase. Rural farm decreased from 16,200 to 6,300, causing the Coastal subarea to have the second smallest rural farm population in the base study area in 1960.

The Coastal subarea's rural farm population is projected to continue to decline from 1960 to 2015, but its rural nonfarm population should increase faster than in any other subarea. By 2015, rural nonnonfarm population should almost reach 150,000, two and one-half times its 1960 total.

Between 1960 and 1980, the Coastal subarea's urban population is projected to almost double, reaching 248,000 in 1980, then increasing 134 percent to 580,700 in 2015. With 79 percent of its total population urbanized by 2015, the subarea's accumulation of the basin's total urban population will have increased from 50 percent in 1960 to 62 percent by 2015.

The growth of urban population in the Chickasawhay subarea has been contingent upon the growth of Meridian, the subarea's major city. Population in the subarea's urban areas increased 76 percent from 1930 to 1960, but faster urban growth in the remainder of the basin reduced its share of the basin's urban population from 31 to 22 percent.

Even though the subarea had a rural population decrease of 22,700 people from 1940 to 1960, it still remained predominantly rural with 56 percent of its people living in rural areas. However, of its 71,400 rural inhabitants in 1960, only 19,100 or 27 percent actually lived on farms.

Farm population in the Chickasawhay is expected to continue to decline during the forecast period, falling to 9,800 in 1980 and to 7,200 in 2015. Nonfarm population should continue to assume a larger portion of the subarea's total rural population, reaching 92 percent in 2015.

Meridian's growth should continue to foster the expected increase in the subarea's urban population from 56,400 in 1960 to 123,400 in 2015. In spite of such growth, the Chickasawhay should contain only 13 percent of the basin's urban population in 2015.

From 1930 to 1960, rural population in the Leaf subarea decreased by 100. The 45,600 increase in rural nonfarm population over the three decades was completely neutralized by the decrease of 45,700 in the rural farm population. The subarea was completely dependent growth-wise on the 34,900 increase in urban population during this period.

Urban population growth should continue to produce the subarea's future population growth. By 1980, urban population should surpass the 100,000 mark and it should rise to 231,000 by 2015. Acceleration of growth in the Hattiesburg and Laurel areas after 1980 is expected to be primarily responsible for urban population more than doubling during the 35-year period.

Rural nonfarm population should also contribute to total population growth. However, the projected addition of 27,300 rural nonfarm inhabitants from 1960 to 2015 will be tempered by the projected decrease of 20,500 rural farm inhabitants, leaving a net rural population growth of only 6,800, compared to an urban increase of 159,500.

SECTION 4. AGE AND SEX CHARACTERISTICS OF THE POPULATION

General. Another important feature of the basin's population is its composition by age and sex. Projected changes in age and sex characteristics can signal changes in the number of households and in the size and composition of the labor force. Births, deaths and migrations are the three factors that determine changes in the age and sex characteristics of a population. The lack of adequate historical indicators prohibits determination of a trend in birth rates. Because of the present high birth rates, it is probable any increase will be slight and possibly followed by a decrease. Therefore, it is assumed that birth rates will continue at about the present rate in the basin until about 1980, then decline gradually. Increased public acceptance of birth control techniques, greater affluence, longer time periods between marriage and the starting of families, urbanization and a declining family size are expected to exert the influences that will cause the projected trends in birth rates in the basin.

Death rates are already very low in the basin, and any further decline is expected to occur at a very slow rate and over a long period. Based on medical advances, it is assumed that a slight decline in death rates from 1960 to 2015 could be possible, thereby contributing to extended life periods resulting in continued increases in the size of the 65 and over age group in the basin.

Migration within age and sex groups is the most unpredictable of the three population factors, also the most perplexing aspect of a regional demographers' attempt to project population. Migration can be in or out of a particular area during a particular time, depending almost entirely on economic opportunities. Since much of the basin's future economic opportunity is expected to be tied to the demands of industry for water, it is likely that water resource development will assume an important role in determining the rate of migration into or out of the basin.

Analysis and Interpretation

The base study area and its basins. The birth rate in the base study area between 1950 and 1960 averaged 20 persons per 1,000 persons annually. This is much higher than the Nation's 15.3 per 1,000, but the expected gradual decline should narrow this difference during the forecast period.

From 1870 to 1960, serious out-migration from the base study area occurred in only three decades, 1910-1920, 1940-1950 and 1950-1960. The decades of World Wars I and II exemplify the effects of war and subsequent out-migration increase upon a basically agricultural economy. Farm mechanization in the 1950's reduced economic opportunity for thousands of agriculture-oriented workers in the base study area, forcing them to migrate out of the area in search of employment.

The people leaving in the 1940-1950 and 1950-1960 decades were the young, productive citizens. From 1950 to 1960, the 20 through 44 age groups suffered large losses in the base study area (Table 5). Total out-migration during the decade equaled 11 percent of the 1950 population. After 1965, emigration should lessen rapidly, and from 1980 to 2015, a reversal in this trend should occur as economic opportunity increases.

The number of dependents (persons under 20 and persons 65 years old and over) per 100 productive workers (all persons 20 through 64 years of age) in the base study area at any particular time is a highly effective summation index of all fertility, mortality and migration rates.

In 1930, the base study area's dependency ratio was 93:100. A low birth rate during the Great Depression lowered the ratio to 85:100 in 1940. A high birth rate, out-migration of productive workers and increased longevity between 1940 and 1960 reversed the trend, and the ratio equaled 104:100 in 1960. This pattern of change in the dependency ratio was emulated in all the basins and subareas within the base study area. Decreasing out-migration should slow the rate of climb of the dependency ratio from 1960 to 1980. After 1980, the expected decrease in birth rates coupled with in-migration should turn the trend downward.

Table 5

Population distribution by age and sex - 1930 through 1960 and projected to 2015

Base study area

Age Groups	Census Data											
	1930			1940			1950			1960		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 5	426,848	215,612	211,236	416,349	209,462	206,887	575,181	291,349	283,832	629,143	318,702	310,441
5 - 9	455,650	230,077	225,573	418,830	210,921	207,909	475,977	240,683	235,294	585,066	296,075	288,991
10 - 11	409,954	207,340	202,614	169,869	85,839	84,030	167,797	85,382	82,415	221,510	112,542	108,968
12 - 14				272,885	137,701	135,184	248,968	125,567	123,401	310,127	157,328	152,799
15 - 19	405,047	197,606	207,441	430,339	211,591	218,748	377,991	186,477	191,514	420,868	211,173	209,695
20 - 24	383,766	180,243	203,523	377,790	178,652	199,138	367,830	173,745	194,085	311,445	147,683	163,762
25 - 29	324,129	154,162	169,967	362,995	172,252	190,743	357,506	170,978	186,528	289,833	137,151	152,682
30 - 34	261,853	126,810	135,043	326,184	157,897	168,287	317,404	151,724	165,680	311,922	146,566	165,356
35 - 39	466,945	228,977	237,968	299,035	143,619	155,416	326,846	155,593	171,253	316,786	150,153	166,633
40 - 44				246,060	121,202	124,858	298,890	145,512	153,378	291,724	139,410	152,314
45 - 49	354,124	184,518	169,606	215,936	108,034	107,902	258,280	126,796	131,484	286,718	138,568	148,150
50 - 54				180,103	91,535	88,568	214,974	106,076	108,898	259,383	125,642	133,741
55 - 59	200,031	107,690	92,341	142,093	72,833	69,260	172,584	85,896	86,688	223,511	108,184	115,327
60 - 64				113,520	57,396	56,124	137,635	68,134	69,501	174,149	82,050	92,099
65 - 69	99,059	50,533	48,526	100,641	50,713	49,928	133,915	63,680	70,235	156,072	71,675	84,397
70 - 74				57,392	28,695	28,697	82,257	39,379	42,878	111,706	50,763	60,943
75 - 79	44,508	20,778	23,730	56,824	25,687	31,137	76,014	35,277	40,737	74,626	33,055	41,571
80 - 84										36,698	15,495	21,203
85 & Over							13,138	4,277	7,861	22,966	9,261	13,705
Unknown	1,766	886	880	------	------	------	------	------	------	------	------	------
Total	3,833,680	1,905,232	1,928,448	4,186,845	2,064,029	2,122,816	4,603,187	2,257,525	2,345,662	5,034,253	2,451,476	2,582,777

Age Groups	Projections								
	1965			1980			2015		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 5	675,110	342,440	332,670	871,350	442,145	429,205	1,423,960	727,374	696,586
5 - 9	592,382	299,943	292,439	779,692	394,749	384,943	1,322,119	672,154	649,965
10 - 11	243,653	123,595	120,058	302,935	153,803	149,132	521,013	266,042	254,971
12 - 14	334,106	169,157	164,949	408,678	207,381	201,297	694,763	353,763	341,000
15 - 19	491,642	249,147	242,495	608,088	306,553	301,535	1,077,215	546,090	531,125
20 - 24	360,210	176,052	184,158	511,074	249,506	261,568	926,450	453,944	472,506
25 - 29	279,385	129,569	149,816	466,808	222,162	244,646	783,821	375,054	408,767
30 - 34	273,922	129,577	144,345	404,332	192,582	211,750	683,994	325,656	358,338
35 - 39	301,755	141,295	160,460	316,336	149,033	167,303	605,174	286,829	318,345
40 - 44	310,946	147,452	163,494	257,592	118,163	139,429	540,639	256,154	284,485
45 - 49	279,933	134,876	145,057	248,900	117,955	130,945	464,782	221,906	242,876
50 - 54	273,143	131,709	141,434	270,699	127,309	143,390	392,307	186,758	205,549
55 - 59	246,020	118,356	127,664	270,942	127,994	142,948	354,787	168,760	186,027
60 - 64	206,055	97,394	108,661	234,555	109,060	125,495	329,638	153,608	176,030
65 - 69	168,831	76,296	92,535	229,865	104,266	125,599	333,569	150,135	183,434
70 - 74	143,897	63,209	80,688	205,889	88,894	116,995	300,131	127,609	172,522
75 & Over	134,541	58,717	75,824	165,821	69,264	96,557	249,994	98,868	151,126
Total	5,315,531	2,588,784	2,726,747	6,553,556	3,180,819	3,372,737	11,004,356	5,370,704	5,633,652

It is generally recognized that the more urban a basin, the lower its dependency ratio.

From 1930 to 1960, females outnumbered males in the base study area. Their plurality increased each decade, from 50.3 percent of the total population in 1930 to 51.3 percent in 1960. Within the age groups, however, this imbalance did not hold true. In the under-12 age group more males than females were counted every decade.

Conversely, for the remainder of the population (12 and over) there were more females than males, females reaching 52.1 percent of the group's population by 1960.

Females should remain in greater numbers than males in the base study area through 2015, their majority fluctuating between 51.2 and 51.5 percent of the population. Males should continue to dominate the under 12 age group; females, the 12 and over age group. Although the under 12 age group will increase as shown in Table 6, the 12-and-over age group will still comprise approximately 70 percent of the population. Hence, there will be more females than males in the total population.

In the 65 and over age group, where the female majority has been prevalent since 1930, the females should become more numerous than males each decade. Increased urbanization has noticeably affected the sex composition of this elderly group.

This age group is expected to raise its share of the base study area's total population to 9.2 percent by 1980, then drop back to about its 1960 percentage in 2015. This relative decline should be due more to an increasing percentage of productive workers than to a decrease in the number of elderly people.

Table 6

Population composition
Under 12 years of age and 12 years old and over
Base study area

Year	Under 12	12 and over
1940	1,005,048	3,181,797
1950	1,218,955	3,384,232
1960	1,435,719	3,598,534
1965	1,511,100	3,804,400
1980	1,954,000	4,599,600
2015	3,267,100	7,737,300

Pascagoula River Basin. Since 1950, the presence of Keesler Air Force Base and related installations in the Coastal subarea have influenced the imbalance of the male-female proportions of the population

strongly enough to affect the entire Pascagoula Basin. In 1930 and 1940, a majority of females existed in the basin, but by 1950 the relationship had reversed, with males claiming a slight 0.3 percent advantage (Table 7). Between 1950 and 1960, the females increased slightly faster than the males to cut the male plurality to only 0.1 percent. With an increased influence of the Coastal subarea's population upon the basin's forecast for 1965 through 2015, the basin's male majority is projected to fluctuate only slightly between 0.1 and 0.3 percent during the 1965-2015 period.

In the Coastal subarea, assuming no lessening of the military influence, males should exceed females by 2.3 percent in 1965, 1.5 percent in 1980 and 1.1 percent in 2015, from a high of 3.6 percent in 1950 (Table 8). The Leaf and Chickasawhay subareas, having experienced no upsetting influences, had "normal" populations with a slight excess of females throughout the historical periods, as illustrated in Tables 9 and 10. Such a population composition is projected to continue in these subareas to 2015.

With a growing percentage of young people in the Coastal subarea, the percent of persons 65 years of age and over has become relatively low. In 1930, this elderly age group comprised 4.8 percent of the subarea's total population, as compared with, for example, the Chickasawhay with 4.4 percent. However, by 1960, the 65 and over group represented 10.0 percent of the population in the Chickasawhay subarea but only 5.9 percent in the Coastal.

The percentage of 65 years old and over in the total population should peak in 1980 for all the basin's subareas, the Chickasawhay reaching the highest, 12.8 percent. The Coastal subarea will remain low, with 6.1 percent. The Leaf, with 11.0 percent, will be well above the basin average of 9.0 percent. By 2015, the relationship will drop to 10.1, 5.7 and 9.4 percent, respectively, averaging 7.4 percent for the basin.

These differences in age distribution have historically exerted an influence upon the relationship between dependents and productive workers in each subarea, as seen in Table 11. The Chickasawhay has had the highest ratio; the Coastal the lowest. The worker-dependent relationships between the subareas should continue to 2015, though decline slightly from 1980 to 2015. Faster urbanization in the Coastal and Leaf subareas will contribute to the relative slowing of the ratio rise in these subareas.

Emigration from the Leaf and Chickasawhay subareas and immigration in the Coastal subarea contributed to noticeable changes in the 20 through 39 age group from 1940 to 1960. During these 20 years, population in this age group declined 8,097 in the Leaf subarea and 11,410 in the Chickasawhay subarea, and increased 28,310 in the Coastal subarea. This occurrence dropped the percent of total population contained in this age group from 31.4 percent to 23.6 percent in

Table 7

Population distribution by age and sex - 1930 through 1960 and projected to 2015
Pascagoula River Basin

Age Groups	Census Data											
	1930			1940			1950			1960		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 5	40,169	20,346	19,823	38,981	19,872	19,109	53,918	27,423	26,495	62,477	31,783	30,694
5 - 9	42,303	21,414	20,889	39,370	19,727	19,643	45,119	22,910	22,209	55,888	28,437	27,451
10 - 11	37,701	19,132	18,569	16,001	8,128	7,873	16,433	8,367	8,066	21,219	10,857	10,362
12 - 14				25,738	13,119	12,619	24,317	12,306	12,011	30,398	15,439	14,959
15 - 19	37,482	18,334	19,148	40,600	20,110	20,490	40,704	21,811	18,893	46,316	25,511	20,805
20 - 24	32,694	15,180	17,514	33,812	16,144	17,668	37,200	19,138	18,062	34,725	18,051	16,674
25 - 29	26,306	12,177	14,129	31,083	14,806	16,277	34,206	16,695	17,511	30,356	14,970	15,386
30 - 34	21,608	10,291	11,317	27,616	13,292	14,324	30,103	14,932	15,171	30,611	14,701	15,910
35 - 39	39,274	19,338	19,936	24,967	11,791	13,176	30,009	14,403	15,606	30,589	14,681	15,908
40 - 44				21,049	10,388	10,661	27,057	13,228	13,829	28,223	13,724	14,499
45 - 49	29,743	15,315	14,428	18,823	9,663	9,160	23,083	11,166	11,917	27,452	13,484	13,968
50 - 54				16,239	8,391	7,848	19,630	9,804	9,826	24,292	11,974	12,318
55 - 59	17,880	9,815	8,065	12,644	6,493	6,151	16,059	8,303	7,756	21,328	10,240	11,088
60 - 64				10,358	5,443	4,915	13,257	6,761	6,496	17,043	8,104	8,939
65 - 69	9,606	5,073	4,533	9,463	4,931	4,532	12,318	6,071	6,247	15,135	7,283	7,852
70 - 74				5,295	2,750	2,545	7,812	3,942	3,870	11,185	5,334	5,851
75 - 79	4,350	2,156	2,194	5,185	2,480	2,705	7,062	3,431	3,631	7,244	3,353	3,891
80 - 84										3,720	1,673	2,047
85 & Over							1,213	540	673	2,207	948	1,259
Unknown	222	111	111	------	------	------	------	------	------	------	------	------
Total	339,338	168,682	170,656	377,244	187,528	189,696	439,500	221,231	218,269	500,408	250,547	249,861

Age Groups	Projections								
	1965			1980			2015		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 5	68,883	35,101	33,782	93,942	47,883	46,059	171,592	88,014	83,578
5 - 9	57,343	29,172	28,171	76,807	39,053	37,754	151,954	77,236	74,718
10 - 11	23,516	11,973	11,543	29,515	15,017	14,498	57,915	29,480	28,435
12 - 14	32,091	16,338	15,753	39,654	20,165	19,489	77,561	39,484	38,077
15 - 19	52,861	28,322	24,539	64,062	34,348	29,714	131,111	70,840	60,271
20 - 24	43,163	24,707	18,456	56,723	31,120	25,603	120,571	67,100	53,471
25 - 29	31,176	15,210	15,966	47,679	24,001	23,678	97,228	50,141	47,087
30 - 34	27,980	13,166	14,814	41,762	20,233	21,529	80,658	38,852	41,806
35 - 39	29,220	13,906	15,314	34,736	17,604	17,132	69,835	33,313	36,522
40 - 44	29,724	14,086	15,638	26,451	11,859	14,592	61,315	28,834	32,481
45 - 49	27,325	13,445	13,880	25,068	11,595	13,473	53,134	25,322	27,812
50 - 54	25,994	12,834	13,160	26,364	12,566	13,798	45,129	21,651	23,478
55 - 59	23,414	11,489	11,925	26,952	12,908	14,044	40,063	19,156	20,907
60 - 64	20,094	9,388	10,706	24,028	11,478	12,550	36,717	17,070	19,647
65 - 69	16,717	7,641	9,076	23,222	10,659	12,563	35,939	16,397	19,542
70 - 74	14,163	6,569	7,594	21,215	9,389	11,826	33,147	14,881	18,266
75 & Over	13,100	6,006	7,094	15,928	7,504	8,424	26,260	11,542	14,718
Total	536,764	269,353	267,411	674,108	337,382	336,726	1,290,129	649,313	640,816

Table 8

Population distribution by age and sex - 1930 through 1960 and projected to 2015
Coastal subarea, Pascagoula River Basin

Age Groups	Census Data											
	1930			1940			1950			1960		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 5	8,076	4,142	3,934	8,268	4,197	4,071	16,000	8,183	7,817	26,950	13,839	13,111
5 - 9	8,474	4,322	4,152	7,874	3,976	3,898	12,376	6,284	6,092	21,404	10,843	10,561
10 - 11	7,638	3,850	3,788	3,387	1,742	1,645	4,049	2,038	2,011	7,576	3,907	3,669
12 - 14				5,449	2,812	2,637	5,992	2,998	2,994	10,720	5,507	5,213
15 - 19	7,568	3,687	3,881	8,618	4,320	4,298	13,244	8,542	4,702	18,967	11,738	7,229
20 - 24	6,756	3,186	3,570	7,490	3,571	3,919	13,358	8,148	5,210	15,824	8,801	7,023
25 - 29	5,686	2,676	3,010	7,317	3,485	3,832	11,844	6,038	5,806	13,980	7,325	6,655
30 - 34	4,891	2,434	2,457	6,322	2,950	3,372	10,039	5,327	4,712	12,948	6,520	6,428
35 - 39	9,120	4,541	4,579	5,888	2,835	3,053	8,911	4,414	4,497	12,575	6,291	6,284
40 - 44				5,439	2,923	2,516	7,708	3,780	3,928	10,780	5,495	5,285
45 - 49	7,105	3,653	3,452	5,134	2,848	2,286	6,345	3,176	3,169	9,604	4,902	4,702
50 - 54				4,178	2,329	1,849	5,711	3,103	2,608	8,036	4,013	4,023
55 - 59	4,476	2,420	2,056	3,162	1,619	1,543	4,850	2,747	2,103	6,761	3,371	3,390
60 - 64				2,637	1,391	1,246	3,862	2,159	1,703	5,563	2,847	2,716
65 - 69	2,399	1,222	1,177	2,411	1,237	1,174	3,106	1,566	1,540	4,581	2,422	2,159
70 - 74				1,372	709	663	2,063	1,057	1,006	3,332	1,679	1,653
75 - 79	1,088	539	549	1,313	598	715	1,976	940	1,036	1,921	890	1,031
80 - 84										1,006	460	546
85 & Over							316	143	173	594	232	362
Unknown	66	46	20	------	------	------	------	------	------	------	------	------
Total	73,343	36,718	36,625	86,259	43,542	42,717	131,750	70,643	61,107	193,122	101,082	92,040

Age Groups	Projections								
	1965			1980			2015		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 5	32,598	16,739	15,859	51,604	26,499	25,105	104,703	54,328	50,375
5 - 9	24,460	12,391	12,069	38,566	19,537	19,029	87,135	44,141	42,994
10 - 11	9,574	4,865	4,709	14,221	7,226	6,995	31,740	16,128	15,612
12 - 14	12,693	6,450	6,243	18,852	9,579	9,273	42,262	21,475	20,787
15 - 19	22,610	13,005	9,605	31,985	18,055	13,930	74,700	42,167	32,533
20 - 24	20,935	13,734	7,201	31,074	18,343	12,731	75,398	44,579	30,819
25 - 29	16,058	7,929	8,129	26,193	13,473	12,720	62,194	32,939	29,255
30 - 34	13,567	6,375	7,192	22,693	10,937	11,756	50,043	23,799	26,244
35 - 39	12,985	6,475	6,510	19,323	10,185	9,138	41,618	19,594	22,024
40 - 44	12,691	6,216	6,475	13,804	5,867	7,937	34,611	15,935	18,676
45 - 49	10,893	5,635	5,258	12,026	5,561	6,465	28,785	13,469	15,316
50 - 54	9,546	4,915	4,631	11,387	5,697	5,690	23,092	10,908	12,184
55 - 59	8,072	4,023	4,049	11,079	5,549	5,530	19,135	9,020	10,115
60 - 64	6,508	3,142	3,366	9,052	4,571	4,481	16,144	7,356	8,788
65 - 69	5,279	2,601	2,678	7,584	3,633	3,951	15,551	7,141	8,410
70 - 74	4,149	2,079	2,070	6,501	2,836	3,665	14,071	6,796	7,275
75 & Over	4,025	1,942	2,083	6,255	3,513	2,742	12,018	4,776	7,242
Total	226,643	118,516	108,127	332,199	171,061	161,138	733,200	374,551	358,649

Table 9

Population distribution by age and sex - 1930 through 1960 and projected to 2015
Leaf subarea, Pascagoula River Basin

Age Groups	Census Data											
	1930			1940			1950			1960		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 5	17,929	9,038	8,891	17,407	8,881	8,526	21,878	11,144	10,734	20,919	10,571	10,348
5 - 9	18,800	9,470	9,330	17,783	8,888	8,895	19,429	9,862	9,567	20,126	10,388	9,738
10 - 11	16,549	8,392	8,157	7,062	3,588	3,474	7,149	3,675	3,474	7,912	4,088	3,824
12 - 14				11,359	5,791	5,568	10,578	5,404	5,174	11,514	5,808	5,706
15 - 19	16,491	8,075	8,416	17,887	8,874	9,013	15,865	7,649	8,216	16,654	8,401	8,253
20 - 24	14,245	6,625	7,620	14,740	7,110	7,630	13,838	6,482	7,356	11,661	5,834	5,827
25 - 29	11,478	5,301	6,177	13,328	6,417	6,911	12,988	6,216	6,772	9,768	4,644	5,124
30 - 34	9,225	4,374	4,851	11,944	5,856	6,088	11,522	5,567	5,955	10,472	4,852	5,620
35 - 39	16,189	8,014	8,175	10,623	5,045	5,578	12,196	5,797	6,399	10,637	4,979	5,658
40 - 44				8,703	4,193	4,510	11,117	5,486	5,631	10,144	4,871	5,273
45 - 49	11,736	6,151	5,585	7,375	3,696	3,679	9,358	4,525	4,833	10,414	5,044	5,370
50 - 54				6,492	3,337	3,155	7,886	3,786	4,100	9,415	4,658	4,757
55 - 59	6,798	3,809	2,989	5,119	2,667	2,452	6,208	3,112	3,096	8,136	3,883	4,253
60 - 64				3,956	2,142	1,814	5,136	2,543	2,593	6,451	2,960	3,491
65 - 69	3,621	1,962	1,659	3,709	1,954	1,755	5,051	2,502	2,549	5,831	2,742	3,089
70 - 74				1,987	1,052	935	2,987	1,538	1,449	4,303	2,048	2,255
75 - 79	1,567	810	757	1,959	998	961	2,656	1,319	1,337	2,935	1,364	1,571
80 - 84										1,385	650	735
85 & Over							469	223	246	856	400	456
Unknown	91	36	55	------	------	------	------	------	------	------	------	------
Total	144,719	72,057	72,662	161,433	80,489	80,944	176,311	86,830	89,481	179,533	88,185	91,348

Age Groups	Projections								
	1965			1980			2015		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 5	21,321	10,774	10,547	24,812	12,538	12,274	41,092	20,565	20,527
5 - 9	19,464	10,046	9,418	22,756	11,745	11,011	39,539	20,408	19,131
10 - 11	8,158	4,211	3,947	9,077	4,685	4,392	15,798	8,054	7,744
12 - 14	11,264	5,814	5,450	12,439	6,397	6,042	21,402	11,047	10,355
15 - 19	18,056	9,170	8,886	19,213	9,887	9,326	34,971	17,996	16,975
20 - 24	13,834	6,897	6,937	15,776	8,025	7,751	28,422	14,458	13,964
25 - 29	9,369	4,656	4,713	13,104	6,622	6,482	22,268	11,252	11,016
30 - 34	8,521	4,079	4,442	11,677	5,792	5,885	19,466	9,787	9,679
35 - 39	9,527	4,364	5,163	9,783	4,768	5,015	17,938	8,924	9,014
40 - 44	9,860	4,599	5,261	7,922	3,863	4,059	17,048	8,454	8,594
45 - 49	9,420	4,566	4,854	7,825	3,683	4,142	15,509	7,763	7,746
50 - 54	9,453	4,584	4,869	8,873	4,097	4,776	14,031	7,032	6,999
55 - 59	8,628	4,242	4,386	9,286	4,351	4,935	13,246	6,596	6,650
60 - 64	7,535	3,516	4,019	8,534	4,024	4,510	12,675	6,178	6,497
65 - 69	6,418	2,846	3,572	8,795	4,008	4,787	12,602	5,862	6,740
70 - 74	5,472	2,521	2,951	8,274	3,772	4,502	11,738	5,024	6,714
75 & Over	5,000	2,296	2,704	5,252	2,233	3,019	8,032	4,273	3,759
Total	181,300	89,181	92,119	203,398	100,490	102,908	345,777	173,673	172,104

Table 10

Population distribution by age and sex - 1930 through 1960 and projected to 2015
Chickasawhay subarea, Pascagoula River Basin

Age Groups	Census Data											
	1930			1940			1950			1960		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 5	14,164	7,166	6,998	13,306	6,794	6,512	16,040	8,096	7,944	14,608	7,373	7,235
5 - 9	15,029	7,622	7,407	13,713	6,863	6,850	13,314	6,764	6,550	14,358	7,206	7,152
10 - 11	13,514	6,890	6,624	5,552	2,798	2,754	5,235	2,654	2,581	5,731	2,862	2,869
12 - 14				8,930	4,516	4,414	7,747	3,904	3,843	8,164	4,124	4,040
15 - 19	13,423	6,572	6,851	14,095	6,916	7,179	11,595	5,620	5,975	10,695	5,372	5,323
20 - 24	11,693	5,369	6,324	11,582	5,463	6,119	10,004	4,508	5,496	7,240	3,416	3,824
25 - 29	9,142	4,200	4,942	10,438	4,904	5,534	9,374	4,441	4,933	6,608	3,001	3,607
30 - 34	7,492	3,483	4,009	9,350	4,486	4,864	8,542	4,038	4,504	7,191	3,329	3,862
35 - 39	13,965	6,783	7,182	8,456	3,911	4,545	8,902	4,192	4,710	7,377	3,411	3,966
40 - 44				6,907	3,272	3,635	8,232	3,962	4,270	7,299	3,358	3,941
45 - 49	10,902	5,511	5,391	6,314	3,119	3,195	7,380	3,465	3,915	7,434	3,538	3,896
50 - 54				5,569	2,725	2,844	6,033	2,915	3,118	6,841	3,303	3,538
55 - 59	8,606	3,586	3,020	4,363	2,207	2,156	5,001	2,444	2,557	6,431	2,986	3,445
60 - 64				3,765	1,910	1,855	4,259	2,059	2,200	5,029	2,297	2,732
65 - 69	3,586	1,889	1,697	3,343	1,740	1,603	4,161	2,003	2,158	4,723	2,119	2,604
70 - 74				1,936	989	947	2,762	1,347	1,415	3,550	1,607	1,943
75 - 79	1,695	807	888	1,913	884	1,029	2,430	1,172	1,258	2,388	1,099	1,289
80 - 84										1,329	563	766
85 & Over							428	174	254	757	316	441
Unknown	65	29	36	------	------	------	------	------	------	------	------	------
Total	121,276	59,907	61,369	129,532	63,497	66,035	131,439	63,758	67,681	127,753	61,280	66,473

Age Groups	Projections								
	1965			1980			2015		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 5	14,964	7,588	7,376	17,526	8,846	8,680	25,797	13,121	12,676
5 - 9	13,419	6,735	6,684	15,485	7,771	7,714	25,280	12,687	12,593
10 - 11	5,784	2,897	2,887	6,217	3,106	3,111	10,377	5,298	5,079
12 - 14	8,134	4,074	4,060	8,363	4,189	4,174	13,897	6,962	6,935
15 - 19	12,195	6,147	6,048	12,864	6,406	6,458	21,440	10,677	10,763
20 - 24	8,394	4,076	4,318	9,873	4,752	5,121	16,751	8,063	8,688
25 - 29	5,749	2,625	3,124	8,382	3,906	4,476	12,766	5,950	6,816
30 - 34	5,892	2,712	3,180	7,392	3,504	3,888	11,149	5,266	5,883
35 - 39	6,708	3,067	3,641	5,630	2,651	2,979	10,279	4,795	5,484
40 - 44	7,173	3,271	3,902	4,725	2,129	2,596	9,656	4,445	5,211
45 - 49	7,012	3,244	3,768	5,217	2,351	2,866	8,840	4,090	4,750
50 - 54	6,995	3,335	3,660	6,104	2,772	3,332	8,006	3,711	4,295
55 - 59	6,714	3,224	3,490	6,587	3,008	3,579	7,682	3,540	4,142
60 - 64	6,051	2,730	3,321	6,442	2,883	3,559	7,898	3,536	4,362
65 - 69	5,020	2,194	2,826	6,843	3,018	3,825	7,786	3,394	4,392
70 - 74	4,542	1,969	2,573	6,440	2,781	3,659	7,338	3,061	4,277
75 & Over	4,075	1,768	2,307	4,421	1,758	2,663	6,210	2,493	3,717
Total	128,821	61,656	67,165	138,511	65,831	72,680	211,152	101,089	110,063

Table 11

Number of dependents per 100 productive workers
Pascagoula River Basin and subareas
1930-1960 and projected to 2015

	1930	1940	1950	1960	1965	1980	2015
Pascagoula River Basin	103	92	91	105	108	118	113
Leaf subarea	108	96	95	106	111	119	115
Chickasawhay subarea	103	94	94	108	112	130	127
Coastal subarea	93	81	81	101	104	112	109

the Leaf and from 30.6 percent to 22.3 percent in the Chickasawhay. The Coastal subarea only declined from 31.3 percent to 28.6 percent. Increased employment opportunities in the Coastal subarea, plus the rising number of babies and teenagers, should expand the 20 through 39 age group in the future. For example, in 1980, this age group is forecast to account for 30 percent of total population in the Coastal subarea, compared to 25 percent in the Leaf and 23 percent in the Chickasawhay.

Increasing birth rates in the basin from 1940 to 1960 raised the percent of total population under 12 years of age to 27.9 by 1960. By 2015, this age group should account for almost 30 percent of the total population. The Coastal subarea should experience the greatest increase in this grouping, reaching 223,600 in 2015, or 59 percent of the total under 12 group in the basin (Table 12).

Table 12

Population composition - under 12 years of age and 12 years and over
Pascagoula River Basin and subareas
1930-1960 and projected to 2015

	Leaf subarea	Chickasawhay subarea	Coastal subarea	Total basin
1940				
Under 12	42,252	32,571	19,529	94,352
12 and Over	119,181	96,961	66,730	282,872
1950				
Under 12	48,456	34,589	32,425	115,470
12 and Over	217,855	96,850	99,325	324,030
1960				
Under 12	48,957	34,697	55,930	139,584
12 and Over	130,576	93,056	137,192	360,824
1965				
Under 12	48,900	34,200	66,600	149,700
12 and Over	132,400	94,700	160,000	387,000
1980				
Under 12	56,600	39,200	104,400	200,300
12 and Over	146,800	99,300	227,800	473,800
2015				
Under 12	96,400	61,500	223,600	381,500
12 and Over	249,300	149,700	509,600	908,700

SECTION 5. RACE CHARACTERISTICS OF THE POPULATION

General. The racial composition of the base study area's population is another important characteristic that tends to affect population change. Historical investigation of the racial composition of the subareas within the base study area indicates the following general trends may be expected to continue during the period from 1965 to 2015:

(1) The higher the proportion of nonwhite population in a subarea the greater the likelihood of population loss, particularly of nonwhites.

(2) Population growth for both whites and nonwhites has tended to occur in those subareas where nonwhites are in the minority.

(3) Those subareas that have experienced substantial industrialization have generally had a higher net gain of whites than nonwhites.

(4) Nonwhite gains have been generally concentrated in those subareas with employment demands requiring large numbers of service or nonskilled workers.

(5) The heaviest out-migration of nonwhites has occurred in those subareas which developed originally under the plantation system.

Therefore, it is important that the future racial composition of the basins and subareas within the base study area be closely studied and its significance related to future total population changes.

Definition. Population was divided into two racial groups, white and nonwhite, as derived from the concept of race commonly accepted by the general public. The nonwhite population as discussed in this section consists of Negroes, Indians, Japanese, Chinese, Filipinos, Koreans, Asian Indians, Malayans and others of similar stock.

Analysis and Interpretation

The base study area. Between 1930 and 1960, the percentage of white population in the base study area rose from 57 to 64 percent of the total population. The white population is projected to increase to 4,405,200 in 1980 and to 7,882,100 in 2015, while the nonwhites increase in 1980 and 2015 to 2,148,400 and 3,122,300, respectively (Table 13). Such relative rates of growth will increase the majority of whites to 67 percent in 1980 and 72 percent in 2015.

Pascagoula River Basin. In 1960, 74 percent of the total population in the Pascagoula Basin was white, as compared to 69 percent in 1930. The smallness of the nonwhite population gave the basin the largest plurality of whites of any basin in the base study area from 1930 to 1960. The underlying reason for the basin's position was its Coastal subarea's population, which by 1960 was only 17 percent nonwhite. Nonwhites did not decrease in the subarea; in fact, they increased faster than in any other subarea – almost 100 percent from 1930 to 1960 – but white inhabitants grew 182 percent.

The Leaf subarea historically held the largest share of the basin's nonwhite population in spite of the Coastal's large gains. By 1960, 40 percent of the basin's nonwhites lived in the Leaf subarea. Only in the Chickasawhay subarea was there a decline in the number of nonwhites during the 1930-1960 period.

White population in the basin is projected to rise from 371,700 in 1960 to 1,062,300 in 2015, a gain of 186 percent – the highest of any basin in the base study area. Meanwhile, nonwhite population is expected to grow from 128,700 to 227,900. The big growth is expected

Table 13

Race characteristics of the population, base study area
Pascagoula River Basin and subareas,
1930 through 1960 and projected to 2015
(Thousands)

Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
BASE STUDY AREA							
White	2,201.4	2,442.0	2,843.0	3,217.6	3,453.2	4,405.2	7,882.1
Nonwhite	1,632.3	1,744.9	1,760.2	1,816.7	1,862.3	2,148.4	3,122.3
PASCAGOULA							
Leaf:							
White	101.4	113.3	125.7	128.1	129.3	147.3	256.6
Nonwhite	43.3	48.1	50.6	51.4	52.0	56.1	89.2
Chickasawhay							
White	75.8	82.0	84.6	83.6	84.9	93.3	149.5
Nonwhite	45.5	47.5	46.8	44.2	43.9	45.2	61.7
Coastal							
White	56.8	69.0	109.0	160.0	189.7	287.7	656.2
Nonwhite	16.6	17.3	22.8	33.1	36.9	44.5	77.0
Total Pascagoula							
White	234.0	264.3	319.3	371.7	403.9	528.3	1,062.3
Nonwhite	105.4	112.9	120.2	128.7	132.8	145.8	227.9

to occur in the Coastal subarea where white population is forecast to increase fourfold, and nonwhite population to more than double. By 2015, 62 percent of the basin's white inhabitants and 34 percent of its nonwhites are forecast to reside in the Coastal subarea. The large growth of whites in this subarea will reduce the percentage of nonwhites to only 11 percent in 2015, as compared to 26 percent in the Leaf and 29 percent in the Chickasawhay.

SECTION 6. EDUCATIONAL LEVEL OF THE POPULATION BY RACE

General. The conditions relative to the strong and sound development of projections for educational levels by race within the base study area have been necessarily weakened due to the absence of a broad historical base. Because data on the nonwhite segment were not available for the years earlier than 1950, indicators of the trend in education in the base study area are contingent upon the one decade advancement from 1950 to 1960. However, if advancements shown during this period

can be considered a strong growth phase, the base study area offers much of the development challenge of an educational frontier.

The generalized change toward improvement of educational facilities and standards of education apparent throughout the Nation as well as in the base study area was probably the most dominant factor inherent in educational level gains recorded for whites and nonwhites in the base study area during the 1950-1960 period. Also to be considered as responsible, in part, in the base study area were the heavy rural outmigrations of nonwhites and the broader income opportunities resulting from increased industrialization. However, radical changes would seem necessary to bring the base study area's educational levels by race within a parallel to national levels in the immediate future.

Definition. The educational levels of whites and nonwhites are expressed in terms of the median number of school years completed by persons 25 years of age and over in each segment. However, since the data were available only on county or parish and state bases, the median number of school years completed for the counties included in the base study area, basin or subarea were averaged and used as the median number of school years completed for the area under consideration. The median number of school years completed is the value which divides the population group into two equal parts, one-half having completed more, and the other half less schooling than the median. This median is expressed as a number to the nearest tenth, in a continuous series of numbers representing years of school completed, such as 9 for the first year of high school and 13 for the first year of college. The median should be used for comparison of groups, or of the same group at different dates, rather than as an absolute measure of educational attainment.

Analysis and Interpretation

The basin and subareas. The 1950-1960 period indicators provide reliable data as to the rates of growth enjoyed by both race segments during that period. From 1950 to 1960, nonwhites nationally had a gain in educational levels from 6.8 to 8.2; simultaneously, white educational levels rose from 9.7 to 10.9. Concurrently, base study area levels for nonwhites rose from 5.4 to 6.6 and for whites from 9.7 to 10.7 (Table 14).

Growth increases, based on the relatively embryonic educational levels of the base study area in the past, are forecast to continue to improve throughout the 1960-2015 period, with the nonwhite level rising to 11.5; the white level to 13.1 in 2015.

The Pascagoula Basin is largely dependent on the high levels attained in its Coastal subarea. The educational level of the whites in this subarea exceeded that of the Nation in both 1950 and 1960. Though the nonwhites in the subarea did not attain such a high level, they were still the most educated in the base study area. Both

Table 14

Educational level of the population by race
Base study area, Pascagoula River Basin and subareas
1950 through 1960 and projected to 2015
(Median number of school years completed -
Persons 25 years old and older)

Item	Historical		Projected		
	1950	1960	1965	1980	2015
BASE STUDY AREA					
Total	9.2	9.4	10.0	11.2	12.6
White	9.7	10.7	11.4	12.2	13.1
Nonwhite	5.4	6.6	7.2	9.1	11.5
PASCAGOULA					
Total	9.0	10.1	10.6	11.7	12.8
White	10.1	11.0	11.5	12.5	13.1
Nonwhite	5.9	7.3	7.8	9.7	11.6
Leaf					
Total	8.9	9.7	10.1	11.4	12.5
White	9.9	10.4	10.9	12.1	12.9
Nonwhite	5.9	7.7	8.1	9.9	11.8
Chickasawhay					
Total	8.5	9.5	9.9	11.0	12.3
White	10.0	10.8	11.0	12.2	12.8
Nonwhite	5.4	6.5	7.0	8.9	11.4
Coastal					
Total	9.7	11.0	11.5	12.3	13.1
White	10.3	11.6	12.1	12.7	13.3
Nonwhite	6.6	7.8	8.2	10.3	12.0

remaining Pascagoula subareas, the Leaf and Chickasawhay, generally paralleled base study area educational levels, allowing the basin in 1960 to attain a level of 11.0 for whites and 7.3 for nonwhites.

Educational levels in the Pascagoula Basin are expected to remain consistently high through the terminal year, reaching 13.1 for whites and 11.6 for nonwhites. Again, this basin's high educational levels are predicated on the continued advancement of the Coastal subarea. Forecasts for this subarea allow an unequaled high of 12.0 for nonwhites and a favorable 13.3 for whites in 2015.

SECTION 7. EDUCATION LEVEL OF THE POPULATION BY SEX

General. Historically, educational levels in the base study area have remained consistently lower than national levels. However, based on the three-decade influence of the 40's, 50's and 60's, and the gains noted during that period, forecasts are encouraging for the area.

The trend toward the more educated female has been prevalent throughout the Nation. On the national level, males are expected to attain a higher level than females by 1980. However, in the base study area, because of the more pronounced divergence in male-female educational levels in the past, the exceeding of female levels by males is anticipated at a much later date than that for the Nation. By 2015, educational levels in the base study area are predicted to reach 12.5 for females and 12.8 for males.

It is important to note that the probable stimulus provided by the more urban basis accounted, in large measure, for base study area gains of over one full year of schooling completed per each ten-year period between 1940 and 1960.

Definition. The educational levels of the males and females are expressed in terms of the median number of school years completed by males and females 25 years of age and over as defined in section 6.

Analysis and Interpretation

The basin and subareas. The Pascagoula Basin historically has been the educational level pace-setter for the base study area, with male levels of 9.9 and female levels of 10.3 in 1960 (Table 15). This basin is expected to remain one of the leaders in education throughout the forecast period, with its males reaching a 13.0 level, and its females 12.6 by 2015. The high rate of educational level growth experienced in this basin has been heavily dependent on the fast-growing Coastal subareas, which had 1960 levels of 11.0 for females and 10.8 for males. Only in this subarea did educational levels exceed the national levels of 10.9 for females and 10.3 for males. The Chickasawhay subarea had the lowest male and female educational levels in the basin from 1940 to 1960. However, they were equal to or above the base study area levels during that period.

The Coastal subarea is expected to retain its first place status in educational levels in the base study area throughout the forecast period, reaching a high of 13.2 for males and 13.0 for females by 2015. Both the male and female educational levels in the Leaf subarea are expected to remain slightly higher than those in the Chickasawhay through 2015.

Table 15

Educational level of the population by sex,
Base study area, Pascagoula River Basin and subareas
1940 through 1960 and projected to 2015
(Median number of school years completed -
Persons 25 years old and older)

Item	Historical			Projected		
	1940	1950	1960	1965	1980	2015
BASE STUDY AREA						
Total	6.8	8.2	9.4	10.0	11.2	12.6
Male	6.4	7.9	9.1	9.7	11.0	12.8
Female	7.1	8.4	9.6	10.5	11.3	12.5
PASCAGOULA						
Total	7.8	9.0	10.1	10.6	11.7	12.8
Male	7.5	8.7	9.9	10.4	11.7	13.0
Female	8.1	9.3	10.3	10.8	11.7	12.6
Leaf						
Total	7.9	8.9	9.7	10.1	11.4	12.5
Male	7.6	8.5	9.3	9.7	11.2	12.8
Female	8.1	9.1	10.1	10.4	11.5	12.2
Chickasawhay						
Total	7.5	8.5	9.5	9.9	11.0	12.3
Male	7.2	8.1	9.1	9.5	10.8	12.7
Female	7.8	8.9	9.9	10.2	11.1	12.0
Coastal						
Total	7.9	9.7	11.0	11.5	12.3	13.1
Male	7.6	9.5	10.8	11.4	12.5	13.2
Female	8.3	9.9	11.0	11.5	12.2	13.0

SECTION 8. POPULATION OF MAJOR CITIES OR STANDARD METROPOLITAN STATISTICAL AREAS

General. With the increasing urbanization and the rising populations in the metropolitan areas of the base study area, the furnishing of water through municipal water systems has assumed increasing importance. During the 1930-1960 period, there was a tremendous increase in the number of people served by these water systems which, coupled with a large increase in per capita use, compounded the problems experienced by metropolitan areas in supplying residents and industries with adequate supplies of clean, fresh water.

Future growth in these population centers, combined with the continuing increase in per capita consumption of water, constitutes one of the most important factors affecting future municipal water requirements in the base study area.

In 1963, seven cities in the base study area met the criteria for delineation as Standard Metropolitan Statistical Areas (SMSA's). These were Birmingham, Gadsden, Tuscaloosa, and Mobile, Alabama; New Orleans and Baton Rouge, Louisiana; and Jackson, Mississippi. Early in the study it became evident that certain SMSA's located just outside the periphery of the base study area exerted enough economic influence on or were subject to enough influence from some of the base study area's subareas to require an examination of their expected future growth and the implications of such growth on the base study area. Such an examination was made of Memphis, Tennessee; Huntsville and Montgomery, Alabama; and Pensacola, Florida.

As the economic analysis progressed, findings substantiated the opinion that several of the base study area's major cities would achieve SMSA status within the next several decades. To present a true perspective of future metropolitan growth in the base study area the following cities (all in Mississippi) were included as "major cities": Meridian, Hattiesburg, Laurel, Vicksburg, Columbus, Greenville, and the evolving Pascagoula-Biloxi-Gulfport metropolitan complex.

The addition of the seven major cities brought the number of metropolitan areas that merited consideration in an analysis of the base study area's future economic growth to 18.

Definition. It has long been recognized that for many types of social and economic analyses it is necessary to consider as a unit the entire population in and around the city whose activities form an integrated social and economic system. Prior to 1960, areas of this type had been defined in somewhat different ways for different purposes by various government agencies. To permit all Federal statistical agencies to utilize the same area for the publication of general purpose statistics, the Bureau of the Budget established the Standard Metropolitan Statistical Area in 1959*. Each SMSA consisting of one or more counties must include at least one city with 50,000 or more inhabitants or two cities having continuous boundaries and constituting, for general and social purposes; a single community with a combined population of at least 50,000, the smaller of which must have a population of at least 15,000. At least 75 percent of the labor force of a county must be in a nonagricultural labor force, and in addition the county must meet at least one of the following qualifications: (1) it must have 50 percent or more of its population

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*STANDARD METROPOLITAN STATISTICAL AREAS, U. S. Bureau of the Budget, Executive Office of the President, 1961.

living in contiguous minor civil divisions with a density of at least 150 persons per square mile in an unbroken chain of minor civil divisions with a density radiating from the central city in the area; or (2) the number of nonagricultural workers employed in the county must equal at least 10 percent of the number of nonagricultural workers employed in the county containing the largest city in the area, or the outlying county must be the place of employment of at least 10,000 nonagricultural workers; or (3) the nonagricultural labor force living in the county must equal at least 10 percent of the nonagricultural labor force living in the county containing the largest city in the area, or the outlying county must be the place of residence of a nonagricultural labor force of at least 10,000.

An outlying county is included with the county containing the central city if 15 percent of the workers living in the outlying county work in the county containing the central city, or if 25 percent of those working in the outlying county live in the county containing the central city. In this section, historical data for each SMSA reflect the population of the county or counties defined as part of the SMSA by the Bureau of Census in October 1963*.

Population growth. The eleven SMSA's and seven major cities increased in population from 2.4 million in 1930 to 4.3 million in 1960. Population in those metropolitan areas located within the base study area increased 80 percent from 1930 to 1960, compared to the 31 percent gain for the base study area. Actually, those SMSA's and major cities located in the base study area gained more people during the 1930-1960 period than the base study area netted. However, expected growth in the base study area's basins from 1960 to 2015 will not allow this phenomenon to be repeated, although the metropolitan areas will still outgrow the base study area, 176 percent compared to 119 percent.

The New Orleans SMSA was the largest of the 18 metropolitan areas during the historical period and is projected to continue to be so through 2015, reaching 2.25 million in the terminal projection year (Table 16). In 1930, the "top ten", in size, included all four of the SMSA's located outside the base study area's boundary. The Memphis and Pensacola SMSA's increased their standings from 1930 to 1960, while the Montgomery and Huntsville SMSA's decreased in relative stature (Table 17).

The reason for Huntsville's decline was that it did not begin to grow until the 1950's when the Redstone Arsenal and the George C. Marshall Space Flight Center initiated project work on missile development, resulting in the rapid expansion of the SMSA population to 153,900 in 1960. Continuation of this recent growth is expected to characterize its population change, raising the population to 305,000 in 1980 and 785,300 in 2015.

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*CURRENT POPULATION REPORT, Series P-23, No. 10, Department of Commerce, Bureau of the Census.

Table 16

Population of major cities and standard metropolitan statistical areas within or exerting influence on the base study area 1930-1960 and projected to 2015
(Thousands)

City	1930	1940	1950	1960	1965	1980	2015
*Baton Rouge, La.[1]	68.2	88.4	158.2	230.1	273.4	425.6	809.6
*Birmingham, Ala.[2]	431.5	459.9	558.9	634.9	671.7	829.1	1,322.5
Columbus, Miss.[3]	30.0	35.2	37.9	46.6	51.3	65.5	106.8
*Gadsden, Ala.[4]	63.4	72.6	93.9	97.0	103.7	131.1	239.7
Greenville, Miss.[5]	54.3	67.6	70.5	78.6	82.4	96.3	153.0
Hattiesburg, Miss.[6]	30.1	34.9	45.1	52.7	56.0	72.0	158.4
*Huntsville, Ala.[7]	101.3	102.0	108.7	153.9	185.4	305.0	785.3
*Jackson, Miss.[8]	105.5	135.2	171.0	221.4	250.9	379.5	888.1
Laurel, Miss.[9]	41.5	49.2	57.2	59.5	61.6	73.8	144.2
*Memphis, Tenn.[10]	346.2	400.7	529.6	674.6	762.3	991.0	1,511.2
Meridian, Miss.[11]	52.7	58.2	64.2	67.1	69.6	81.3	146.6
*Mobile, Ala.[12]	146.7	174.3	272.1	363.4	410.4	578.2	1,153.9
*Montgomery, Ala.[13]	133.0	149.0	170.6	199.7	217.7	274.9	438.4
*New Orleans, La.[14]	526.2	575.9	712.4	907.1	1,010.6	1,340.8	2,249.7
Pascagoula-Biloxi-Gulfport, Miss.[15]	60.1	71.4	115.5	175.0	208.7	321.2	787.5
*Pensacola, Fla.[16]	67.7	90.8	131.3	203.4	254.2	406.8	833.8
*Tuscaloosa, Ala.[17]	64.2	76.1	94.1	109.0	117.4	153.6	261.1
Vicksburg, Miss.[18]	35.8	39.6	39.6	42.2	43.5	50.4	96.3

Historidal data include: [1]East Baton Rouge Parish, Louisiana; [2]Jefferson County, Alabama; [3]Lowndes County, Mississippi; [4]Etowah County, Alabama; [5]Washington County, Mississippi; [6]Forrest County, Mississippi; [7]Madison and Limestone Counties, Alabama; [8]Hinds and Rankin Counties, Mississippi; [9]Jones County, Mississippi; [10]Shelby County, Tennessee and Crittenden County, Arkansas; [11]Lauderdale County, Mississippi; [12]Mobile and Baldwin Counties, Alabama; [13]Montgomery and Elmore Counties, Alabama; [14]Orleans, St. Bernard, Jefferson and St. Tammany Parishes, Louisiana; [15]Harrison and Jackson Counties, Mississippi; [16]Escambia and Santa Rosa Counties, Florida; [17]Tuscaloosa County Alabama, [18]Warren County, Mississippi.

Note: 1930 data from "Fifteenth Census of the United States, 1930", 1940 data from "Sixteenth Census of the United States, 1940", 1950 data from "U. S. Census of Population: 1950", 1960 data from U. S. Census of Population: 1960".

* SMSA's in 1963.

Table 17

The ten largest metropolitan areas

	1930	1960	2015
1.	New Orleans	New Orleans	New Orleans
2.	Birmingham	Memphis	Memphis
3.	Memphis	Birmingham	Birmingham
4.	Mobile	Mobile	Mobile
5.	Montgomery	Baton Rouge	Jackson
6.	Jackson	Jackson	Pensacola
7.	Huntsville	Pensacola	Baton Rouge
8.	Baton Rouge	Montgomery	Pascagoula-Biloxi-Gulfport
9.	Pensacola	Pascagoula-Biloxi-Gulfport	Huntsville
10.	Tuscaloosa	Huntsville	Montgomery

Source: Table 16

Rapid growth in the Baton Rouge and Pensacola SMSA's raised them from eighth and ninth place in 1930 to fifth and seventh place in 1960, respectively. The entrance of the Pascagoula-Biloxi-Gulfport area complex into ninth place in 1960 reflected the tremendous growth of a complex not yet classified as an SMSA. However, in 1960 it had a larger population than either the Huntsville, Tuscaloosa or Gadsden SMSA. By 2015, it is expected to surpass the Montgomery SMSA in size and rank eighth among the metropolitan areas. The big four in 1960, New Orleans, Memphis, Birmingham and Mobile, are not expected to change in relative status by 2015, but Jackson is projected to move into fifth place replacing Baton Rouge which is expected to fall to seventh place behind Pensacola.

Also of importance to the proper evaluation of each metropolitan area's future expansion is the rate of population growth. From 1930 to 1960, the Baton Rouge SMSA had the highest annual rate of growth, followed by Pensacola, the Pascagoula-Biloxi-Gulfport complex and Mobile (Table 18).

The rapid growth rate of Baton Rouge from 1930 to 1960 is not expected to continue over the long 55-year projection period as has been previously stated. This is also true of the larger cities, for, as an area increases in size, maintenance of past rates of growth becomes more difficult. The growth rate of Huntsville is projected to continue to be relatively high during the period as continued emphasis on space exploration is likely to prevail, and Huntsville is expected to lead in this development.

Table 18

Average annual rates of growth
of the ten fastest growing metropolitan areas
1930-1960 and 1960-2015

	1930-1960		1960-2015	
	Metropolitan area	Percent	Metropolitan area	Percent
1.	Baton Rouge	7.9	Huntsville	7.5
2.	Pensacola	6.7	Pascagoula-Biloxi-Gulfport	6.4
3.	Pascagoula-Biloxi-Gulfport	6.4	Pensacola	5.6
4.	Mobile	4.9	Jackson	5.5
5.	Jackson	3.7	Baton Rouge	4.6
6.	Memphis	3.2	Mobile	4.0
7.	Hattiesburg	2.5	Hattiesburg	3.6
8.	New Orleans	2.4	New Orleans	2.7
9.	Tuscaloosa	2.3	Gadsden	2.7
10.	Columbus	1.8	Laurel	2.6

Source: Table 16

The long-run growth rates of the Jackson and New Orleans SMSA's and the Hattiesburg metropolitan area – firm and well-balanced – are projected to increase during the 55-year period, while growth in the Pascagoula-Biloxi-Gulfport complex will tend to maintain its past high rate of growth. *It is interesting to note that rates of population* growth in Hattiesburg and Columbus (neither being SMSA's) outpaced several SMSA's from 1930 to 1960, adding more justification to their becoming SMSA's before 2015. Likewise, the Laurel area moved into tenth place for the forecast period at 2.6 percent per year, moving ahead of both Tuscaloosa and Columbus, while Gadsden's expected growth (slightly below Columbus' from 1930 to 1960) is forecast to move it up to ninth place.

It should be noted that the projected population of some SMSA's may exceed the projected population of its subarea. This is attributable to an SMSA's expansion to include counties or parishes located outside the subarea. Many of the SMSA's located around the border of the base study area will exhibit this phenomenon from 1980 to 2015.

SECTION 9. HOUSEHOLDS

General. The household is the basic consuming unit of home construction and accessory items in our economy. In fact, by definition the number of households and the number of occupied dwelling units are synonymous. The actual number of households is related to marriage rates in the adult population and, especially since 1950, to the number

of nonfamily units occupying separate housing units. Further, population age composition and sex distribution have strongly influenced the rate of household formations.

The growth in the number of households from the present until 1980 can be projected closely because household heads are almost exclusively of age groups presently integrated in population enumeration. Unpredictable fertility factors are thus eliminated in a projection of household levels, as are self-compensating marriage rate factors. The adult population in the base study area is forecast to rise by 715,300 from 1960 to 1980 and to increase almost 2.4 million between 1980 and 2015. These gains in the adult population will provide a strong underpinning for substantial gains in households over the next two decades.

A shadow of uncertainty about future levels of households is cast by the 1950-1960 rise of nonhusband-wife households. In this decade primary individual households increased at a very fast rate. Among females the increase in households is especially pronounced among older age segments, while among males, the trend is most noticeable in younger age groups. Advancing income levels make possible an increase in the maintenance of separate households by unmarried males and females. This uptrend in primary individual households should continue strong at least to 1980.

Definition. The 1960 composition of a household consisted of all the persons occupying a housing unit; therefore, the count of occupied housing units was the same as the count of households. An occupied housing unit includes a house, an apartment or other group of rooms or a single room occupied or intended for occupancy as separate living quarters. That is, single room occupants do not live and eat with any other persons in the structure, and direct access is provided them from the outside or through a common hall, or kitchen-cooking equipment is provided for their exclusive use. Trailers, camps, boats and railroad cars were included if occupied as living quarters.

Though households are closely related to families, the two are not necessarily the same. For example, an individual living alone or in a separate apartment constitutes a household, and will be purchasing many of the same products as will a family. Conversely, a family such as a married couple may be living with their relatives or living in a hotel or rooming house. In none of these or similar cases would they constitute a separate household.

All persons not members of a household are regarded as living in group quarters, located most frequently in institutions, lodging and boarding houses, military and other types of barracks, college dormitories, fraternity and sorority houses, hospitals, homes for nurses, convents and monasteries and on ships.

The 1960 definition of a household differs slightly from that used in 1950. A change became necessary as a result of a shift from

a "dwelling unit" to a "housing unit" as a basic unit of enumeration in the decennial census of housing. According to the 1960 definition, a household consisted of all the persons occupying a housing unit, whereas the 1950 definition stipulated that a household consisted of all the persons occupying a dwelling unit. Housing units differed from dwelling units in that separate living quarters consisting of one room with direct access but without cooking equipment qualified as a housing unit, but qualified as a dwelling unit when located in a regular apartment house or when the room was the only living quarters in the structure. Available evidence suggests that the change from the dwelling unit concept to the housing unit concept had relatively little effect on the comparability of the statistics.

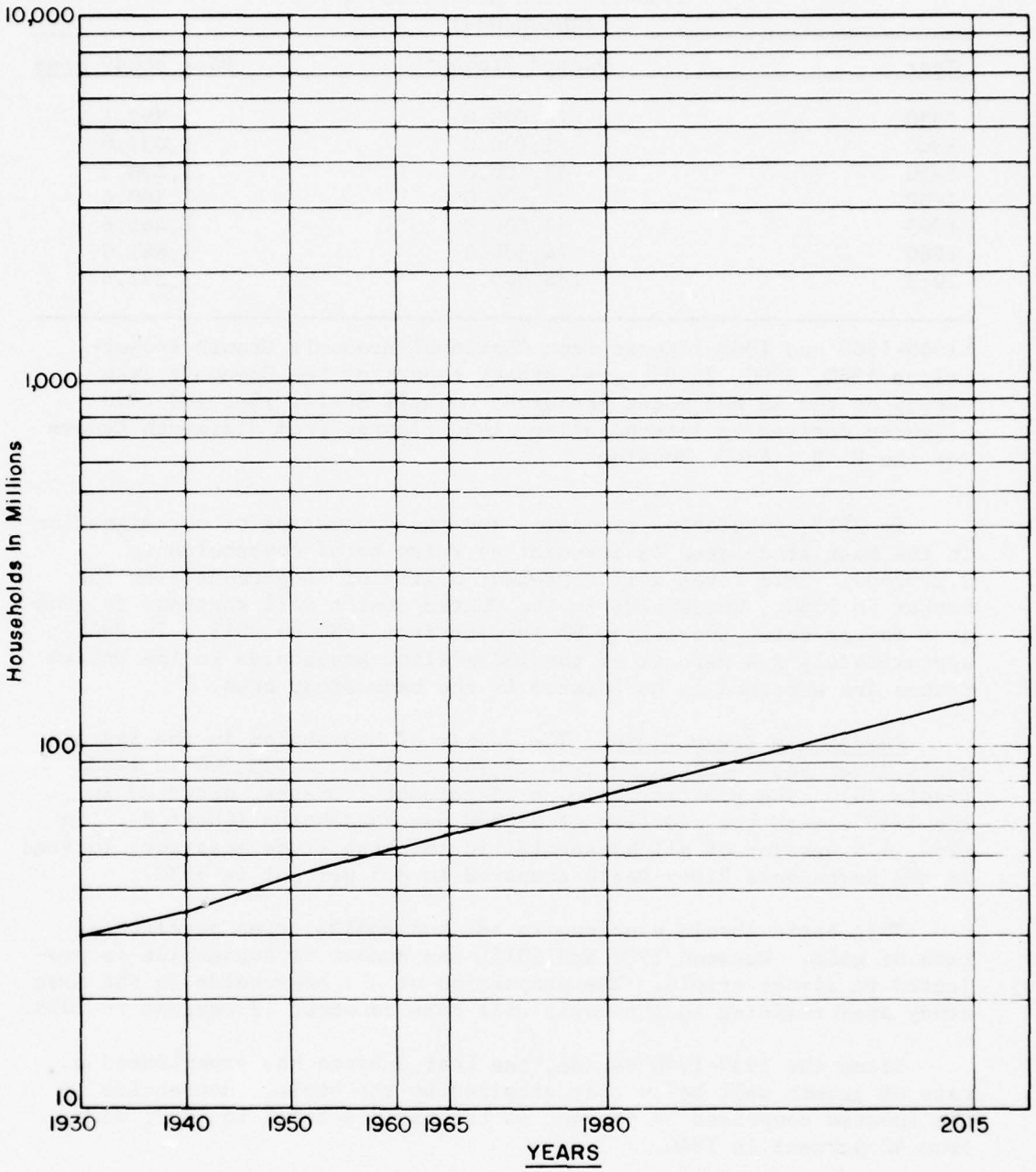
Minor changes in the definition of households between 1940 and 1950 may have affected slightly the increase in households between the two dates. In 1940, the occupants of a lodging house were regarded as constituting a "quasi-" household if eleven or more lodgers were included. In 1950, the criterion was reduced to five or more lodgers. Quasi-household, as used in the 1940 and 1950 census years, was similar in concept to group quarters as used in 1960. As a result of this slight change in definition, the number of quasi-households probably doubled in many areas. In general, however, the household data of 1950 and 1960 may be regarded as comparable to the 1940 data.

In 1930, the enumeration of "Private Families" was used in the count of households for that year. This concept of families and households constituting an identical unit presumably understated the number of households.

Analysis and Interpretation

The United States and the base study area. Nationally, and in the base study area, the 1940's witnessed a healthy gain in households despite the fact that the adult population increased at a rate only slightly more than during the 1930's (Chart 7). This departure in household formation levels was accounted for by an increase in marriage rates. Undoubtedly, improved incomes and savings accumulated during the war years contributed to this increase. Marriage rates were especially high during the 1945-1947 demobilization period.

In the United States, the number of households increased from 29.9 million in 1930 to 52.6 million in 1960 (Table 19). Even though the base study area lagged behind the Nation during this three-decade period, there was a total of 1,360,600 households in the area by 1960. By 1980, projections place the number of households in the United States at 74.5 million and in the base study area at almost 1.9 million, the base study area's rate of growth continuing to be somewhat below that of the Nation. Consequently, the percentage of the Nation's households found in the base study area will drop slightly from 2.6 percent in 1960 to 2.5 percent in 1980.



NUMBER OF HOUSEHOLDS
UNITED STATES

CHART 7

Table 19

Households - United States and base study area
1930-1960 and projected to 2015
(Thousands)

Year	United States[1]	Base study area
1930	29,900.0	892.1
1940	35,100.0	1,037.0
1950	43,600.0	1,208.3
1960	52,600.0	1,360.6
1965	57,500.0	1,465.6
1980	74,500.0	1,881.0
2015	138,000.0	3,277.6

[1] 1940-1960 and 1980 figures from "National Economic Growth Projections 1980, 2000, 2020", preliminary report of the Economic Task Group of the Ad Hoc Water Resources Council Staff; 1965 and 1980 figures derived by interpolation; 1930 figures from Sixteenth Census of the U. S.: 1940, Housing.

In 2015, population expansion and the conquering of out-migration in the base study area is forecast to raise total households to 3,277,600. This level will represent a gain of 74 percent over the number in 1980. Households in the United States will continue to grow at a faster rate, increasing 85 percent from 1980 to 2015. In 2015, approximately 2.4 percent of the 138 million households in the United States are expected to be located in the base study area.

Pascagoula River Basin. The number of households in the Pascagoula River Basin increased from 75,900 in 1930 to 133,500 in 1960 (Table 20). The greatest gain, a 25-percent increase, occurred in the 1940's with the addition of 22,800 new households (Chart 8). In 1960, 9.8 percent of all households in the base study area were located in the Pascagoula River Basin compared to 8.5 percent in 1930.

This basin should continue to add households at an accelerated rate of gain. Between 1960 and 2015, the number of households is projected to almost triple. The proportion of all households in the base study area residing in the basin will rise to about 12 percent in 2015.

Since the 1930-1940 decade, the Leaf subarea has experienced a rate of growth well below that attained by the basin. Households in the subarea comprised 36 percent of the basin's total in 1960, down from 42 percent in 1940.

Household growth in the Leaf subarea during the forecast period is not expected to be spectacular. A gain of 118 percent is anticipated between 1960 and 2015, boosting total households to 104,800 in

Table 20

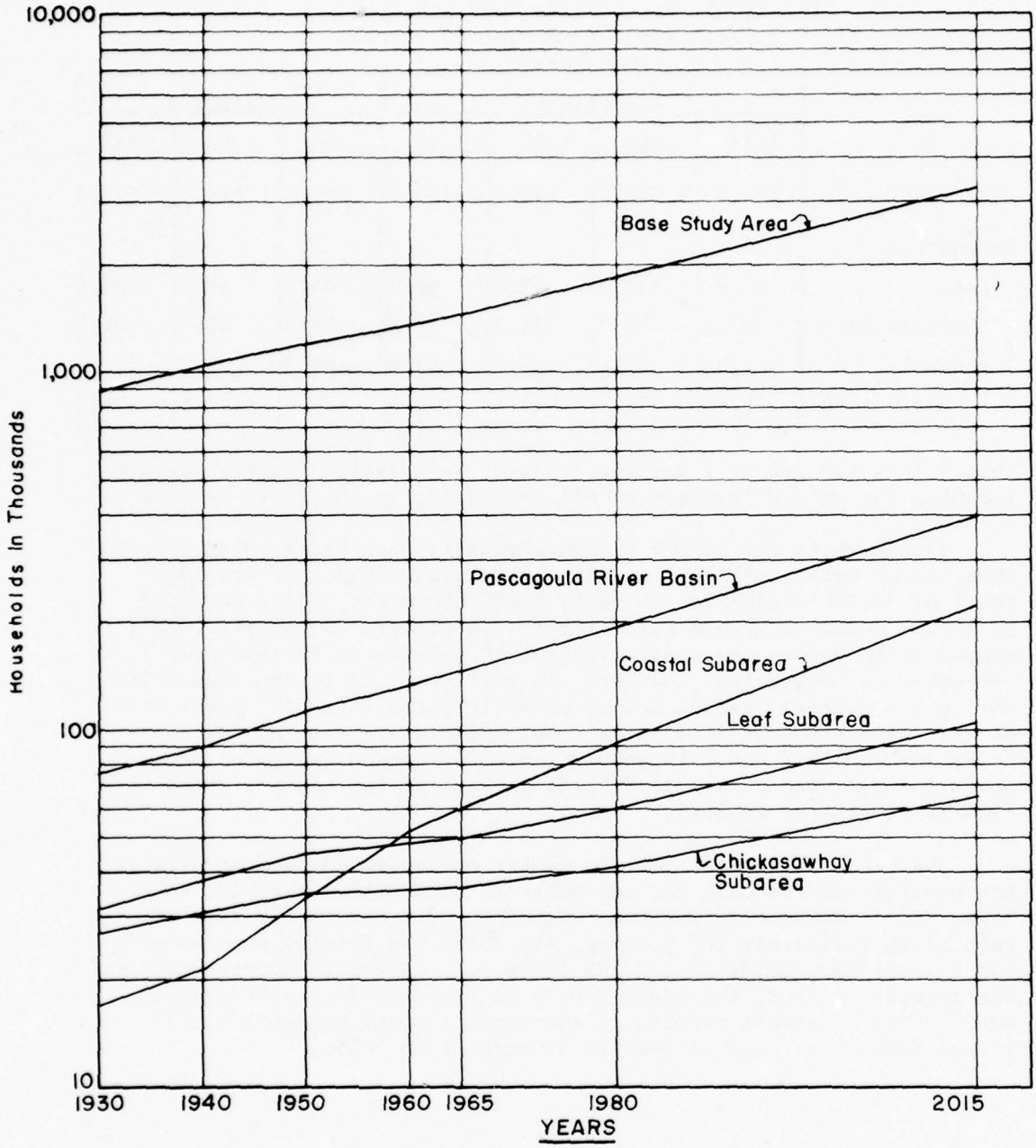
Number of households - Base study area, Pascagoula River Basin, and subareas 1930 through 1960 and projected to 2015 (Thousands)

Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
Base study area	892.1	1,037.0	1,208.3	1,360.6	1,465.6	1,881.0	3,277.6
Pascagoula							
Leaf	31.8	38.0	45.0	48.0	49.8	59.1	104.8
Chickasawhay	27.1	31.0	34.7	35.2	36.6	40.7	64.0
Coastal	17.0	21.6	33.7	50.3	60.3	92.7	222.2
Basin total	75.9	90.6	113.4	133.5	146.7	192.5	391.0

2015. This subarea will decline, though, in relative importance, accounting for only 27 percent of all households in the basin by 2015.

Increases in the number of households in the Chickasawhay subarea have become relatively static, especially since 1950, and its 1960 total of 35,200 households was only 8,100 above the figure recorded in 1930. A decade growth rate of only 1.4 percent during the 1950's caused it to become the least significant subarea in the basin in terms of number of households. However, it will continue to add households during the forecast period but at an anticipated rate well under that of the basin and base study area. The addition of only 28,800 households between 1960 and 2015 should cause the concentration of households in the subarea to fall from 26 percent of the basin's total in 1960 to 16 percent in 2015.

The rate of increase for the number of households was greater in the Coastal subarea than for any other subarea within the base study area. Total households numbered 17,000 in 1930 and 50,300 in 1960, a gain of approximately 200 percent. By 2015, the Coastal subarea will boost total households to 222,200 for a gain of about 340 percent over the forecast period, the highest rate of increase in the base study area. This subarea's portion of the basin's total households will increase from 38 percent in 1960 to 57 percent in 2015.



NUMBER OF HOUSEHOLDS
BASE STUDY AREA
PASCAGOULA RIVER BASIN AND SUBAREAS

SECTION 10. LABOR FORCE

General. The number of potential employees in the base study area at any particular time is limited roughly by the size of the labor force derived from the population. In turn, the productivity of the labor force is a major indicator of the income flow that the base study area's economy can generate. An analysis of the labor force discloses the quantity of the human resources of the base study area. In interpreting the economic growth of the basins and subareas comprising the base study area, due consideration must be given to upgrading the productive capacities of the labor force through skills development, and the transfer of large segments of the labor force into higher value-added industries occasioned by the absorption of labor freed by declining agricultural employment.

Definition. The labor force includes all persons 14 years of age and over classified as employed or unemployed, including members of the Armed Forces.

The data on the labor force for 1940, 1950 and 1960 are not entirely comparable with the data for 1930, due to differences in definition. The 1930 data were based on statistics for "gainful workers"; gainful workers were defined as persons having a useful occupation whether or not they were working or seeking work at the time of the census. Certain classes of persons, such as retired workers, inmates of institutions, recently incapacitated workers and seasonal workers not working or seeking work were included frequently as gainful workers. The 1930 statistics did not include persons seeking work without previous working experience. However, it did include workers 10 years old and over, in contrast to later censuses which used only those 14 years old and over.

Analysis and Interpretation

The United States and the base study area. The labor force in the United States has expanded at a significantly higher rate than that of the base study area. In the 1930 to 1960 period, the national labor force rose from 49.1 million to 73.1 million (Table 21). This national gain of 49 percent compares with a modest 11 percent gain in the base study area (Chart 9). The failure of the base study area's labor force to match national growth rates is evidence of the serious employment transfer problems encountered in a change-over from an agricultural to an industrial economy.

An examination of decade-to-decade labor force developments shows that between 1930 and 1940 every basin in the base study area lagged behind the national rate. Lagging labor force growth rates were not limited to small pockets of underdevelopment but prevailed throughout the base study area. Between 1930 and 1960, a net addition of only 172,700, or 11 percent, was made to the labor force in the base study area. In comparison, the gain in the United States labor force was 49 percent.

Table 21

Labor force - United States and the base study area
1930-1960 and projected to 2015
(Thousands)

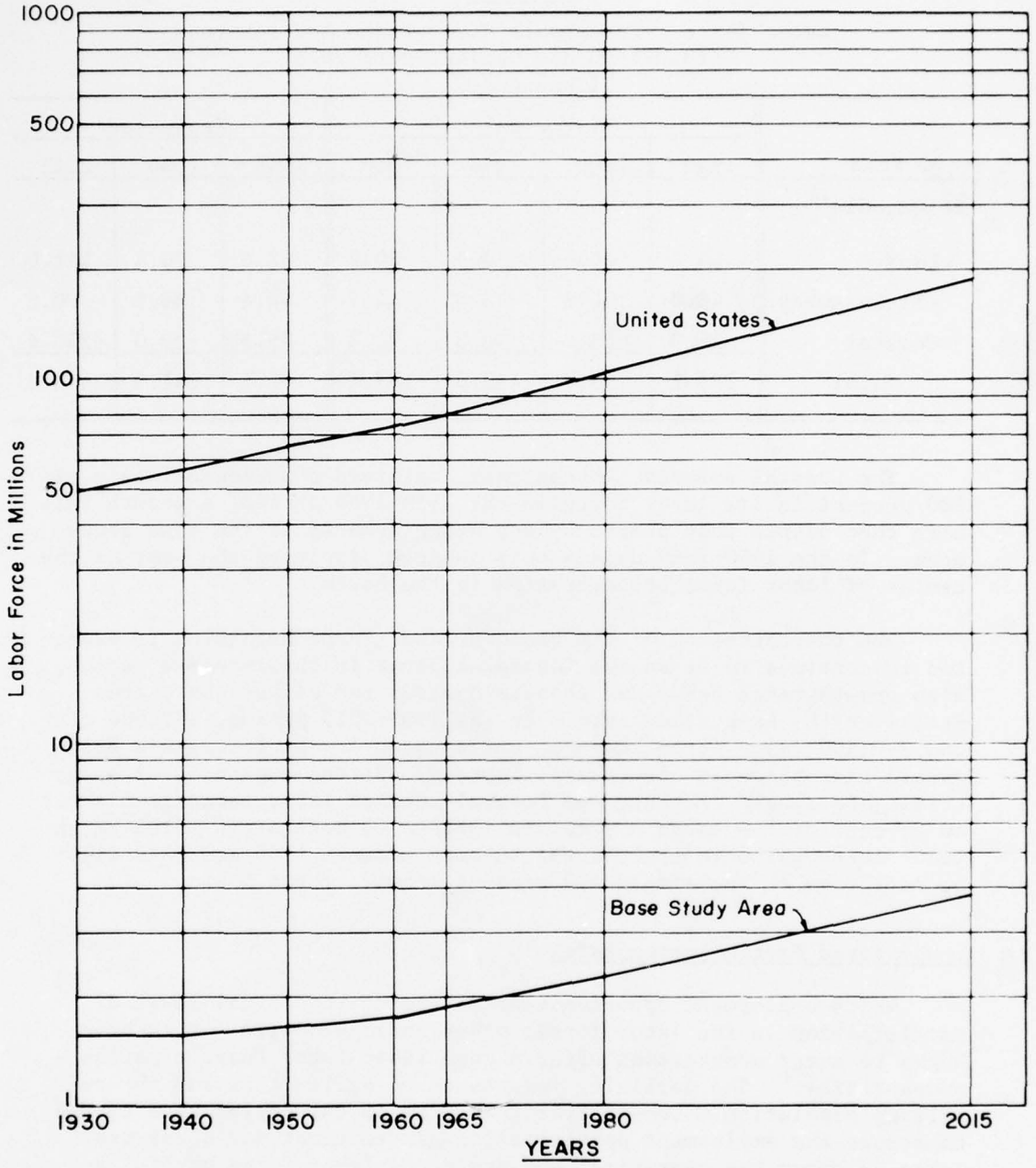
Year	United States[1]	Base study area
1930	49,083.3	1,580.9
1940	56,200.0	1,585.1
1950	64,700.0	1,653.5
1960	73,100.0	1,753.6
1965	79,900.0	1,867.3
1980	104,500.0	2,281.2
2015	189,000.0	3,856.8

[1] 1940-1960 and 1980 figures from "National Economic Growth Projections 1980, 2000 and 2020", preliminary report of the Economic Task Group of the Ad Hoc Water Resources Council Staff; 1965 and 2015 figures derived by interpolation; 1930 figures from "Fifteenth Census of the U. S., 1930."

With the realignment and balancing of the employment mix among agricultural, manufacturing and service industries, the sharp divergence in labor force growth rates between the United States and the base study area should diminish over time. The labor force in the base study area will expand at a more satisfactory pace as the distribution of employment by industry groups develops greater similarity to national employment trends. The total labor force is projected to rise from 1,753,600 in 1960 to 3,856,800 in 2015. However, this rate of growth will not equal the national labor force projections or reverse the mild decline in the proportion of the national force represented by the base study area, from 2.4 percent in 1960 to 2.0 percent in 2015. The labor force in the United States is expected to rise from 73.1 million in 1960 to 189.0 million in 2015, a gain of over 150 percent. If the base study area labor force grew at the national rate between 1960 and 2015, there would be some 4,534,000 rather than the 3,856,800 anticipated.

Pascagoula River Basin. The basin labor force grew from 128,100 in 1930 to 177,100 in 1960 (Table 22 and Chart 10). The growth momentum created by expanding job opportunities centered in the Coastal subarea was sufficient to cause the proportion of the base study area's total labor force concentrated in this basin to rise from 8 percent in 1930 to 10 percent in 1960.

Labor force expansion lagged in both the Leaf and Chickasashay subareas. Rising at a slow but continuous rate, the labor force of the Leaf subarea increased at about the same rate as in the base study area between 1930 and 1960. The labor force in the Chickasawhay subarea, which failed to generate nonagricultural jobs, actually declined from 1930 to 1960, and no real increase is anticipated until the 1965-1980 period.



LABOR FORCE

UNITED STATES AND BASE STUDY AREA

E-57

CHART 9

Table 22

Labor force - Pascagoula River Basin and subareas
1930-1960 and projected to 2015
(Thousands)

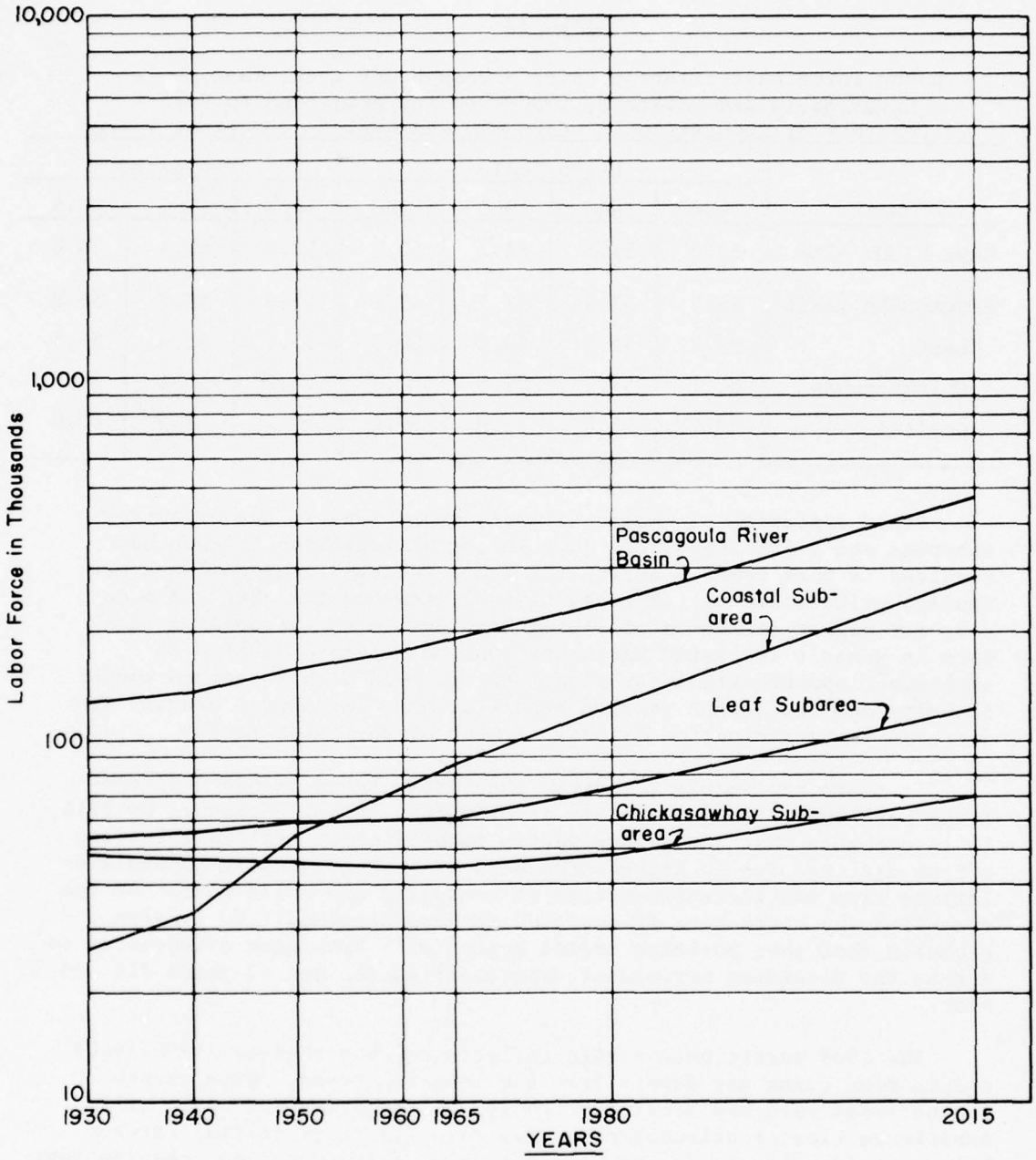
Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
Pascagoula							
Leaf	54.1	55.9	58.9	60.2	61.6	70.4	121.0
Chickasawhay	48.0	46.8	46.8	44.1	44.4	48.5	70.2
Coastal	26.0	33.0	52.3	72.8	85.5	123.0	280.4
Total	128.1	135.7	158.0	177.1	191.5	241.9	471.6

The Coastal subarea, in contrast, attained a phenomenal gain of 180 percent in its labor force in the 1930-1960 period, a growth rate more than double that scored by any other subarea in the base study area. In the 1950-1960 decade this subarea displaced the Leaf as the center of labor force concentration in the basin.

The concentration of the basin's labor force expansion is expected to continue to be in the Coastal subarea in the forecast period, with growth rates far above those projected for either the United States or the base study area. In the 1960-2015 period, 207,600 of the 294,500 labor force increase anticipated in the Pascagoula Basin should take place in the Coastal subarea. Strong expansion of industrial jobs should increase the Coastal subarea labor force from about 40 percent of the basin's total in 1960 to 60 percent in 2015. High labor force gains in the Coastal subarea between 1960 and 2015 will be reflected in the almost 170 percent growth of the basin.

Labor Force Participation Rates

While employment opportunities determine the actual level of participation in the labor force, other socio-economic forces have begun to exert contrasting effects upon labor force "participation propensities." The declining importance of agriculture and the resulting population movement from the farms to the cities have tended to reduce the employment participation of teenagers and older men. Table 23 shows the historical and projected labor force participation rates of the base study area, basin and subareas. The agricultural subareas have relatively lower participation rates than metropolitan subareas. Compulsory education, child labor laws and the desire and need for advanced education have tended to reduce the proportion of young people in the labor force. Young men and women



LABOR FORCE

PASCAGOULA RIVER BASIN AND SUBAREAS

are waiting longer before entering the labor force. Growing demand for higher skills, increasing worker productivity and rising family income levels have also contributed to the decrease in young workers.

Table 23

Labor force participation rates - base study area, Pascagoula River Basin and subareas, 1930-1960 and projected to 2015
(Percentage of population 14 years old and over in the labor force)

Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
BASE STUDY AREA	62.6	54.5	52.7	53.3	53.8	54.4	54.8
PASCAGOULA BASIN	58.5	52.8	52.7	53.6	53.9	55.7	56.8
Leaf	59.2	51.9	50.2	50.5	50.9	52.4	53.1
Chickasawhay	61.1	53.2	52.5	51.9	51.3	53.4	53.5
Coastal	53.0	53.8	56.0	57.6	58.1	58.9	60.0

Rapid expansion of "white collar" occupations in the urbanized subareas and light industrial jobs in the metropolitan fringes have resulted in more women entering the labor force. Fewer children per family, utilization of labor-saving appliances in the home and a desire for higher standards of living have dominated the complex factors in women's increased participation. A relative decline in employment opportunities for older men, coupled with increased social security and retirement pension benefits, have influenced heavily the decrease in participation by this segment of the labor force.

It seems reasonable to assume that these broad trends will continue past 1980, though possibly at different rates. However, by 2015, it is probable that the participation rate of women will have leveled off or declined due to higher standards of living, growing emphasis on leisure time and increasing costs of household and child care. At the same time the birth rate is expected to have declined. It is also probable that some positive social action will have been effectuated to arrest the declining employment opportunities for men 65 years old and over.

The 1965 participation rate reflects current changes (1950-1960) and in some cases may depart from the long-run trend. Even though the national rate may decline slightly, the subareas and basin will experience slow, continuing rises due to: (1) their initial rates being considerably lower than the Nation's, (2) increasing urbanization, and (3) expanding employment opportunities in the underdeveloped areas which will pull workers (such as housewives) into the labor force who were not previously there because no jobs existed. In the larger urban

subareas a more pronounced leveling of participation rates is expected than in the less urbanized subareas, and toward the end of the forecast period, a slight decline in line with national expectations is possible.

It should also be pointed out that in those subareas with large military installations, such as the Coastal, the participation rate will be higher than normal.

SECTION 11. TOTAL EMPLOYMENT

General. The expansion of employment opportunities is an economic concomitant of population growth. Jobs are increasingly concentrated in urban areas, and this trend has caused considerable depopulation in rural counties dependent on agriculture as their employment base. Employment in agriculture and agriculturally related industries remains high in the base study area in comparison with the national distribution of employment. A considerable expansion in manufacturing employment is needed to balance population growth with employment opportunity and to expand the export segment of subarea economies within the base study area. This expansion in manufacturing employment is now in evidence, and is expected to continue throughout the forecast period.

Definition. Employed persons are defined as all civilians 14 years and over who were either (a) at work (those who did any work for pay or profit or worked without pay for 15 hours or more on a family farm or in a family business), or (b) with a job but not at work, such as those who had a job or business from which they were temporarily absent because of bad weather, industrial disputes, vacations, illness or other personal reasons.

Employment figures contained in this study represent employment at place of work and should not be confused with census figures which reflect employment by place of residence. Total employment in the base study area was broken down into three major divisions: agricultural, manufacturing and nonagricultural-nonmanufacturing.

The agricultural division includes employment in agriculture, forestry and fisheries. The manufacturing division consists of employment in establishments engaged in the mechanical or chemical transformation of inorganic or organic substances into new products.

The third major division, nonagricultural-nonmanufacturing, consists of employment in: mining; contract construction; transportation and communication; utilities; wholesale and retail trade; finance, insurance and real estate; services; government; and all other industries. The All Other Industries group consists of employment in nonclassifiable industries and industries not specified or reported. Employment within these divisions is based on classifications contained in the "Standard Industrial Classification Manual".

Analysis and Interpretation

The United States and the base study area. The expansion of total employment in the base study area has lagged behind national gains. In turn, population growth and increases in per capita income have not achieved parity with that of the United States. Nationally, employment rose from 45.9 to 69.2 million between 1930 and 1960, a gain of approximately 50 percent. In the base study area, total employment achieved a gain of less than 10 percent, rising from 1,506,300 to 1,637,000 (Table 24).

Table 24

Total employment - United States and base study area
1930-1960 and projected to 2015
(Thousands)

Year	United States[1]	Base study area
1930	45,895.6	1,506.3
1940	48,060.0	1,383.3
1950	61,400.0	1,596.9
1960	69,200.0	1,637.0
1965	75,500.0	1,736.0
1980	100,000.0	2,178.2
2015	181,000.0	3,759.5

[1] 1940, 1960 and 1980 figures from "National Economic Growth Projections 1980, 2000, 2020," preliminary report of the Economic Task Group of the Ad Hoc Water Resources Council Staff; 1965 and 2015 figures derived from interpolation; 1930 figures from 1930 "Census of Population" (includes military).

Employment growth in the United States outpaced that of the base study area in every decade between 1930 and 1960. During the depressed 1930's, total employment nationally increased 5 percent. This contrasted with an 8 percent decrease in the base study area. The war-generated prosperity of the 1940's caused employment to rise 28 percent nationally and 15 percent in the base study area. The national employment growth of 13 percent from 1950 to 1960 was more than five times the 2.5 percent expansion experienced in the base study area.

As a result of insufficient job opportunities in most subareas of the base study area, population growth has been restricted, low incomes have limited the development of consumer markets, low levels of personal savings have limited the accumulation of capital, and human and natural resources have remained underdeveloped. Had employment gains in the base study area matched national gains from 1930 to 1960, total employment would have stood at 2,271,000 in 1960 instead of 1,637,000.

In the base study area employment is expected to rise to 3.8 million in 2015, achieving an average annual growth rate of 1.7 percent in the 1960 to 1980 period and 2.1 percent in the 1980 to 2015 period. Nationally, employment growth is projected to rise from 69.2 to 100.0 million, up an average of 2.2 percent per year, in the 1960 to 1980 period, and reaching 181.0 million in 2015, a 2.3 percent gain per year after 1980.

During the 55-year forecast interval, employment growth in the United States is estimated at 162 percent, compared with 130 percent in the base study area. Over time, the divergence in employment growth rates between the base study area and the United States will lessen (Chart 11). Despite this tendency, however, total employment in the base study area is expected to decline from 2.4 percent of national employment in 1960 to 2.1 percent in 2015.

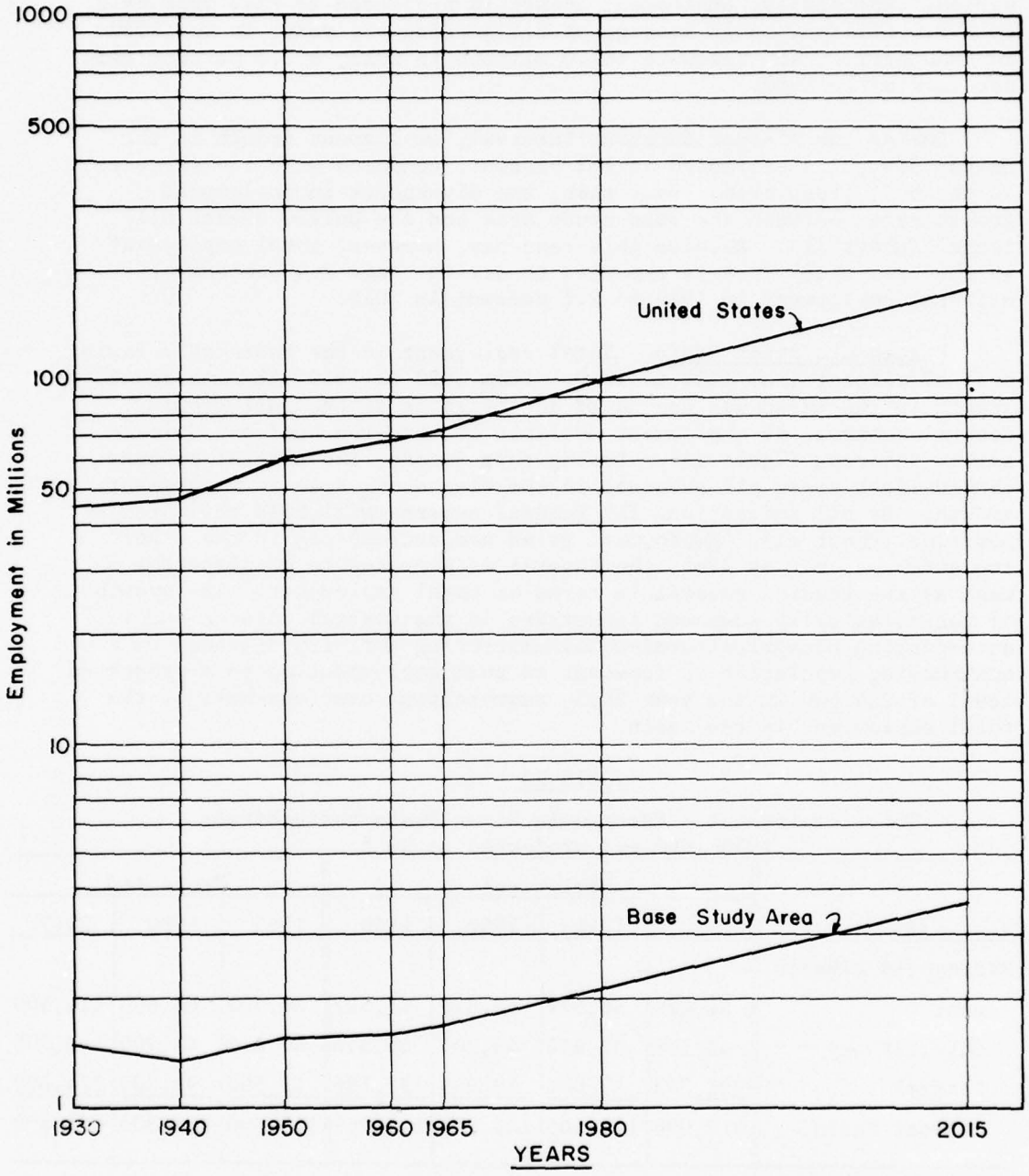
Pascagoula River Basin. Total employment in the Pascagoula Basin rose 27 percent from 1930 to 1960. From 1950 to 1960 all employment growth in the basin was accounted for by gains in the fast growing Coastal subarea, as employment declined in both the Leaf and Chickasawhay subareas (Table 25). During this decade, the Coastal subarea ranked first among all subareas in the base study area in employment growth. By all indications the Coastal subarea will hold this premier position (Chart 12). Employment gains are anticipated in the other two subareas, but by 1965, the Coastal is expected to displace the Leaf as the leading subarea in terms of total employment. The growth of technologically advanced industries in the Coastal subarea and the accompanying nonagricultural-nonmanufacturing activity demanded by a mushrooming population is forecast to push employment up to a projected level of 224,600 in the year 2015, representing over one-half of the total employment in the basin.

Table 25

Total employment - Pascagoula River Basin and subareas 1930-1960 and projected to 2015

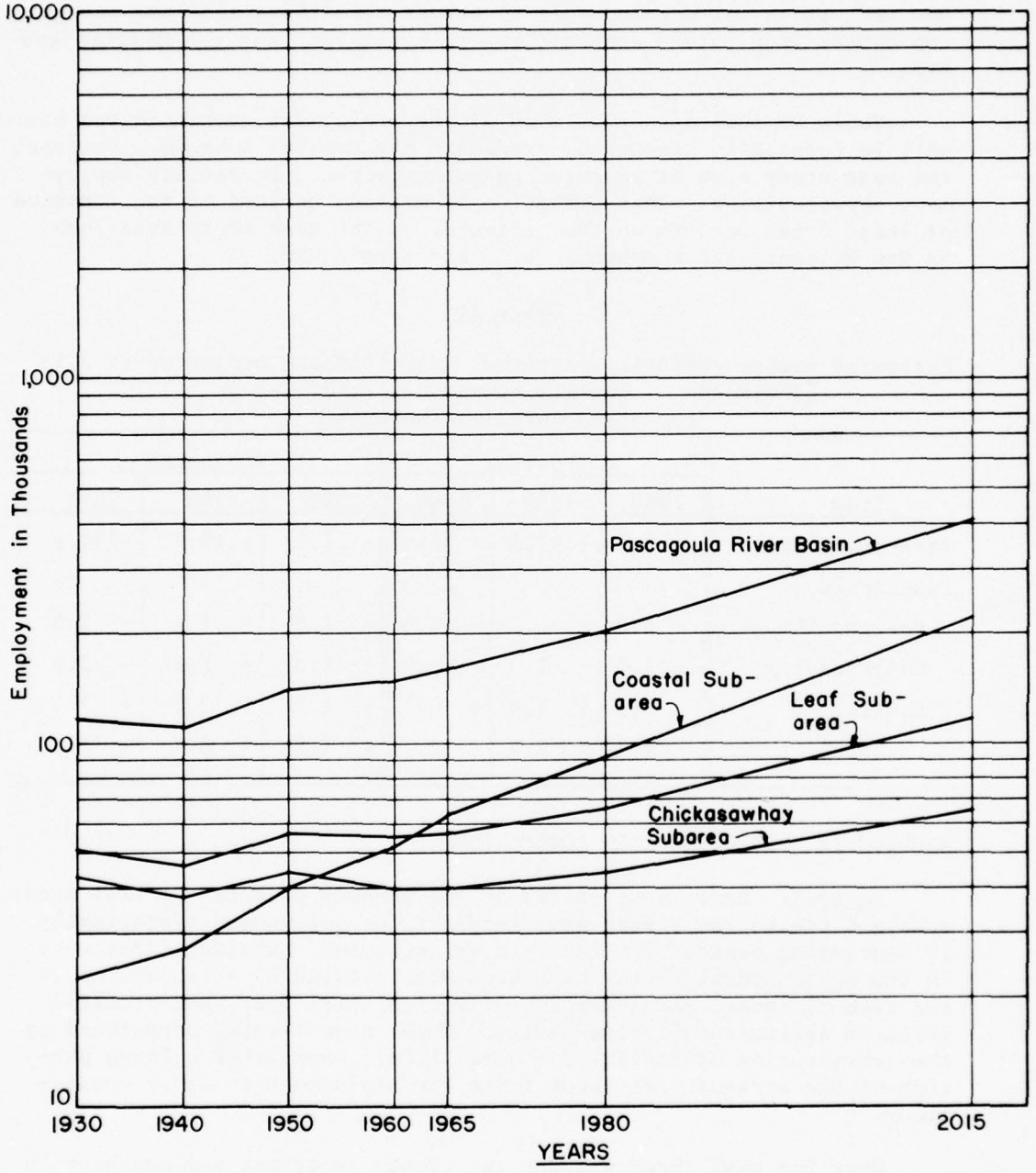
Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
Pascagoula R.Basin							
Leaf	51,225	46,671	56,670	55,527	56,700	65,600	114,500
Chickasawhay	43,566	37,970	44,207	40,356	40,400	44,700	66,700
Coastal	22,303	27,004	39,933	53,186	63,500	93,000	224,600
Total basin	117,094	111,645	140,810	149,069	160,600	203,300	405,800

With expanding port traffic and the extension development of deep water industrial sites, construction of a major oil refinery, the embryonic development of a petrochemical complex, and an expanding heavy



TOTAL EMPLOYMENT
UNITED STATES AND BASE STUDY AREA

CHART 11



TOTAL EMPLOYMENT

PASCAGOULA RIVER BASIN AND SUBAREAS

CHART 12

industrial base, the Coastal subarea has significant assets for growth in industrial employment. The Leaf and Chickasawhay, on the other hand, will continue to depend heavily on labor-intensified, relatively low value-added industries to stimulate gains in total employment. However, it is not unreasonable to expect that these subareas may gain employment from future economic growth spillover from the Coastal subarea.

Table 26 indicates that much of the employment growth in the basin will be internally generated, except in the Coastal subarea. However, the base study area is expected to import workers to satisfy employment opportunities. This situation is created because of the location of large urban centers on the perimeter of the base study area such as New Orleans, Baton Rouge, Mobile and Birmingham.

Table 26

Estimated worker commuting patterns, 1940-1960 and projected to 2015
[Thousands of workers commuting out of (-) or commuting into (+) the area]

Item	Historical			Projected		
	1940	1950	1960	1965	1980	2015
Base study area	- 3.6	+ 37.8	+ 8.5	+ 6.4	+ 49.7	+131.9
Pascagoula						
Pascagoula	- 1.8	- 0.2	- 1.6	- 1.6	- 1.4	- 1.3
Chickasawhay	- 2.4	- 1.0	- 1.2	- 1.3	- 1.5	- 2.6
Coastal	- 0.5	+ 3.6	+ 0.1	+ 1.1	+ 2.2	+ 7.3
Total	- 4.7	+ 2.4	- 2.7	- 1.8	- 0.7	+ 3.4

SECTION 12. EMPLOYMENT IN AGRICULTURE

General. Employment shifts in the economy of both the base study area and the United States have tended to be influenced historically by decreasing demands for labor in agriculture. Massive adjustments in the agricultural sector have been precipitated by an expansion in the size of farms, mechanization of agricultural jobs, and dramatic gains in agricultural productivity. These adjustments, occasioned by the substitution of capital for human labor, have freed a large portion of the agricultural labor force for employment in other occupations.

Over the past three decades the growth in output per man hour in agriculture has been very rapid – at a rate approaching 1.5 percent per year. This growth has been achieved with approximately the same crop acreage but with a large increase in the amount of farm machinery

and equipment per man. Further, declining labor requirements have been accompanied by higher expenditures for variable capital inputs, viz., fertilizer, seed, insect and disease control and weed eradication.

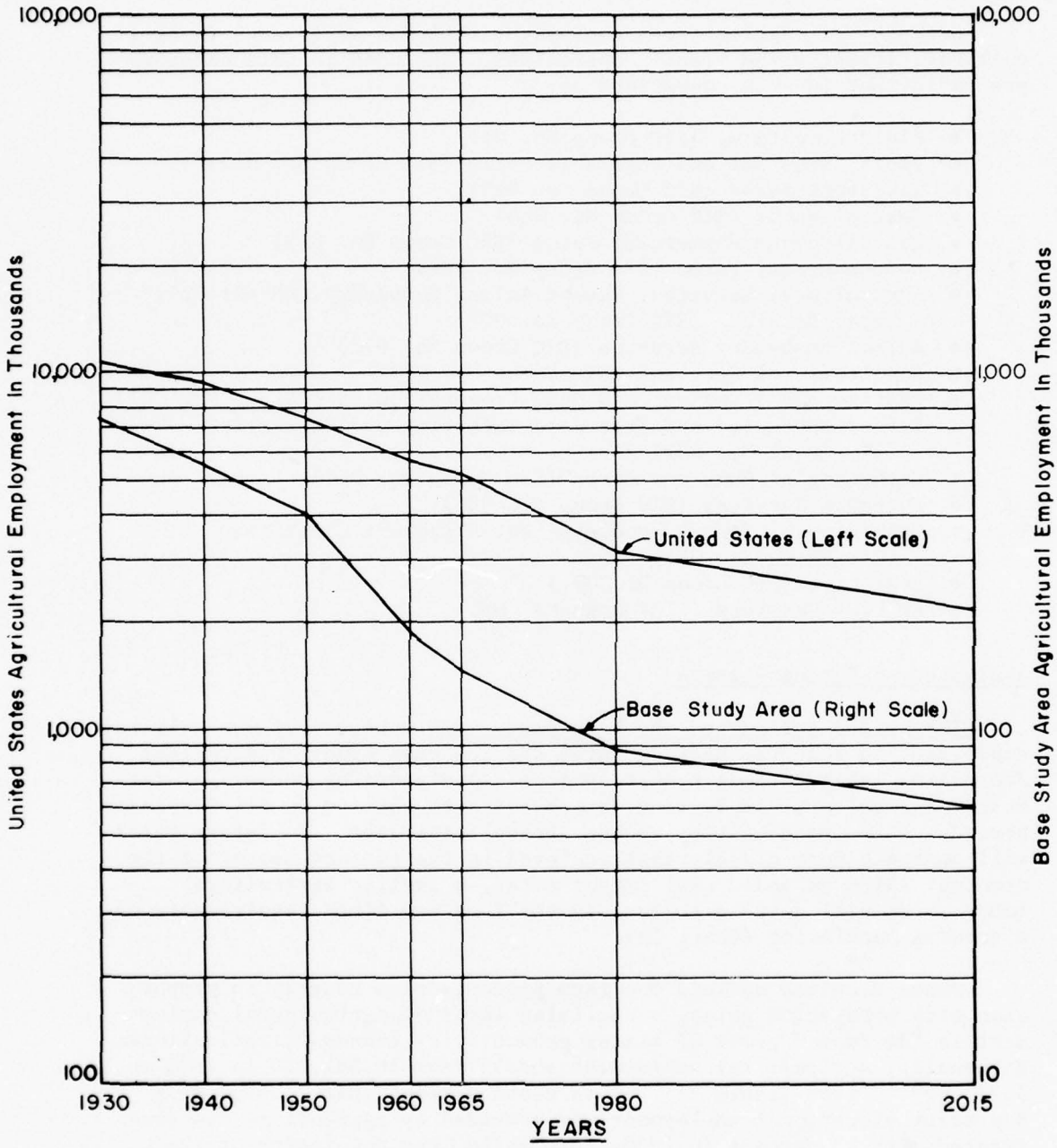
Definition. Agricultural employment includes employment in agricultural, forestry and fishing operations. Included in this category are employment in such operations as:

- Field Crop Farms (SIC Group No. 011)
- Fruit, Tree Nut and Vegetable Farms (SIC Group No. 012)
- Livestock Farms (SIC Group No. 013)
- General Farms (SIC Group No. 014)
- Miscellaneous Commercial Farms (SIC Group No. 019)
- Noncommercial Farms (SIC Group No. 021)
- Agricultural Services, Except Animal Husbandry and Horticultural Services (SIC Group No. 071)
- Animal Husbandry Services (SIC Group No. 072)
- Horticultural Services (SIC Group No. 073)
- Hunting and Trapping, and Game Propagation (SIC Group No. 081)
- Forest Nurseries and Tree Seed Gathering and Extracting (SIC Group No. 082)
- Gathering of Gums and Barks (SIC Group No. 084)
- Forestry Services (SIC Group No. 085)
- Gathering of Forest Products, Not Elsewhere Classified (SIC Group No. 086)
- Fisheries (SIC Group No. 091)
- Fishery Services (SIC Group No. 098)

Analysis and Interpretation

The United States and the base study area. Levels of agricultural employment in both the United States and the base study area reflect decreasing labor demands resulting from rapidly rising output per man hour. Agricultural employment is projected to decline in all forecast periods, since productivity in the agricultural sector in future years will approach more closely that achieved in the nonfarm sector of the economy. With expanded real output rates, a smaller agricultural labor force will be able to satisfy the food and fiber requirements of a growing population (Chart 13).

Since domestic markets for farm products rise roughly in proportion with population gains, a declining level of agricultural employment is "de facto" proof of rising productivity trends in agriculture. Nationally, agricultural employment shrank from 10,581,000 in 1930 to 5,723,000 in 1960 (Table 27). This decline meant that in 1960 only 8 percent of national employment was provided by agriculture, as contrasted with 23 percent in 1930. Meanwhile, the population of the United States expanded by the same percent as agricultural employment declined between 1930 and 1960.



EMPLOYMENT IN AGRICULTURE
UNITED STATES AND BASE STUDY AREA

E-68

CHART 13

Table 27

Employment in agriculture - United States and base study area
1930-1960 and projected to 2015
(Thousands)

Year	United States[1]	Base study area
1930	10,581	746.8
1940	9,540	557.9
1950	7,497	403.7
1960	5,723	187.1
1965	5,090	146.4
1980	3,168	87.1
2015	2,210	62.6

[1] 1940-1960 and 1980 figures from "National Economic Growth Projections 1980, 2000, 2020", preliminary report of the Economic Task Group of the Ad Hoc Water Resources Council Staff; 1965 and 2015 figures derived by interpolation; 1930 figures from "Fifteenth Census of the United States, 1930."

Agricultural employment will decline from a national level of 5,723,000 in 1960, representing 8 percent of total employment, to 2,210,000 in 2015, the equivalent of a mere one percent of total employment.

In keeping with national trends, falling agricultural employment has been characteristic of the base study area. In 1930, some 746,800 workers in the base study area were dependent on agriculture for their livelihood, while in 1960, the agricultural sector provided employment for only 187,100 workers. Agriculture accounted for one-half the total employment in the base study area in 1930, as compared to 11 percent in 1960.

Agriculture is undergoing a technological revolution that is expected to change the nature of agricultural employment. As the "cotton belt" farms increase in size and change to enterprises that make the best use of resources, agricultural employment will demand a highly skilled, highly productive work force. These trends will cause a gradual decrease in agricultural employment in the base study area to 62,600 employees in 2015, representing less than two percent of all employment.

In the base study area the rate of decline in agricultural employment will slacken to an annual average of 1.2 percent in the 1960-2015 forecast period from an average annual drop of 2.5 percent between 1930 and 1960. The worker loss between 1960 and 2015 is forecast at 124,500, compared with an employment drop of 559,700 in the three decades from 1930 to 1960. Late in the forecast period, the base study

area may experience a slight upturn of agricultural employment as the national production of agricultural commodities becomes more regionalized.

Since 1950, a significant expansion of employment in the nonagricultural sector of the economy of the base study area has brought about greater employment similarities between the base study area and the United States. In 1950 and prior decades, the proportion of the work force employed in agriculture in the base study area was approximately double that of the United States, while in 1960, the gap had narrowed to a 38 percent differential. Employment dissimilarities between the base study area and the United States are forecast to reduce further during the 1960-2015 period.

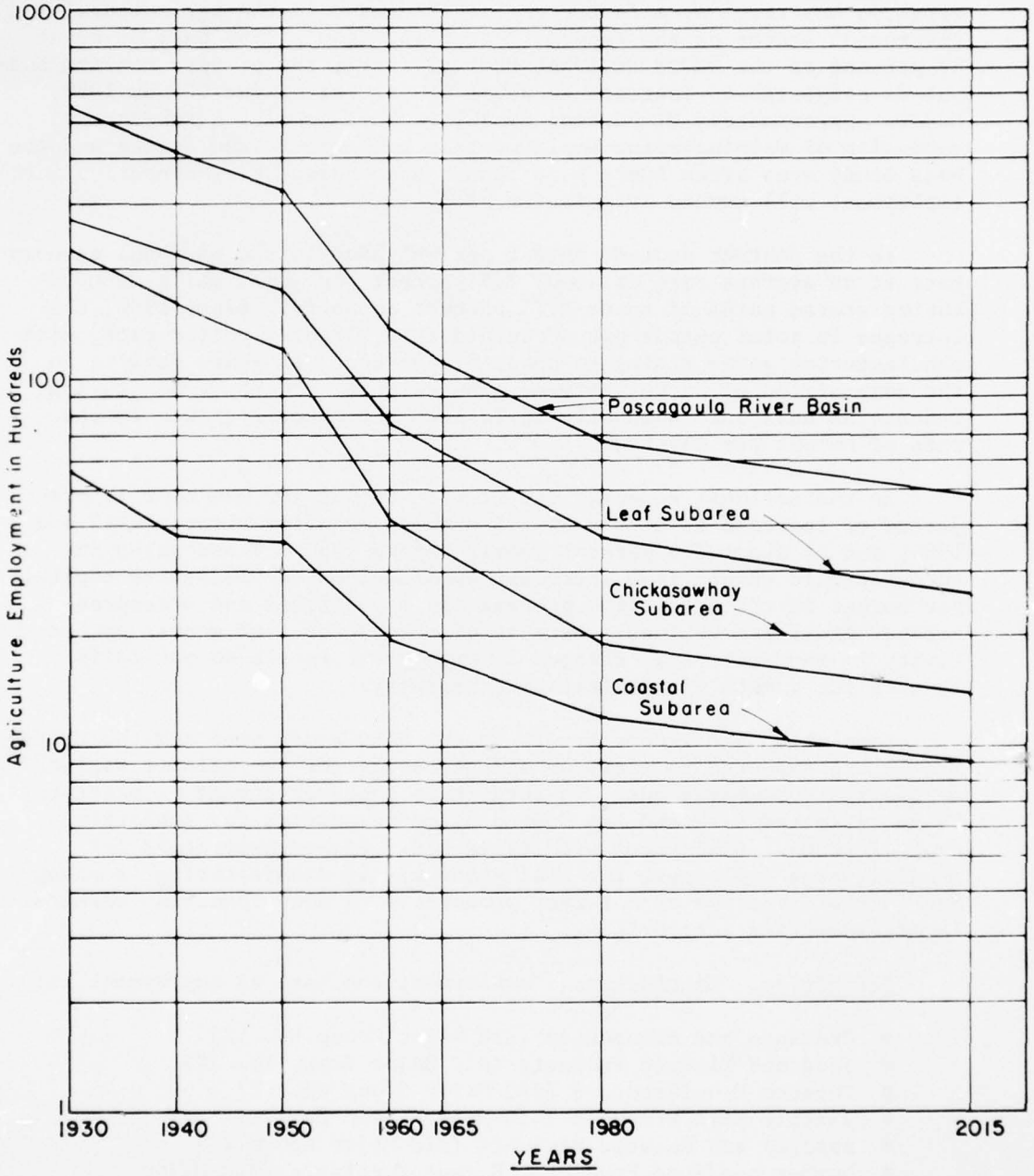
Pascagoula River Basin. Agricultural employment in the basin followed basically the same pattern as the base study area. In 1930 and 1960 the basin accounted for 7.4 percent of the base study area's agricultural employment. Agricultural job opportunities in the basin decreased from 55,100 in 1930 to 13,900 in 1960 (Table 28). This trend is expected to continue in the future at a decreasing rate (Chart 14).

Table 28

Employment in agriculture - Pascagoula River Basin and subareas 1930-1960 and projected to 2015

Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
Pascagoula R. Basin							
Leaf	27,426	21,857	17,173	7,770	6,200	3,700	2,600
Chickasawhay	22,047	16,150	12,180	4,191	3,300	1,900	1,400
Coastal	5,640	3,761	3,643	1,977	1,700	1,200	900
Total	55,113	41,768	32,996	13,938	11,200	6,800	4,900

Although each subarea showed a decrease in agricultural employment between 1930 and 1960, the rate of decline for the Chickasawhay subarea was larger than for any other subarea. In 1930 this subarea accounted for 40.0 percent of the basin's agricultural employment. By 1960, its share had dropped to 30.1 percent and by 2015 is expected to decline to 28.5 percent.



EMPLOYMENT IN AGRICULTURE

PASCAGOULA RIVER BASIN AND SUBAREAS

CHART 14

SECTION 13. EMPLOYMENT IN MANUFACTURING

General. Historically, the demand for nonagricultural goods and services has risen at a faster pace than demand in the agricultural and government sector of the economy. Starting from a 1960 base of about 87 percent of the GROSS NATIONAL PRODUCT (GNP), the private nonfarm output is projected to increase to about 89 percent of the GNP by 1980, and to approximately 91 percent by 2015. This implies a substantial expansion of manufacturing employment in both the United States and the base study area after 1960, even though nonmanufacturing-nonagricultural employment will expand at a faster pace.

In the postwar period, output per man-hour in the national economy rose at an average rate of about 2.5 percent per year, while manufacturing scored gains of about 2.75 percent annually. Since 1960, the increase in total output has proceeded at a slightly better rate, with manufacturing gains rising to about 3.5 percent per year. Shifts in the composition of output between manufacturing and nonmanufacturing industries have only nominally influenced the overall growth in the rate of output per man-hour.

In the national economy, the rise in output per man-hour is projected to increase at a rate of 2.5 percent annually between 1960 and 1980, and by about 2.3 percent yearly beyond 1980. These gains in output should result from increased applications of productive capital per worker in the production process and significant and widespread technological innovations. Because of the increase of worker productivity in manufacturing, changes in employment levels do not fully measure the growth of manufacturing activity.

Population and income growth in the base study area and the United States are expected to exert demand pressures for an infinite variety of quality consumer goods. In turn, this consumer demand is expected to be reflected backward, as demand by manufacturers for supporting capital goods. Concurrent with these basic demand generators for manufacturing employees, the employment mix in manufacturing is changing in the direction of a larger proportion of non-production workers in manufacturing enterprises.

Definition. Manufacturing employment consists of employment in:

- Ordnance and Accesories (SIC Major Group No. 19)
- Food and Kindred Products (SIC Major Group No. 20)
- Tobacco Manufacturers (SIC Major Group No. 21)
- Textile Mill Products (SIC Major Group No. 22)
- Apparel and Related Products (SIC Major Group 23)
- Lumber and Wood Products, Except Furniture (SIC Major Group No. 24)
- Furniture and Fixtures (SIC Major Group No. 25)
- Paper and Allied Products (SIC Major Group No. 26)

- Printing, Publishing, and Allied Industries (SIC Major Group No. 27)
- Chemicals and Allied Products (SIC Major Group No. 28)
- Petroleum Refining and Related Industries (SIC Major Group No. 29)
- Rubber and Miscellaneous Plastics Products (SIC Major Group No. 30)
- Leather and Leather Products (SIC Major Group No. 31)
- Stone, Clay and Glass Products (SIC Major Group No. 32)
- Primary Metal Industries (SIC Major Group No. 33)
- Fabricated Metal Products (SIC Major Group No. 34)
- Machinery, Except Electrical (SIC Major Group No. 35)
- Electrical Machinery, Equipment and Supplies (SIC Major Group No. 36)
- Transportation Equipment (SIC Major Group No. 37)
- Instruments and Related Products (SIC Major Group No. 38)
- Miscellaneous Manufacturing Products (SIC Major Group No. 39)

Note: For a detailed breakdown of each major group, see "Standard Industrial Classification Manual", Executive Office of the President, Bureau of the Budget, 1957.

Because of the relatively small amount of employment in tobacco, rubber and plastics, leather, instruments, ordnance and miscellaneous manufacturing industries in the base study area, the employment figures for these industries were combined into a category called Other Manufacturing. Employment in the furniture industry, also relatively small, was combined with employment in the lumber and wood products industry, and the total listed under lumber, wood and furniture.

Analysis and Interpretation.

The base study area. In recent decades the base study area has emerged from its position as one of the less developed regions of the United States into one offering significant advantages to manufacturers seeking to expand or relocate. The manufacturing segment of the economy of the base study area is in a strong growth phase, and at this time offers much of the development challenge of an economic frontier. Throughout much of its history the agricultural orientation of the economy of the base study area limited industrialization and urbanization in many basins and subareas. Markets were so limited that it was not feasible to establish plants in most basins to manufacture for "domestic" consumption.

With enormous strides in farming technology, labor was freed for other industries without reducing agricultural output. The types of manufacturing that first developed in the base study area were, in general, tied closely to the region's agricultural labor force surplus. This embryonic industrialization had the twin effects of

generating "export" trade, thus stimulating the flow of money back into the base study area which, in turn, raised personal income and broadened market demand. Gains in manufacturing employment have continued along increasingly sophisticated lines, and the base study area stands now on the threshold of tremendous technological upgrading as a growth region in terms of manufacturing employment.

Manufacturing employment was found to have demonstrated a strong, positive growth trend in the base study area in all periods evaluated (Table 29 and Chart 15). Even during the depressed 1930's, total manufacturing employment rose from 158,300 in 1930 to 192,700 in 1940 and rose to 336,800 by 1960. This employment trend stands in sharp contrast with agricultural employment which declined in every period examined. Further, these gains were absolute in that the proportion of the labor force employed in manufacturing approximately doubled from 1930 to 1960.

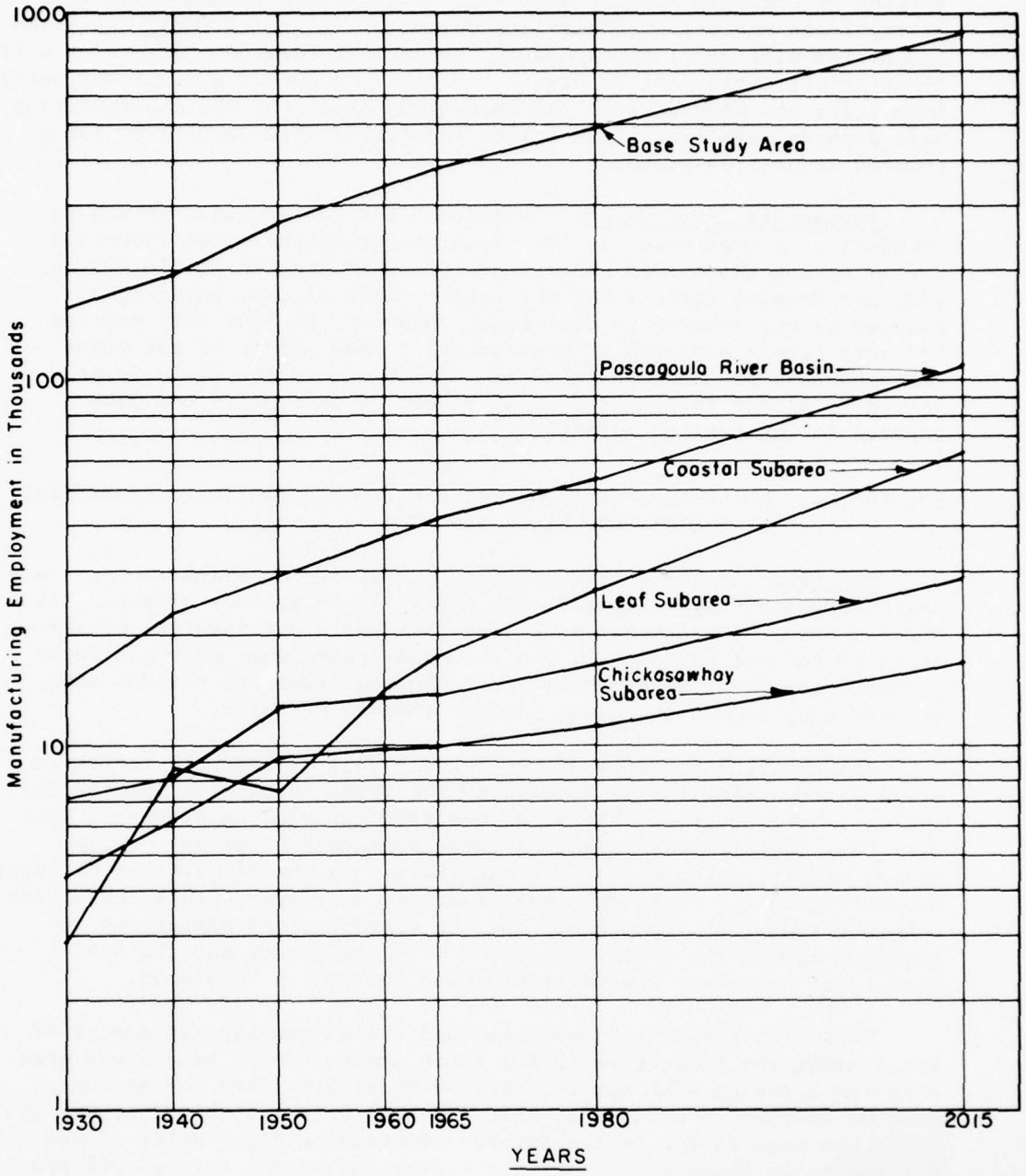
Table 29

Employment in manufacturing
Base study area, Pascagoula River Basin and subareas
1930-1960 and projected to 2015

Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
Base study area	158,267	192,699	267,048	336,784	377,400	489,400	889,200
Pascagoula River							
Leaf	7,140	8,198	12,574	13,252	13,700	16,300	28,400
Chickasawhay	4,371	6,247	9,132	9,633	9,900	11,200	16,500
Coastal	2,858	8,485	7,492	13,820	17,500	26,100	63,400
Total	14,369	22,930	29,198	36,705	41,100	53,600	108,300

The expansion of manufacturing employment in the base study area is a recent phenomenon. In 1930, only the Birmingham manufacturing complex qualified as an industrial area in that it alone contained a concentration of manufacturing industry employing at least 40,000 wage earners. The bordering Memphis area, though, did rate as an important industrial center as early as 1930, and by 1960 it was "importing" a considerable volume of workers daily from the Northwest Mississippi basin bordering on the Tennessee line. All other sections have done so since 1940.

The future economic growth of the base study area should hinge in significant measure on a continued expansion of the manufacturing sector. Over the 1960-2015 forecast period, employment in manufacturing is projected to rise by about 165 percent to a total terminal employment level of 889,200. In future years, manufacturing employment in the base study area should gain, relative to total employment.



EMPLOYMENT IN MANUFACTURING INDUSTRIES
BASE STUDY AREA,
PASCAGOULA RIVER BASIN AND SUBAREAS

CHART 15

With the development of markets concurrent with population and income growth, branch manufacturing operations oriented toward the serving of regional markets will tend to gravitate toward existing metropolitan centers in the base study area. Existing resources-based industries will continue expanding, although automation tendencies will limit actual employment levels in the paper, chemical and primary metal industries now prominent in the base study area. As the manufacturing base expands, small-scale satellite industries will develop to serve related industrial groups.

Pascagoula River Basin. Consistent decade-to-decade growth in manufacturing employment in the basin was achieved in the 1930-1960 period during which such employment more than doubled (Table 29). In 1930 the Coastal subarea had the least number of manufacturing employees of any subarea in the basin. However, by 1960 this subarea had more people employed in manufacturing than either of the other two subareas. The 1960 manufacturing employment in the basin is projected to almost triple by 2015 with over 50 percent of the jobs located in the Coastal subarea.

SECTION 14. EMPLOYMENT IN MAJOR WATER-USING MANUFACTURING INDUSTRIES, BY 2 DIGIT SIC MAJOR GROUPS

General. In 1959, manufacturing industries in Alabama, Louisiana and Mississippi used slightly over one trillion gallons of water, 18 percent more than they had used just five years previously. Of this, about 83 percent was used by the chemical, petroleum, pulp and paper, primary metals and food industries. The remainder was divided among a great many industries using smaller amounts of water.

The chemical industry is the largest user of water in the three states, accounting for 32 percent of the total industrial intake. The greatest percentage of this water was used for cooling purposes; however, the industry also required large amounts for use as reaction media, washing large amounts of materials, and the dilution of effluent. Generally, in the past, chemical plants in the United States have been concentrated in the Northeast, but the current trend appears to be shifting toward the South. Abundant water resources and the availability of petroleum raw materials have influenced this move.

Petroleum refining industries used the second largest amount of water among the industries in the three states in the base study area. With the location of a new refinery in Mississippi and the announcement of another in Louisiana, this industry will probably increase its water use much faster in the future. Continuing discoveries of new oil fields in these states and the rising demand for refined oil products will enhance the probability of new refineries being built in the area, especially along the Gulf Coast and navigable waterways.

The pulp and paper industry ranks third among the major water-using manufacturing industries in the three States. While each of the 16 specific classifications in the pulp and paper grouping requires water, the manufacturers of pulp, paper, paperboard, building paper and building board are, by far, the major users.

The availability of commercial timberlands and fresh water are primary requisites for the location of pulp and paper plants. Therefore, it is not unusual that industry planning for new sites favors the base study area region, since it is one of the few remaining in the Nation that possesses these factors in optimum quantities. Continued growth of the pulp and paper industry is fully expected in the base study area.

Because converted paper and board industries rely on the primary pulp, paper and board industries for their principal raw materials, it was assumed that the base study area would experience future location of these converter industries near existing and expected primary paper plants. Substantiation is already being found in the large paper companies which are vertically integrating to incorporate the conversion of paper and board into end products such as boxes, bags, etc., at the millsite.

The principal usage of water in the primary metal industries in the base study area is found in the iron and steel industry of the Warrior subarea. Water is an indispensable material for the industry, being used mostly for cooling purposes but also for cleaning and the conveying and dilution of wastes. However, water is important for another reason. This industry is increasing its dependence on imported raw materials, and the costs of transportation make location along the coastal areas and navigable waterways an economic necessity. Even though water requirements for the production process may be reduced, water as a means of transportation should remain highly important to the industry.

Certain technological changes, which are still in the early stages of application, may develop importantly enough to have significant effects on water use and employment in the iron and steel industry. One, is the direct reduction of iron ore which requires approximately one-third as much water per ton of steel as the conventional blast furnace. Additional reduction in water needs should result from the expected widespread adoption of the oxygen converter as a steel-smelting furnace. The use of nuclear energy for heating and power generation is another development that is expected to affect the industry's future demands for water. Finally, the perfection of continuous casting, which would reduce or eliminate the rolling of semifinished steel, should cut down on the use of water, when adopted by the industry.

The food industry includes establishments engaged in the manufacturing of meat products; dairy products; canned, preserved and

frozen products; grain-mill products; bakery products; sugar, confectionery and related products; beverages and other food preparations. There is a wide variation in the amount of water used by the specific industries within this category, ranging from very little water used in the manufacture of animal feeds to a considerable amount used in the preparation of food for canning and freezing.

Major uses of water by this industry include heating and cooking, cleaning, peeling, grading and the conveying of the food products. Water used in the production of food must be chemically and hygienically pure and, in the majority of cases, conform to U. S. Public Health Service standards. Hence, most food industries are large customers of municipal water systems.

Mergers in this industry may affect the future location of large food processing plants in the base study area, but the continued expansion of this industry in the metropolitan centers of the area is foreseen, contributing to increased water demands in the cities as the industry grows.

Definition. Employment in major water-using manufacturing industries includes those workers employed in the following industries: (1) Food (SIC Major Group No. 20), (2) Paper (SIC Major Group No. 26), (3) Chemicals (SIC Major Group No. 28), (4) Petroleum Refining (SIC Major Group No. 29), and (5) Primary Metals (SIC Major Group No. 33). All employment figures are presented at place of work.

Analysis and Interpretation

The base study area. The growth of technically oriented, high value-added major water-using industries in the base study area has added strength and diversity to total manufacturing employment. Between 1930 and 1960, this type of employment doubled from 68,300 to 139,100 workers (Table 30). Over this same period, major water-using industries became more widely diffused among the basins of the base study area and provided employment diversification. Still the historical period saw a slight decline in the proportion of total manufacturing employment represented by major water-using industries between 1930 and 1960.

Because the base study area is characterized as a water abundant area, major water-using industries are expected to expand significantly in periods beyond 1960, despite their large capital requirements. Total employment in major water-using categories is projected at 331,200 in 2015, a 1960-2015 gain of almost 140 percent. This growth over the forecast period will lag behind the 182 percent gain in other manufacturing employment, causing the proportion of total manufacturing employment allocable to major water-using industries to fall from 41 percent in 1960 to 37 percent by 2015.

Table 30

Employment in major water-using manufacturing industries
Base study area, 1930-1960 and projected to 2015
By 2-digit SIC major groups

Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
Food	16,069	25,843	30,298	45,196	48,570	66,100	131,530
Pulp and paper	5,517	7,577	19,170	26,324	30,070	40,120	79,750
Chemicals	11,497	8,801	12,216	18,115	20,400	27,430	56,340
Petroleum	99	7,600	11,370	9,660	10,310	13,630	20,390
Primary metals	35,081	32,280	38,753	39,829	39,800	38,460	43,230
Total base study area	68,263	82,101	111,807	139,124	149,150	185,740	331,240

Over the forecast period a number of major water-using industries, insignificant or even nonexistent in the base study area in 1960, should emerge as satellite industries to support the development of structurally related industry groups. In general, these developments are expected to be localized in basins with a major employment concentration in the related industry groups.

The expansion of employment by major groups of water-using industries has shown mixed trends. With the expansion and urbanization of population and rising incomes permitting the consumption of more convenience foods, employment in the food group rose from 16,100 in 1930 to 45,200 in 1960 and is projected to almost triple to 131,500 workers by 2015. Employment gains in food have been absolute, in that the proportion of all major water-using employment represented climbed steadily from one-fourth in 1930 to one-third in 1960 and is projected at successively higher proportions up to 40 percent in 2015. In 1960, food replaced primary metals as the leading major water-using employer in the base study area, and this leadership position should continue over the forecast period.

The gross consumption of paper and paperboard products has reached a level approaching one ton per family per year and by all allocations should rise. Rich reserves of rapidly growing pine timber, abundant water, and the expanding national consumption of paper and containers, boosted employment in the paper group from 5,500 in 1930 to 26,300 in 1960, with especially good gains noted in the 1940-1950 decade. The growth thrust established in the historical period is projected at an accelerated rate between 1960 and 2015, with employment rising to 79,750 in the terminal year. Employment in this

growth industry is projected to nearly double between 1980 and 2015. The paper industry increased its share of total major water-using industry employment from 1930 to 1960 and is projected to sustain further gains to 2015, ranking next to food as the second major employer from 1980 onward.

Employment in chemical industries in the base study area evidenced a slow gain between 1930 and 1960. Contrary to movements in the major water-using groups, employment in the chemical group actually declined during the 1930 to 1940 decade, accounted for, in part, by falling prices in agricultural markets and consequent declines in the demand for fertilizer during the years of the great depression. Based on a projected expansion in all categories of manufacturing employment, a strong upward trend in the demand for chemical products is expected in such traditional industries as sulfuric acid, fertilizer and the basic organics. Total chemical employment in the base study area is projected to rise to 56,300 in 2015, up from 18,100 in 1960. The high value-added, high wage characteristics of this industry group foretells an economic importance to the economy of the base study area beyond that indicated by projected employment gains.

The petroleum industry is essentially resource based, and the base study area enjoys large proved resources of oil. Better recovery techniques and an expanded product yield from given quantities of raw petroleum suggest expanded employment in the petroleum group. Starting from an insignificant 100 employees in 1930, employment in petroleum industries expanded to 9,700 in 1960. Employment in this industry group is projected to rise to 20,400 in 2015, despite the very high investment required per job in the industry.

Industries in the primary metals group are subject to amplified employment changes with basic shifts in business conditions. This characteristic was demonstrated in the depressed 1930's when employment in primary metals fell from 35,100 in 1930 to 32,300 in 1940. The partial depletion of high grade raw materials in the greater Birmingham complex, accompanied by an under-investment in plant and equipment, resulted in a sluggish rise to an employment level of 39,800 in 1960. Over the forecast period a slow growth to 43,200 workers in 2015 is projected, the least responsive major water-using industry group in the base study area. The primary metals group has suffered consistent declines in the proportion it represents of total major water-using employment, falling from 51 percent in 1930 to 29 percent in 1960 and projected at only 13 percent in 2015.

Projections of employment growth in major water-using industries are predicated on the continued availability of industrial water and, indeed, abundant water resources in the base study area will attract these industry groups. The aggregate benefits to the base study area resulting from an expansion of major water-using employment are greater than indicated by employment gains. The industries analyzed

use vast quantities of raw materials, implying a carry-back of employment gains in supporting agricultural and extractive industries. Further, these industries, with the exception of food, generate high pay employment opportunities, so that wage and salary disbursements exceed income gains that would be anticipated from employment growth alone.

Pascagoula River Basin. Employment in major water-using industries in the Pascagoula Basin increased from 3,800 workers in 1930 to 12,300 workers in 1960 (Table 31). The most noticeable employment increases occurred in the paper, food and chemical industries.

In coming periods, the basin will experience significantly higher levels of employment in all major water-using industries, excepting primary metals. Between 1960 and 2015, food employment is scheduled to rise from 4,700 to 11,600, paper employment from 5,300 to 17,100, chemical employment from 1,700 to 10,100, and petroleum employment from 400 to 5,100 workers. These projected levels of employment for the basin will account for one-fourth of the total employment in the petroleum industry in the base study area in 2015 and about one-fifth of total employment in the paper and chemical industry.

Employment in major water-using industries in the Leaf subarea comprised 45 percent of manufacturing employment in 1960. Such employment is projected to be well over one-half of manufacturing employment in 2015. In 1960 the Leaf subarea accounted for about one-half of all employment in major water-using industries in the basin. Substantial concentrations had developed in paper industries, in which the 3,100 workers represented well over one-half of the basin's aggregate paper employment; in the chemical industries, with 1,100 workers and two-thirds of the basin's total; and in petroleum industries, with about three-fourths of all jobs but an insignificant level of employment. The position of employment dominancy in major water-using industries enjoyed by the Leaf subarea in 1960 is projected to pass to the Coastal subarea by 1965.

Based on historical and projected developments, the Chickasawhay subarea cannot be considered a significant employer in any major industrial water-using group. Actual employment in all major water-using categories stood at 1,600 in 1960 and is forecast at 4,100 in 2015.

The Coastal subarea, by all indications, should show a strong reversal in the historical composition of its manufacturing employment over the forecast period. Employment in major water-using industries demonstrated good growth from 1930 to 1960, increasing from 1,700 employees to 4,800 employees and is projected to continue this growth and reach a level of 24,600 employees by 2015. The proportion of total manufacturing employment represented by major water-using industries fell from 60 percent in 1930 to 35 percent in 1960 but is projected to increase to almost 40 percent in 2015.

Table 31

Employment in major water-using manufacturing industries
Pascagoula River Basin and subareas, 1930-1960 and projected to 2015

Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
Leaf							
Food	367	419	790	1,435	1,920	2,310	4,910
Pulp & paper	303	94	2,495	3,133	3,400	4,330	8,530
Chemicals	449	1,031	1,127	1,060	1,060	1,190	1,990
Petroleum	---	2	79	291	360	370	700
Primary metals	309	86	18	36	50	80	170
Total	1,428	1,632	4,509	5,955	6,790	8,280	16,300
Chickasawhay							
Food	297	478	690	904	920	1,040	1,750
Pulp & paper	---	6	282	439	500	730	1,380
Chemicals	195	163	158	72	120	210	610
Petroleum	---	1	64	100	110	140	270
Primary metals	114	13	9	50	60	70	120
Total	606	661	1,203	1,565	1,710	2,190	4,130
Coastal							
Food	1,008	2,930	1,834	2,389	2,990	3,570	4,940
Pulp & paper	435	1,172	1,249	1,750	2,240	3,300	7,200
Chemicals	172	276	415	539	820	1,370	7,490
Petroleum	---	---	---	---	710	2,120	4,170
Primary metals	102	7	7	150	190	340	770
Total	1,717	4,385	3,505	4,828	6,950	10,700	24,570
TOTAL BASIN							
Food	1,672	3,827	3,314	4,728	5,830	6,920	11,600
Pulp & paper	738	1,272	4,026	5,322	6,140	8,360	17,110
Chemicals	816	1,470	1,700	1,671	2,000	2,770	10,090
Petroleum	---	3	143	391	1,180	2,630	5,140
Primary metals	525	106	34	236	300	490	1,060
TOTAL	3,751	6,678	9,217	12,348	15,450	21,170	45,000

SECTION 15. EMPLOYMENT IN OTHER MANUFACTURING INDUSTRIES BY 2 DIGIT SIC MAJOR GROUPS

General. The manufacturing sectors of the economies of both the United States and the base study area are now undergoing changes that profoundly affect the techniques of production and, in turn, the demand for human skills. Most lines of manufacturing are substituting capital and machine-time for manpower. Routine clerical and bookkeeping jobs are being displaced by computers in practically all industries. In companies that produce or distribute goods in large quantities, the extensive use of conveyors and other devices for handling materials is rapidly replacing manpower. Manufacturing concerns are replacing labor by electronic devices in both production and quality-control operations.

In an economy characterized by innovations that are reshaping the production and distribution functions in terms of capital-intensive as contrasted with labor-intensive processes and procedures, a growth in demand through the expansion of population and rising incomes is no guarantee of increasing job opportunities. In fact, many industries, particularly those described as major water-using industries will experience substantial demand growth without equivalent employment growth. However, total employment outlook in the base study area is not gloomy, because of job potentials in the nonagricultural-nonmanufacturing sector and in other manufacturing industries which, in general, have a higher ratio of jobs to value of output than do major water-using industries.

The employment composition found in both the United States and the base study area is undergoing a major restructuring along the lines indicated. In general, the composition of employment in the base study area will, in future years, resemble more closely that of the United States. Employment gains in other manufacturing industries will be more substantial than in major water-using industries and, indeed, we must look mainly to new jobs in industries included in the other manufacturing categories to provide the jobs needed for balanced employment growth in the base study area.

Definition. All manufacturing industries not classified as major water-users in the previous section, compose the "Other Manufacturing Industries" category. Hence, employment in other manufacturing industries includes employment in the following SIC Major Groups: (1) Textiles (SIC Major Group No. 22), (2) Apparel (SIC Major Group No. 23), (3) Lumber, Wood and Furniture (SIC Major Groups Nos. 24 and 25), (4) Printing and Publishing (SIC Major Group No. 27), (5) Stone, Clay, and Glass (SIC Major Group No. 32), (6) Fabricated Metal Products (SIC Major Group No. 34), (7) Machinery, Except Electrical (SIC Major Group No. 35), (8) Electrical Machinery (SIC Major Group No. 36), and (9) Transportation Equipment (SIC Major Group No. 37).

Because employment in the base study area was relatively small in the manufacturing of: (1) Ordnance and Accessories (SIC Major Group No. 19), (2) Tobacco (SIC Major Group No. 21), (3) Rubber and Miscellaneous Plastics Products (SIC Major Group No. 30), (4) Leather and Leather Products (SIC Major Group No. 31), (5) Instruments and Related Products (SIC Major Group No. 38), and (6) Miscellaneous Products (SIC Major Group No. 39), the employment in these industries was combined to form the tenth major manufacturing grouping, "All Other."

All figures reflect employment at the plant sites.

Analysis and Interpretation

The base study area. A breakdown of total manufacturing employment between major water-using and other industries is a necessary first step in evaluating the present level of utilization of water resources and projecting future requirements. Industries in the other category, defined as those utilizing relatively small quantities of water in the production process, have slowly emerged as employment growth leaders in the base study area. In fact, total other manufacturing employment recorded substantial decade-to-decade gains between 1930 and 1960, rising from 90,000 in 1930 to 197,660 in 1960 (Table 32). Further, over this historical period other manufacturing employment maintained a dominancy of slightly under 60 percent of total manufacturing employment.

Over the forecast period, the growth of manufacturing employment should give substantial support to the economic development of the base study area, and an increasingly significant share of manufacturing employment is expected to be concentrated in other manufacturing industries. Slated to rise to 558,000 workers in 2015, other manufacturing employment will increase its share of total manufacturing employment from 59 percent in 1960 to 63 percent in 2015. The labor-intensive, low wage-scale characteristics of several types of other manufacturing, though, should cause some lag in wage and salary disbursements in comparison with gains in major water-using industries.

A generalized pattern of employment expansion has evolved in the base study area. Agricultural employment has declined in each successive period since 1930, while manufacturing employment has scored successive gains. Nonagricultural-nonmanufacturing employment has accounted for an increasing share of total employment and has, since 1950, represented a substantial majority of total employment in the base study area. In the manufacturing sector, growth in the other manufacturing industries has outpaced gains in the major water-using categories. The growth patterns of other manufacturing industries, however, have been so divergent that each must be examined to delineate the major future employment generators in the base study area.

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The agricultural sector of the economy of the base study area is tied closely with the production of cotton, the single key material in textile mill products. The integration of this raw material base with manufacturing facilities, however, has not occurred in the base study area. Employment in the textile industry rose sharply from 4,900 in 1930 to 13,300 in 1950, but declined to 9,600 in 1960. After a continued decline to 9,100 in 1965, a slight 28 percent gain to 12,300 is anticipated by 2015. Textile employment has declined steadily as a percentage of other manufacturing employment in the base study area, falling from 11 percent in 1940 to a projected low of 2 percent in 2015. From 1965 onward, textile employment is forecast as the least important type of manufacturing activity in the base study area, declining to about 1 percent of total manufacturing employment in 2015.

Based on an extensive pool of low-cost female labor, the apparel industry has sustained a steady upward employment trend. With gains from 5,800 workers in 1930 to 41,800 in 1960 and projected employment of 144,600 in 2015, the apparel industry, representing 12 percent of total manufacturing employment in 1960, will become, over the forecast period, the leading other manufacturing employment in the base study area. In the base study area this industry is concerned primarily with the cutting and sewing of purchased woven fabrics into low-cost work and other clothing, with a consequent low value of output per man hour.

Extensive forest resources have fostered the growth of employment in cutting timber and pulpwood, and in merchant sawmills in the base study area. Coupled with numerous small plants producing household, office, and commercial furniture and fixtures, employment in lumber, wood and furniture industries climbed from 44,000 in 1930 to a peak of 70,000 in 1950. In 1940, these industries claimed almost one-half of all employment in other manufacturing industries but declined in relative importance to just over one-fourth in 1960. They are projected to slide to 9 percent by 2015. Absolute employment levels are projected to decline from 53,500 in 1960 to 50,700 in 2015, reflecting the fact that the per capita consumption of forest products is trending steadily downward because of market encroachment by substitutes.

Printing and publishing industries serving essentially local and regional markets can be expected to provide employment roughly commensurate with population and business gains in the base study area. The quadrupling of jobs in the industry, from 2,900 workers in 1930 to 13,000 in 1960, is expected to be matched by consistent period gains and reach 36,900 in 2015. The increased public consumption of newspapers, books and periodicals and the expanded business consumption of printed reports and forms should maintain employment in this industry at about 7 percent of total other manufacturing employment during the forecast period.

Employment in the stone, clay and glass industries embraces a large number of establishments engaged in the manufacture of glass products, cement, structural clay products, pottery, concrete and gypsum products, cut stone products and abrasive and asbestos products. Based on extensive natural resources proximate to manufacturing facilities, employment in these industries increased from 2,500 in 1930 to 12,900 in 1960, and employment is projected to reach 42,200 in 2015.

The production of fabricated metals in the base study area is more than 50 percent localized in the integrated mining, smelting and refining complex in the Tombigbee-Warrior basin. The expansion of this type of employment dates from 1940, when the entire base study area claimed only 1,400 such workers. By 1960, employment in fabricated metals industries had risen to 16,100, and substantial gains to 71,200 in 2015 are projected in the base study area. This industry group should account for an increasing share of total other manufacturing employment in the base study area over the forecast period, rising from 8 percent of the total in 1960 to 13 percent in 2015.

Employment in the nonelectrical machinery industry expanded from 4,000 in 1940, the first time that the industry group recorded employment in the base study area, to 8,100 in 1960. A record 310 percent employment growth in the industry is contemplated over the forecast period 1960-2015, boosting employment to 33,200 in 2015.

The manufacture of electrical machinery is a recent growth industry in the base study area. In 1950, only 1,100 employees were engaged in the production of electrical machinery, while in 1960 the industry group claimed 8,700 workers. This regionalization of manufacturing activity should continue as employment climbs to a forecast level of 31,600 in 2015. Industries in this classification in the base study area include firms engaged in manufacturing machinery, apparatus and supplies for the generation, storage, and transmission of electrical energy, as well as the production of household appliances.

The transportation equipment industry was well-established in the base study area in 1940 with 5,700 employees. Consistent growth elevated employment to 21,100 in 1960, and further increases to 81,400 in 2015 are projected. If this level of employment is achieved by 2015, the transportation equipment industry should rank second only to apparel as the leading employer among other manufacturing industries. The proportion of total other manufacturing employment represented by the transportation equipment industry is expected to rise from 11 percent in 1960 to 15 percent in 2015, activated by shipbuilding operations along the Gulf Coast.

The remaining manufacturing industries not classified as major water-using were grouped into the classification "All Other Manufacturing." As previously stated, this includes the ordnance, tobacco,

rubber, plastics, leather, instruments and miscellaneous manufacturing industries. Employment in this group rose from 4,900 in 1940 to 12,700 in 1960. (Data for 1930 are not considered wholly consistent to the other years due to the lack of an adequate and comparable classification of industries).

All other manufacturing industries provide one of the primary boosts to the rise in employment in the broad other manufacturing category in the projection years. Future increases in the industries grouped in this classification are projected to raise the total to 54,000 by 2015.

Pascagoula River Basin. Other manufacturing employment in this basin doubled from 10,600 in 1930 to 24,400 in 1960 and is forecast to rise to 63,300 by 2015 (Table 32). Manufacturing employment in the basin, however, is definitely drifting toward water-using industries, as other manufacturing employment declined from 74 percent of the total in 1930 to 66 percent in 1960, and further declines to 58 percent are forecast by 2015.

Roughly 73 percent of the basin's total employment in other manufacturing in 1930 was concentrated in lumber, wood and furniture industries centered in the Leaf subarea. The decade of the 1940's witnessed the embryonic development of stone, clay and glass, fabricated metals, and non-electrical machinery industries in the basin. By 1960, the apparel industry with 6,200 workers rivaled the lumber, wood and furniture industry with 7,200 employees as the major other manufacturing group. In 1960, the transportation equipment industry, centered entirely in the Coastal subarea, took first position as the leading other manufacturing growth industry in the basin.

Over the forecast period two industries, apparel and transportation equipment, are forecast to become dominant in the basin. In 2015, apparel manufacturers are projected to employ an estimated 17,300 workers, representing 16 percent of all manufacturing employment in the basin, while transportation equipment with 18,000 employees should account for 17 percent of total manufacturing employment. In terms of the distribution of employment in other manufacturing industries, these two major groups combined are expected to employ 56 percent of the workers so classified in the Pascagoula basin.

The most dramatic impact of employment growth in other manufacturing industries is found in the Coastal subarea. By 1960, this subarea contained over one-third of all other manufacturing jobs in the basin, and the concentration is forecast to rise to nearly two-thirds in 2015. Between 1930 and 1960, the Coastal subarea far outstripped all other subareas in the base study area in the rate of growth in other manufacturing employment, rising 688 percent. This achievement is allocable almost entirely to phenomenal gains in the transportation equipment group, even though the subarea by 2015 should

Table 32

Employment in other manufacturing industries - base study area, Pascagoula River Basin and subareas
1930-1960 and projected to 2015

	Basins and subareas	Total	Major Groups									
			Textiles	Apparel	Lumber, wood & furniture	Printing and publishing	Stone, clay & glass	Fabricated metals	Machinery except electrical	Electrical machinery	Transportation equipment	All other 1/
1930	Base study area	90,004	4,857	5,772	43,971	2,865	2,536	---	---	---	---	30,003
	Pascagoula											
	Leaf	5,712	361	61	4,641	69	---	---	---	---	---	580
	Chickasawhay	3,765	738	116	2,090	103	---	---	---	---	---	718
	Coastal	1,141	33	18	1,035	55	---	---	---	---	---	---
	Total	10,618	1,132	195	7,766	227	---	---	---	---	---	1,298
1940	Base study area	110,598	12,611	12,775	53,990	7,998	7,188	1,428	3,983	---	5,717	4,908
	Pascagoula											
	Leaf	6,566	395	994	3,645	147	1,258	20	51	---	---	56
	Chickasawhay	5,586	2,058	418	2,774	173	44	13	46	---	10	50
	Coastal	4,100	545	663	1,272	161	10	31	56	---	1,284	78
	Total	16,252	2,998	2,075	7,691	481	1,312	64	153	---	1,294	184
1950	Base study area	155,241	13,287	19,956	69,950	11,547	8,933	7,247	5,794	1,139	8,696	8,692
	Pascagoula											
	Leaf	8,065	427	1,627	5,368	248	136	102	81	1	---	75
	Chickasawhay	7,929	1,619	1,607	4,166	237	123	37	69	---	10	61
	Coastal	3,987	514	257	2,057	216	113	63	72	7	632	62
	Total	19,981	2,560	3,491	11,591	701	372	202	222	8	642	192
1960	Base study area	197,660	9,645	41,802	53,537	13,025	12,867	16,117	8,126	8,964	21,138	12,708
	Pascagoula											
	Leaf	7,297	66	2,679	3,070	312	196	95	227	600	---	52
	Chickasawhay	8,068	1,280	2,764	2,820	302	305	186	61	200	50	100
	Coastal	8,992	25	803	1,351	384	414	324	95	50	5,471	75
	Total	24,357	1,371	6,246	7,241	998	915	605	383	850	5,521	227
1965	Base study area	228,280	9,100	47,590	50,240	14,570	15,000	19,980	10,710	11,370	26,470	23,250
	Pascagoula											
	Leaf	6,960	10	2,960	2,340	340	230	120	270	630	---	60
	Chickasawhay	8,180	1,480	2,510	2,860	320	350	210	70	210	80	90
	Coastal	10,520	220	1,180	1,400	550	860	480	400	50	5,050	330
	Total	25,660	1,710	6,650	6,600	1,210	1,440	810	740	890	5,130	480
1980	Base study area	303,680	9,900	66,960	49,430	19,800	21,270	29,870	15,680	16,830	40,510	33,430
	Pascagoula											
	Leaf	7,990	20	3,600	2,330	410	310	160	330	750	---	80
	Chickasawhay	9,040	1,580	2,870	3,040	340	450	250	100	230	90	90
	Coastal	15,390	290	1,810	1,610	710	1,440	930	550	50	7,490	510
	Total	32,420	1,890	8,280	6,980	1,460	2,200	1,340	980	1,030	7,580	680
2015	Base study area	557,990	12,340	144,550	50,680	36,930	42,150	71,190	33,210	31,550	81,370	54,020
	Pascagoula											
	Leaf	12,120	30	7,350	1,260	680	600	310	560	1,180	---	150
	Chickasawhay	12,380	1,940	3,840	3,560	420	1,060	620	260	420	100	160
	Coastal	38,780	410	6,120	2,340	2,070	4,600	2,800	1,280	50	17,850	1,260
	Total	63,280	2,380	17,310	7,160	3,170	6,260	3,730	2,100	1,650	17,950	1,570

1/ All Other Manufacturing includes: Tobacco Manufactures, Rubber and Miscellaneous Plastic Products, Leather and Leather Products, Instruments and Related Products, Miscellaneous Manufacturing Industries, and Ordnance and Accessories except in 1930, when adequate data were not available to determine what classifications of employment were included in the All Other group.

hold the basin's employment concentration in all industry groups, with the exception of apparel and electrical machinery centered in the Leaf subarea and lumber, wood and furniture in the Chickasawhay subarea. The pattern of employment localization in the Coastal subarea holds in nonagricultural-nonmanufacturing industries too, so that this subarea has the brightest promise for sustaining employment growth in the entire Pascagoula Basin.

In both the Leaf and Chickasawhay subareas the apparel and lumber, wood and furniture industries are the only prominent other manufacturing employers, both historically and over the forecast period. Based on an abundant supply of low-cost male labor and extensive forest resources, wood-using operations, especially the harvesting of pulpwood, are expected to play an important role in the economies of these subareas. Some strengthening of the employment base should be provided in future years by the expansion of electrical machinery industries in the Leaf subarea and textiles in the Chickasawhay subarea.

SECTION 16. EMPLOYMENT IN NONAGRICULTURE-NONMANUFACTURING INDUSTRIES, BY SIC DIVISIONS

General. Pronounced gains in employment have occurred in recent decades in the nonagricultural-nonmanufacturing sector of the economy in the base study area. These employment gains are evidence of population and income growth, with the largest increases taking place in wholesale and retail trade; finance, insurance and real estate; services; and government employment. In each historical period since 1930, when agricultural employment held the position of dominance, nonagricultural-nonmanufacturing jobs have provided the bulk of employment in the base study area.

Because no product is sold in certain categories of nonagricultural-nonmanufacturing employment, such as government, projections of productivity movements present formidable statistical problems. The expansion of output is related closely to employment levels in all types of nonagricultural-nonmanufacturing employment, as this sector of the economy has not enjoyed the productivity gains through innovations and technological advancements found in the agricultural and manufacturing sectors.

The nonagricultural-nonmanufacturing sector encompasses a broad spectrum of industries, including all occupations not concerned with the growing of food and fiber requirements of the population and the fabrication of raw and semi-finished products. The expansion of these types of employment is evidence of continuing basic demand shifts that are restructuring the industrial and employment composition of the United States economy.

Definition. Nonagricultural-nonmanufacturing employment consists of employment in nine industrial divisions established by the "Standard Industrial Classification Manual, 1957." They are: (1) Mining; (2) Contract Construction; (3) Transportation and Communications; (4) Utilities; (5) Wholesale and Retail Trade; (6) Finance, Insurance and Real Estate; (7) Services; (8) Government; and (9) Other Industries.

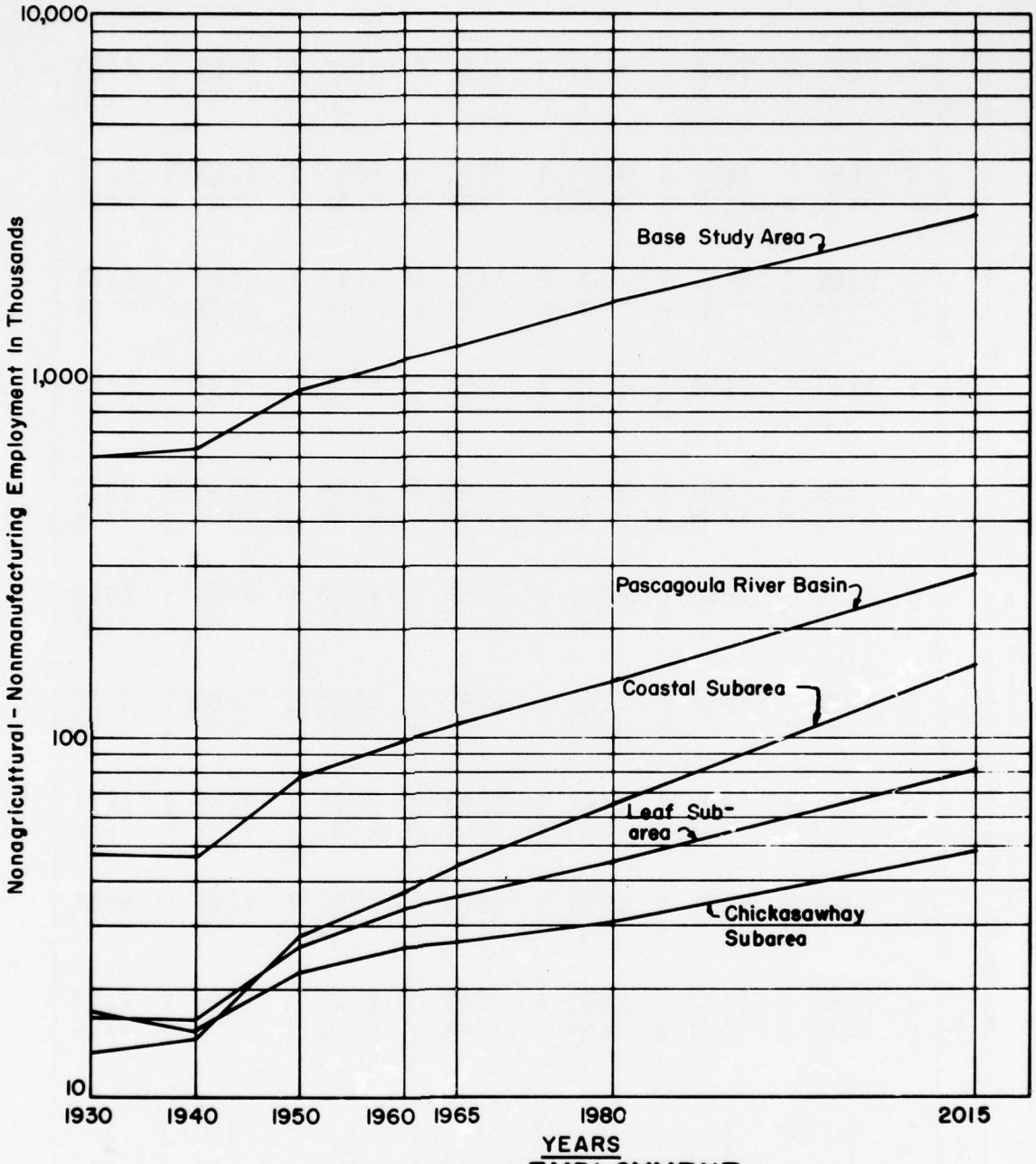
Analysis and Interpretation

The base study area. Total nonagricultural-nonmanufacturing employment in the base study area grew at an accelerated rate over the 1930 to 1960 period and should account for an increasing share of total employment during the 1960-2015 forecast period (Chart 16). In 1930, the 601,200 workers in this category accounted for four out of every ten workers. By 1960, those employed in the nonagricultural-nonmanufacturing category represented seven out of every ten workers. In coming decades, the allocation of total employment should become even more noticeably concentrated in the nonagricultural-nonmanufacturing sector of the economy of the base study area (Table 33).

The expansion of population, the regionalization of manufacturing, and the need for vast public improvements is expected to give considerable thrust to construction employment. Construction employment rose from 35,900 in 1930 to 103,800 in 1960 and is projected to increase to 277,900 in 2015. In the 1930 to 1960 period, the expansion in construction employment was exceeded only by the growth in government employment. Construction workers accounted for 6 percent of total nonagricultural-nonmanufacturing employment in 1930 and 9 percent in 1960. By 2015, construction employment is expected to account for one out of every ten nonagricultural-nonmanufacturing jobs in the base study area.

Employment trends in wholesale and retail trade indicate that this industry is in a strong growth phase. In 1930, the 135,200 workers employed by wholesale and retail firms accounted for 22 percent of the 601,200 nonagricultural-nonmanufacturing workers in the base study area. By 1960, the industry claimed 296,400 workers or 27 percent of the total. As the industry is not highly susceptible to extensive automation, population and income growth should boost employment to 802,600 in 2015. Wholesale employment is forecast to be concentrated in major urban areas, while retail jobs will follow closely the residential patterns of the population.

Employment in finance, insurance and real estate more than doubled between 1930 and 1960 in the base study area, reaching 55,400 in 1960. Between 1960 and 2015, a slower rate of growth is projected, with employment reaching 128,400 in 2015. Financial institutions are becoming highly automated, resulting in a limited expansion of the clerical work force. Although classified as a growth industry, the proportion of total nonagricultural-nonmanufacturing employment represented by



EMPLOYMENT
NONAGRICULTURAL - NONMANUFACTURING INDUSTRIES
BASE STUDY AREA
PASCAGOULA RIVER BASIN AND SUBAREAS

Table 33

Employment in nonagricultural-nonmanufacturing industries
Base study area, Pascagoula River Basin and subareas - 1930-1960 and projected to 2015

	Basins and subareas	Total NANM	Mining	Construction	Transportation and communication	Utilities	Wholesale and retail trade	Finance, insurance & real estate	Services	Government	Other
1930	Base study area	601,202	33,087	35,936	96,261	14,579	135,180	25,493	199,251	41,422	19,993
	Pascagoula										
	Leaf	16,659	102	964	2,459	692	3,730	509	6,460	1,211	532
	Chickasawhay	17,148	41	938	2,692	700	4,008	566	6,560	1,030	613
	Coastal	13,805	17	1,005	2,194	315	2,636	614	3,605	2,491	928
	Total	47,612	160	2,907	7,345	1,707	10,374	1,689	16,625	4,732	2,073
1940	Base study area	632,671	34,218	53,101	73,781	11,131	170,540	27,715	196,418	51,137	14,630
	Pascagoula										
	Leaf	16,616	147	1,774	1,359	246	4,710	434	6,284	1,184	478
	Chickasawhay	15,573	101	1,310	1,997	331	4,156	460	5,754	1,092	372
	Coastal	14,758	43	1,486	1,418	394	3,704	514	4,139	2,633	427
	Total	46,947	291	4,570	4,774	971	12,570	1,408	16,177	4,909	1,277
1950	Base study area	926,143	38,518	87,574	100,411	21,103	267,665	37,431	196,788	153,417	23,236
	Pascagoula										
	Leaf	26,923	894	3,047	2,156	643	8,221	760	5,927	4,486	789
	Chickasawhay	22,895	219	2,027	2,517	614	7,147	724	5,315	3,642	690
	Coastal	28,798	70	2,703	2,300	596	6,996	893	4,733	10,106	401
	Total	78,616	1,183	7,777	6,973	1,853	22,364	2,377	15,975	18,234	1,880
1960	Base study area	1,113,094	30,844	103,779	97,675	25,354	296,366	55,408	253,717	203,765	46,186
	Pascagoula										
	Leaf	34,505	1,479	4,076	2,421	697	9,899	1,169	7,732	5,900	1,132
	Chickasawhay	26,532	490	3,052	2,358	555	7,587	1,039	6,376	4,228	847
	Coastal	37,389	157	3,774	2,408	975	10,194	1,789	8,254	8,318	1,520
	Total	98,426	2,126	10,902	7,187	2,227	27,680	3,997	22,362	18,446	3,499
1965	Base study area	1,212,200	31,070	115,550	101,310	26,110	317,260	62,300	280,360	228,430	49,810
	Pascagoula										
	Leaf	36,800	1,470	4,270	2,480	740	10,850	1,240	8,210	6,330	1,210
	Chickasawhay	27,200	490	3,260	2,360	560	7,760	1,140	6,490	4,300	840
	Coastal	44,300	170	4,820	2,500	1,030	11,870	2,120	10,940	9,190	1,660
	Total	108,300	2,130	12,350	7,340	2,330	30,480	4,500	25,640	19,820	3,710
1980	Base study area	1,601,700	35,760	151,420	110,650	29,220	432,930	76,730	382,950	325,690	56,350
	Pascagoula										
	Leaf	45,600	1,500	5,410	2,520	760	13,480	1,290	10,580	8,850	1,210
	Chickasawhay	31,600	500	3,960	2,400	560	8,910	1,350	7,730	5,340	850
	Coastal	65,700	200	7,370	3,100	1,330	17,280	3,440	17,280	13,890	1,810
	Total	142,900	2,200	16,740	8,020	2,650	39,670	6,080	35,590	28,080	3,870
2015	Base study area	2,807,700	41,920	277,860	140,050	40,070	802,600	128,370	730,280	578,410	68,140
	Pascagoula										
	Leaf	83,500	1,580	9,750	3,650	950	24,820	2,660	20,520	18,190	1,380
	Chickasawhay	48,800	520	6,200	2,550	620	14,210	2,260	12,560	8,940	940
	Coastal	160,300	620	20,910	3,870	2,620	49,240	6,340	47,200	26,420	3,080
	Total	292,600	2,720	36,860	10,070	4,190	88,270	11,260	80,280	53,550	5,400

finance, insurance and real estate is expected to decrease slightly over the projection periods from the 5 percent attained in 1960.

A sharply accelerated growth rate is projected in service employment. In the 1930 to 1960 period, this form of employment rose slowly from 199,300 workers in 1930 to 253,700 in 1960. Substantial gains forecast after 1960 should boost employment to 730,300 in 2015, almost three times the 1960 total. Since service employment is capable only of limited output gains, the ratio of inputs to outputs is fairly constant over time. With substantial income gains, however, a larger share of consumer expenditures will be allocated to the purchase of services, and service employment should rise slowly to slightly over one-fourth of all nonagricultural-nonmanufacturing employment in 2015.

Government employment experienced a five-fold increase from 1930 to 1960, the most significant advance scored by any type of nonagricultural-nonmanufacturing employment during the historical period. Dramatic gains in government employment are forecast to continue, especially at the state and local level, with the number of civil servants rising from 203,800 in 1960 to 578,400 in 2015. In 1930, government employment represented 7 percent of total nonagricultural-nonmanufacturing employment. By 1960, this proportion had risen to about one-fifth of all nonagricultural-nonmanufacturing workers where it is expected to roughly remain during the forecast period.

In contrast with these growth industries, certain types of nonagricultural-nonmanufacturing employment are projected over the 1960-2015 period at rates of gain well below the expected overall growth for all the industries. Employment in the utility, transportation and communication, mining and other nonagricultural-nonmanufacturing industries is not expected to exhibit any appreciable expansion capabilities during this period. These industries are subject either to depletable natural resources, massive automation, or market encroachment from competitive products.

Pascagoula River Basin. The allocation of total employment among the agricultural, manufacturing, and nonagricultural-nonmanufacturing categories in the Pascagoula Basin follows closely the distribution found in the base study area, with the nonagricultural-nonmanufacturing component growing from 41 percent of all employment in 1930 to two-thirds in 1960 and projected to almost three-fourths in 2015. In 1960, wholesale and retail trade employment was the most significant, followed closely by services and government. This pattern of development holds throughout the forecast period, with wholesale and retail trade and service employees projected to account for over half of the projected 292,600 nonagricultural-nonmanufacturing workers in 2015 (Table 33).

In the future periods, employment in wholesaling and retailing and services are projected to lead the pace of growth in nonagricultural-nonmanufacturing industries in the Coastal subarea. From 10,200

workers in wholesaling and retailing establishments and 8,300 in services in 1960, employment in these industries is projected to increase to 49,200 and 47,200, respectively, by 2015. In fact, employment in all nonagricultural-nonmanufacturing industries in the basin is expected to be concentrated in the Coastal subarea from 1980 to 2015, with the exception of employment in mining which is projected to center in the Leaf subarea.

In the basin, the Coastal subarea shows the most promise for development as a major nonagricultural-nonmanufacturing employment center. The Pascagoula-Biloxi-Gulfport strip city, which already has major military installations, is fast developing a complex of technologically sophisticated industries and extensive tourist attractions. A soaring demand for industrial, commercial and residential properties should support a high level of construction activity.

In the Leaf and Chickasawhay subareas, wholesale and retail trade, services, and government employment constitute the prevailing types of nonagricultural-nonmanufacturing employment. Such employment in the Leaf subarea continues to cluster in Hattiesburg, the leading trade center of that section of Mississippi and site of the University of Southern Mississippi, and in Laurel, an important oil equipment distribution center. With the exception of Meridian, which ranks second only to Jackson as a retail and wholesale trade center, the Chickasawhay subarea has not emerged as a dynamic employment center for nonagricultural-nonmanufacturing industries.

SECTION 17. VALUE ADDED BY MANUFACTURING

General. Value added by manufacturing is the one indicator of manufacturing activity with sufficient published data available to permit analyzing present and projecting future commodity movements. Many of the commodity movements originating in or terminating in the direct tributary area of the Pascagoula River are related to manufacturing.

Several large plants, representing a wide variety of manufacturing sectors, have located in the basin in recent years. The most notable are paper and allied products, chemicals and allied products, food and kindred products, and the transportation equipment. As the economic activity of the basin continues the shift from agriculture to manufacturing and nonagricultural-nonmanufacturing, value added will become a more important segment of the basin's economy.

Definition. Value added by manufacturing is derived by subtracting the cost of materials (including materials, supplies, fuels, cost of sale and miscellaneous receipts) from the value of shipments (including resales) and adjusting the resulting amount by the net

change in finished goods and work-in-process inventory between the beginning and end of the year. For most purposes, it is the best measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

Historical data and projections of value added by manufacturing were developed for the following SIC groups:

- Food and Kindred Products (SIC Major Group No. 20)
- Textile Mill Products (SIC Major Group No. 22)
- Apparel and Related Products (SIC Major Group No. 23)
- Lumber and Wood Products, Furniture and Fixtures (SIC Major Groups Nos. 24 and 25)
- Paper and Allied Products (SIC Major Group No. 26)
- Printing, Publishing and Allied Industries (SIC Major Group No. 27)
- Chemicals and Allied Products (SIC Major Group No. 28)
- Petroleum Refining and Related Industries (SIC Major Group No. 29)
- Stone, Clay and Glass Products (SIC Major Group No. 32)
- Primary Metal Industries (SIC Major Group No. 33)
- Fabricated Metal Products (SIC Major Group No. 34)
- Machinery (SIC Major Groups Nos. 35 and 36)
- Transportation Equipment (SIC Major Group No. 37)
- Other and Miscellaneous Manufacturing Products (SIC Major Groups Nos. 19, 21, 30, 31, 38 and 39)

Analysis and Interpretation

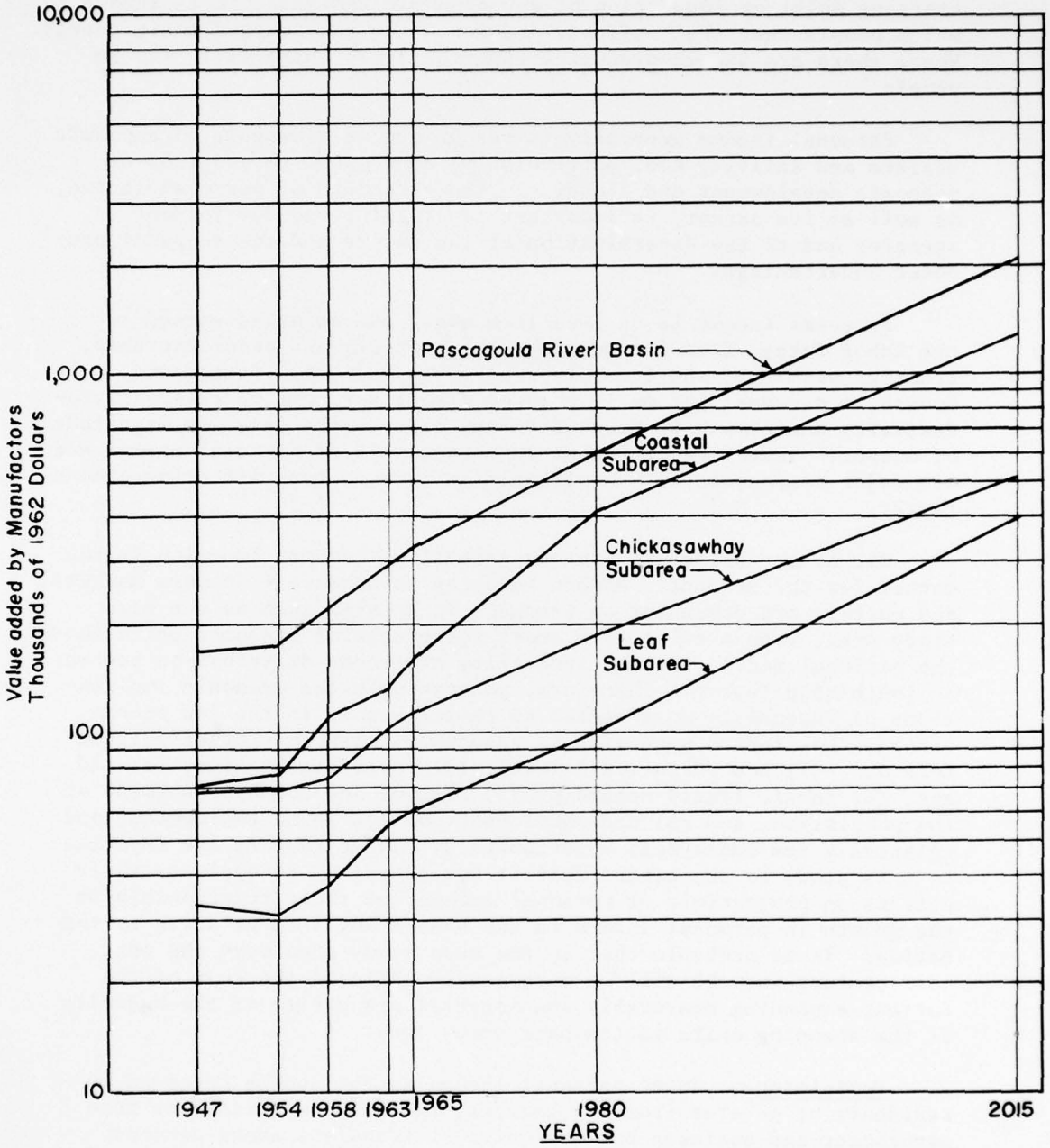
Pascagoula River Basin. Total value added by manufacturing for the basin has increased at a steady rate from $172 million in 1947 to $292 million in 1963 (Table 34). This trend is expected to continue throughout the projection period, reaching $2.066 billion by 2015. The rapidly developing Coastal subarea has led the other two subareas in manufacturing growth (Chart 17). In 1947, the Coastal subarea accounted for 41 percent of the basin's value added. By 1963, its share had increased to almost 46 percent. This trend is projected to continue throughout the forecast period, reaching 63 percent of the basin total by 2015.

The leading manufacturing industry in terms of value added is the paper and allied products industry, which accounted for almost 20 percent of the total value added in 1963. With the abundance of water and large tracts of productive timberland, the basin is expected to continue to produce paper and allied products. The chemical and allied products industries should be the fastest growing industries in the basin, with a major portion of that growth developing in the Coastal subarea. Other industries emerging as leaders in the basin include food and kindred products, transportation equipment, and stone, clay and glass.

Table 34

Value added by manufacturing for selected 2-digit SIC major groups
Pascagoula River Basin and subareas - 1947-1963 and projected to 2015
(Thousands of 1962 dollars)

Area or subarea	Year	2-Digit SIC major groups														
		20	22	23	24-25	26	27	28	29	32	33	34	35-36	37	All other	Total
LEAF SUBAREA	1947	4,169	2,280	5,521	18,135	17,400	924	13,273	769	2,834	281	582	579	---	1,741	68,488
	1954	5,252	841	5,359	13,962	26,606	1,367	9,335	1,833	1,134	53	619	2,530	---	583	69,474
	1958	7,834	483	6,355	10,882	24,728	1,493	13,066	2,510	1,349	120	575	4,967	---	322	74,684
	1963	12,096	384	8,960	13,119	30,167	1,943	20,890	6,388	1,914	387	860	6,439	---	410	103,957
	1965	13,918	136	10,026	12,430	32,599	2,039	22,582	6,825	2,158	508	997	7,106	---	460	111,784
	1980	21,642	401	17,827	18,449	57,143	2,563	36,941	7,783	4,431	1,149	1,918	12,679	---	895	183,821
	2015	70,748	1,063	63,496	17,862	181,996	4,693	90,079	20,285	14,071	4,154	6,456	33,652	---	2,792	511,347
CHICKASAWHAY SUBAREA	1947	3,138	7,769	3,983	11,438	1,574	717	1,570	209	500	46	177	399	50	1,152	32,722
	1954	3,504	3,706	4,722	10,031	3,240	1,138	972	504	1,210	44	517	849	122	600	31,159
	1958	5,090	4,370	6,418	9,432	3,264	1,429	1,208	795	1,912	158	931	1,615	218	513	37,353
	1963	5,479	15,246	7,063	12,063	3,503	1,579	1,695	1,600	2,445	411	1,334	1,721	332	583	55,054
	1965	5,682	17,169	7,239	12,939	4,082	1,634	2,178	1,776	2,798	522	1,486	1,883	393	588	60,369
	1980	8,300	26,920	12,103	20,502	8,204	1,811	5,554	2,508	5,479	861	2,552	3,300	569	858	99,521
	2015	21,480	58,421	28,251	42,980	25,076	2,469	23,525	6,662	21,176	2,511	10,996	11,204	943	2,538	258,232
COASTAL SUBAREA	1947	18,750	3,955	2,125	9,510	16,796	1,176	6,763	---	690	56	541	778	7,024	2,161	70,325
	1954	14,325	1,584	1,758	7,648	19,717	1,915	5,610	---	2,182	246	1,406	1,007	17,743	756	75,897
	1958	20,897	1,550	2,839	7,161	21,123	2,667	9,673	---	3,905	745	2,513	1,463	35,396	621	110,553
	1963	21,976	3,091	3,731	7,952	21,262	3,304	16,492	4,326	6,811	1,892	3,715	2,812	33,675	1,932	132,971
	1965	24,955	3,542	4,601	8,561	24,730	3,797	20,113	15,495	9,292	2,236	4,591	4,091	33,588	2,913	162,505
	1980	35,172	5,182	8,637	12,355	45,355	4,545	44,669	45,671	21,486	5,261	11,652	7,089	63,770	6,022	316,866
	2015	74,846	12,947	50,955	32,149	159,984	14,629	356,097	123,749	112,617	20,269	60,950	25,890	226,945	24,755	1,296,782
PASCAGOULA RIVER BASIN STUDY AREA	1947	26,057	14,004	11,629	39,083	35,770	2,817	21,606	978	4,024	383	1,300	1,756	7,074	5,054	171,535
	1954	23,081	6,131	11,839	31,641	49,563	4,420	15,917	2,337	4,526	343	2,542	4,386	17,865	1,939	176,530
	1958	33,821	6,403	15,612	27,475	49,115	5,589	23,947	3,305	7,166	1,023	4,019	8,045	35,614	1,456	222,590
	1963	39,551	18,721	19,754	33,134	54,932	6,826	39,077	12,314	11,170	2,690	5,909	10,972	34,007	2,925	291,982
	1965	44,555	20,847	21,866	33,930	61,411	7,470	44,873	24,096	14,248	3,266	7,074	13,080	33,981	3,961	334,658
	1980	65,114	32,503	38,567	51,306	110,702	8,919	87,164	55,962	31,396	7,271	16,122	23,068	64,339	7,775	600,208
	2015	167,074	72,431	142,702	92,991	367,056	21,791	469,701	150,696	147,864	26,934	78,402	70,746	227,888	30,085	2,066,361



VALUE ADDED BY MANUFACTORING
FOR SELECTED 2-DIGIT SIC
MAJOR GROUPS (THOUSANDS OF 1962 DOLLARS
PASCAGOULA RIVER BASIN AND SUBAREAS

E-97 CHART 17

SECTION 18. TOTAL PERSONAL INCOME BY MAJOR COMPONENTS

General. While the assertion may be made that population is the starting point or foundation of any economic analysis, it is income to which people gear their efforts and for which they expend their energy. Where there are income-producing opportunities, there will also be people.

Personal income generally is recognized as a measure of economic welfare and activity and, particularly, as a gauge to progress of economic development and planning. The structure of personal income, as well as its amount, is important to planning and development agencies and to the determination of the nature and the scope of proposed undertakings.

Personal income is derived from wages and salaries earned by the labor force, from income-producing property and proprietorship, transfer payments, and from other personal business investments. Growth in personal income is related directly to rising rates of productivity and growth in production and also to its level or magnitude of output. Therefore, inherent in an analysis of personal income and its major components is a confrontation with factors affecting productivity.

One of the principal factors affecting industry location is the market for the product. Modern industry is dependent on mass markets, and markets are dependent on income. In an area such as the base study area, with a relatively small percentage of consumer units above the national median income, inequality of income distribution becomes an inhibiting factor. Therefore, concern with the economic implications of inequality must center on those persons in the low income groups. Low income generally is associated with such principal factors as: (1) low educational level, (2) large family size, (3) old age, (4) female family headship, (5) size of the nonwhite segment of the population, and (6) underemployment or low level employment, and relatively few employment opportunities. These factors are important in this study to the extent that it was necessary to evaluate their effects on projections of personal income and their relationship to the growth in personal income in the base study area relative to the Nation. It is probable that in the base study area over the next half century incomes will be more nearly those of the rest of the Nation, expanding measurably the material prosperity of the majority of the spending units in the base study area.

Definitions. Total personal income is the income received by residents of an area from all sources, inclusive of transfers from government and business but exclusive of transfers among persons. It is income received before taxes and includes allowances for nonmonetary income or income received "in kind" rather than cash. It consists of six major components: wage and salary disbursements,

other labor income, proprietors' income, property income, and transfer payments, less personal contributions for social insurance.

Wage and salary income consists of the monetary remuneration of employees inclusive of executives' compensation, commissions, tips, and bonuses and of the value of "payments in kind" which represent income to the recipient. They are measured before deductions for social security contributions, union dues or other purposes. This category covers employees not only of all nonfarm business establishments but also of farms, private households, hospitals, and private educational, social service and nonprofit institutions. Also, all government employees including those of the state, local and Federal governments (both civilian and military) are included.

Other labor income consists of employer contributions under private pensions, health, welfare and group insurance plans; compensation for injuries; pay of military reservists; directors' fees; and other minor items, such as marriage fees paid justices of the peace, jury and witness fees.

Proprietors' income is measured as the net business earnings of owners of unincorporated enterprises, consisting almost entirely of sole proprietorships and partnerships but including also producers' cooperatives and other minor forms of noncorporate businesses. Also covered in this category are farmers, independent professional practitioners (doctors, dentists and lawyers), entrepreneurs in nonfarm businesses and others in a self-employed status. Proprietors' income contains the net income of unincorporated real estate businesses, including that derived from the rental of property. It excludes the rental income of individual landlords not engaged primarily in the operation of a real estate business. Dividend and interest receipts are omitted from proprietors' income and are counted as a return on property investment or ownership compensatory yield, as distinguished from the economic function that produces the profit reward to proprietorship. Capital gains and losses are also excluded, and no deductions are made for depletion. The net income of a noncorporate business is considered to accrue to the proprietor in his personal capacity and thus is counted as personal income in its entirety.

Property income consists of rental income to persons, dividends, and personal interest income. Rental income includes: (1) monetary earnings of persons (except professional real estate operators) from the rental of real property as well as from royalties on patents, copyrights and rights to natural resources and (2) the imputed net rental returns to owner-occupants of nonfarm dwellings. This item is defined as the gross rental value of owner occupied nonfarm houses, less actual expenses (including depreciation) incurred in home ownership.

Dividends include cash or stock dividend disbursements by corporations organized for profit to stockholders residing in an area.

Dividends paid by savings and loan associations and other mutual financial institutions are not included in this category but are classified in personal interest income.

Personal interest income includes the total interest, both monetary and imputed that accrues to residents of an area. Monetary income covers all interest received in monetary form. The imputed interest is the excess of property income received by financial intermediaries from funds entrusted to them by persons over property income actually returned in monetary form by these intermediaries to these persons. A portion of imputed interest is numerically equal to the value of financial services received by persons without explicit payment, such as checking, banking and investment services rendered to persons by banks without the assessment of specific charges. The remainder represents property income withheld by life insurance companies and mutual financial intermediaries (such as savings and loan associations and credit unions) to the account of persons.

Transfer payments include the receipts of persons from government and business (other than government interest) for which no services were rendered at the time. Government transfers consist of payments from Federal, state and local governments to individuals not in return for current services and to private nonprofit institutions such as hospitals and charitable and welfare organizations. Under the first category are included such items as old-age and survivors' benefits, unemployment benefits, pensions under public employee retirement systems, direct relief and pension, disability and related payments to former members of the armed services.

Business transfers consist of distribution of business output to persons for which no services are received. Included under this heading are such items as an individual's bad debts to business, corporate gifts to private nonprofit institutions, cash prizes and personal injury payments by business other than to employees.

Contributions made by individuals under the various social insurance programs are excluded from personal income by handling them as an explicit deduction item. Personal contributions for social insurance include payments by both employees and the self-employed. The employee portion covers contributions for old-age and survivors' insurance, state unemployment insurance, railroad retirement insurance, cash sickness compensation and Federal, state and local public employee retirement systems, as well as premium payments for government life insurance. Contributions of the self-employed relate to old-age and survivors' insurance, first made in 1952, under amendments extending coverage of the OASI system to include the self-employed.

Analysis and Interpretation

The United States and the base study area. As shown in Table 35, personal income in 1960 stood at $8.1 billion in the base study area, representing an increase of over 280 percent from 1930. This compared to an increase of less than 200 percent for the United States. Significantly, personal income in the base study area constituted 2 percent of that for the Nation in 1960, as compared to 1.5 percent in 1930. During the same period the per capita income in the base study area rose from $555 in 1930 to $1612 in 1960 (Table 36), but still remained well below that of the Nation which was $1133 in 1930 and $2271 in 1960. It would be unrealistic not to expect a continuation of the rapid historical rise in personal income in the base study area. However, the future rise in the United States is expected to move at an even more rapid rate, as illustrated in Charts 18 and 19. The continued expected disparity in income growth between the base study area and the United States likely will exist because the United States contains the dynamic geographical growth areas while the less aggressive income growth in the proportionately large rural part of the base study area will retard the rate of growth in personal income for the composite.

Personal income in the base study area is forecast to rise to $46.6 billion in 2015, representing a standard of living two and one-half times more prosperous than existed in 1960. The principal factors that are likely to be responsible for this advance are: (1) continuation of urban development; (2) a substantial expansion of employment opportunities in higher-paying nonagricultural jobs; (3) continuation of increasing productivity resulting from expanding technology; (4) continued shift in types of manufacturing to higher wage-paying industries; and (5) a rising level of education.

In 1960, wages and salaries accounted for $6.36 out of every $10.00 received in income by residents of the base study area. The rising importance of this income component to the welfare of the base study area is evident when it is noted that only thirty years prior to 1960, $5.72 of every $10.00 received came from wages and salaries. A lagging of growth in proprietors' income over this same 1930-1960 period resulted in proprietors' income being the third largest source of income in 1960, behind property income which expanded faster as economic development raised property values throughout the area (Table 37).

Wages and salaries are forecast to continue their dominancy over total personal income throughout the 1960-2015 period, rising to $6.54 of every $10.00 of income by 2015. The largest rate of growth is expected in personal contributions for social insurance as social insurance programs experience a tremendous expansion. Since this component is a deducation from total personal income, growth in income will be slowed somewhat by the size of this

Table 35

Total Personal Income
United States, base study area, Pascagoula River Basin and subareas
1930-1960 and projected to 2015

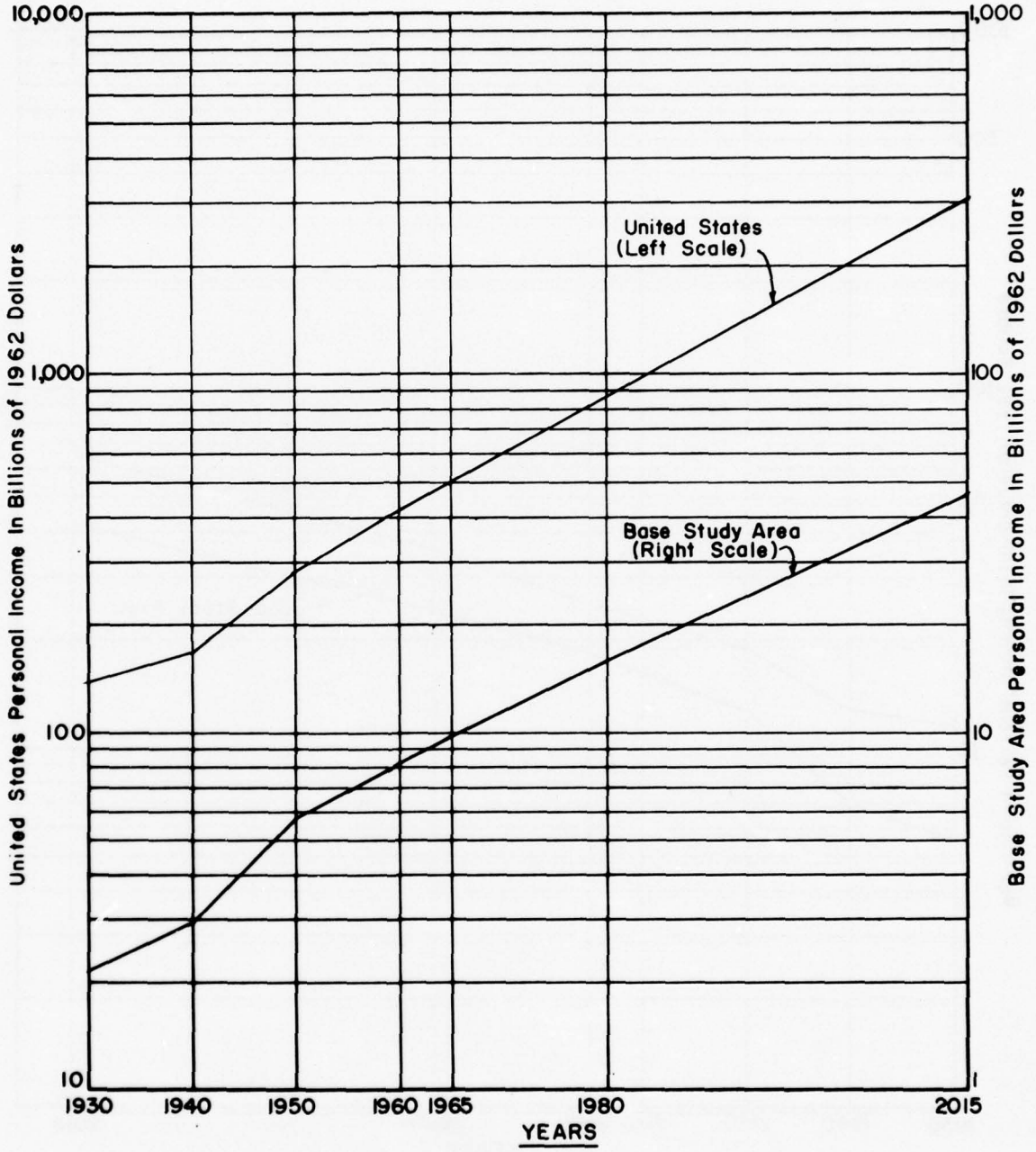
Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
*United States[1]	139.1	169.6	283.6	407.3	492.0	872.0	3,002.0
‡Base study area	2,126.4	2,934.8	5,788.7	8,113.7	9,657.7	15,701.4	46,603.7
‡Pascagoula Basin							
Leaf	56.8	86.0	173.2	247.0	290.8	463.9	1,435.4
Chickasawhay	53.6	67.8	128.4	164.6	185.7	281.0	784.1
Coastal	41.3	60.5	140.3	269.0	372.3	767.7	3,152.9
Total	151.7	214.3	441.9	680.6	848.8	1,512.6	5,372.4

*In billions of 1962 dollars.
‡In millions of 1962 dollars.
[1]Historical data from U. S. Department of Commerce. Forecast data derived from projections of disposable personal income contained in "National Economic Growth Projections 1980, 2000, 2020", preliminary report of the Economic Task Group of the Ad Hoc Water Resources Council Staff.

Table 36

Per Capita Income
United States, base study area, Pascagoula River Basin and subareas
1930-1960 and projected to 2015
(1962 dollars)

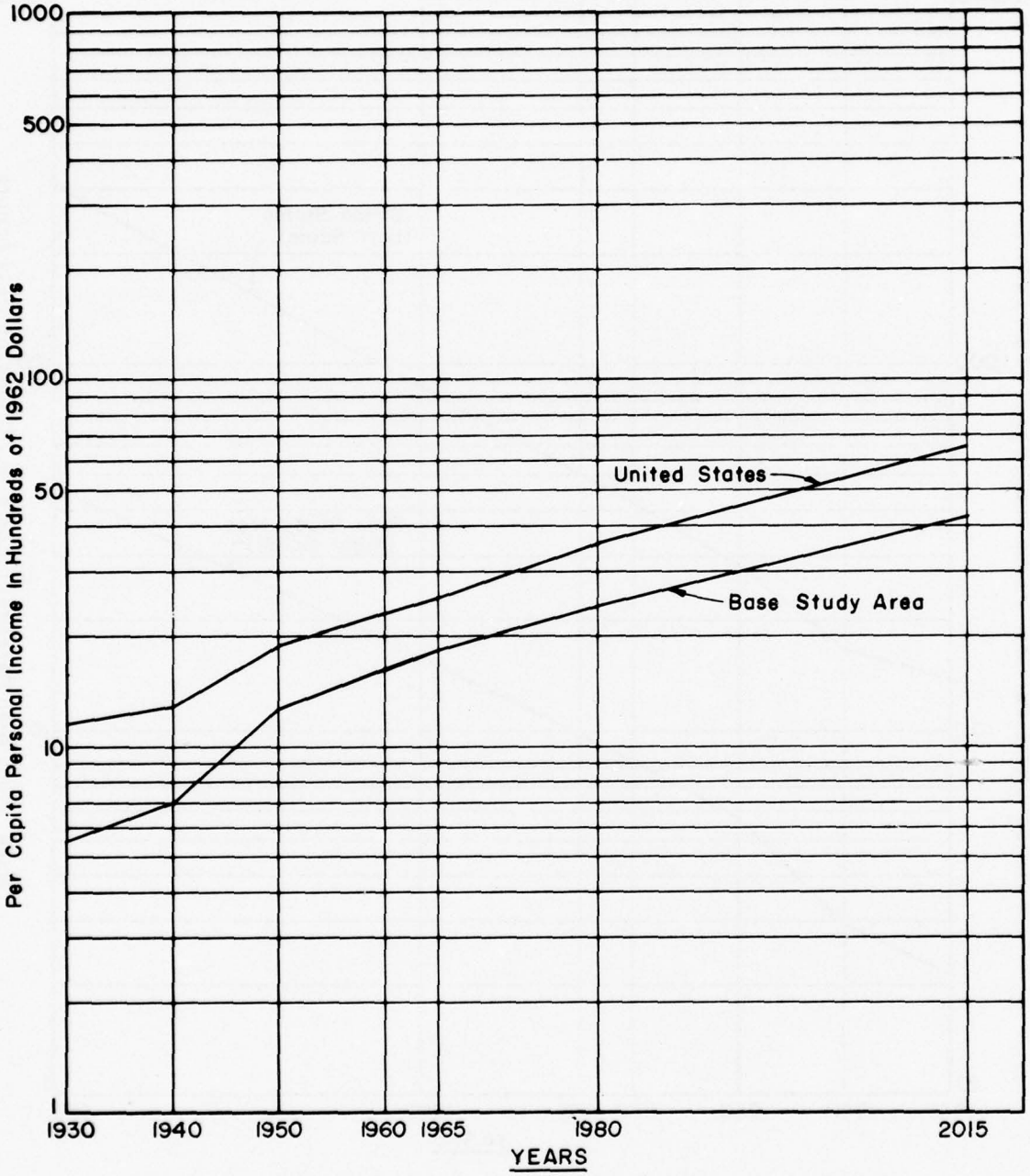
Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
United States	1,133	1,288	1,884	2,271	2,497	3,559	6,512
Base study area	555	701	1,258	1,612	1,817	2,396	4,235
Pascagoula Basin	447	568	1,005	1,360	1,582	2,244	4,164
Leaf	393	533	982	1,376	1,604	2,281	4,151
Chickasawhay	442	524	977	1,288	1,442	2,029	3,713
Coastal	563	701	1,064	1,393	1,643	2,311	4,300



TOTAL PERSONAL INCOME

UNITED STATES AND BASE STUDY AREA

E - 103 CHART 18



PER CAPITA PERSONAL INCOME

UNITED STATES AND BASE STUDY AREA

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CHART 19

Table 37

Total Personal Income by major components
Base study area, Pascagoula River Basin and subareas, 1930-1960 and projected to 2015
(millions of 1962 dollars)

Item	Historical				Projected		
	1930	1940	1950	1960	1965	1980	2015
BASE STUDY AREA							
Total Personal Income	2,126.4	2,934.9	5,788.6	8,113.8	9,657.7	15,701.4	46,603.7
Wage & Salary Income	1,216.3	1,775.0	3,448.8	5,158.5	6,165.2	10,131.8	30,463.8
Other Labor Income	12.3	42.3	63.1	127.7	154.9	255.2	924.9
Proprietors' Income	436.2	639.6	1,061.3	1,121.2	1,310.2	1,952.6	5,604.0
Property Income	420.3	403.0	766.5	1,240.8	1,492.9	2,663.8	7,900.2
Transfer payments	45.8	99.0	520.2	649.4	761.6	1,304.3	4,142.5
Less Personal Contribution for Social Ins.	4.5	24.0	71.3	183.8	227.1	606.3	2,431.7
PASCAGOULA BASIN							
Total	151.7	214.4	441.9	680.8	848.8	1,512.6	5,372.4
Wage & Salary	96.4	133.1	266.2	440.0	553.7	991.8	3,532.4
Other Labor	0.6	6.7	5.9	18.7	23.6	43.6	177.4
Proprietors	33.9	50.6	86.4	107.7	126.7	217.7	647.2
Property	17.3	17.2	39.6	61.9	78.5	158.9	670.1
Transfer payments	3.8	8.2	49.2	70.7	89.6	174.9	660.8
Less Personal Contribution for Social Ins.	0.3	1.4	5.4	18.2	23.3	74.3	315.5
Leaf - Total	56.8	86.1	173.2	247.1	290.8	463.9	1,435.4
Wage & Salary	34.7	51.2	100.4	155.8	184.5	296.7	942.0
Other Labor	0.3	2.9	2.3	5.3	6.3	9.7	30.1
Proprietors	13.2	21.8	36.9	41.9	46.7	74.7	179.3
Property	7.2	7.2	15.9	24.7	30.9	56.4	204.5
Transfer payments	1.5	3.5	19.7	25.8	30.2	49.5	153.5
Less Personal Contribution Social Ins.	0.1	0.5	2.0	6.4	7.8	23.1	74.0
Chickasawhay - Total	53.6	67.8	128.4	164.7	185.7	281.0	784.1
Wage & Salary	34.2	41.8	76.9	102.2	115.2	178.4	483.3
Other Labor	0.2	1.9	1.9	4.4	5.0	7.6	28.9
Proprietors	12.3	16.3	25.6	26.8	28.0	36.4	100.1
Property	5.6	5.5	11.0	16.4	20.0	33.5	106.8
Transfer payments	1.4	2.8	14.7	19.2	22.6	36.2	105.9
Less Personal Contribution Social Ins.	0.1	0.5	1.7	4.3	5.1	11.1	40.9
Coastal - Total	41.3	60.5	140.3	269.0	372.3	767.7	3,152.9
Wage & Salary	27.5	40.1	88.9	182.0	254.0	516.7	2,107.1
Other Labor	0.1	1.9	1.7	9.0	12.3	26.3	118.4
Proprietors	8.4	12.5	23.9	39.0	52.0	106.6	367.8
Property	4.5	4.5	12.7	20.8	27.6	69.0	358.8
Transfer payments	0.9	1.9	14.8	25.7	36.8	89.2	401.4
Less Personal Contribution Social Ins.	0.1	0.4	1.7	7.5	10.4	40.1	200.6

component. Increases in other labor income and transfer payments are forecast to lead the remainder of the components during the projection period. Even though the agricultural sector of the economy, which accounts for a significant part of the proprietors' income in the rural basins, will continue to decline in overall importance, the lack of comparable growth in proprietors' income throughout the area during the projection period in relation to growth in wages and salaries, other labor income and transfer payments provides some indication of the economic complexion of the base study area during the next half century.

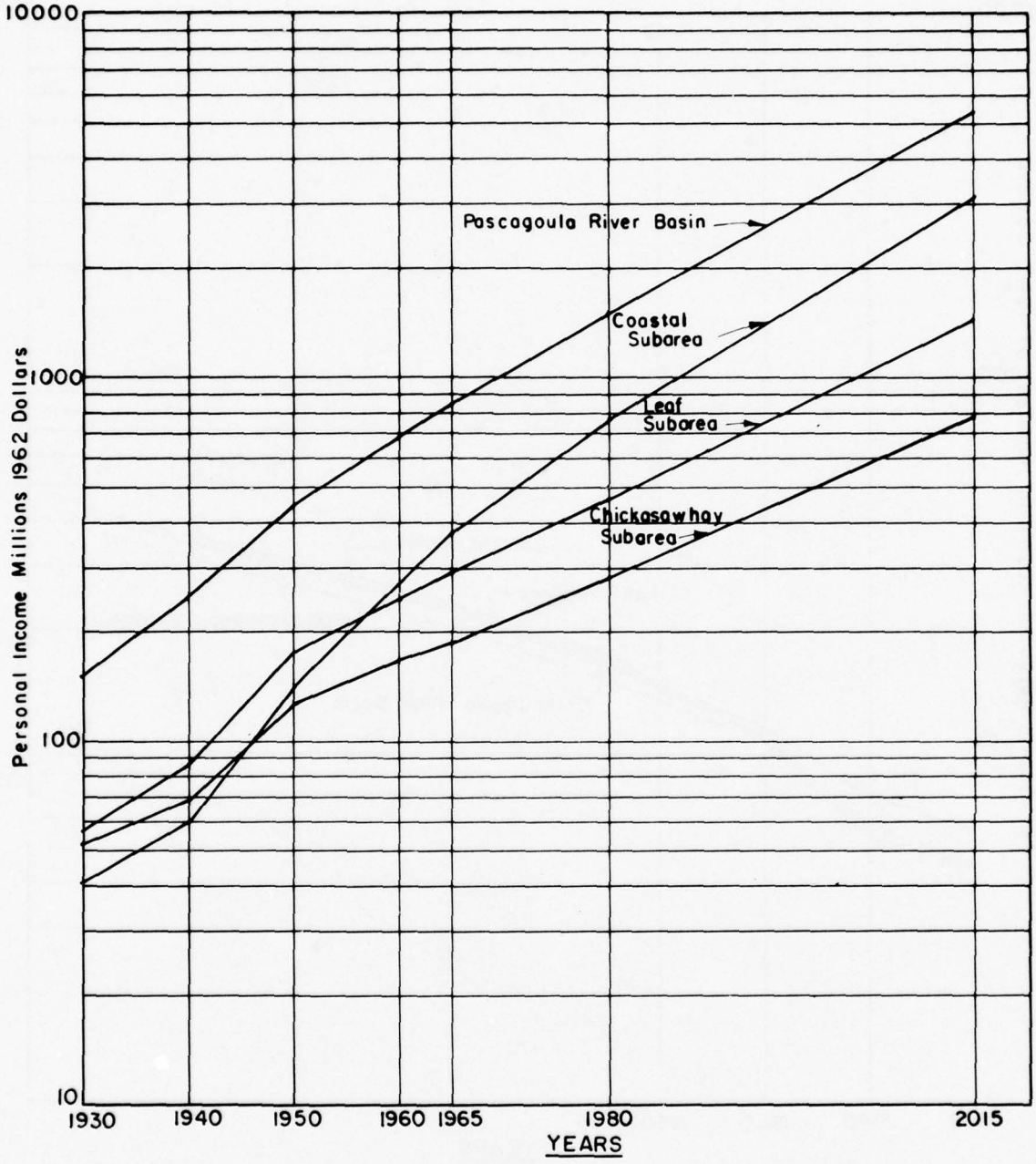
Pascagoula River Basin. Growth in personal income in the Pascagoula River Basin rose approximately 350 percent from 1930 to 1960, which was the highest rate of income growth for any basin within the base study area. Income projections for this basin reflect a continuation of its relative position in income growth, as represented by a 2015 level almost eight times the 1960 level (Charts 20 and 21). Such a rate of growth should exceed not only the rate of growth of the base study area, but also exceed that of the Nation during the projection period.

Personal income movements in the Leaf subarea are heavily influenced by Hattiesburg and Laurel, just as the Chickasawhay subarea is dominated by Meridian. Outside of and surrounding the Cities of Hattiesburg and Laurel in the Leaf subarea and Meridian in the Chickasawhay subarea, there is still strong agricultural activity and rural influence which is reflected in a considerably less rapid rate of growth in personal income.

Between 1930 and 1960 the Leaf subarea generally maintained its relative position in personal income growth within the basin as compared with a significant decline in the position of the Chickasawhay. Both, however, are expected to incur erosion of their positions in the basin as the Coastal subarea assumes a larger portion of all income generated in the basin between 1960 and 2015.

Growth of the personal income in the Coastal subarea from 1930 to 1960 has been dynamic, rising six and one-half times during this 30-year period. Projections of personal income, therefore, in this subarea reflect dynamic expectations of growth to the terminal forecast year. Total income in the Coastal subarea is expected to rise almost 12 times from 1960 to 2015. Hence, its growth in personal income will exceed the rate of growth in any subarea or basin in the base study area as well as the rate of growth for the Nation. The per capita income in the subarea is projected to exceed that of the base study area in 2015.

Whereas personal income in the Coastal subarea in 1960 accounted for 40 percent of total basin personal income, it is projected in 2015 to account for almost 60 percent. This growth unequaled by any other basin or subarea in the base study area, will result from the

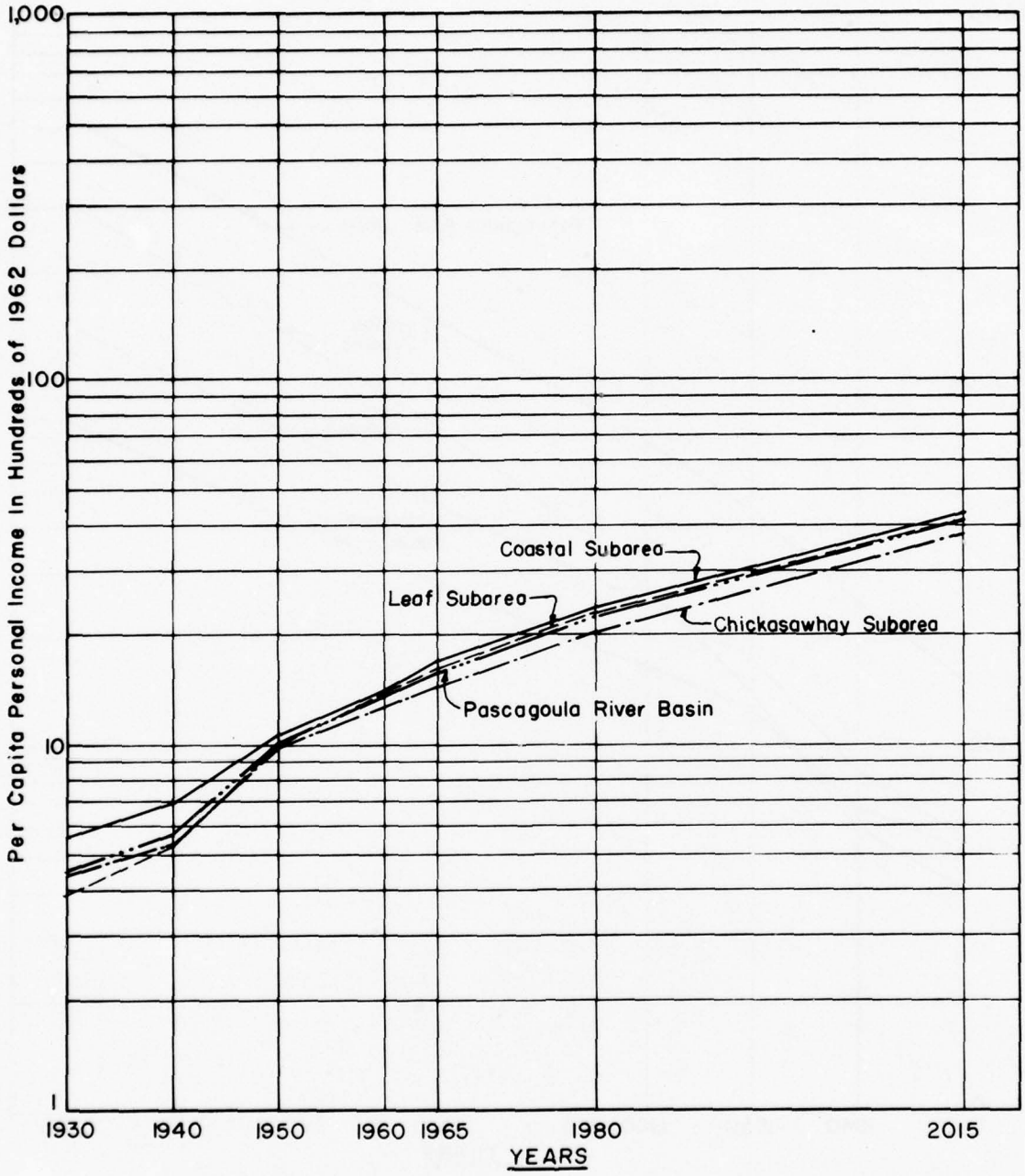


TOTAL PERSONAL INCOME

PASCAGOULA RIVER BASIN AND SUBAREAS

E-107

CHART 20



PER CAPITA PERSONAL INCOME

PASCAGOULA RIVER BASIN AND SUBAREAS

E-108

CHART 21

continued rapid broadening and diversification of the Coastal subarea's economic base. The Coastal subarea is expected to be the most dramatically developing subarea along the entire distance of the "booming" coastline area from Pensacola, Florida, to New Orleans, Louisiana. So fast is the expected growth and development of this entire area that by the year 2015 this entire strip is forecast to constitute one of the South's major megalopolises.

SECTION 19. TOTAL WAGE AND SALARY INCOME BY MAJOR SOURCES

General. Since growth in future personal income will be, in large measure, dependent upon growth in wage and salary income, heavy emphasis was placed upon the analysis of wage and salary income. Wages and salaries reveal to some extent the fundamental economic characteristics that, in general, establish the framework of income production. Also, the determination of sources of wages and salaries points directly to areas of economic vitality or deficiency, as well as to the diversity of the economic development.

Definition. As stated previously, total wage and salary income consists of the monetary remuneration of employees inclusive of executives' compensation, commissions, bonuses and the value of "payments in kind" which represent income to the recipient. Wages and salaries are measured before deduction for taxes, social security contributions, union dues or other purposes. In other words, this study deals with gross wages and salaries. It covers wages and salaries earned or received by employees, not only of all non-farm business establishments, but also of farms, private households, hospitals, and private educational, social service and nonprofit institutions. Also, all government employees including those of the state, local and Federal governments (both civilian and military) are included. Wage and salary income is derived from eleven major sources which are: (1) farming, (2) mining, (3) contract construction, (4) manufacturing, (5) wholesale and retail trade, (6) finance, insurance and real estate, (7) utilities, (8) transportation and communications, (9) services, (10) government and (11) other industries.

Analysis and Interpretation

The base study area. It is quite evident from available data that wage and salary income has historically been the largest type of income payments in the base study area and has, over the years, increased its importance to income recipients. Morever, it is expected that wage and salary income will grow faster than total personal income from 1960 to 2015. The relative advance in the position of wages and salaries is expected to continue to result, as in the past, from growing urban centers, expanding consumer markets, increased utilization of services, large governmental functions, and continued industrial expansion.

As shown in Table 38, wage and salary income in the base study area increased from $1.2 billion in 1930 to $5.2 billion in 1960, and it is expected that such income will continue to $30.5 billion by 2015. This remarkable rise ties in with the expected expansion in employment opportunities to accommodate anticipated population growth during this period.

As an indication of the structure of total wage and salary income in 1960 in the base study area, manufacturing earnings accounted for over one-fourth; government payrolls, one-fifth; and, wholesale and retail trade, 18 percent. Combined, these three sources accounted for nearly two-thirds of total wage and salary income. It is quite evident from the advancements in employee earnings that government continued to enlarge its function from 1930 to 1960, thus becoming a more important source of income in the wage salary structure. While wage and salary income in wholesale and retail trade fluctuated narrowly and barely maintained its relative position in the wage and salary structure from 1930 to 1960, income from manufacturing forged ahead, reflecting industrial expansion in the base study area during this time interval. The comparable growth of wages and salaries per worker in manufacturing is illustrated in Tables 39 and 40. From a 1960 per worker income of $4469 in manufacturing, employees income is forecast at $12,293 in 2015 for those employed in manufacturing.

Construction wage and salary income advanced in the base study area from $40.4 million in 1930 to $285.7 million in 1960 and is expected to rise to $2.2 billion in 2015, indicating a large expansion in capital formation, which from 1960 to 2015 will accelerate investment and sustain the growth trend in capital assets and employment opportunities. As income expansion occurs in the above sectors, the number of transactions in finance, insurance and real estate should rise. Wage and salary income in finance, insurance and real estate, which rose almost 300 percent from 1930 to 1960, is expected to advance about 450 percent from 1960 to 2015, reaching $1.4 billion in 2015. This advance, reflecting a rapidly expanding volume of financial transactions, is an optimistic indicator of the expected overall expansion in economic assets of the area.

In 1960, the service industry ranked fourth in total wage and salary income payments. This position is expected to continue from 1960 to 2015 with employee earnings rising to $2.8 billion in 2015, over five times the 1960 income.

Indicating the impact of farm mechanization and migration of the workers from the rural economy, wage and salary income from farm operations increased modestly from $21.6 million in 1930 to $64.2 million in 1960, a rate of growth well under that of total wages and salaries. Continuation of the trend in agricultural demands for employees indicates wage and salary income from farm employment should total $54.3 million in 2015, a decline from the $64.2 million recorded in 1960. The trend in farm employment wages and salaries has resulted, for the

Table 38

Wage and salary income by major sources
Base study area, Pascagoula River Basin and subareas
1930-1960 and projected to 2015

Year	Area	Total	Farming	Mining	Contract construction	Manufacturing	Wholesale and retail trade	Finance, insurance and real estate	Utilities	Transportation and communications	Services	Government	Other industries
		(THOUSANDS OF 1962 DOLLARS)											
1930	Base study area	1,216,272.5	21,619.8	45,812.6	40,414.5	281,048.0	224,071.1	64,241.8	14,374.0	178,714.7	166,756.3	174,187.7	4,032.0
	Pascagoula												
	Leaf	34,695.5	790.0	231.2	1,205.0	10,581.7	5,979.1	1,260.6	375.7	5,030.0	4,733.4	4,394.7	114.1
	Chickasawhay	34,181.6	743.5	94.4	1,239.6	9,006.3	6,326.3	1,316.5	315.0	6,257.7	4,641.4	4,139.4	101.5
	Coastal	27,475.6	495.7	35.4	1,180.7	7,744.5	4,260.3	1,105.9	150.4	3,289.2	3,578.8	5,583.6	51.1
	Total	96,352.7	2,029.2	361.0	3,625.3	27,332.5	16,565.7	3,683.0	841.1	14,576.9	12,953.6	14,117.7	266.7
1940	Base study area	1,774,911.6	34,141.5	73,756.7	79,098.4	430,762.0	347,853.7	72,583.0	31,529.8	171,752.8	171,423.9	357,352.4	4,657.4
	Pascagoula												
	Leaf	51,152.3	1,054.4	342.1	2,823.1	14,068.3	7,893.4	1,313.2	523.0	4,077.4	4,826.7	14,086.8	143.9
	Chickasawhay	41,831.3	770.9	208.7	1,861.0	9,616.7	6,034.5	1,269.3	481.0	6,509.9	4,508.2	10,451.2	119.9
	Coastal	40,101.4	411.0	95.5	2,328.4	14,660.6	5,427.0	950.2	560.8	1,946.3	4,230.9	9,409.0	81.7
	Total	133,085.0	2,236.3	646.3	7,012.5	38,345.6	19,354.9	3,532.7	1,564.8	12,533.6	13,565.8	33,947.0	345.5
1950	*Base study area*	3,448,712.7	78,854.7	121,965.8	192,567.2	920,065.3	674,668.9	137,070.9	58,502.2	322,226.0	339,541.9	557,181.7	11,043.6
	Pascagoula												
	Leaf	100,367.4	1,444.4	1,941.8	5,236.0	34,596.3	19,947.6	2,586.5	1,583.4	5,972.6	9,087.9	16,620.4	399.6
	Chickasawhay	76,929.0	872.2	324.0	3,299.0	22,528.3	16,492.5	2,478.2	1,167.8	8,539.3	8,334.1	13,645.7	317.5
	Coastal	88,937.9	410.6	230.4	5,499.1	23,540.4	19,113.6	2,506.9	1,327.5	4,686.9	10,071.3	22,459.5	254.5
	Total	266,234.3	2,727.2	2,496.2	14,034.1	80,665.0	55,553.7	7,571.6	4,078.7	19,198.8	27,493.3	52,725.6	971.6
1960	Base study area	5,158,323.3	64,184.1	162,465.5	285,707.2	1,460,258.2	911,925.8	250,354.8	92,132.6	334,206.9	531,967.3	1,049,079.2	16,041.7
	Pascagoula												
	Leaf	155,780.0	1,717.9	6,116.8	9,312.1	50,429.9	28,553.3	5,160.4	2,737.9	6,818.9	12,690.5	31,558.6	683.7
	Chickasawhay	102,163.7	723.6	1,463.4	6,212.0	28,156.4	19,474.4	4,271.3	1,511.6	6,687.1	10,437.7	22,728.0	498.2
	Coastal	181,984.7	443.9	836.1	9,871.3	59,230.4	33,593.9	6,645.9	3,373.2	5,758.1	14,846.7	46,749.1	636.1
	Total	439,928.4	2,885.4	8,416.3	25,395.4	137,816.7	81,621.6	16,077.6	7,622.7	19,264.1	37,974.9	101,035.7	1,818.0
		(MILLIONS OF 1962 DOLLARS)											
1965	Base study area	6,165.2	56.2	186.1	351.3	1,800.9	1,085.7	302.5	111.1	347.3	626.3	1,279.8	18.0
	Pascagoula												
	Leaf	184.5	1.9	7.1	11.4	59.0	34.9	6.2	3.6	7.2	14.5	38.0	0.7
	Chickasawhay	115.2	0.6	1.9	7.6	32.2	21.3	5.2	1.7	5.8	11.5	26.8	0.6
	Coastal	254.0	0.5	1.2	13.8	86.2	48.2	9.1	4.7	6.6	17.8	65.1	0.8
	Total	553.7	3.0	10.2	32.8	177.4	104.4	20.5	10.0	19.6	43.8	129.9	2.1
1980	Base study area	10,131.8	45.6	290.6	656.8	2,981.6	1,869.4	515.8	185.6	423.4	993.2	2,136.1	33.7
	Pascagoula												
	Leaf	296.7	2.4	12.1	19.2	91.5	60.6	9.8	6.0	8.3	23.5	61.7	1.6
	Chickasawhay	178.4	0.5	3.2	12.4	50.3	36.5	7.8	2.7	5.8	16.1	42.2	0.9
	Coastal	516.7	0.4	2.5	29.5	162.7	109.8	19.9	9.8	10.8	30.2	139.0	2.1
	Total	991.8	3.3	17.8	61.1	304.5	206.9	37.5	18.5	24.9	69.8	242.9	4.6
2015	Base study area	30,463.8	54.3	648.0	2,224.0	9,747.0	5,720.0	1,374.0	472.5	697.3	2,776.1	6,631.8	118.8
	Pascagoula												
	Leaf	942.0	3.5	26.1	63.3	307.9	214.5	22.4	21.0	14.6	48.6	215.2	4.9
	Chickasawhay	483.3	0.5	7.8	32.2	143.5	113.1	15.8	6.8	7.9	28.3	124.7	2.7
	Coastal	2,107.1	0.3	11.6	100.5	737.7	496.5	54.7	25.8	30.5	94.7	544.4	10.4
	Total	3,532.4	4.3	45.5	196.0	1,189.1	824.1	92.9	53.6	53.0	171.6	884.3	18.0

Table 39

Manufacturing wage and salary income per worker
Base study area, Pascagoula River Basin and subareas
1940-1960 and projected to 2015
(1962 dollars)

Item	Historical			Projected		
	1940	1950	1960	1965	1980	2015
Base study area	2,265	3,670	4,469	5,008	6,562	12,293
Pascagoula Basin						
Leaf	1,721	2,993	3,920	4,747	5,822	11,708
Chickasawhay	1,431	2,351	2,990	3,323	4,554	9,103
Coastal	1,863	3,332	4,972	5,514	7,238	14,506
Total Basin	1,695	2,876	4,072	4,731	6,246	12,949

Table 40

Index of manufacturing wage and salary income per worker
Base study area, Pascagoula River Basin and subareas
1940-1960 and projected to 2015
(1960 = 100)

Item	Historical			Projected		
	1940	1950	1960	1965	1980	2015
Base study area	51	82	100	112	147	275
Pascagoula Basin	42	71	100	116	153	318
Leaf	44	76	100	121	149	299
Chickasawhay	48	79	100	111	152	304
Coastal	38	67	100	111	146	292

most part, from the relatively small and, in many instances, uneconomical ownership units, advances in agricultural research and market utilization and the full-scale mechanization of farm production. It is to be noted, however, that the inclusion of wage payments of forestry and fishing operations mitigated the decline in total farm wages in several subareas.

Wage and salary payments in mining rose from $46.8 million in 1930 to $162.5 million in 1960 but declined in importance to total wages and salaries over the period. Although the rate of growth in expected mining income does not equate with growth in total wages and salaries, income from mining should continue to rise. The projection is based on the premise of additional crude oil discoveries and the utilization of other mineral resources.

Although wage and salary income in the transportation and communication industry constituted 15 percent of total wage and salary income in 1930, its relative position in the wage and salary structure declined to less than 7 percent in 1960. Automation effected the displacement of units of manpower in these industries. Hence, the rise in employee earnings was a result of increases in the value of service output per hour of manpower utilization. This change is expected to carry into the future, as reflected in the projected rise of only slightly over 100 percent from 1960 to 2015.

It is expected that extending the availability of utility facilities to the more remote rural areas, along with the modernization and enlargement of these facilities, should command an expansion in employment that will carry wage and salary income in the utility industry to $472.5 million in 2015, up from $92.1 million in 1960. Although automation in this industry will decelerate the rate of expansion of employment opportunities, expanded facilities will still require increased manpower needs in an industry that maintains the wage and salary scale for its employees in proportion to the general level for comparable performance throughout the Nation.

Pascagoula River Basin. The Pascagoula Basin has a somewhat diverse economy. The Leaf and Chickasawhay subareas are still predominantly rural and are expected to remain so, with urban influence residing in Hattiesburg and Laurel in the Leaf subarea and Meridian in the Chickasawhay subarea, while the Coastal subarea is rapidly becoming one of the most urbanized and progressive subareas in the base study area.

Wage and salary income in both the Leaf and Chickasawhay subareas showed quantitative leadership over the Coastal subarea in 1930 and 1940. By 1950, wage and salary income in the Coastal surpassed that in the Chickasawhay and by 1960 had moved ahead of the Leaf.

The Leaf subarea presented a relative decline in its share of wage and salary income in the basin during the historical period.

This movement was reflected in practically every component constituting wage and salary income, with the exception of substantial relative gains in wage and salary income from mining and farm activity. Although wage and salary income advanced in the subarea during the period, the rate of advance lagged considerably behind that of the Coastal subarea. Simultaneously, the dynamic expansion of diversified economic activity in the Coastal subarea minimized the mining and farming activity in the Leaf which had the tendency to elevate the position of these components in the basin. Trade is one of the more important sources of wage and salary income in the economy of the Leaf subarea and is expected to lead all sources in rate of growth from 1960 to 2015, followed by government, construction and manufacturing. These data somewhat establish the anticipated economic growth in the subarea from 1960 to 2015, a continuation of growth patterns established during the historical period.

The Chickasawhay subarea, with the exception of Lauderdale County, represents a predominantly rural economy. Wage and salary income in the subarea grew relatively slowly from 1930 to 1960. The most rapid expansion among major sources occurred in government, finance, insurance and real estate, manufacturing, and contract construction. Continuation of historical wage and salary patterns in the Chickasawhay is expected to raise the total to a projected $483.3 million in 2015. Among the principal sources, the highest expected rate of growth during the projection period will be in income from trade, followed by increases in government, other industries, and mining.

In the Coastal subarea, the 1960 total wage and salary income was nearly seven times the 1930 total. It is clearly evident that the rate of growth in wage and salary income in this subarea outpaced that of the remaining subareas in the basin. The most dynamic expansion occurred in the government function which grew 737 percent from 1930 to 1960, reaching $46.7 million in 1960. Though they trailed growth in government wages and salaries, incomes in construction, trade and manufacturing registered large gains over the period.

In the Coastal subarea, wage and salary income is expected to rise to $2.1 billion in 2015, an increase of over 1,000 percent over 1960. Such a rate of growth in the subarea over the next half century will not only provide leadership in wage and salary income for the Pascagoula Basin but will represent the fastest rate of growth of any subarea in the base study area. The most important advances are forecast in trade, manufacturing and government. Aggressive growth earnings also are expected to occur in all other sources of wages and salaries except agriculture, indicating that expansion of the subarea's economy will be highly diversified.

SECTION 20. WAGE AND SALARY INCOME OF MAJOR WATER-USING MANUFACTURING INDUSTRIES

General. Fundamentally, this economic base study is oriented to the concept of comprehensive river basin planning. Such planning relates primarily to problems directly or indirectly pertinent to the functions of water, its need and utilization for economic and social purposes. The development and interpretation of economic data offer criteria by which planners, in advance of need, may organize and plan development programs that, when implemented, will meet the water requirements of people and industry. The following discussion of wage and salary income received from employment in major water-using manufacturing industries augments the earlier discussion of employment in major water-using manufacturing industries. Together, these economic indicators establish, in large measure, an industrial identification of the base study area and its components.

Definition. Wage and salary income from employment in major water-using manufacturing industries includes earnings received at place of residence of workers employed in industries manufacturing food, pulp and paper, chemicals and primary metals and those refining petroleum. These are the same industries as previously described. Per worker wage and salary income reflects income to workers at place of work.

Analysis and Interpretation

The base study area. In the base study area, combined wage and salary income of the five major water-using manufacturing industries rose from $152.4 million in 1930 to $722.6 million in 1960 (Table 41). Per worker income in the chemical industry led all major water-using industries in rate of improvement (Table 42). Wages and salaries in this industry group grew at a rate in excess of that accomplished by total wages and salaries but less than the increase in manufacturing wage and salary income. Employee earnings in petroleum refining were practically nonexistent in 1930, but in 1960 amounted to $63.2 million, providing the highest per worker disbursements among the industries. Earnings in the chemical industry expanded almost seven times and in paper, over six times. Even though the primary metal industry incurred the least rate of growth in wages, the industry still disbursed more wages in 1960 than any of the other industries.

The economy of the base study area is expanding along the line of manufacturing activity that will not only require larger quantities of water but will inject good health into the industrial environment by bringing into the area those types of manufacturing operations that add high value to products in the manufacturing process.

Dynamic expectations are revealed in projections of wage and salary income in the major water-using manufacturing industries from

Table 41

Wage and salary income of major water-using manufacturing industries
Base study area, Pascagoula River Basin and subareas, 1930-1960 and projected to 2015

Item	Historical (thousands of 1962 dollars)				Projected (millions of 1962 dollars)		
	1930	1940	1950	1960	1965	1980	2015
BASE STUDY AREA - Total	152,371.6	227,505.4	486,418.9	722,605.8	855.9	1,342.4	4,260.4
Food	41,086.9	52,072.2	103,926.6	173,066.0	205.5	344.7	1,097.1
Pulp & Paper	24,445.3	16,163.8	83,934.9	149,214.3	183.1	333.6	1,146.5
Chemicals	16,995.5	24,104.9	62,507.5	115,504.7	140.6	259.5	985.5
Petroleum	1,317.4	23,118.8	63,322.6	63,221.9	72.4	128.4	387.3
Primary Metals	68,526.5	112,045.7	172,727.3	221,598.9	254.3	276.2	644.0
PASCAGOULA							
Leaf - Total	3,496.9	3,860.4	17,572.3	28,734.0	35.6	55.4	208.2
Food	838.1	702.2	2,237.1	5,060.7	6.9	11.0	47.6
Pulp & Paper	730.3	247.3	10,241.4	16,747.9	20.5	33.7	122.3
Chemicals	1,928.5	2,704.8	4,605.8	5,088.4	5.9	7.4	24.9
Petroleum	---	46.8	405.6	1,718.5	2.1	2.9	11.6
Primary Metals	---	159.3	82.4	118.5	0.2	0.4	1.8
Chickasawhay - Total	1,995.1	1,530.5	4,438.7	6,521.4	8.2	14.7	46.3
Food	959.7	792.1	2,062.0	3,123.1	3.6	5.9	17.5
Pulp & Paper	---	64.9	1,198.8	2,127.1	2.7	5.4	16.4
Chemicals	980.2	615.4	782.9	440.2	0.9	1.7	5.4
Petroleum	15.2	19.7	348.9	515.1	0.6	1.0	3.8
Primary Metals	---	38.4	46.1	315.9	0.4	0.7	3.2
Coastal - Total	4,520.7	7,449.1	11,312.0	19,204.9	31.5	66.9	294.4
Food	2,792.2	4,946.8	5,330.3	7,643.3	10.2	14.4	40.1
Pulp & Paper	1,047.1	1,766.0	4,335.7	7,854.8	11.2	21.6	95.7
Chemicals	681.4	648.9	1,585.0	3,073.3	4.5	10.9	75.8
Petroleum	---	53.5	---	---	4.7	17.9	71.3
Primary Metals	---	33.9	61.0	633.5	0.9	2.1	11.5
Pascagoula - Total	9,972.7	12,840.0	33,323.0	54,460.3	75.3	137.0	548.9
Food	4,590.0	6,441.1	9,629.4	15,827.1	20.7	31.3	105.2
Pulp & Paper	1,777.4	2,078.2	15,775.9	26,729.8	34.4	60.7	234.4
Chemicals	3,590.1	3,969.1	6,973.7	8,601.9	11.3	20.0	106.1
Petroleum	15.2	120.0	754.5	2,233.6	7.4	21.8	86.7
Primary Metals	---	231.6	189.5	1,067.9	1.5	3.2	16.5

Table 42

Wage and salary income per worker in major water-using manufacturing industries
Base study area, Pascagoula River Basin and subareas
1940-1960 and projected to 2015
(1962 dollars)

Item	Historical			Projected		
	1940	1950	1960	1965	1980	2015
BASE STUDY AREA - Average	2,806	4,449	5,350	5,927	7,539	14,362
Food	2,127	3,565	3,910	4,366	5,510	9,811
Pulp & Paper	2,130	4,677	4,801	6,484	8,868	15,362
Chemicals	1,924	4,849	6,252	6,870	9,467	17,910
Petroleum	3,073	5,999	6,979	7,488	9,431	20,139
Primary Metals	3,457	4,558	5,662	6,477	7,478	16,405
PASCAGOULA						
Leaf - Average	2,109	3,996	4,873	5,434	6,908	13,258
Food	1,824	2,963	3,401	3,878	4,857	10,013
Pulp & Paper	1,994	4,239	5,380	6.090	7,939	14,624
Chemicals	2,273	4,116	5,043	5,876	6,655	13,764
Petroleum	2,463	5,337	6,295	6,774	8,788	17,846
Primary Metals	1,642	2,168	2,963	3,704	4,819	10,465
Chickasawhay - Average	1,765	3,239	3,867	4,444	6,210	11,477
Food	1,640	2,896	3,083	3,523	4,793	9,459
Pulp & Paper	1,324	3,666	5,138	5,672	7,770	12,481
Chemicals	2,182	3,449	4,538	5,625	6,800	12,949
Petroleum	2,193	4,715	5,422	6,000	7,937	16,522
Primary Metals	1,324	1,921	2,796	3,007	5,000	13,333
Coastal - Average	1,801	3,706	4,748	5,367	7,374	15,433
Food	1,697	3,090	3,723	3,991	5,009	10,147
Pulp & Paper	1,901	4,507	5,827	6,500	8,511	17,281
Chemicals	2,486	4,033	6,110	6,311	8,755	15,655
Petroleum	2,546	---	---	6,763	8,861	17,960
Primary Metals	1,697	2,542	3,579	4,072	6,231	16,289
Pascagoula - Average	1,873	3,787	4,697	5,294	7,071	14,282
Food	1,703	3,017	3,475	3,864	4,913	9,966
Pulp & Paper	1,886	4,258	5,483	6,181	8,117	15,406
Chemicals	2,290	4,010	5,346	5,650	7,672	15,011
Petroleum	2,449	5,030	6,070	6,693	8,289	17,876
Primary Metals	1,586	2,203	3,149	3,676	5,714	14,758

1960 to 2015. Total earnings in this category of industrial grouping are expected to rise to $4.3 billion in 2015. During the forecast period, wage and salary income in chemicals is expected to rise the fastest, followed by earnings in paper, petroleum, food and primary metals. The petroleum industry is expected to continue to lead the way in per worker earnings.

Pascagoula River Basin. Wage and salary income of employees in major water-using manufacturing industries in this basin rose from $10.0 million in 1930 to $54.5 million in 1960, the most important growth occurring in the paper industry. Starting from a base of $1.8 million in 1930, earnings of workers in this industry rose to $26.7 million in 1960, with practically all of this growth occurring after 1940. Combined wage and salary income in these industries is expected to rise to $548.9 million in 2015, advancing faster from 1960 to 2015 than either total wages and salaries or total manufacturing wages and salaries. This, of course, is encouraging because expansion in the technologically sophisticated industries is expected to occur more rapidly than in other types of manufacturing. With the petroleum industry moving into the basin, the largest earnings advance is expected to occur in this industry. However, considerable strengthening of the economy is expected from significant gain in wage and salary income in all the water-using industries.

In the future, wage and salary income in major water-using manufacturing industries in the three subareas is expected to follow somewhat the pattern of the past except in the Coastal subarea where the future of the wage earner in the major water-using industries appears somewhat brighter. Large expansions in these payrolls occurred after 1960. For example, some $125 million has been invested in a large new oil refinery at Pascagoula, which not only will add significantly to payrolls, but will probably shift emphasis to a new industrial base for the subarea.

SECTION 21. WAGE AND SALARY INCOME OF OTHER MANUFACTURING INDUSTRIES

General. A breakdown of total manufacturing employment between major water-using and other manufacturing industries was a necessary procedure in fulfilling the purposeful orientation of this study. This breakdown was essential in the evaluation of the present form and level of utilization of water resources upon which the projection of future water requirements, quantitatively and qualitatively, must be predicated. Other manufacturing industries, classified as those requiring relatively small quantities of water in production processes, have gradually emerged as prominent contributors to nonagricultural payrolls in the base study area.

Definition. Wage and salary income from employment in other manufacturing industries includes earnings received at the place of residence of workers employed in the printing and publishing industry

and in those industries manufacturing: (1) textiles, (2) apparel, (3) lumber, wood and furniture, (4) stone, clay and glass products, (5) fabricated metal products, (6) nonelectrical machinery, (7) electrical machinery, (8) transportation equipment, and (9) all other manufactured products. These are the same industries as previously described. Per worker wage and salary income reflects income to workers at place of work.

Analysis and Interpretation

The base study area. Total payrolls in other manufacturing industries recorded substantial decade-to-decade gains between 1930 and 1960, rising from $128.7 million in 1930 to $737.7 million in 1960, with all industries making substantial gains in per worker wage and salary income (Table 43). By 1960, payrolls in other manufacturing industries were slightly in excess of those in major water-using manufacturing industries, exhibiting the balance that existed among the industries. While wage and salary income in other manufacturing industries is projected to rise from $737.7 million in 1960 to $5.5 billion in 2015, such income in the major water-using manufacturing industries is expected to grow more slowly, rising from $722.6 million in 1960 to $4.3 billion in 2015. Therefore, by 2015, payrolls in other manufacturing industries will have increased in dominancy of total manufacturing wage and salary income.

Prior to 1950, the most significant payrolls in the base study area were those received in the manufacture of textiles, apparel, lumber, wood and furniture, and in printing and publishing. From 1940 to 1960, payrolls in the stone, clay and glass, fabricated metals, nonelectrical machinery, electrical machinery, transportation equipment and all other manufacturing industries expanded greatly the importance of their contribution to the economy of the base study area.

In 1930, the textile industry was an important payroll segment of the base study area's economy, but this no longer held true in 1960. Despite the fact that the industry's manufacturing process is closely tied to cotton as the key raw material, there was never a massive integration of this raw material base with manufacturing activity in the base study area. From 1960 onward, textile payrolls are forecast to rise very slowly, becoming the least important other manufacturing payroll in the base study area by 2015.

The availability of an extensive pool of low-cost labor, particularly female labor, and the growing demand for apparel products by an expanding population acted to encourage continued growth in payrolls of the apparel industry during the historical period. Payrolls grew in this industry from $16.1 million in 1930 to $113.5 million in 1960. With payrolls in the industry forecast at $997.6 million in 2015, it is evident that the apparel industry will continue to be an important segment of wage and salary income from other manufacturing industries.

Table 43

Wage and salary income in other manufacturing industries
Base study area, Pascagoula River Basin and subareas
1930-1960 and projected to 2015

Year	Area	Total	Major groups: Textiles	Apparel	Lumber, wood & furniture	Printing & publishing	Stone, clay & glass	Fabricated metals	Machinery except electrical	Electrical machinery	Transportation equipment	All other 1/ manufacturing
						(THOUSANDS OF 1962 DOLLARS)						
1930	Base study area	128,676.4	15,481.3	16,141.9	53,071.5	16,315.3	1,679.1	---	4,356.4	724.8	7,773.7	13,132.4
	Pascagoula											
	Leaf	7,084.8	882.7	196.7	5,290.5	229.4	---	---	85.2	---	130.1	270.2
	Chickasawhay	7,051.2	2,722.9	344.2	3,280.8	356.8	---	---	55.2	---	17.9	273.4
	Coastal	3,223.8	67.5	125.7	1,052.6	238.7	---	---	53.1	---	1,480.1	206.1
	Total	17,359.8	3,673.1	666.6	9,623.9	824.9	---	---	193.5	---	1,628.1	749.7
1940	Base study area	203,256.6	26,062.9	20,767.5	78,708.9	19,345.5	17,689.2	---	9,238.1	---	16,564.4	14,880.1
	Pascagoula											
	Leaf	10,207.9	927.7	1,008.6	4,941.1	289.0	2,571.4	---	139.6	---	205.7	124.8
	Chickasawhay	8,086.2	3,335.3	365.9	3,774.5	335.3	94.0	---	72.8	---	27.0	81.4
	Coastal	7,211.5	1,075.7	1,392.5	1,719.4	318.5	23.8	---	89.9	---	2,454.2	137.5
	Total	25,505.6	5,338.7	2,767.0	10,435.0	942.8	2,689.2	---	302.3	---	2,686.9	343.7
1950	Base study area	468,670.9	48,259.3	50,312.5	164,609.2	39,866.1	36,907.3	31,741.1	22,252.7	4,518.0	41.313.9	28,890.8
	Pascagoula											
	Leaf	17,974.9	1,375.8	3,484.2	11,012.5	597.4	466.1	244.1	457.4	35.5	72.7	229.2
	Chickasawhay	17,020.0	4,924.3	2,241.5	8,320.4	606.0	353.2	94.0	231.2	30.7	52.5	166.2
	Coastal	11,065.6	1,850.6	1,045.0	4,248.9	600.9	477.7	123.7	247.8	48.6	2,341.4	81.0
	Total	46,060.5	8,150.7	6,770.7	23,581.8	1,804.3	1,297.0	461.8	936.4	114.8	2,466.6	476.4
1960	Base study area	737,652.4	34,431.2	113,486.3	151,438.4	53,677.7	65,074.6	78,948.8	37,625.4	34,200.5	127,041.3	41,728.2
	Pascagoula											
	Leaf	21,695.9	289.9	6,607.9	8,737.8	956.4	801.7	299.3	1,088.9	2,325.1	414.2	174.7
	Chickasawhay	21,635.0	4,058.8	5,227.4	8,118.4	847.3	1,131.9	707.4	284.2	413.6	647.3	198.7
	Coastal	40,025.5	153.3	3,166.5	4,047.1	1,394.7	2,019.4	1,053.1	395.2	319.8	27,185.3	291.1
	Total	83,356.4	4,502.0	15,001.8	20,903.3	3,198.4	3,953.0	2,059.8	1,768.3	3,058.5	28,246.8	664.5
						(MILLIONS OF 1962 DOLLARS)						
1965	Base study area	945.0	33.0	138.0	160.1	63.0	81.2	103.8	54.3	44.5	169.2	97.9
	Pascagoula											
	Leaf	23.4	0.0	8.0	7.6	1.3	1.1	0.5	1.4	2.7	0.6	0.2
	Chickasawhay	24.0	4.9	5.2	8.4	0.9	1.5	1.0	0.4	0.5	1.0	0.2
	Coastal	54.7	1.3	4.8	4.5	2.5	4.8	1.8	1.8	0.4	31.3	1.5
	Total	102.1	6.2	18.0	20.5	4.7	7.4	3.3	3.6	3.6	32.9	1.9
1980	Base study area	1,639.2	43.3	269.7	199.6	112.5	139.2	205.2	100.2	83.6	319.4	166.5
	Pascagoula											
	Leaf	36.1	0.1	14.3	8.9	2.8	1.8	0.9	2.2	4.0	0.8	0.3
	Chickasawhay	35.6	5.7	10.6	11.0	1.3	2.5	1.5	0.7	0.8	1.2	0.3
	Coastal	95.8	1.8	10.1	6.1	3.9	9.0	4.9	3.4	0.6	53.3	2.7
	Total	167.5	7.6	35.0	26.0	8.0	13.3	7.3	6.3	5.4	55.3	3.3
2015	Base study area	5,486.6	95.5	997.6	324.8	380.2	487.8	902.9	390.1	308.8	1,102.4	496.5
	Pascagoula											
	Leaf	99.7	0.2	53.7	8.1	6.1	5.5	3.8	6.7	14.3	0.8	0.5
	Chickasawhay	97.2	12.6	36.2	19.0	3.3	9.8	7.5	2.9	3.2	2.1	0.6
	Coastal	443.3	4.0	50.3	17.0	19.9	49.6	28.4	14.1	1.0	250.0	9.0
	Total	640.2	16.8	140.2	44.1	29.3	64.9	39.7	23.7	18.5	252.9	10.1

1/ All other manufacturing includes: Tobacco manufactures, Rubber and miscellaneous plastic products, Leather and leather products, Instruments and related products Miscellaneous manufacturing industries, and Ordnance and accessories.

The increase in payrolls projected for the apparel industry will stem from expanding employment by virtue of a rising demand, not from a high value of output per man-hour of work.

A favorable growth in wage and salary income in the lumber, wood and furniture industry in the past resulted from extensive forest resources that fostered the expansion of operations engaged in cutting timber and pulpwood, merchant saw mills and the integration of the raw materials of the forest with the expansion of numerous small plants manufacturing household, office and commercial furniture and fixtures. Wage and salary income in this industry grew from approximately $53.1 million in 1930 to $151.4 million in 1960. Projections indicate that payrolls in this industry should more than double again from 1960 to 2015. However, it is significant that earnings in this industry declined from 1950 to 1960, reflecting the fact that per capita consumption of forest products is trending steadily downward because of market encroachment by substitutes. Unlike payrolls in the apparel industry but similar to those in the textile industry, wage and salary income in the lumber, wood and furniture industry will decline in relative importance to the economy of the base study area.

Payrolls in printing and publishing rose gradually from $16.3 million in 1930 to $53.7 million in 1960. The output and, therefore payrolls, of the printing industry are geared to serve essentially local and regional markets, and can expect to grow roughly in proportion to population and commercial volume gains. Following the economic expansion of the base study area, payrolls in the printing and publishing industry are expected to rise to $380.2 million in 2015, scoring a significant percent advance from 1960 to 2015.

The stone, clay and glass industry is geared to extensive natural resources present in the base study area. From a relatively negligible payroll of $1.7 million in 1930, this income jumped to $17.7 million by 1940, more than doubled this by 1950, and moved sharply upward to $65.1 million in 1960 — a dynamic advance to a position of high relative economic significance in the base study area's payroll structure. It is anticipated that wage and salary income from this industrial source will rise to $487.8 million in 2015, assuming its role as one of the leaders in payroll expansion in the onward march of the economic forces in the base study area.

The production of fabricated metals in the base study area is localized very largely in the integrated mining, smelting, and refining complex of the Warrior subarea. Although there were very few metal fabrication plants located in the base study area during the early part of the historical period, earnings totaled $78.9 million in 1960. Payrolls in the industry are projected to rise to $902.9 million by 2015.

Worker earnings in the base study area's nonelectrical machinery industry jumped from $4.4 million in 1930 to $37.6 million in 1960,

contributing a large advance to the ever-broadening industrial payroll base of the base study area. This type of manufacturing is also somewhat concentrated in the Tombigbee-Warrior Basin, though a dispersion tendency should become more evident over the forecast period. It is anticipated that payrolls in this heavy manufacturing operation will reach $390.1 million in 2015.

Although the manufacturing of electrical machinery is a recent growth industry in the base study area, a large increase in future earnings is forecast. Employee earnings amounted to only a little more than $4.5 million in 1950 but had expanded to $34.2 million by 1960. Forecast growth places payrolls at $308.8 million in the terminal projection year. This industry is expected to assume a position of relative economic importance in the base study area during the next half century and further strengthen the industrial payroll structure.

Starting from a relatively small payroll base of $7.8 million in 1930, the transportation equipment industry expanded sharply to a payroll level of $127 million in 1960. From 1950 to 1960 alone, earnings tripled. By 1960, workers in this industry were taking home more pay than workers in any other manufacturing industry. It is anticipated that payrolls in the transportation equipment industry will rise to more than $1.1 billion by 2015, the largest wage distribution among the other manufacturing industries. The industry's forecast rate of growth leads all others in the base study area.

Payrolls of the all other manufacturing group tripled from $13.1 million in 1930 to $41.7 million in 1960. During the forecast period, payrolls from this source of industrial output are expected to rise to $496.5 million in 2015. The principal impetus in this advance is expected to be provided by earnings in the rubber, plastic, ordnance, and instruments industries.

The wage and salary income per worker in other manufacturing industries is given in Table 44.

Pascagoula River Basin. The Pascagoula Basin from 1930 to 1960 enjoyed a tremendous expansion in practically all sectors of its economy. Aggressive growth in capital formation was the mainspring of the broadly diversified expansion of the economic structure in this basin, with particular reference to the strong leadership in the rate of earnings growth displayed by the Coastal subarea.

Manufacturing earnings in the Pascagoula Basin are trending more toward the water-using industries. An analysis of the payrolls in other manufacturing industries reveals that major expansion has been and is expected to continue to be in the more technologically oriented industries, principally transportation equipment. An exception is the importance of payrolls in the apparel industry which are

Table 44

Wage and salary income per worker in other manufacturing industries
Base study area, Pascagoula River Basin and subareas
1940-1960 and projected to 2015
(1962 Dollars)

Year and area		Average	Major groups									
			Textiles	Apparel	Lumber, wood & furniture	Printing & publishing	Stone, clay & glass	Fabricated metals	Machinery except electrical	Electrical machinery	Transportation equipment	All other 1/ manufacturing
1940	Base study area	1,863	1,815	1,776	1,499	2,603	2,280	---	2,510	---	2,936	2,530
	Pascagoula	1,622	1,628	1,653	1,433	1,924	1,629	---	1,566	---	2,467	1,637
	Leaf	1,625	1,642	1,640	1,610	1,901	1,642	---	1,642	---	2,364	1,642
	Chickasawhay	1,392	1,560	1,544	1,214	1,916	1,324	---	1,324	---	2,250	1,536
	Coastal	1,930	1,861	1,694	1,598	1,954	1,697	---	1,697	---	2,479	1,697
1950	Base study area	3,114	3,410	2,772	2,399	3,653	4,522	4,707	3,993	3,606	4,751	3,104
	Pascagoula	2,456	2,991	2,598	2,117	2,634	3,685	2,833	3,455	2,551	4,195	2,370
	Leaf	2,419	2,825	2,676	2,247	2,586	3,759	2,743	3,546	2,088	3,462	2,247
	Chickasawhay	2,217	2,954	2,246	1,856	2,525	3,045	2,848	3,003	2,362	2,917	2,246
	Coastal	3,004	3,241	3,415	2,421	2,808	4,265	3,017	3,813	3,241	4,265	3,241
1960	Base study area	3,849	3,358	2,996	3,179	4,131	5,043	5,009	4,548	3,955	6,012	3,797
	Pascagoula	3,755	3,179	3,046	2,885	3,157	4,559	4,383	4,028	3,721	5,708	3,497
	Leaf	3,142	3,493	3,072	2,901	3,017	4,581	4,215	4,172	3,650	3,871	3,493
	Chickasawhay	2,821	3,127	2,584	2,618	2,778	4,131	3,824	3,383	3,693	3,699	2,880
	Coastal	5,092	4,381	3,857	3,572	3,567	4,831	4,921	4,204	4,381	5,825	4,100
1965	Base study area	4,407	3,554	3,111	3,165	4,412	5,443	5,612	4,869	4,355	6,444	5,115
	Pascagoula	4,388	3,465	3,274	3,090	4,226	5,398	5,077	4,557	4,119	6,653	4,348
	Leaf	4,037	3,077	3,351	3,280	3,824	5,366	4,902	4,667	4,048	4,380	3,947
	Chickasawhay	3,093	3,278	2,693	2,690	4,054	4,762	4,608	4,301	4,167	4,386	3,030
	Coastal	5,627	4,437	4,068	3,766	4,545	5,640	5,438	4,534	4,598	6,834	4,732
1980	Base study area	5,964	4,530	4,381	4,075	5,888	6,739	7,529	6,365	5,466	8,251	6,781
	Pascagoula	5,709	3,855	4,227	3,671	5,952	6,367	7,300	6,402	5,158	8,418	5,437
	Leaf	4,718	3,571	4,767	3,819	5,172	6,383	6,923	6,340	5,069	5,442	5,263
	Chickasawhay	4,137	3,608	4,431	3,256	5,372	6,112	6,818	5,785	5,229	6,667	4,412
	Coastal	7,147	4,958	5,439	4,440	5,603	6,438	7,538	6,589	5,714	8,538	5,601
2015	Base study area	11,065	8,050	7,798	6,499	10,952	12,094	14,185	12,088	10,990	14,794	12,689
	Pascagoula	12,005	7,821	9,586	6,379	10,220	10,978	14,775	11,698	11,018	17,349	10,223
	Leaf	9,604	6,250	9,605	6,429	9,064	10,092	14,615	11,672	10,966	8,247	8,928
	Chickasawhay	8,304	7,590	9,549	5,197	10,217	9,939	13,393	10,035	11,034	10,500	9,677
	Coastal	13,938	8,772	9,594	8,513	10,636	11,322	15,212	12,124	11,764	17,507	10,345

1/ All other manufacturing includes: Tobacco manufactures, Rubber and miscellaneous plastic products, Leather and leather products, Instruments and related products, Miscellaneous manufacturing industries, and Ordnance and accessories

forecast to reach $140 million in 2015 and constitute the second largest source of wage and salary income among the other manufacturing industries.

In the past, in both the Leaf and Chickasawhay subareas, the apparel and lumber, wood and furniture industries have provided the largest other manufacturing payrolls. Hence, the manufacturing economies of the subareas have been based on an abundant supply of low-cost labor and extensive forest resources. Wood-using operations, especially those requiring the harvesting of pulpwood, have played an important role in the wage and salary structure of these subareas.

In the early part of the historical period, earnings in the textile industry supplied larger incomes to the workers in these two subareas than did the apparel industry, but from 1950 to 1960, while payrolls in textiles, particularly in the Leaf subarea, declined sharply, payrolls in the apparel operation surpassed those in textiles. Income from textiles is not expected to make any substantial contribution to earning's growth from 1960 to 2015, while the growth of wages and salaries in the apparel industry is expected to continue.

The payroll structure in both the Leaf and Chickasawhay has been broadened and strengthened by expansion in stone, clay and glass, nonelectrical machinery, and electrical machinery operations, particularly from 1950 to 1960, and a continuation of these trends in industrial earnings is expected to 2015.

The Coastal subarea completely dominated the basin's direction of growth of employee earnings in the other manufacturing industries from 1930 to 1960. By 1960, this subarea accounted for nearly one-half of all earnings from employment in other manufacturing industries in the basin, and this concentration is expected to rise to over two-thirds by 2015, when wages and salaries in these industries reach $443.3 million, up from only $40 million in 1960.

CHAPTER 4 *

THE AGRICULTURE OF THE BASIN

SECTION 1. AGRICULTURE AND FORESTRY IN THE ECONOMY

Agriculture and forestry in the Pascagoula Basin are highly important activities, contributing to state and national production. Livestock and livestock products accounted for 79 percent of the value of all farm products sold in 1959. Poultry and poultry products are the main livestock enterprises. Cattle production is the second ranking livestock enterprise. Cotton is the leading cash crop with farm forestry products in second place. The area's pulpwood and southern pine lumber production as well as production of numerous other wood products, contributes to overall national production.

Crop and livestock production provide income for the owners and operators of 21,303 farm units occupying 40 percent of the total land resource base in 1959. Forest production provides income for owners and operators of approximately five million acres of commercial forest which includes slightly over one-half million acres of National Forest. The marketing, processing, distribution, and sale of agricultural products, and the manufacture, distribution, and sale of supplies needed by agriculture constitute an important segment of the total economy.

SECTION 2. THE LAND RESOURCE AREA AND NATIVE FERTILITY

Land resource areas are delimitations of soils with distinct characteristics. The soils of the basin are represented by four land resource areas – Upper Coastal Plain, Blacklands, Lower Coastal Plain and Coastal Flatwoods.

The soils of the Upper Coastal Plain Resource Area are of Coastal Plain origin and are made up of sands, clays, shale, and some gravel. These materials are mixed and mingled together in various proportions forming deposits of unconsolidated formations. The topography, or lay of the land, an important factor in agricultural use, varies from level to steep. The steep land and much of the rolling land is better suited for pine trees than for cultivated crops. There are also large areas of bottom and bench land that are well suited for the production of row crops. Farms located on the better drained soils and bottomland soils usually produce moderately high yields of all crops. The soils are all acid, low in native fertility, and vary in texture from loamy sands to heavy clays.

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* Prepared by Economic Research Service and Forest Service in collaboration with Soil Conservation Service, U. S. Department of Agriculture, Jackson, Mississippi.

The geological materials under the Lower Coastal Plain Resource Area are plain sand, clays, gravel and some shale. From this variety of soil materials, nature developed a number of soils that are acid and low in the major plant nutrients and all of which require liberal applications of lime and complete fertilizers to obtain profitable yields. The soils generally have good physical properties and respond well to sound soil management practices.

The Blacklands Resource Area has soft limestone or chalk under it as the main soil-forming material. This chalk, along with overlying clays, has served as parent material for the upland soils. Soils developing from such materials tend to have clayey or heavy textures. They are tough, sticky and difficult to work, and special management practices are required for cultivated crops. The lay of the land ranges from level to sloping with much land on gentle relief. The flood plains or bottoms tend to be broad and flat in comparison with bottoms in other areas. As a result of these conditions and the rainfall characteristics of the area, frequent floods occur and proper drainage of the bottomland is a major problem.

The Coastal Flatwoods Resource Area represents an area of flat to gently sloping lands along the Gulf of Mexico. The soil materials from which the soils of the area have developed are recent coastal plain, loamy sands and sands. These coarse textured materials resulted in the sandy soils which predominate throughout the area. The fertility level and the water holding capacity of the soils, in general, is very low. Soil fertility and available soil moisture are severe problems in the production of agricultural crops during dry periods. However, the distribution of rainfall during the growing season is more favorable for the production of row crops than it is in other resource areas of the basin. Water can be obtained from the ground at shallow depth and could be used for irrigation, which would be a decided advantage in the production of many crops. Tidal marsh and swamp land occupy large areas throughout the Coastal Flatwood Area and contain many soils that are not classified.

SECTION 3. THE LAND AND WATER RESOURCE BASE

The total land resource base is divided into two broad classes; (1) land in farms, and (2) land not in farms. Detailed use of land in farms was derived from Censuses of Agriculture. Land use of the area not in farms was derived from information presented in the 1958 Conservation Needs Inventory. Major land use data for the basin for 1959 and projected to 1980 and 2015 are presented in Table 45.

The primary factors affecting future agricultural production are the availability and quality of land. In some areas, the demand for nonagricultural purposes has caused a shift in use of land resources. A number of forces are working to reduce the land resource base available for agricultural use. Land is currently being withdrawn from

use for urban and industrial uses and for related developments required to support the expanding economy and the related increase in population. Highway development, airport construction, and recreational demand on the land base are notable examples. Reservoirs and other types of water-resource developments also require land.

Table 45

Major land use, Pascagoula River Basin study area
1959 and projected to 1980 and 2015

Land	1959	Projected	
		1980	2015
	Acres	Acres	Acres
In farms	2,552,482	2,571,000	2,245,000
Other than in farms	3,770,818	3,752,300	4,078,300
Forest[1]	3,461,918	3,310,900	3,291,500
Federal[2]	40,100	70,100	102,100
Urban	231,600	310,100	593,500
Water	37,200	61,200	91,200
Total approximate area	6,323,300	6,323,300	6,323,300

[1] Includes National Forest land.
[2] Does not include National Forest.

The demand made on the basin's land for nonagricultural purposes is not as great as the demand that exists in some other areas of the United States. The Coastal subarea probably will experience a greater demand for nonagricultural land in the future due to the expected population growth. Although the agricultural resource base will not undergo any great reduction by 1980, a relatively small decline will occur by 2015. The decline is not considered significant since within the farmland base there exists room for flexibility in uses.

SECTION 4. SUPPLIES AND USES OF FARMLAND

Land in farms changed but little during the period 1944-59. The projected trend of total land in farms indicates little change by 1980 and only a small reduction by the year 2015.

Land in farms is classified according to the way in which it is used. The four major categories of use are cropland, woodland, pasture and other land. Major land use data for each subarea and the basin are presented in Table 46.

Table 46

Land in farms according to major use,
Pascagoula River Basin study area
1954, 1959 and projected to 1980 and 2015

Subarea	1954	1959	Projected 1980	Projected 2015
	Acres	Acres	Acres	Acres
Chickasawhay	1,222,444	1,034,227	1,043,300	908,600
Cropland, total	255,929	221,687	190,700	155,000
Harvested	174,795	121,291	86,200	65,000
Used for pasture	41,459	56,226	68,800	64,800
Idle	39,675	44,170	35,700	25,200
Woodland, total	781,591	647,826	684,800	594,900
Pasture land	160,176	144,125	152,500	147,200
Other land	24,748	20,589	15,300	11,500
Leaf	1,386,318	1,213,647	1,214,600	1,066,000
Cropland, total	405,597	337,807	312,100	270,700
Harvested	250,175	170,041	123,800	103,000
Used for pasture	106,835	117,651	147,900	139,200
Idle	48,587	50,115	40,400	28,500
Woodland, total	789,973	678,751	720,000	625,500
Pasture land	155,588	162,757	152,500	147,300
Other land	35,160	34,332	30,000	22,500
Coastal	356,743	304,608	313,100	270,400
Cropland, total	107,308	89,306	87,200	74,300
Harvested	60,349	48,177	40,000	32,000
Used for pasture	31,221	29,416	38,300	36,000
Idle	15,738	11,713	8,900	6,300
Woodland, total	215,348	184,664	195,200	169,600
Pasture land	20,520	17,815	16,000	15,500
Other land	13,567	12,823	14,700	11,000
Basin	2,965,505	2,552,482	2,571,000	2,245,000
Cropland, total	768,834	648,800	590,000	500,000
Harvested	485,319	339,509	250,000	200,000
Used for pasture	179,515	203,293	255,000	240,000
Idle	104,000	105,998	85,000	60,000
Woodland, total	1,786,912	1,511,241	1,600,000	1,390,000
Pasture land	336,284	324,697	321,000	310,000
Other land	73,475	67,744	60,000	45,000

The amount of cropland harvested has been declining for the past two decades and this decline is expected to continue throughout the projection period. An increasing amount of the cropland being taken out of production is being pastured. Cropland used for this purpose will peak in the 1980's and remain fairly stable from that point to the year 2015.

Farm woodland acreage has fluctuated within rather narrow limits. A slight increase is expected to 1980 and then a gradual decline to the year 2015.

Permanent pasture land has increased gradually during the past 20 years but has now become stabilized and little change is expected by 2015. Better management of the land in the planting of improved grasses and legumes, fertilization, rotation grazing, mowing and the like, will result in increased carrying capacities to help sustain the expected increase in livestock production.

SECTION 5. STRUCTURE OF LAND IN FARMS AND FARM PEOPLE

In recent decades the Pascagoula River Basin study area has been subject to many of the same forces that have been at work in other agricultural areas of the United States and has shown many of the same basic trends. Farms have become fewer in number and larger in size. The acreage of cropland harvested declined almost 50 percent since 1944. Young people, and nonwhites especially, have been leaving the farms and rural areas. New industries have increased employment and have stimulated related growth in trades and services. Some counties in the study area have gained population and are reaping the cumulative effects of trends toward more intensive use of labor and capital in urban and industrial pursuits. Other counties have lost population as they shifted to less intensive use of land resources such as grazing and forestry.

Population trends in the study area have been toward an increase in rural nonfarm and urban residents and a decline in farm residents even though the area is predominantly agricultural. The total number of rural residents reached a peak in 1940 and has declined since that time. A reversal of this decline is indicated between 1965 and 1980. Approximately 28 percent of total population will reside in rural areas by 2015.

Number of farms. The total number of farms in the study area changed only slightly during the period 1939-54. The major reduction came between 1954 and 1959. The change in definition of a farm eliminated approximately five percent of those farms reported in 1954. There were an estimated 21,303 farms in 1959.

Striking changes have occurred in the kinds and sizes of the farm units. As a result of technological developments, mechanization and other developments, full time farms are getting larger and fewer.

The decline in farm numbers is expected to continue with 12,200 projected for 1980 and 8,500 in 2015 (Table 47).

Table 47

Number of farms, by subareas, Pascagoula River Basin study area 1939-59, and projected to 1980 and 2015

Subarea	1939	1949	1954	1959	Projected 1980	Projected 2015
	Number	Number	Number	Number	Number	Number
Chickasawhay	11,937	11,706	10,719	7,332	4,100	2,700
Leaf	16,589	16,275	15,179	10,914	6,100	4,300
Coastal	3,271	4,012	4,188	3,057	2,000	1,500
Basin	31,797	31,993	30,086	21,303	12,200	8,500

Consolidation of small farm units into larger operating units has been an important factor contributing to the net decrease in farm numbers. Mechanization of farming has made it possible for farm operators to handle increasingly larger acreages with the same labor. The full and efficient utilization of modern farm machinery and equipment favors larger farm units.

Farmers and farm families have been leaving the farm in large numbers. Some of the loss may be attributed to the disappearance of share-tenants and cropper farms with the land absorbed into larger operating units.

In certain areas, the growth of cities, suburban developments, factory sites, new highways, space and defense installations and the like, have contributed to the elimination of some farms. Still other operators have accepted employment at nonfarm jobs and are classified as part-time farmers. Farms of this type contribute a negligible proportion of total agricultural production.

Average size of farms. The production of agricultural products is primarily from units called farms, including ranches. There are many types, classes and sizes of farms. The acres of land in a farm do not always indicate its importance in terms of value of products produced.

Most of the increase in average size of farm has come from the reduction in farm numbers. Thus the average size in the basin has been upward during the past several decades in conformity with the trends in surrounding states and the United States.

Size of farms in the Pascagoula River Basin closely approximates that in other parts of the State of Mississippi with the exception of the Mississippi River Delta area. A historical and projected presentation of farm size for each subarea is presented in Table 48.

Table 48

Average size of farms, Pascagoula River Basin study area 1944-59 and projected to 1980 and 2015

Subarea	1944	1949	1954	1959	Projected 1980	Projected 2015
	Acres	Acres	Acres	Acres	Acres	Acres
Chickasawhay	89	105	119	147	250	340
Leaf	85	86	93	113	200	250
Coastal	69	83	88	105	160	180
Basin	81	91	100	121	210	260

Farms by tenure and color of operator. Owner-operators are the dominant tenure group in the basin followed by part owners, tenants and managers (Table 49). Prior to 1959, the tenant group was second only to full owners. Tenant farms have been most heavily concentrated in the cotton-producing areas of the basin. This was due in part to a large number of sharecropper farms associated with the production of cotton. As the production of cotton became more mechanized and less labor intensive and as emphasis shifted to livestock and forestry production, farms grew in size and decreased in number.

Tenancy in the Chickasawhay and Leaf subareas approached 40 percent in 1939 but by 1959 the proportion declined to approximately 10 percent. Additional reductions are expected in areas relying heavily on cotton as the main source of farm income.

The Coastal subarea has a relatively low proportion of tenants. The proportion declined from 16 percent in 1939 to three percent in 1959. This was well below the national average of 20 percent.

Tenancy in the South traditionally has been high among nonwhites. Large numbers of both white and nonwhite farm operators have left the farm. However, the exodus of nonwhite farm operators has been proportionally greater than that of white operators (Table 50).

Part owners in the basin have not become a dominant tenure group. Part ownership is regarded as a means by which a tenant with limited capital can increase his security of tenure and begin to acquire some equity in the land he operates. In the Chickasawhay and Leaf subareas

Table 49

Number of farms by tenure of operator, by subarea, Pascagoula River Basin study area, 1939, 1949, 1954 and 1959

Subarea	Full owners	Part owners	Managers	Tenants	Proportion of tenancy
	Number	Number	Number	Number	Percent
Chickasawhay					
1939	6,613	629	14	4,681	39.2
1949	7,800	1,085	9	2,812	24.0
1954	7,303	1,455	17	1,944	18.1
1959	5,561	989	11	771	10.5
Leaf					
1939	9,607	653	26	6,303	38.0
1949	11,554	1,154	29	3,538	21.7
1954	10,751	1,775	39	2,614	17.2
1959	8,553	1,177	59	1,125	10.3
Coastal					
1939	2,631	106	27	507	15.5
1949	3,598	171	16	227	5.7
1954	3,770	200	13	205	4.9
1959	2,715	227	15	100	3.3
Basin					
1939	18,851	1,388	67	11,491	36.1
1949	22,952	2,410	54	6,577	20.6
1954	21,824	3,430	69	4,763	15.8
1959	16,829	2,393	85	1,996	9.4

Source: United States Census of Agriculture, 1939, 1949, 1954 and 1959.

Table 50

Farm operators, by color, by subarea, Pascagoula River Basin study area, 1939, 1949, 1954 and 1959

Subarea and color	1939	1949	1954	1959
	Number	Number	Number	Number
Chickasawhay	11,937	11,706	10,719	7,332
White	7,852	8,001	7,624	5,400
Nonwhite	4,085	3,705	3,095	1,932
Leaf	16,589	16,275	15,179	10,914
White	12,518	12,717	11,997	8,831
Nonwhite	4,071	3,558	3,182	2,083
Coastal	3,271	4,012	4,188	3,057
White	3,025	3,734	3,909	2,900
Nonwhite	246	278	279	157
Basin	31,797	31,993	30,086	21,303
White	23,395	24,452	23,530	17,131
Nonwhite	8,402	7,541	6,556	4,172

an upward trend was apparent between 1939 and 1954 but between 1954 and 1959 the peak was reached and a decline is evident. In the Coastal subarea part-owners increased from 106 in 1939 to 227 in 1959.

Manager-operated farms in the Pascagoula River Basin study area are few in number. Only 85 existed in 1959 and even fewer in previous census years.

Type of farms. The type of agricultural production that develops in a particular basin is influenced by such physical factors as rainfall, availability of irrigation water, temperature, soil and topography. Economic factors such as population migration, transportation facilities, consumer preferences for commodities, and costs of production also influence types of farming. Changes in these factors, physical or economic, help to explain changes over time in the type of agricultural production in particular areas.

The value of sales of farm products provides a common denominator for relating the importance of enterprises on farms, since it generally reflects their physical resources and productivity. This information provides the basis for an analysis of the organization, resources used, income, and characteristics of the operator for farms on which each of the principal farm products are produced.

The classification of farms by type is made on the basis of the relationship of the value of sales from one source, or a number of sources, to the total value of sales of all farm products sold from the farm. The number and types of farms in the basin are shown in Table 51.

Table 51

Type of farms, Pascagoula River Basin study area, 1949-59 and projected to 1980 and 2015

Type of farm	1949	1954	1959	Projected 1980	Projected 2015
	Number	Number	Number	Number	Number
Cotton	5,995	7,455	1,660	800	500
Cash grain	154	158	231	200	100
Other field crops	125	66	100	[1]	[1]
Vegetable	156	105	70	100	100
Fruit and nut	111	87	60	[1]	[1]
Poultry	562	622	840	600	500
Dairy	710	775	571	300	300
Other livestock	2,026	1,804	2,465	1,600	1,100
General	1,990	880	512	300	200
Miscellaneous and unclassified	20,164	18,134	14,794	8,300	5,700
All types	31,993	30,086	21,303	12,200	8,500

[1] Less than 50.

Miscellaneous and unclassified farms have historically outnumbered all other types in the basin. Farms of this type include those with 50 percent or more of total sales from: (a) forestry products, (b) nursery and greenhouse products, or (c) horses, mules, colts and ponies. In general these farms are not considered commercial farms as the value of sales per farm was less than $2,500.

In 1949 there were 20,164 miscellaneous farms, declining to 18,134 in 1954 and 14,794 in 1959. Thus, between 1949 and 1959, there occurred an absolute reduction of 5,370 farms or 27 percent. The total of all farms declined approximately 33 percent, therefore a substantial part was accounted for by those classified miscellaneous.

Livestock farms other than dairy and poultry ranked second in 1959 and were of lesser importance in previous years. The 1959 definition included those farms with 50 percent or more of total value of all farm products sold from cattle, calves, hogs, sheep, goats and wool. Beef production is the principal livestock product produced. Isolated instances of hog and sheep enterprises being important are found in the basin.

Cotton type farms are those with sales of cotton, lint and seed, accounting for fifty percent or more of total sales. These farms ranked third in importance in 1959 but in prior years they were second in importance to the noncommercial miscellaneous group. Historically, they have represented a type of farming that existed in the South for many years.

In 1949 there were 5,995 farms of the cotton type, increasing to 7,455 in 1954 and declining to only 1,660 in 1959. It is unlikely that the number of cotton farms will ever again achieve the prominence of earlier years. This does not rule out the concentration of cotton acreage in the hands of fewer operators or that production may be sustained on fewer acres, assuming a cotton policy not greatly altered from that existing during the early 1960's.

Poultry farms include those with 50 percent or more of their total sales from chickens, chicken eggs, turkeys, and other poultry products. This type of farm ranked fourth in 1959 and sixth in 1954 and 1949. The increasing importance of poultry farms came about at the expense of general and other type farms. The transition or shift from cotton to poultry production is not necessarily easy for those farmers seeking enterprises to sustain a livelihood. Poultry production requires relatively large amounts of capital in relation to the quantity of land. The transition difficulty was minimized by contract operations between farm operators and firms supplying feed and other necessary factors of production.

The criterion of 50 percent of total sales was modified in the case of dairy farms. A farm having value of sales of dairy products

amounting to less than fifty percent of the total value of farm products sold was classified as a dairy farm if (a) milk and cream sold accounted for more than 30 percent of the total value of products sold, (b) milk cows represented 50 percent or more of total cows, and (c) the value of milk and cream sold, plus the value of cattle and calves sold, amounted to 50 percent or more of the total value of all farm products sold.

In 1949 there were 710 dairy farms, 775 in 1954 and 571 in 1959. There are substantiating data from more recent sources that indicate that the number of dairy farms has declined still further. However, total milk production is little changed due to increased size of herds and increased output per cow. Dairy farms require large capital outlays in the form of buildings and equipment and as a result have little appeal to those basin farmers desiring a change or intensification of enterprises.

General farms include those with 50 percent of value of sales from field, seed crops, hay and silage. A farm was classified as general also if it had cash income from three or more sources and did not meet the criteria for any other type. General farms in the basin declined 74 percent between 1949 and 1959. Only 512 farms of this type existed in 1959. The category is regarded as a "catch-all" for farms that cannot be classified in any other group. There are wide differences in the kinds of crops as well as in the kinds of livestock contributing to the cash income on general farms.

Cash grain farms include those with 50 percent of value of sales from corn, sorghums, small grains, soybeans for beans, cowpeas for peas, dry field and seed beans and peas. Farms of this type numbered 154 in 1949 and 231 in 1959.

Other field crop farms numbered 100 in 1959. This type includes those that have 50 percent of value of total sales accounted for by peanuts, Irish potatoes, sweet potatoes, sugar cane for sugar or syrup, sweet sorghums for syrup, broomcorn, popcorn and other minor crop sales.

Vegetable farms include both vegetables and melons. Farms of this type have never made up a significant part of the total. Only 70 farms were so classified in 1959.

Fruit and nut farms include those with 50 percent of value of sales from berries, other small fruit, tree fruits, grapes and nuts. Farms of this type are of minor importance in the basin and only 60 were reported in 1959. Fruit and nut farms are a group of specialty farms that require a large amount of close supervision. In addition, a relatively long waiting period is involved between tree planting and the first harvest. For these economic considerations, fruit and nut farms are not well adapted to tenant operations of the nature that exists in the basin.

Economic class of farms. There were 21,303 farms in the basin in 1959. Of these, commercial farms numbered 9,379; part-time 7,973; part retirement 3,944; and abnormal 7 (Table 52). The separation of commercial farms from the latter kinds defines two distinct sectors within agriculture with vast differences in economic interest and environment. The data for farms grouped by economic classes supplement those for other classifications which were made on the basis of size, tenure and type of farm.

Table 52

Projected number of farms by economic class,
Pascagoula River Basin study area,
1959 and projected to 1980 and 2015

Economic class	1959	Projected	
		1980	2015
	Number	Number	Number
Commercial	9,379	6,300	5,100
Class I[1]	124	200	200
Class II[2]	323	300	400
Class III[3]	535	400	400
Class IV[4]	991	900	1,100
Class V[5]	4,325	2,700	1,700
Class VI[6]	3,081	1,800	1,300
Part-time	7,973	4,200	2,600
Part-retirement	3,944	1,700	800
Abnormal	7	0	0
Total	21,303	12,200	8,500

[1]Sales of $40,000 and over.
[2]Sales of $20,000 to $39,999.
[3]Sales of $10,000 to $19,999.
[4]Sales of $5,000 to $9,999.
[5]Sales of $2,500 to $4,999.
[6]Sales of $50 to $2,499.

Farms, other than commercial, account for a relatively small volume of total farm output in the basin. Thirty-seven percent of basin farms were classified as part-time in 1959. In the Coastal subarea part-time farms exceeded all other economic classes. The combining of farm and nonfarm work into a dual income earning capacity has become a widespread practice. The incidence of part-time farming is high in the South and in the basin. The growth of industry, trade, and service, along with the improvement of roads in rural areas and the increase in automobile ownership has made it possible for farm people to live on farms and commute to jobs in town. Likewise, the

low incomes resulting from the existence of farms with small or limited resources of land, equipment, and capital have provided incentives for farm families to supplement their income through off-farm work. By definition, a part-time farm is one having value of sales of farm products of $50 to $2,499 and an operator under 65 years of age who either worked off the farm 100 or more days or he and members of his household received income from nonfarm sources greater than the total value of farm products sold.

There were 3,944 part-retirement farms in the basin in 1959. These farms have product sales of $50 to $2,499 and operators 65 years old and over. Many of these are farms on which the operator's income from nonfarm sources was greater than the value of sales of agricultural products. Prior to 1959, the age of the farm operator was not a criterion for grouping farms by economic class. Since the number of elderly people in our population has been steadily increasing in recent decades, a separate classification for farms operated on a part-retirement basis is considered important for an adequate analysis of the agricultural structure of a study area. In terms of total resources used and agricultural production, part-retirement farms are relatively unimportant. Normally the scale of operation is not large and a majority of operators are full owners or part owners of the farm they operate. Cattle and calves account for the largest share of total value of farm products sold from part-retirement farms.

Abnormal farms include Indian reservations and institutional farms. Institutional farms include those operated by hospitals, penitentiaries, schools, grazing associations, government agencies, etc. Seven basin farms were so classified in 1959.

Commercial farms are divided into six classes on the basis of the value of farm products sold in 1959. The variations in the size of operations for farms comprising these six classes are very great. The farms varied in value of farm products sold from $50 to $40,000 or more. There are also great differences in the contribution of the various economic classes of farms to total agricultural production. The economic classes were established on the basis of one or more factors: (1) total value of all farm products sold, (2) number of days the farm operator worked off the farm, (3) the age of the farm operator, and (4) the relationship of income received by the operator and members of his household from nonfarm sources to the value of all farm products sold.

A comparison of basin commercial farms to those in Mississippi and the United States revealed that slightly more than 3.0 percent of total commercial farms in Mississippi had sales of $40,000 or more in 1959 (Class I). Only 2.7 percent in the Nation and 1.3 percent in the basin were listed as Class I. The greatest disparity occurs at the opposite end of the scale. Basinwide, 33 percent of all commercial farms are classified as Class VI compared to 45 percent for Mississippi and 8 percent for the United States.

Class V and VI farms account for 46 percent and 33 percent, respectively, of total commercial farms in the basin. Thus, many basin farmers are in an economically distressed situation.

Cultural and social values are related to farm operator income levels and are, therefore affected adversely by low income. Housing, diet, education of children, home conveniences and all other indexes of Standards of living depend in part on family income, as does the development of such community facilities as churches, schools, and roads.

Mechanization. There are many concepts and probably little concensus as to what type of index is the best indicator of the extent of mechanization. An index of tractors and farm implements is deemed satisfactory by some, while others feel that measures of labor efficiency are more realistic. Despite the differences, agricultural mechanization is related to the substitution on farms of mechanical sources of power for animal sources with a resultant decrease in man-labor inputs in the production process.

Data are available from the Census of Agriculture pertaining to various types of farm facilities and equipment. These data were summed to facilitate a comparison of mechanization in the basin to that in Mississippi and the United States (Table 53).

Table 53

Proportion of farms reporting specified facilities and equipment, Pascagoula River Basin study area, Mississippi and United States, 1959

Item	Basin	Mississippi	United States
	Percent	Percent	Percent
Grain combines	1.4	4.4	26.3
Corn pickers	1.8	2.5	20.7
Pickup balers	2.8	4.2	18.1
Field forage harvesters	0.7	1.4	7.4
Motor trucks	51.7	44.5	58.7
Tractors	40.0	38.1	72.3
Telephones	35.2	26.7	65.0
Home freezers	57.6	42.6	55.8
Milking machines	3.4	4.2	18.0
Electric milk coolers	3.1	3.6	11.6
Crop driers	0.2	0.4	1.4
Power operated elevators or conveyors	1.4	1.9	25.0
Automobiles	56.6	52.7	79.7

Both Mississippi and the basin, in general, have lagged behind other areas in the United States in the mechanization of farms. Farm labor in the basin in the past was inexpensive and lacking in the

technical skills necessary for farm mechanization. Consequently, farm mechanization had difficulty gaining a foothold. However, the current movement of farm wage hands to higher paying industrial jobs has increased the demand for mechanical power.

Many small farms are still operated largely with workstock. The principal reasons are: (1) investment capital and the means of obtaining investment capital are limited, (2) workstock can be used very cheaply, so there is a question as to whether mechanical power is more economical, and (3) problems resulting from topography, field size, soil types, and mechanical inexperience of farmers are barriers to operational adaptation.

Replacing farm labor with machinery will be a major change in the basin in years to come. The decision making process for the individual farmer will become increasingly complex because of continuous engineering advances in farm machinery and equipment. Factors to be considered include size, make, and the number of accessories desired or needed. The benefits of shorter working days, added comfort and timeliness of operations which can be acquired with relatively larger and more expensive machinery and equipment must be compared with the added cost of operating and owning specific types of machinery and equipment.

Irrigation. The use of supplemental irrigation as a production practice is limited. In 1954 only 54 basin farms reported irrigating on a total of 1,396 acres. By 1959 this had declined to 26 farms and 968 acres.

The intensity and frequency of droughts are sufficient to offer possibilities for irrigation of some crops. The extent to which application of irrigation practices is economical varies from year to year because of variations in rainfall. Cost of irrigation over the long run must include fixed costs on investments, as well as operating costs; the prospective buyer of an irrigation system must consider the total cost over a period of years rather than for one season only. Those operators who already own an irrigation system can operate profitably in any one year so long as added returns more than cover variable costs.

Irrigation of crops in the basin is not now and will not in the immediate future be a widespread production practice.

SECTION 6. FARM PRODUCTION

Crops. Corn, hay, cotton, oats and soybeans are the principal crops in the basin. These five crops accounted for 85 percent of total cropland harvested in 1959.

Corn is the most widely grown crop in the basin. Sixty-nine percent of the basin farms report some corn acreage. Of those farmers growing corn, 63 percent harvested less than 11 acres. About 3 percent of the farmers reported corn acreage of 50 acres or more. Basin farmers have traditionally used corn production to round out their farm business. In many instances farmers have utilized for corn production land and labor left over from other cash crops.

Cotton is produced on 25 percent of the basin farms but with limited acreage per farm. Basinwide, approximately three-fourths of those farms reporting the production of cotton harvested under 10 acres. Another 21 percent harvested 10 to 24 acres. Few farms have more than 25 acres of cotton.

Oats for grain and grazing are grown on relatively few farms. Approximately half of the farms producing oats harvest less than 10 acres.

Soybeans are currently a minor enterprise in the basin. Most of the farmers producing soybeans harvest less than 10 acres. There are isolated instances of a few farmers harvesting in excess of 100 acres. Acreage and production are expected to increase in future years.

The principal hay crops are small grain, lespedeza, clover and timothy, soybeans, alfalfa and miscellaneous hays. The range in size of hay enterprises per farm is 10 to 15 acres.

Numerous other crops are produced in the basin but are insignificant in terms of acreage and production. Acreage, production and yield data for the principal crops are presented in Table 54.

Livestock. Livestock and poultry are an integral part of the agricultural resources in the basin. Considerable area is used for pasture or grazing of livestock. In addition, a sizable acreage of cropland is used to grow feed for animals. Present and projected livestock numbers and production of livestock and poultry products are presented in Table 55.

A number of farmers in the basin have made a complete change from row crops to the production of livestock and livestock products. Others have combined the production of livestock with row crops.

The importance of livestock in the economy of the basin is evidenced by the proportionate increase in total farm marketing receipts from livestock. The dollar share increased from 41 percent in 1939 to 79 percent in 1959. Further increases are expected as a result of a continued high demand for livestock and poultry products.

The shift in enterprises from crops to livestock came as a result of a decline in the farm labor supply and better adaption of

Table 54

Acreage, production, and yield per acre of crops harvested, Pascagoula River Basin study area, 1959 and projected 1980 and 2015

(ACREAGE)

Crop	1959	Projected 1980	Projected 2015
	Acres	Acres	Acres
Cotton	41,631	20,000	25,000
Corn	171,435	95,000	48,000
Oats	8,239	10,000	6,000
Soybeans	2,749	8,000	9,000
Hay	62,711	80,000	76,000
Fruits, nuts, vegetables, and other field crops	52,744	37,000	36,000
Total	339,509	250,000	200,000

(PRODUCTION)

Crop	Unit	1959	Projected 1980	Projected 2015
Cotton	Bales[1]	29,298	20,000	34,000
Corn	Bushels	5,129,308	4,750,000	3,000,000
Oats	Bushels	244,052	420,000	300,000
Soybeans	Bushels	58,376	200,000	281,000
Hay	Tons	69,300	104,000	190,000

(YIELD)

Crop	Unit	1959	Projected 1980	Projected 2015
Cotton	Lbs. lint	352	500	680
Corn	Bushels	30	50	63
Oats	Bushels	30	42	50
Soybeans	Bushels	21	25	31
Hay	Tons	1.1	1.3	2.5

[1] Bale - 500 lbs. lint cotton.

Table 55

Livestock numbers and production of products, Pascagoula River Basin study area, 1959 and projected to 1980 and 2015

(NUMBERS)

Type livestock	1959	Projected 1980	Projected 2015
	Number	Number	Number
Cattle and calves	300,955	393,100	515,800
Sheep and lambs	15,799	7,600	12,000
Hogs and pigs	135,259	64,400	53,300
Horses and mules	16,622	7,200	5,400
Farm chickens[1]	1,407,469	2,800,000	2,984,500
Broilers[2]	30,217,244	69,617,100	123,840,500
Turkeys	15,509	22,500	35,200

(PRODUCTION)

Item	Unit	1959	Projected 1980	Projected 2015
Beef and veal	Thousand lbs.	75,239	125,800	178,000
Lamb and mutton	Thousand lbs.	452	300	500
Pork	Thousand lbs.	35,032	17,400	16,000
Broilers	Thousand lbs.	93,673	243,700	433,400
Turkeys	Thousand lbs.	256	400	700
Eggs	Thousands	233,640	509,600	814,800
Milk	Thousand lbs.	124,118	158,400	229,900

[1] Excludes broilers.
[2] Number sold per year.

land resources in order to obtain better use of resources on the farm. Enterprises with relatively small labor requirements are being substituted for those requiring more labor. Relatively low labor requirements and reasonable prices have made the production of certain livestock products attractive to many farmers facing an adjustment in their system of farming.

SECTION 7. FARM INCOME

Realized gross farm income is that received in cash and non-monetary allowances. It consists of four major components – farm marketings, home consumption of farm produced products, rental value of farm dwellings, and government transfer payments.

Farm marketings in the basin totaled $60,682,000 in 1959 and are the main source of farm income. Income from marketings is comprised of the quantity of production marketed times the price per unit received. Livestock and livestock products currently account for 79 percent of marketing receipts and crops 21 percent. Broilers and eggs are the most important source of livestock receipts, while cotton and farm forestry products are the most important source of crop receipts.

Income from sources other than product marketings contribute about 15 percent toward total gross income. In 1959, gross income minus production expenses yielded a farm proprietors' income of approximately 30 million dollars. Production expenses referred to above include only those cash outlays for production items. Derived net income per farm amounted to $1,414, about $500 less than the average for the State of Mississippi. Derived per capita farm income in 1959 was $516 and was less than half that for all segments of the population. Farm income data for the basin are presented in Table 56.

Table 56

Gross income, production expense and net income, Pascagoula River Basin study area, 1959 and projected to 1980 and 2015

Item	Unit	1959	Projected 1980	Projected 2015
		Dollars	Dollars	Dollars
Receipts				
Farm marketings	Thousands	60,682	124,078	194,042
Other[1]	Thousands	11,046	16,920	21,560
Total gross income[2]	Thousands	71,728	140,998	215,602
Total production expense	Thousands	41,602	77,549	118,581
Net income[2]	Thousands	30,126	63,449	97,021
Net income per farm[2]	Dollars	1,414	5,201	11,414
Per capita farm income	Dollars	516	2,073	4,218

[1] Includes value of home consumption of farm products, value of farm dwellings and government transfer payments.
[2] Excludes changes in inventories.

In an economy marked by steadily increasing levels of living, there exists a problem of low income among farm families. Low incomes are a chronic problem among operator families on many farms. Although many farms have disappeared since 1954, a sufficiently large number still exists to reduce the share of farm income per person. By 2015

the economic environment should be such that more of the smaller farms will be absorbed by larger farm units, other operators will seek nonfarm jobs, and still others will farm on a part-time basis resulting in a farm income per person slightly larger than for all segments of the population.

Many farm operators currently work off-farm to supplement their farm income. They work at odd or spare-time jobs and some have regular nonfarm jobs and use the farm to either supplement their regular income or as a rural residence. Some farm operators use their nonfarm income as a source of capital for expanding their farming operations.

The families of farm operators are active in jobs off-farm. Sixty-four percent reported in 1959 that family income from off-farm sources exceeded the value of agricultural products sold. The shift in farm enterprises from those of high labor use to low labor use coupled with the desire for better living standards has released farm labor seeking other employment opportunities.

SECTION 8. FORESTRY

Area. The area occupied by forests in the basin is greater than the combined acreage devoted to all other land uses. Forest acreage accounts for almost 5 million acres out of a total of 6.3 million acres in the study area. Eighty-four percent of the commercial forest land is under private ownership – farm, forest industry and other (Table 57). Thirty percent of the forest area is in the farmland sector and 70 percent is in other types of ownership (Table 58). Large timber holdings are held by some of the basic wood-using industries such as lumber and pulp companies.

The trend toward conversion of farmlands to forests has tended to offset the effects of localized land clearing. Basinwide, the net result of shifting land use is that the 1980 forest acreage will be only one percent lower than the present acreage and by 2015 the forest acreage will decline six percent. The forest acres in the Chickasawhay and Leaf subareas will remain fairly constant but the Coastal subarea will register a decrease of about 15 percent due to an increasing demand for urban and built-up areas during the projected period.

The softwood forest types, which include longleaf-slash pine, loblolly-shortlead pine, and oak-pine, cover 76 percent of the commercial forest land. Most of the type is longleaf-slash pine and loblolly-shortleaf pine. Twenty-four percent of the commercial forest area is stocked with hardwood types which include oak-hickory, elm-ash-cottonwood, and oak-gum-cypress. The stand size for both hardwood and softwood types is mostly pole timber and seedlings and saplings (Table 59).

Table 57

Commercial forest land by ownership class
Pascagoula River Basin study area, 1957

Subarea	All ownerships	Public					Private			
		Total	National Forest	Other Federal	State	County & municipal	Total	Farm	Forest industry	Other
	Thou. acres	Thou. acres	Thou. acres	Thou. acres	Thou. acres	Thou. acres	Thou. acres	Thou. acres	Thou. acres	Thou. acres
Chickasawhay	1,713.5	176.5	125.1	3.9	2.2	45.3	1,537.0	512.9	393.3	630.8
Leaf	1,782.0	370.5	322.4	0.4	---	47.7	1,411.5	548.4	263.3	599.8
Coastal	1,164.3	203.4	127.8	1.7	22.3	51.6	960.9	151.3	222.8	586.8
Total	4,659.8	750.4	575.3	6.0	24.5	144.6	3,909.4	1,212.6	879.4	1,817.4

Table 58

Forest land by subarea and class
Pascagoula River Basin study area
1957, 1959, and projected to 1980 and 2015

Subarea and class	1957	1959	Projected	
			1980	2015
	Acres	Acres	Acres	Acres
Chickasawhay	1,713,500	1,840,070	1,854,300	1,841,600
Farm	512,900	647,826	684,800	594,900
Nonfarm	1,200,600	1,192,244	1,169,500	1,246,700
Leaf	1,782,000	1,889,799	1,870,900	1,850,200
Farm	548,400	678,751	720,000	625,500
Nonfarm	1,233,600	1,211,048	1,150,900	1,224,700
Coastal	1,164,300	1,243,290	1,185,700	989,700
Farm	151,300	184,664	195,200	169,600
Nonfarm	1,013,000	1,058,626	990,500	820,100
Basin	4,659,800	4,973,159	4,910,900	4,681,500
Farm	1,212,600	1,511,241	1,600,000	1,390,000
Nonfarm	3,447,200	3,461,918	3,310,900	3,291,500

Table 59

Commercial forest land by forest types and stand size class
Pascagoula River Basin study area, 1957

Forest type	All stand sizes	Large saw-timber	Small saw-timber	Pole timber	Seedlings and saplings	Non-stocked and other areas
	Thou. acres	Thou. acres	Thou. acres	Thou. acres	Thou. acres	Thou. acres
Softwood types:						
Longleaf-slash pine	1,563.8	31.6	268.8	496.3	488.0	279.1
Loblolly-shortleaf pine	1,398.2	139.6	340.4	481.6	422.3	14.3
Oak-pine	596.6	37.3	78.9	271.8	199.9	8.7
Total	3,558.6	208.5	688.1	1,249.7	1,110.2	302.1
Hardwood types:						
Oak-hickory	527.3	25.1	44.9	247.0	163.2	47.1
Elm-ash-cottonwood	25.9	---	5.5	16.2	3.3	0.9
Oak-gum-cypress	548.0	73.6	95.1	270.6	107.6	1.1
Total	1,101.2	98.7	145.5	533.8	274.1	49.1
All types	4,659.8	307.2	833.6	1,783.5	1,384.3	351.2

There is light to moderate grazing damage on 26 percent of the upland forests. Skid trails and over-cutting, exposing the humus and litter to the weather, account for damage to 14 percent of the area. Thirteen percent of the present woodland was formerly cultivated and reverted to woods through natural regeneration. Good timber management was found on 32 percent of the upland forest; however, most was on industry land. A few of the large private landowners are seeing the advantages in taking proper care of their forests.

Volume and value. The basin's wood supply is derived from trees that are harvested from commercial forest land. In 1956, these trees contained 2.1 billion cubic feet of wood classified as forest growing stock. The volume does not include that of cull trees, salvable dead trees, and hardwood limbs.

The forest growing stock is the significant portion of the timber resource. Fifty-eight percent of it is in sawtimber trees; the other 42 percent is in poletimber trees and smaller trees that may become sawtimber trees in the future. The volume for growing stock is 460 cubic feet per acre.

The total net volume of sawtimber on commercial forest lands is 7.4 billion board feet, measured by the International one-fourth inch log rule. Softwood species account for 72 percent of the total sawtimber volume and hardwood species 28 percent. The inventory volume amounted to 1,600 board feet per acre.

Table 60 gives the volume of growing stock and sawtimber for the various forest land owners. About 80 percent of the growing stock and sawtimber volume is in private ownership.

The growing stock is projected at 5.8 billion cubic feet in 1980 and sawtimber 18.3 billion board feet. The growing stock and sawtimber inventory will decline by 2015 but will be 74 and 85 percent greater than the 1956 inventory, respectively. Softwoods are the major species now and by 2015 their proportionate share will be larger. The increase is expected from pine plantings of open areas, inter and underplantings, stand conversion, release work and better management of the forest land. Hardwood growing stock will register a slight increase by 1980 but by 2015 it is expected to be 11 percent less than in 1956.

The net annual growth for sawtimber in 1956 was 569.9 million board feet of softwood and 128.7 million board feet of hardwood. The combined growth per acre was 150 board feet. Net annual growth for growing stock in 1956 was 138.5 million cubic feet of softwood and 48.9 million cubic feet of hardwood. The growth for all species equals 40 cubic feet or 0.5 cord per acre per year. This is a growth rate of approximately nine percent on the 1956 inventory base. Annual growth of growing stock and sawtimber is expected to increase 12 percent

Table 60

Volume of growing stock and sawtimber on commercial forest land by ownership class and species group, Pascagoula River Basin study area, 1956

Ownership class	Growing stock			Sawtimber		
	Total	Softwoods	Hardwoods	Total	Softwoods	Hardwoods
	Mil.cu.ft.	Mil.cu.ft.	Mil.cu.ft.	Mil.cu.ft.	Mil.cu.ft.	Mil.cu.ft.
Public						
National Forest	342.9	276.1	66.8	1,327.5	1,175.7	151.8
Other Federal	2.5	1.6	0.9	8.6	6.1	2.5
State	12.1	11.4	0.7	39.8	37.1	2.7
County & municipal	65.2	50.9	14.3	212.4	173.2	39.2
Total	422.7	340.0	82.7	1,588.3	1,392.1	196.2
Private						
Farm	538.8	270.7	268.1	1,609.3	1,009.6	599.7
Forest industry	439.0	303.2	135.8	1,665.7	1,316.9	348.8
Other	735.9	407.4	328.5	2,593.4	1,674.6	918.8
Total	1,713.7	981.3	732.4	5,868.4	4,001.1	1,867.3
Grand total	2,136.4	1,321.3	815.1	7,456.7	5,393.2	2,063.5

by 2015. This increase is due to the much larger volume of softwoods and offsets the decline in hardwood species.

The softwood species, in line with inventory and growth, accounts for the largest volume being cut. By 2015, softwoods will account for over 90 percent of the growing stock and sawtimber cut. The 1956 figures show the annual cut of growing stock to be 67 percent of growth and the cutting of sawtimber amounts to 62 percent of growth. Timber inventory, growth and cut of growing stock and sawtimber for current and projected years are presented in Table 61.

A comparison of annual timber cut and net annual timber growth of growing stock shows that growth exceeds the cut through 1980 but between 1980 and 2015 a deficiency of growth will amount to 161 million cubic feet (Table 62). This deficiency occurs in the softwood species. This deficiency in growth may be offset if forest landowners will increase their inventory and growth through intensified timber management; such as (1) conversion, (2) thinnings, (3) stand improvement, and (4) full stocking.

The value of the timber cut was determined by using average stumpage prices for softwoods and hardwoods prevailing in 1956 and 1965, which were:

	Sawtimber per thousand board feet	Pulpwood per cord
1956		
Softwood	$ 31.90	$ 6.00
Hardwood	15.45	2.10
1965		
Softwood	21.75	3.90
Hardwood	14.90	1.90

The projected cut values were calculated using 1965 stumpage prices.

The estimated value of timber cut of growing stock for the basin is presented in Table 63. On the basis of the stumpage prices quoted, the annual timber harvest represents an annual gross income to the forest landowners of about $3.00 per acre in 1956. By 2015, with a much larger cut, this gross income to the landowners increases to $7.60 per acre.

The value of the standing timber for 1956 was approximately 250 million dollars and should increase to 350 million dollars by 2015.

Table 61

Timber inventory, growth, and cut of growing stock and sawtimber, Pascagoula River Basin, 1956 and projected to 1980 and 2015

Year	Inventory			Growth			Cut		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Growing stock								
	Million cubic feet								
1956	2,136.4	1,321.3	815.1	187.4	138.5	48.9	124.9	71.5	53.4
1980	5,836.0	5,009.0	827.0	307.0	277.0	30.0	145.0	123.0	22.0
2015	3,720.0	2,994.0	726.0	220.0	191.0	29.0	381.0	357.0	24.0
	Sawtimber								
	Million board feet								
1956	7,456.7	5,393.2	2,063.5	698.6	569.9	128.7	430.9	243.6	187.3
1980	18,340.0	17,047.0	1,293.0	1,041.0	993.0	48.0	541.0	477.0	64.0
2015	13,830.0	12,858.0	972.0	810.0	764.0	46.0	1,278.0	1,217.0	61.0

Table 62

A comparison of estimated timber cut with net annual timber growth of growing stock on commercial forest land, Pascagoula River Basin, 1956 and projected to 1980 and 2015

Item	1956	1980	2015
	Mil.cu.ft.	Mil.cu.ft.	Mil.cu.ft.
Timber cut			
Softwood	71.5	123.0	357.0
Hardwood	53.4	22.0	24.0
Total	124.9	145.0	381.0
Net annual growth			
Softwood	138.5	277.0	191.0
Hardwood	48.9	30.0	29.0
Total	187.4	307.0	220.0
Net annual growth less timber cut			
Softwood	67.0	154.0	- 166.0
Hardwood	- 4.5	8.0	5.0
Total	62.5	162.0	- 161.0

Table 63

Estimated value of timber cut of growing stock and sawtimber by species group, Pascagoula River Basin study area, 1956 and projected to 1980 and 2015

All products	Growing stock			Sawtimber		
	1956	1980	2015	1956	1980	2015
	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.	Mil. dol.
Softwood	10.3	12.5	34.4	7.8	10.3	26.4
Hardwood	3.6	1.3	1.3	2.9	0.9	0.9
Total	13.9	13.8	35.7	10.7	11.2	27.3

Forest employment and industry. Employment in timber-based manufacturing industries in the basin is presented for two Standard Industrial Classification Groups. The groups are Lumber and Wood Products (SIC 24), Furniture and Fixtures (SIC 25) and Paper and Allied Products (SIC 26). Basin employment in the lumber, wood and furniture groups (SIC 24 and 25) has remained fairly constant except for 1950. By 1980, a slight decrease in employment is expected but by 2015 a small upturn is indicated. Paper and allied products (SIC 26) employment has steadily increased since 1930 and by 2015 will have more than tripled the 1960 employment figure (Table 64).

Besides the employment in the two SIC groups, forestry employment, which includes forest management and timber harvesting, was estimated for 1954, 1958, and projected to 1980 and 2015. Forest management includes all employment involved in protecting and managing forest lands for the production of timber and related products. Timber harvesting is employment involved in harvesting and transporting timber and related products from forests to local points of delivery. Employment data for forest management and timber harvesting are presented in Table 65.

A variety of wood industries are located throughout the study area as shown in Chart 22. They include sawmills, wood preserving mills, veneer plants, wood pulpmills, charcoal, handle stock, shuttleblock, and other miscellaneous mills. The primary wood-using plants and their number are listed in Table 66.

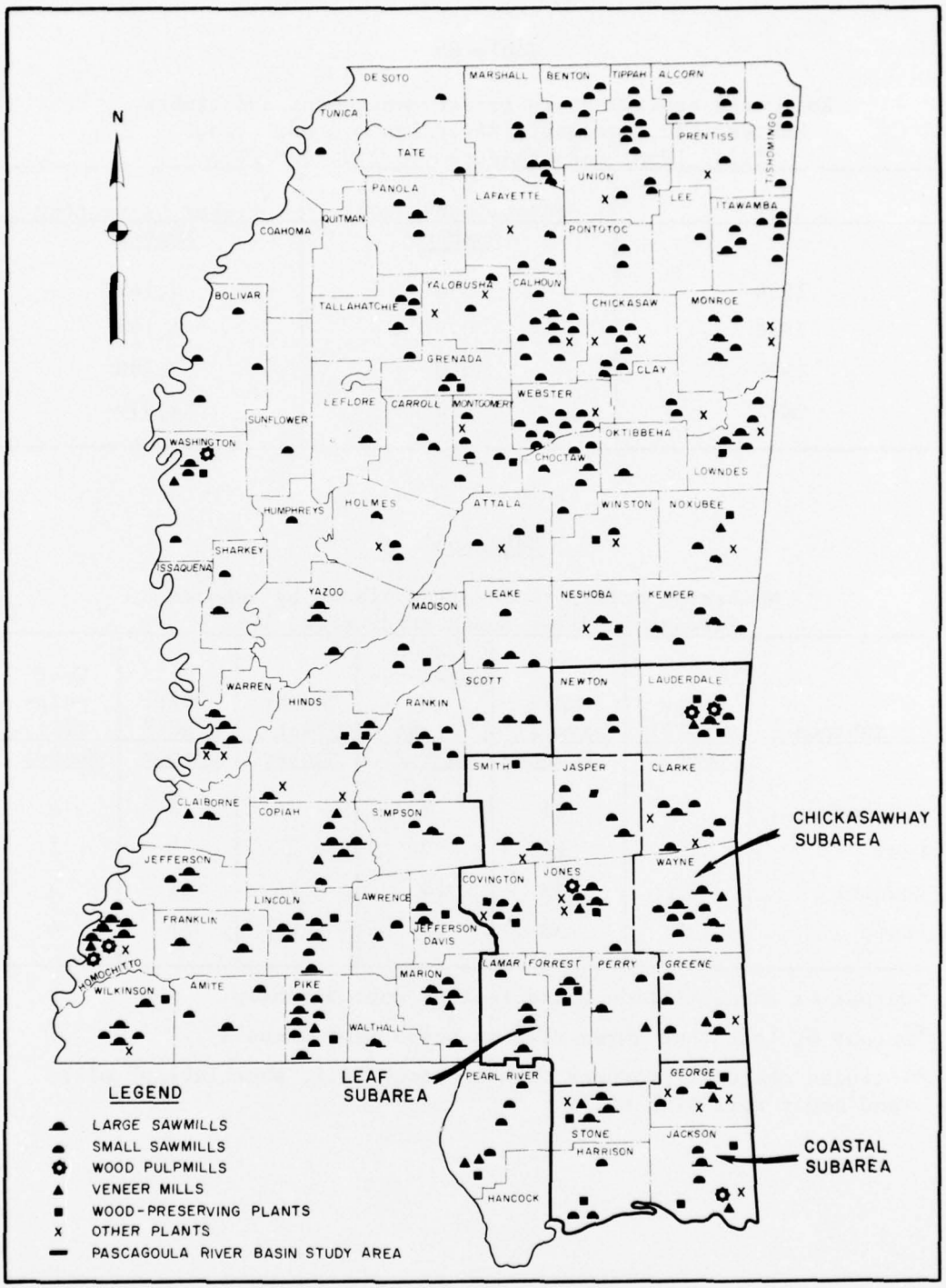
The prospect of more wood-using firms locating in the basin is very good. A special study by the Ross Engineering Associates, Inc., Gulfport, Mississippi, states that there is abundant wood and water in the basin to provide the two major requirements for at least three pulp and paper mills in the area. Other factors stated included ideal climatic conditions, the availability of labor and the nearness to many large market areas. A new firm is the recently established four million dollar southern pine plywood plant at Beaumont, Mississippi. It is expected that 30 million board feet of pine will be required annually as raw material for the plant with machinery initially installed. The plant will employ 225 workers in the production process plus another 450 in the timber cutting, hauling and related operations. The plant is designed to increase production by one-third as raw material becomes available.

A smaller wood-using firm, but one that will still create work for an additional 35-50 men, was announced for Raleigh, Mississippi. The mill will produce in excess of 25,000 board feet of quality pine 2 x 4 inch studs daily which will be ready for construction use. Timber will be used ranging from 6-inch to 14-inch top diameter and will offer the timber grower an excellent opportunity to thin his stand at a profit while keeping the more vigorous trees for later harvesting.

Table 64

Persons employed in timber-based manufacturing industries by Standard Industrial Classes, Pascagoula River Basin study area, 1930-60, and projected to 1965, 1980 and 2015

Subarea and year	Standard Industrial Class	
	SIC 24 and 25	SIC 26
	Number	Number
Chickasawhay		
1930	2,090	---
1940	2,774	6
1950	4,166	282
1960	2,820	439
1965	2,860	500
1980	3,040	730
2015	3,560	1,380
Leaf		
1930	4,641	303
1940	3,645	94
1950	5,368	2,495
1960	3,070	3,133
1965	2,340	3,400
1980	2,330	4,330
2015	1,260	8,530
Coastal		
1930	1,035	435
1940	1,272	1,172
1950	2,057	1,249
1960	1,351	1,750
1965	1,400	2,240
1980	1,610	3,300
2015	2,340	7,200
Basin		
1930	7,766	738
1940	7,691	1,272
1950	11,591	4,026
1960	7,241	5,322
1965	6,600	6,140
1980	6,980	8,360
2015	7,160	17,110



LOCATION OF PRIMARY WOOD-USING PLANTS IN MISSISSIPPI, 1962

Table 65

Estimated employment in forest management and timber harvesting, Pascagoula River Basin study area, 1954, 1958, and projected to 1980 and 2015

Year	Forest management	Timber harvesting
	Number	Number
1954	594	7,141
1958	675	4,198
1980	860	3,780
2015	810	4,970

Table 66

Number of primary wood-using plants by subarea, Pascagoula River Basin study area, 1962

Subarea	Large sawmill[1]	Small sawmill[2]	Wood preserving plant	Veneer plant	Misc. plant[3]	Wood pulpmill
	Number	Number	Number	Number	Number	Number
Chickasawhay	7	21	2	3	3	2
Leaf	10	10	7	3	3	1
Coastal	22	38	14	9	11	4
Basin	22	38	14	9	11	4

[1] Output of three million board feet or more annually.

[2] Output of less than three million board feet annually.

[3] Includes charcoal producer, handle stock mill, shuttleblock mill, and paper roll plug mill.

Potential benefits to forest production. Benefits to forest production result from a number of different practices. These practices include improvement in management, forest protection and utilization and water control.

Management practices such as growing the best species on the right site, removing the undesirable species, marking out the poor quality and poor form trees, and tree planting to put all the forest land into production, will give an increase in forest production. The net annual growth for sawtimber in the Pascagoula River Basin study area is 150 board feet per acre. Studies have shown that properly managed forest land will produce the equivalent of 400-700 board feet per acre per year. Based on a conservative figure of 400 board feet per acre, the potential of the forest land within the study area is almost three times the 1956 production. Better utilization through planning, research and effort invested now will give future rewards by increasing the forest production and, in turn, the value received from these lands. Using the 1965 weighted sawtimber stumpage prices[1] and the potential growth of 400 board feet per acre, an increase of $22,000,000 a year would be realized from the increased forest growth.

Uncontrolled fire is a bitter enemy: growing timber is damaged, wildlife is lost, ground cover is destroyed and soil erosion begins. It has been estimated that the average forest fire damage in Mississippi is $14.20 per acre. During the nine year period 1956 to 1965 the acres of forest land burned annually in the Pascagoula River Basin study area ranged from 20,777 to 74,753 acres. This amounts to a loss of approximately $295,000 to $1,061,500 per year.

Damage by insects and diseases within the study area is causing a loss of some timber. However, damage spots are small and scattered and have not reached epidemic proportion in recent years. Preventive efforts are made to locate and treat these areas before they become epidemic.

The Coastal subarea has some wet forest land that would benefit by the removal of surface water. Benefits would consist of early restocking and better juvenile growth. Water removal would also improve the accessibility of wet lands for logging by conventional equipment. Studies now being made by the Southeastern Forest Experiment Station may furnish basic data for evaluating benefits from water level control projects.

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[1] Softwood - 59 percent, hardwood - 41 percent.

SECTION 9. AGRICULTURAL OUTLOOK

In line with the basic concept that plans for resource development be related to the projected economic and social needs of the Nation and the Pascagoula River Basin, it is essential that the magnitude of future resource requirements be indicated to serve as a guide to planning. Projects have been planned with the objective of developing those particular resources required to serve the projected economy.

The increase in population expected in the United States for 1980 and 2015 will place demands on the Pascagoula River Basin for an expanded agricultural output. Studies indicate there will be an increased demand for agricultural products such as cotton, soybeans, feed crops and livestock and poultry products that are produced in the basin. In order to meet the basin's portion of the national needs for food and fiber products, it is projected that the Pascagoula River Basin study area would need to produce 4,702 more bales of cotton in 2015 than were produced in 1959. In addition, the basin would need to produce 223,000 more bushels of soybeans in 2015 than were produced in 1959.

Due to expanded national demand for livestock and poultry products, production of some products will increase in the basin; however, production of others will decline because of the basin's competitive position in production efficiencies. Basin production of beef and veal will need to expand by 103 million pounds in 2015 as compared to 1959. Likewise, the basin would need to produce about 50 million more pounds of lamb and mutton, 349 million more pounds of broilers and turkeys, 106 million more pounds of milk and 48 million more dozens of eggs than were produced in 1959. Studies indicate that pork production in the basin will decline approximately 50 percent by 2015 when compared with 1959 production. An expanded output of agricultural products must be met with fewer farms and farm people on essentially the same land base as existed in 1959.

Farm marketings of agricultural products are projected to reach $194 million in the year 2015 in the Pascagoula River Basin as compared to $61 million in 1959. Broilers, eggs and cattle and calves will account for 86 percent of total farm marketings in 2015. In order to meet the production requirements, some major adjustments in the agricultural industry will be required. Farm size will be about twice as large in 2015 as in 1959 and the capital investment will be considerably greater because of the shift in enterprise combinations. The total acreage of cropland harvested will decline, there will be an increase in cropland pastured and permanent pasture and farm woodland will remain essentially unchanged.

Studies by the Mississippi Agricultural Experiment Station indicate that given present resources and levels of technology, farm reorganizations of small and medium size farms for optimal enterprise combinations will not result in appreciable increases in net cash

income. The amount of physical resources, primarily cropland, available on average farms of the size that currently exists in the basin, limits the choice of enterprises and contributes to the high level of under-employment of the farm operators. The amount of resources available to the relatively few large farm operators allows for flexibility in the choice of enterprises and consequently improves the possibilities for increasing farm incomes.

The adoption of improved techniques, given present farm resources, could result in sizable gains in farm income for farms of all sizes but the impact would be greatest on medium and large farms. The general shortage of physical resources available on the small, and to some extent, on the medium farms, severely limits the income producing possibilities open to these farm operators. The small farm operator would still fall within the low-income category of $3,000 net family income per year. Many small farm operators are apparently presently losing money on their farm operations and could increase their net family incomes simply by discontinuing the farm operation altogether. A real problem facing farming in the basin is the low productivity of the labor employed in farming which results from the inadequate bundle of resources controlled by the farm family and with inefficiencies in its use.

Assuming that in the future many of the smaller farm operators do discontinue farming, the resulting larger farms can improve net cash farm earnings through the adoption of advanced techniques and the choosing of more profitable enterprises. An important factor will be that of having a larger resource base. Farm incomes can also be improved by better management of farm woodlands. Generally, the farm operator considers the woodlands as an insurance policy to be harvested in times of dire need. Consequently, poor management practices and slow development of improved cultural practices and new techniques in forestry have resulted. Proper management of farm woodlands that now contribute only slightly to farm income, can result in increased returns to basin farmers and help relieve the low income problem.

SECTION 10. LAND DEVELOPMENT NEEDS

Indications for future production of agricultural commodities show that between 1959 and 1980 there will be approximately a 105 percent increase and this will have reached about 320 percent by 2015. The projections also reveal that this production will be realized from roughly 9 percent fewer acres in 1980 and about 23 percent fewer acres in 2015. In the aggregate, expanded production must be derived from a reduced resource base. Therefore, efficiency will become a prime consideration, along with improved management and fuller utilization of technological advances.

Efficiency considerations are multi-dimensional. Probably among the most important of these are land resource quality and problems

associated with land resource utilization. The quality of the resource base in the basin is quantified in Appendix F of this report. The identification reveals that there is an opportunity for land conversions which would more nearly capitalize the inherent capabilities of the varying quality of the land resources. However, these conversions would be limited and, in many instances, prohibited by existing constraints. As the cost-price relationship changes with changes in demand, some of these constraints which limit efficiencies of population will become irrelevant whereas others will not.

The problems related to land resource use seem to offer some potential for fostering improvement in production efficiencies on farms in the Pascagoula River Basin. Specifically, the major problems are flooding, inadequate drainage, and supplemental irrigation. There are 330,000 acres of open land in the upstream watersheds which have varying intensities of flooding under current conditions. Analysis of the economic loss associated with this hazard reveals that production could be increased approximately 20 percent by the elimination of this problem. There are about 189,000 acres of inadequately drained land which could, under proper drainage conditions, produce approximately 25 percent more food and fiber. Opportunity for gain is evident from data relating to input-output considerations in the absence of problems. Supplemental irrigation is not presently economically feasible, but under future conditions this practice could become highly profitable and contribute significantly to increased efficiency. There are about 58,000 acres of open land which are physically suited to irrigation.