68070

Mississippi Department of Corrections

SYSTEMS DEVELOPMENT

A PROJECTION OF AVERAGE

INMATE POPULATION

1978-1981

Prepared by:
Sandra K. C. Martin

W. Scott Fulton, Director
Systems Development

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INTRODUCTION

The Mississippi Department of Corrections came into existence on July 1, 1976, as a result of the "Mississippi Corrections Act of 1976." Prior to this time Mississippi State Penitentiary was under the authority of a governing board composed of five members appointed by the Governor and confirmed by the Senate.

In 1972, prior to the enactment of legislation creating the Department of Corrections, the Mississippi correctional system came under federal court order due to "unconstitutional conditions and practices in maintenance, operation, and administration of state penitentiary."

On August 7, 1975, a court order was issued closing several of the inmate camps and thus setting a maximum number for inmates who could be housed at each of the remaining camps. Compulsory reduction of the inmate population forced officials to reduce commitments to Parchman and in turn resulted in a county jail backlog. In December, 1976, approximately 30 state prisoners were remanded to county jails as a result of the halt in admissions due to overcrowded conditions.

OBJECTIVE

The major objective of this study is to predict average annual

inmate population levels through the year 1981. More specifically, the objective is to describe the relationship of average annual inmate population to changes in the Mississippi state population and changes in the number of indictments in Mississippi. Achieving this objective would result in more effective planning for future inmate housing requirements as well as other areas of correctional planning.

DATA SOURCE

Data for this study was collected for years 1973 through 1976. After 1976, complete information was not available on county jail numbers and therefore 1977 data was not included in this study. Complete historical data on sentence length and offense incidence was not found prior to 1977 and consequently could not be used.

Pertinent secondary data used represents several sources. Monthly statistical reports from the Mississippi State Penitentiary yielded necessary information in determining average yearly inmate population. Mississippi state population estimates were taken from the United States Bureau of Census' "Current Population Reports." Information regarding indictment numbers was taken from "An Analysis of Criminal Indictments Filed in Mississippi for Years 1973 through 1977" compiled by the Mississippi Judicial Council, Court Information System. Data used in the analysis is presented below:

TABLE 1: AVERAGE INMATE POPULATION, ESTIMATED STATE POPULATION,
          AND NUMBER OF INDICTMENTS

YEAR	AVERAGE INMATE POPULATION	ESTIMATED STATE POPULATION	NUMBER OF INDICTMENTS
1973	1874	2,317,000	4622
1974	1931	2,334,000	5465
1975	2248	2,341,000	6218
1976	2470	2,365,000	6600

METHOD OF ANALYSIS

Regression analysis, a statistical tool which utilizes the
relation between two or more quantitative variables so that one
variable can be predicted from the other, or others, was used to
predict average yearly inmate population. Preliminary models
were run and variables were eliminated on the basis of whether
they increased the predictability of the model and their effect
on the standard errors of estimates. Variables considered but
not included were reported crime, numbers released on parole,
and numbers returned from parole. The final regression model
used to estimate average yearly inmate population can be express-
ed as:

$$IP = B_o + SP_i + I_i + E$$

where: IP   -   inmate population

   B_i -   constants   ,

   SP_i -   Mississippi state population

   I_i -   indictments

   E   -   error term

The designation of variables for the regression equation are given below:

Dependent variable:	IP	=	inmate population
Independent variables:	SP	=	state population
	I	=	indictments

The regression model for estimating IP was:

$$IP = 14,587.25 + .0068SP + .1553I \text{ a/}$$
$$(.0128) \quad (.2926)$$

RESULTS AND DISCUSSION

The prediction equation estimating average annual inmate population accounted for about 91 percent of the total variation. Neither state population nor number of indictments was significant $(P \; .10)$.

When examining the correlation coefficients, large values were noted. A situation known as multicollinearity may exist when the independent variables are very highly correlated among themselves. When multicollinearity is present, the regression coefficient of any independent variable depends on which other independent variables are included in the model. An examination of data graphs showed no indication of multicollinearity existing among the independent variables.

(See Appendix A)

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a/The figure below each coefficient is the standard error of the coefficient where:

$R^2 = .9094$

$S_e = 145.80$

$F = 5.9197$

TABLE 2.　　　　　　　　CORRELATION COEFFICIENTS

VARIABLE	INMATE POPULATION	MISSISSIPPI POPULATION	INDICTMENT NUMBER
Inmate Population	1.0000	.9402	.9404
Mississippi Population	.9402	1.0000	.9443
Indictment Number	.9404	.9443	1.0000

An examination of the error terms revealed a normal distribution.

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                    PLOT OF STANDARDIZED RESIDUAL
      -2.0          -1.0          0.0          1.0          2.0
                                   I *
                               *   I
                                   I*
                                   I*
```
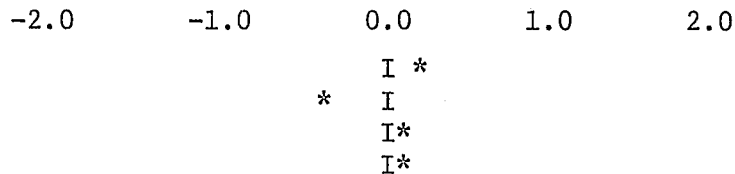
TABLE 3.　　　　　　MEANS AND STANDARD DEVIATIONS FOR ESTIMATES OF POPULATION VARIABLES

VARIABLE	MEAN	STANDARD DEVIATION
Inmate Population	2,130.75	279.68
Mississippi Population	2,339,250.00	19,901.03
Indictments	5,726.25	874.24

TABLE 4.　　　　　　PREDICTION EQUATION OF AVERAGE YEARLY POPULATION

DEPENDENT VARIABLE	R^2	SE	INTERCEPT	REGRESSION COEFFICIENT
Inmate Population	.9094	145.80	-.14,587.25	+.0068 St. Pop.
				+.1553 Indict.

TABLE 5.		ANALYSIS OF VARIANCE		
	DF	SUM OF SQUARES	MEAN SQUARE	F
Regression	2	213,402.18	106,701.09	5.0197
Residual	1	21,256.57	21,256.57	

When projecting inmate population for 1978 through 1981, population was found to be increasing at a decreasing rate. It must be kept in mind that these projections are based on the assumption that state population and number of indictments will increase on a linear basis.

When making projections of this type, a mathmatical rule of thumb is that projections should go no more years than the number of preceding data years utilized in the study. Since information was gathered on four years prior to the 1978 projection, average annual inmate population was projected through 1981. More reliability may be placed on short-term projections than long-term ones. Too many unknown factors may exist in the future that could have considerable effect on population levels. In view of this, mathmatical reliability diminishes, increasingly so for each succeeding year.

Final projections are presented below.

TABLE 6. PROJECTED AVERAGE ANNUAL POPULATION LEVELS 1978-1981

YEAR	PROJECTED AVERAGE	PERCENT CHANGE
1978	2,839	
1979	3,153	+9.96
1980	3,364	+6.28
1981	3,575	+5.93

AVERAGE YEARLY INMATE POPULATION-C1, VS MISSISSIPPI STATE POPULATION-C2

```
PLOT C1 VS C2
-- PLOT C1 VS C2
                 C1
         2600.+
              -
              -
              -
              -
              -                                                    *
         2450.+
              -
              -
              -
              -
         2300.+
              -
              -                                  *
              -
         2150.+
              -
              -
              -
              -
         2000.+
              -
              -                          *
              -
         1850.+ *
              +-------+-------+-------+-------+-------+-------+C2
         2315000.        2335000.        2355000.
              2325000.        2345000.        2365000.
```
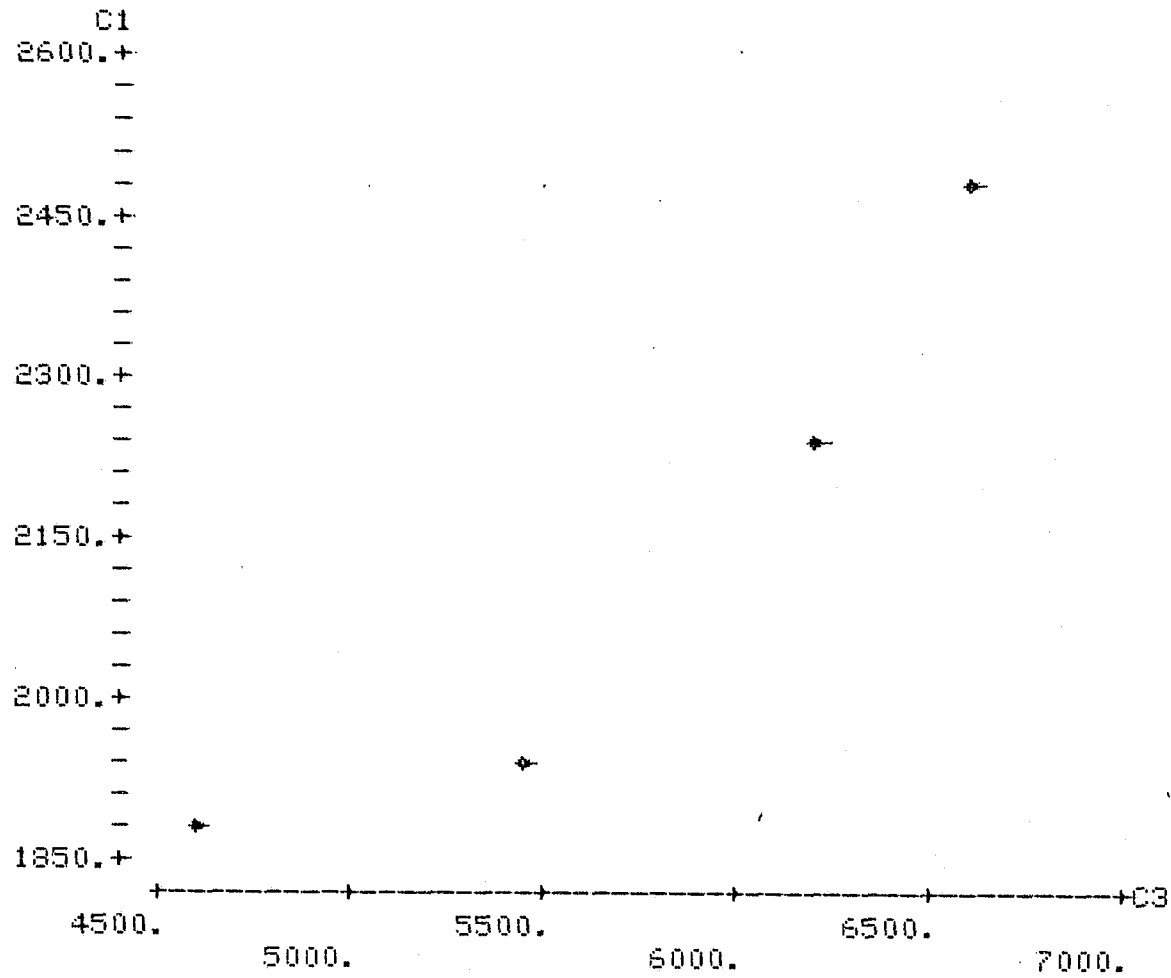
AVERAGE YEARLY INMATE POPULATION-C1, VS NUMBER OF INDICTMENTS-C3

```
PLOT C1 VS C3

-- PLOT C1 VS C3
              C1
          2600.+
              -
              -
              -
              -
              -
          2450.+                                          +
              -
              -
              -
              -
          2300.+
              -                                    +
              -
              -
          2150.+
              -
              -
              -
              -
          2000.+
              -
              -                          +
              -
              -                 +
          1850.+
              +--------+--------+--------+--------+--------+C3
           4500.    5500.    6500.
              5000.    5500.    6000.    6500.    7000.
```

END