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THE
SATSOP
CONSTRUCTION PROJECT

AND

GROWTH PATTERNS IN
GRAYS HARBOR COUNTY:
1977-1981

THE
GRAYS HARBOR
REGIONAL PLANNING
COMMISSION

MAY 1982

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1977-1981

A Report to the
Grays Harbor Regional
Planning Commission

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EXECUTIVE SUMMARY AND CONCLUSIONS

This report presents a comprehensive analysis of the impact of a major, energy facility, construction project on growth and development in its host communities. The Satsop Nuclear Project, located in eastern Grays Harbor County, Washington, began construction in the spring of 1977. The project was to consist of twin, nuclear-powered, electric-generating plants. In the fall of 1981, however, one of the two units was cancelled due to rapidly escalating project costs. This early termination resulted in prematurely reaching the peak construction force during June of 1981 at 5,388 workers.

GENERAL CONCLUSIONS

The buildup of the project's construction work force between 1977 and the peak in 1981 has had a very pronounced effect on both the amount of growth in the county and on the location of resulting development. The analysis contained in this report has estimated that the project is responsible for supporting 2,325 households, directly and indirectly. This number of households accounts for 7.8% of all households in the county and all of the net new population growth that has occurred in the county since the project began. The major focus of this growth pressure has been on the Elma area, the closest community to the project's site. Forty-four percent (44%) of the households supported by the project are located in the Elma/McCleary area where those households account for 25% of the total households in the area. The amount of growth stimulated by the project in the Elma area greatly exceeded original projections.

A very significant conclusion reached in this analysis is that the actual impact of a major, energy facility, construction project will be substantially affected by what occurs in the other aspects of the host communities' economy. This conclusion is particularly significant because the relationship of the impact of an energy facility to other economic conditions is not well addressed in the literature concerning factors to consider in the planning for and siting of such projects. This analysis would suggest that understanding potential future economic problems and trends in the host communities should be an essential part of planning for these construction projects.

The impact of the Satsop Project may be viewed as having two stages with each stage being related to the condition of the host's regional economy. The first stage, from 1977 to 1979, occurred during a period of recovery and expansion in the other basic economic sectors of the county. The Satsop Project's impact on growth trends then augmented and accelerated a general pattern of regional growth and development. It is estimated that the Satsop Project accounted for approximately half of the regional growth during this time. This additional stimulus led to a substantial (for Grays Harbor County) increase in all types of development. During this period competition for workers and housing between the Satsop Project and other sectors was great.

During the second stage of the project, between 1979 and 1981, the situation was very different because all of the other major, basic economic

sectors went into a period of serious decline. The role of the Satsop Project then changed from being an additional source of growth pressure to being the only major source. As such, it compensated for the loss of economic stimulus associated with other economic conditions. Not only could the Satsop Project account for all growth during this second stage, but this growth stimulus actually was enough to account for all of the net growth that occurred in the county since the start of the project. Consequently, it is quite likely that there would have been a loss, rather than a gain, in regional population during this second stage of the project's development. While some decline did occur in the regional population center (Aberdeen-Hoquiam-Cosmopolis), the area more directly affected by the project (Elma/McCleary) continued to grow. In fact, while the rate of growth declined in most other areas during 1981, it actually increased from 1979 in the Elma area.

This added growth stimulus led both to some inappropriate development (such as conversion of prime agricultural and forest land) and to a strengthening of land use programs to control such problems. There seemed to be a need in the impact area to experience problems before effective measures were developed to manage them. This, perhaps, is clearest in the need to conserve prime soils for agricultural production.

GENERAL CONTEXT OF GROWTH

Grays Harbor County has had a stable population since the 1920's. In fact, the population of the county in 1930 exceeded the 1970 level in spite of a moderate growth level (9.3%) between 1960 and 1970. Population continued to grow slowly in the early 1970's with a very low growth rate between 1974 and 1977. As the project began in 1977, growth rates spurted upward particularly in the area immediately around the project. Growth since the start of the project has been influenced by a variety of factors including a resurgence of the regional economy recovering from a recession in 1975 and the Satsop Project.

Since detailed information regarding population patterns is very limited between census years, the analysis of growth patterns in this report has focused on households for which very detailed and timely data can be developed. Prior to the start of the construction project, the principal cause of growth in households was the declining household size. After the project began, however, the primary cause of the growth in households was the in-migration of new people. The focus of this growth in households is in the Elma/McCleary area of the county although all areas had significantly increased growth rates during the first two years of the construction project. After 1979, growth rates moderated in most of the county, even declining in the more populous urban area. During the project period, 2% more households were added each year to the county total above the number of households needed to accommodate the declining household size. In Elma the growth rate, which is equivalent to population growth, was 5.9% for each year during the project, and in Montesano it was 5.3%. This constitutes a very high rate of growth in these communities.

THE INFLUENCE OF THE SATSOP PROJECT

At the peak of construction 1,722 workers on the project resided in the county. This represented 32% of the total project work force. Of these county residents, 488 (28%) were considered transients, 415 (24%) were residents of the county before 1977, and 812 were residents moving into the area since 1977. These workers supported an estimated 2,204 secondary jobs. Altogether, the primary and secondary jobs contributed to the creation of 2,325 new households. This represented 7.8% of all the households in the county in 1981.

Much of the influence of the project was focused on the Elma/McCleary area which had 51% of the county residents who were Satsop workers, and 44% of the total new households attributable to the project. This accounted for 25% of all the households in the Elma/McCleary area. The next largest number of households attributable to the project was in the urban area. While 22% of the Satsop-related households were in the urban area, these households only accounted for 3% of all units in the urban area. Fourteen percent (14%) of the impact of the project fell to the Montesano area and 4% to Oakville. While the ocean beach areas of the county received 17% of the total impact of this project, most of this was in the form of secondary effects rather than the in-migration of new workers. Only 60 new workers resided in these areas (7% of the Satsop workers residing in the county).

The way in which the project influenced growth patterns varied significantly between the first two years and the second two years. During the first two years only 19.6% of the total construction workers in-migrated to the county. After 1979, however, this rate increased to 25.5%. In Elma this proportion increased from 8.9% to 12.4%. Since other economic sectors of the county were performing poorly between 1979 and 1981, the increased rate of in-migration may be due to less competition for the available housing stock.

IMPACT ON DEVELOPMENT PATTERNS

Since the project greatly stimulated growth rates in some areas of the county (reaching a peak of almost 12% in the Montesano area between 1977 and 1978, and almost 10% in Elma between 1978 and 1979), it also significantly affected development patterns. With the start of construction, there was a dramatic increase in all forms of common development indicators: zoning, land divisions, and building permits. Much of this activity was focused on the eastern part of the county in general and on the Elma area in particular. This, in turn, led to a large amount of land use change. In the eastern part of the county, 1,203 acres (almost 2 square miles) changed in use since 1977. Most of this change occurred in what originally were forest areas (48% of the total changes). A total of 352 acres was converted from agricultural uses to another use. Forty-three percent (43%) of these total changes was to residential use, with gravel pits constituting most of the remaining new use. Most of these changes in use occurred in the area immediately around Elma.

In response to the new growth pressure, all of the communities in east county substantially improved their land use management capacity, as

did Grays Harbor County. All of the cities instituted new comprehensive plans, and most revised their development ordinances. The county adopted a variety of new policies and programs ranging from a complete agricultural element to its comprehensive plan, to regulations managing gravel pits.

CONCLUSION

The Satsop Construction Project has had a pronounced affect both on the amount of growth and on the location of development in Grays Harbor County generally and in the Elma area particularly. However, the nature of the impact of the project has also been substantially influenced by the underlying economic conditions of Grays Harbor County.

This report, unlike previous reports, concentrates on growth and development rather than on the full scope of socioeconomic change. Future efforts will address these other concerns.

The conclusions presented in this summary, and in the full report, represent the sole views of the staff of the Grays Harbor Regional Planning Commission. These opinions are intended to give a potential interpretation of the data and do not represent the position of the Commission, its members, or the Washington Public Power Supply System.

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INTRODUCTION

On April 8, 1977 construction began on twin, nuclear-generating facilities southwest of the City of Elma in Grays Harbor County, Washington. This project was planned to be constructed over a ten year period involving an estimated 20,091 man years of craft labor and an expenditure of approximately 7.5 billion dollars.¹ The site of the project is adjacent to the Chehalis River in a rural agricultural and forestry community. Four small cities are in the immediate vicinity of the project: Elma, population 2,930; Montesano, 3,270; McCleary, 1,430; and Oakville, 554. Approximately another 12,000 people reside in the unincorporated areas surrounding these communities. The Aberdeen-Hoquiam area is the nearest urban center, fifteen miles to the west of the site. This project, officially designated as WNP-3 and WNP-5, is commonly known as "The Satsop Project."

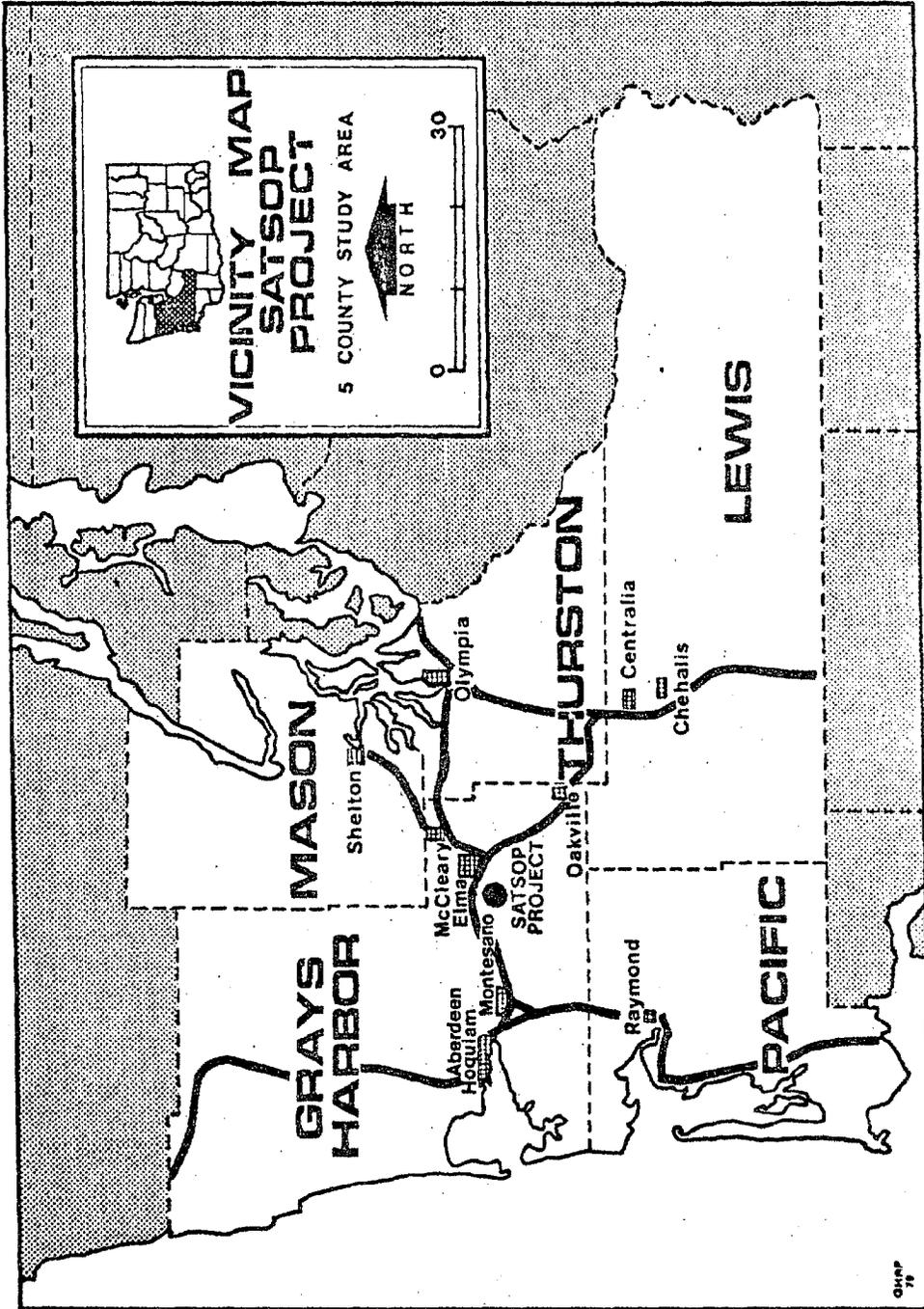
The staff of the Grays Harbor Regional Planning Commission has conducted periodic analyses of the impact of the project on the host communities. This report is another of that series.

During 1981 the project underwent a dramatic change in scope. Severe difficulties related to the ability of the Power System to finance the construction project led to the eventual termination of construction on the second unit. At the present time, it appears unlikely that construction of the unit will be resumed. One of the effects of this termination is to reduce the full range of anticipated impacts of the project. Prior to termination, it was expected that the project would reach its peak of construction during 1983. However, with the termination of Unit 5, the peak probably occurred during 1981. Consequently, this analysis will cover the impact of the project on growth in the county during the build-up phase. Since it appears that the remaining life of the project will consist of a leveling off of the construction work force through 1982, then declining to 1985 when Unit 3 is expected to be operational, most of the growth influence produced by the project is completed, and future analyses will focus on the effects of the "down side" of the construction cycle.

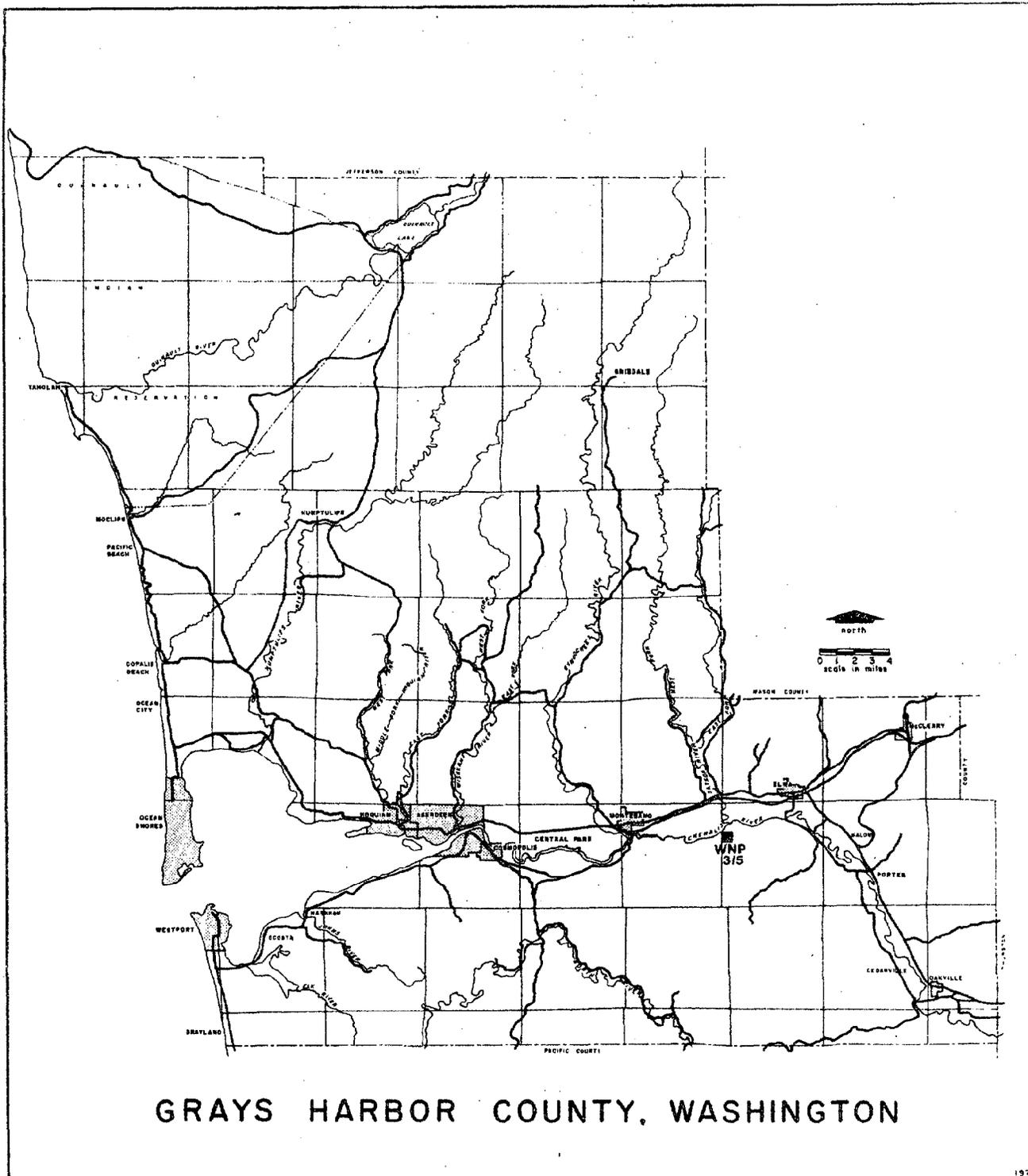
A construction project of this size was expected to have a significant influence on population growth and development patterns of the host rural communities.² As a part of the licensing process of the facility by the State of Washington, the project operators, the Washington Public Power Supply System, were required to monitor the socioeconomic change within the project's area of influence. The Power System then contracted with the Grays Harbor Regional Planning Commission to collect and report data and information which might serve as indicators or measures of any socioeconomic change occurring within the area. This Monitoring Program has to date produced seventeen volumes of data and information.³

This report presents, in the sole view of the staff of the Grays Harbor Regional Planning Commission, the impact of the project on county

MAP 1



MAP 2



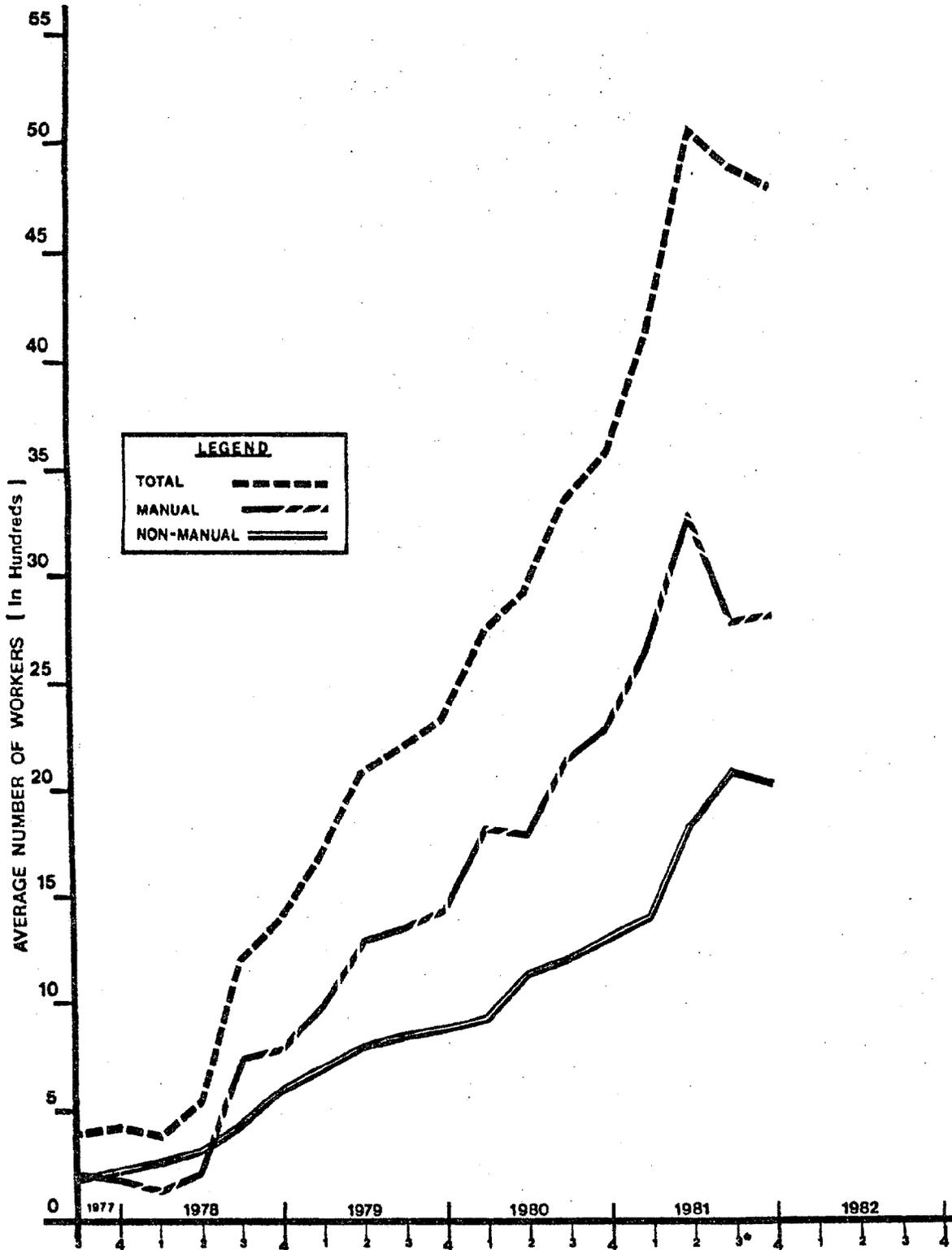
growth and development patterns, as identified in this monitoring data, occurring during the build-up phase of the construction project. This report is produced separate from, and is in no manner to be considered a part of, the Monitoring Program itself. The opinions expressed in this report are intended to give a potential interpretation of the data and do not necessarily represent the position of the Commission, its members, or the Power System. It is hoped that this report will contribute to the awareness and knowledge of change which is occurring in this project area, and thereby provide needed insight into this process of change for the Commission and its constituent local governments. Furthermore, it is hoped that this discussion will contribute to the general body of knowledge relating to the socioeconomic implication of major construction projects.

The construction began on April 8, 1977 under a limited work authorization issued by the Nuclear Regulatory Commission. This authorization was limited to the preparation and excavation of the site. On April 11, 1978 the full construction permit was granted, and full construction began. On June 30, 1978 employment on the Project was 824. Employment then rose to a weekly average of 2,211 in June 1979 and 3,143 in July 1980. Peak employment reached 5,388 in June 1981.⁴ Employment levels then subsided to a weekly average of 4,202 in December 1981. This growth of employment is portrayed on Graph 1.

In order to monitor socioeconomic change which might be produced by the project, a large potential area was established by the Monitoring Program consisting of five counties. These counties were monitored at a very general level. Two of these counties, Grays Harbor and Thurston, were monitored in greater detail, and particular subareas (called Primary Study Areas) were examined very closely in each of these counties. Since this report is prepared by the staff of the Grays Harbor Regional Planning Commission for its members, it concerns itself with only change occurring in Grays Harbor County. Grays Harbor County has been divided into two areas, a Primary Study Area and the remainder of the county. The Primary Study Area includes the Cities of Elma, Montesano, and Oakville, the Town of McCleary, and their unincorporated surroundings. The term also may include the unincorporated area of Central Park, but due to difficulties in obtaining information which separates this area from the Aberdeen area, Central Park is sometimes not included in the "Primary Study Area." Map 3 identifies the Primary Study Area. For comparison purposes, Aberdeen, Hoquiam, and Cosmopolis are termed the "urban area" within this report, and the "beaches" refer to the Cities of Westport and Ocean Shores, and unincorporated areas adjacent to the Ocean. The Primary Study Area is also referred to as east county.

The analysis of the complex impact of a major construction project can only proceed with peril because socioeconomic change seldom occurs in clear cause-effect relationships, and any effect will have complex roots of causation which tend to defy detection. Since it is expected that the construction project has been a major catalytic agent in the study area, this report attempts to relate identified change to this stimulus. As will be noted, this can range from rather clear situations

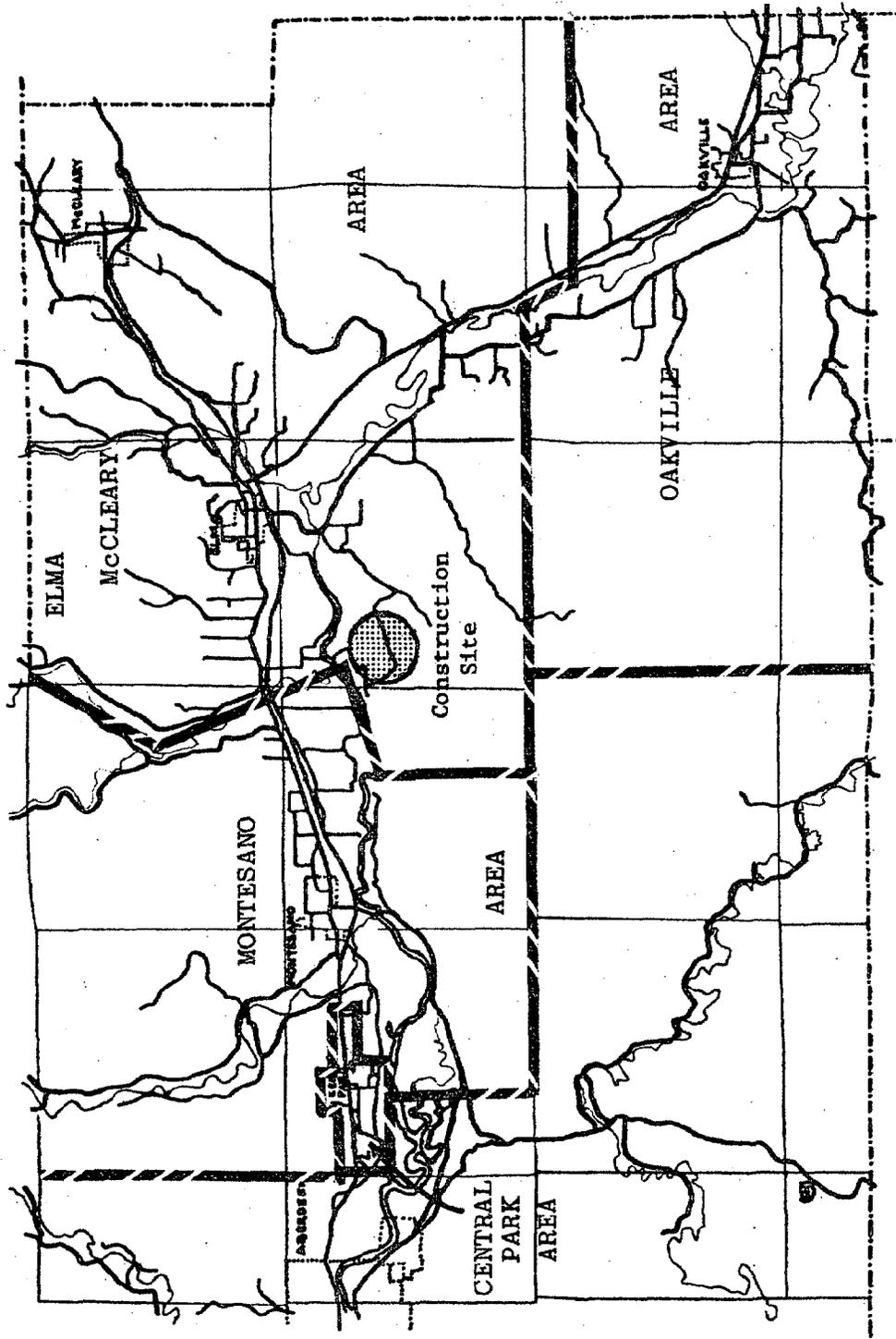
GRAPH 1
WNP-3/5 WORK FORCE HISTORY



SOURCE: Weekly Manning Reports and Daily Work Force Reports, WPPSS, Site Office.

NOTE: Figures represent average numbers per week per quarter.
*Mothballing of WNP-5 began about July 1981.

MAP 3

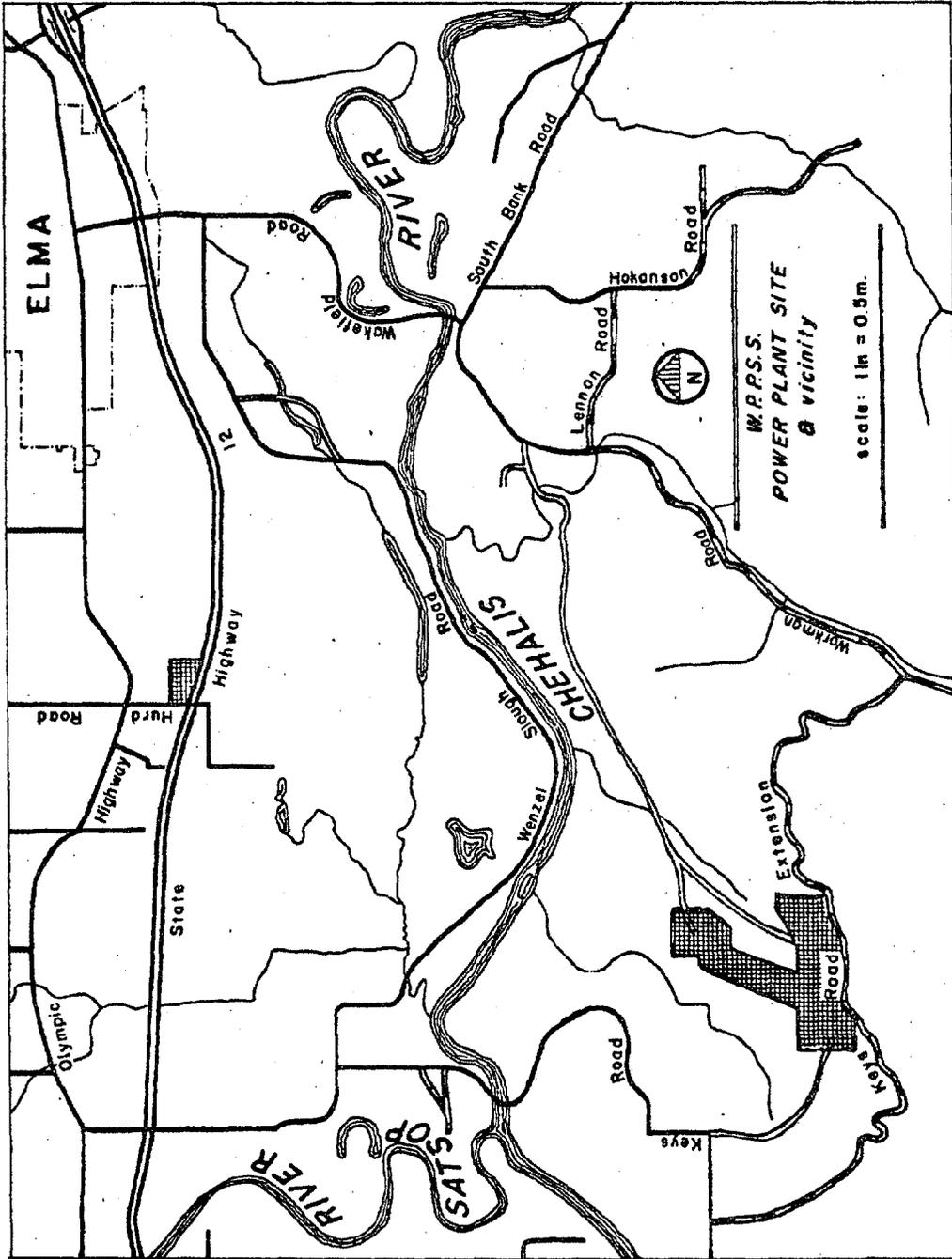


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PRIMARY STUDY AREA, EAST GRAYS HARBOR CO.

MAP 4



(such as the proliferation of gravel pits) to a mere juxtaposition of occurrence (a rapid rise in taxable sales in Elma) without significant evidence of a clear causal relationship. Consequently, discussions herein which seek to relate change to the project should be critically reviewed and considered by the reader. It is more the underlying desire of the authors to stimulate such critical thought on these complex relationships than to necessarily establish a position regarding the manner by which change is being produced.

In reviewing any situation of this nature, a useful analogy is possible. It is too tempting to think of the impact of a major construction project as being a rock tossed into a placid pool where the ripples of impact can be easily and comfortably counted and measured. The nature of socioeconomic systems, unfortunately, is not so accommodating. A better analogy is a rock tossed into a babbling brook with its own established currents of change. The influence of the rock is an additional influence which will bend and turn those currents but is not the sole "cause."⁵

This report and its conclusions are limited by the nature of available information. Four key problems are present. First, important pieces of information are not reported until some time after the event occurs. Some cases (such as income information) can be as long as several years. This delay naturally prevents the use of such information in a report like this. This is particularly an acute problem in this report due to the delays associated with the publication of the 1980 Census data. That census will produce a large volume of information which will make better analysis possible. Second, many important pieces of information (most significantly employment data) are not available on a subcounty level, and, consequently, county level discussion (where more influences would operate to make analysis of cause more difficult) must suffice. Third, some information is not generated for many areas (reliable population data for subcounty unincorporated areas), and related to this are time or cost limitations for the Commission to generate information (such as Assessor data). In these cases this analysis has used available information as an indicator of the general. Fourth, the complexity of some data literally defies interpretations. This is often true for data relating to the Satsop Project itself even for something so apparently clear as employment levels. Needless to say, these general limitations impose hazardous conditions for many conclusions in this report. More importantly, data limitations also often make meaningful comments about many potential concerns impossible. Consequently, this discussion limits itself to growth and development issues which are possible to discuss meaningfully within the parameters and limitations of the monitoring information. In some cases where data were not previously available, this report will address and even modify conclusions reported in earlier analyses as based on this new data.

This report is a continuation of an attempt to understand the relationship between this construction project and the socioeconomic character of the host region. This report, however, unlike previous analyses, concentrates on growth and development patterns rather than the full scope of

socioeconomic change. Future efforts will address these other concerns. It is hoped that this effort will lead to further discussion, analysis, and debate which is necessary for a full understanding of the issues which may be raised.

INTRODUCTION
NOTES

1. Total man-hours including both manual and non-manual estimated by the Grays Harbor Regional Planning Commission on the basis of Washington Public Power Supply System craft manpower projections. The official designation of this project is WNP-3 and WNP-5.
2. The planning of the project included several discussions of potential economic implications of the project. This included publications by the Power System such as:
 - Community Development Services Inc., An Analysis of Socio-economic Impacts of WNP-3 and WNP-5, Washington Public Power Supply System, September 17, 1975.
 - Westinghouse Electric Corporation, Socioeconomic Effects of Construction and Operation on WNP-3 and WNP-5 and Alternatives to Alleviate Adverse Effects, Washington Public Power Supply System, December 1974.
 - Washington Public Power Supply System, Environmental Reports.

The monitoring requirement in the Site Certification Agreement with the State of Washington grew out of a consideration of these reports, other available literature, and testimony by the Regional Planning Commission.

3. Seventeen monitoring reports have been prepared and are on file with the Power System, the Regional Planning Commission, and the Energy Facility Site Evaluation Council. Frequent references shall be made to these reports in this study:
 - Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 1, Report No. 2, July 1, 1977 to September 30, 1977, Washington Public Power Supply System, October 1977.
 - Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 1, Report No. 3, October 1, 1977 to December 31, 1977, Washington Public Power Supply System, January 1978.
 - Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 2, Report No. 1, January 1,

1978 to March 31, 1978, Washington Public Power Supply System, April 1978.

- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 2, Report No. 2, April 1, 1978 to June 30, 1978, Washington Public Power Supply System, July 1978.
- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 2, Report No. 3, July 1, 1978 to September 30, 1978, Washington Public Power Supply System, October 1978.
- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 2, Report No. 4, October 1, 1978 to December 31, 1978, Washington Public Power Supply System, January 1979.
- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 3, Report No. 1, January 1, 1979 to March 31, 1979, Washington Public Power Supply System, April 1979.
- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 3, Report No. 2, April 1, 1979 to June 30, 1979, Washington Public Power Supply System, July 1979.
- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 3, Report No. 3, July 1, 1979 to September 30, 1979, Washington Public Power Supply System, October 1979.
- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 3, Report No. 4, October 1, 1979 to December 31, 1979, Washington Public Power Supply System, January 1980.
- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 4, Report No. 1, January 1, 1980 to March 31, 1980, Washington Public Power Supply System, April 1980.
- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 4, Report No. 2, April 1, 1980 to June 30, 1980, Washington Public Power Supply System, July 1980.
- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 4, Report No. 3, July 1, 1980 to September 30, 1980, Washington Public Power Supply System, October 1980.

- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 4, Report No. 4, October 1, 1980 to December 31, 1980, Washington Public Power Supply System, January 1981.

Also, this study utilizes information that will be reported in an annual report to be published in 1982:

- Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 5, Report No. 1, January 1, 1981 to June 30, 1981, Washington Public Power Supply System, 1982.
 - Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 5, Report No. 2, July 1, 1981 to September 30, 1981, Washington Public Power Supply System, 1982.
 - Grays Harbor Regional Planning Commission, Quarterly Socio-economic Report of WNP 3/5, Volume 5, Report No. 3, October 1, 1981 to December 31, 1981, Washington Public Power Supply System, 1982.
4. Tables in Monitoring Reports under Tables number GH-T.32.15. and from information furnished by the Supply System.
 5. This analogy was originally suggested by Carl Van Hoff, staff of the Supply System.
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CHAPTER 1
REGIONAL GROWTH PATTERNS

1. REGIONAL GROWTH PATTERNS

1.1 Introduction: One of the first concerns regarding the siting of any large construction project is how such a project may affect growth patterns in the host region. Indeed, this effect is often the primary concern of most socioeconomic studies relating to such projects since growth resulting from such a project will affect virtually every aspect of the socioeconomic character of an area. For this reason the Monitoring Program has collected substantial information regarding growth patterns in the county. Of this data, two are particularly important: U.S. and State census data and estimates, and electrical service connections.¹ While each of these sources of information have significant limitations, they do provide very useful insights into the pattern of growth occurring within the region. This information then can be compared to data relating to the migration patterns of construction workers, employment data for the rest of the economy, and other information to assess the relationship between growth in the region, the construction project, and other factors which influence growth patterns.

This analysis of growth and its causes first seeks in this chapter to portray regional and subregional growth (primarily in households) which has been occurring before and during the construction project. Then, in the following chapter, potential causes of growth, notably general regional economic growth, are examined to explore what influences are operating in the area besides just the Satsop Project. Finally, from specific information from the project, an attempt is made to account for the amount of growth that is occurring in the area due to the Satsop Project. This attempt includes a measure of the secondary or induced effects of the project on regional growth.

1.2 Overall County Growth: The population of Grays Harbor County is noted for its long-term stability. It reached a peak population of nearly sixty thousand people during its lumbering heyday of 1930, a population level which was not reached again until 1971. After several decades of population decline and low growth, the population grew between 1960 and 1970 by 9.3% (0.9% annually). This growth continued through the 1970's with an 11.4% increase between 1970 and 1980 (1.1% annually). However, if State population estimates are correct, much of this growth in the 1970's occurred late in the decade (Table 1.2).

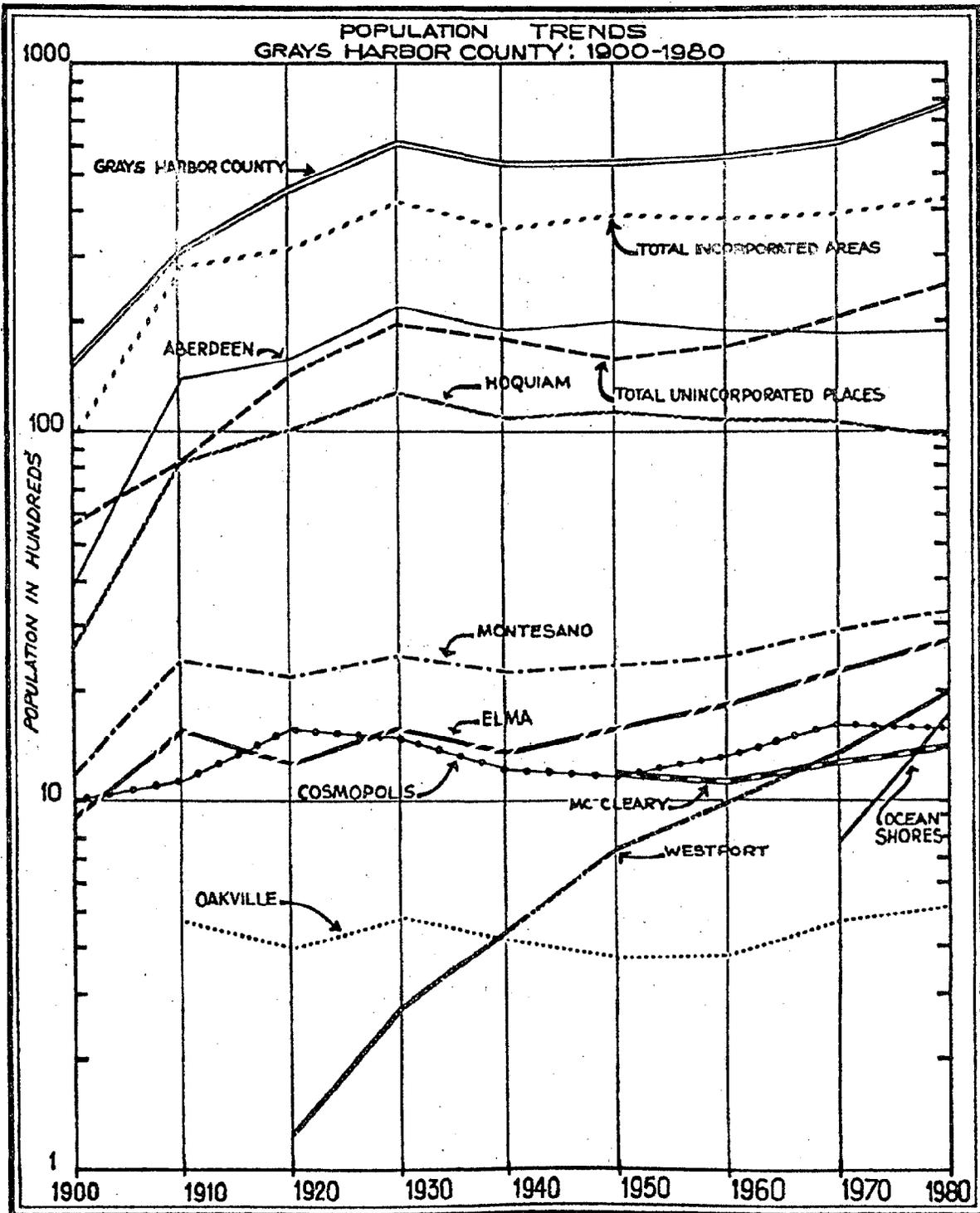
TABLE 1.1
RESIDENT POPULATION

	1930	1940	1950	1960	1970	1980	1981
State	1,563,396	1,736,191	2,378,963	2,853,214	3,413,244	4,113,331	4,248,100
Grays Harbor County	59,982	53,166	53,644	54,465	59,553	66,314	66,800
Grays Harbor County as Percent of State	3.84%	3.06%	2.25%	1.91%	1.74%	1.61%	1.56%

SOURCE: U.S. Bureau of Census.

1981 figures are State estimates.

GRAPH 1.1



While the actual decennial census data for the end of each decade may be viewed as highly accurate, the annual data are estimates and, thus, might be less reliable. Another limitation of relying solely on population data for an analysis of growth is that the annual estimates are made only for the county as a whole and each incorporated city and, consequently, information is not reliable for unincorporated areas. Fortunately, far more accurate information regarding growth is available in the form of residential electrical service connections. While this information is reliable in terms of what it measures, residential electrical services, it is severely limited in its use to determine the population trends. Its major limitation is that the ratio between population and number of households is dropping due to a variety of factors. Consequently, power hookups should be expected to increase faster than population. However, if this distinction between households and population is kept in mind, power hookups can be used as a very important information source regarding growth in the area.

TABLE 1.2
POPULATION AND RESIDENTIAL ELECTRICAL SERVICES BY
GRAYS HARBOR PUBLIC UTILITY DISTRICT

Year	Population Estimates April	Residential Electrical Services Connections April*
1970	59,553	22,919
1971	60,000	23,305
1972	60,000	23,797
1973	60,100	24,274
1974	60,100	24,983
1975	60,200	25,342
1976	60,500	25,760
1977	61,400	26,428
1978	62,300	27,562
1979	63,700	28,677
1980	66,314	29,463
1981	66,800	30,149

SOURCE: Table GH-T.32.16.4, 3/78 as updated and Office of Financial Management.

*Electrical data used here is actual total served by the Grays Harbor Public Utility District. On the other tables averages for several months are used.

Table 1.3 compares the growth of population by official estimates to the actual utility hookups for the same period. Growth in electrical services seemed to spurt between 1971 and 1974, slow between 1974 and 1976, then resurge again since 1977 with a significant degree of growth occurring from 1977-1981. This pattern of higher growth early in this

decade followed by a slowdown (and possible decline in population) in the middle and a resurgence of growth recently should be particularly noted because it will be a recurrent theme when this report addresses land use and development. Growth during the last year has accelerated from the first year of construction.

TABLE 1.3
POPULATION TRENDS AND ELECTRICAL SERVICE TRENDS

Year	Percent Change In Population April to April (Estimates)	Percent Change In Residential Electrical Customers April to April
1970-71	0.8	1.7
1971-72	0	2.1
1972-73	0.2	2.0
1973-74	0	2.9
1974-75	0.2	1.4
1975-76	0.5	1.6
1976-77	1.5	2.6
1977-78	1.5	4.3
1978-79	2.2	4.1
1979-80	4.1	2.7
1980-81	0.7	2.3

SOURCE: Office of Financial Management and previous table.

1.3 East County Growth: It was hoped that the 1980 Census of Population would supply detailed information regarding population change in east county since 1970. However, the Bureau of Census changed most boundaries in the County Census Divisions (CCD) which made direct comparison between censuses very difficult. Due to this change, extensive adjustments based on detailed information have been made for accurate comparisons. As noted, the McCleary area was the fastest growing area in east county followed by the Elma area.

Comparison of Table 1.4 and 1.5 indicates that most of the east county population growth occurred outside the cities where the growth rate was over two times faster than the incorporated areas. This difference was particularly dramatic in the McCleary area.

TABLE 1.4

1970-1980 POPULATION OF STUDY AREA

	<u>1970</u>	<u>1980</u>	<u>Percent Change</u>	<u>Annual Growth Rate(%)</u>
Central Park Area	3,595	4,243	18.0	1.7
Montesano Area (Wynoochee CCD)	5,217	6,253	19.9	1.8
Elma Area (Elma and Malone/ Porter CCD)	4,863	6,523	34.1	3.0
McCleary Area (McCleary CCD)	2,124	2,818	32.7	2.8
Oakville Area (Oakville CCD)	1,134	1,345	18.6	1.7
Total Excluding Central Park	13,338	16,939	27.0	2.4
Grays Harbor County	59,553	66,314	11.4	1.1

SOURCE: U.S. Bureau of Census with 1970 figures adjusted to 1980 CCD boundaries.

TABLE 1.5
POPULATION GROWTH OF EAST COUNTY CITIES

	<u>1970</u>	<u>1980</u>	<u>Percent Change</u>	<u>Annual Growth Rate (%)</u>
Montesano	2,847	3,247	14.0	1.3
Elma	2,227	2,720	22.1	2.0
McCleary	1,265	1,419	12.2	1.2
Oakville	460	537	16.7	1.6
TOTAL	6,799	7,923	16.5	1.6
East County Unincorporated	6,539	9,016	37.9	3.3

SOURCE: U.S. Bureau of Census.

As noted on this table, the City of Elma is the fastest growing of the four cities, averaging an annual growth rate of 2% for the decade with the other cities slightly exceeding a growth of 1% per year.

Tables 1.6 and 1.7 examine east county growth trends in greater detail from another perspective. They present the change and growth in various areas of east county in residential electrical connections.

TABLE 1.6
GROWTH OF RESIDENTIAL POWER SERVICES
1974-1981

Study Area	BEFORE CONSTRUCTION			AFTER CONSTRUCTION			Utility Services 1981
	Utility Services 1974	Total New Connections 1974-1977	Annual Rate Of Growth (%) 1974-1977	Utility Services 1977	Total New Connections 1977-1981	Annual Rate Of Growth (%) 1977-1981	
Central Park*	1,187	38	1.1	1,225	-7	-0.1	1,218
Elma/McCleary Area Total	2,819	237	2.7	3,056	969	7.1	4,025
Elma City	836	130	4.9	966	347	8.0	1,313
McCleary Town	594	6	0.3	600	60	2.4	660
Rural	1,389	101	2.4	1,490	562	8.3	2,052
Montesano Area Total*	2,036	114	1.8	2,154	614	6.5	2,764
Montesano City	1,029	31	1.0	1,060	109	2.5	1,169
Rural*	1,007	83	2.7	1,090	505	10.0	1,595
Oakville Area Total	470	47	3.2	517	88	4.0	605
Oakville City	201	8	1.3	209	13	1.5	222
Rural	269	39	4.6	308	75	5.6	383
Study Area	6,512	436	2.2	6,948	1,664	5.5	8,612
Urban Area	12,225	447	1.2	12,672	673	1.3	13,345
Other Areas**	5,700	615	3.5	6,315	1,371	5.0	7,686
Total County	24,437	1,498	2.0	35,935	3,708	3.4	29,643

SOURCE: Table GH.T.32.16.20 and 22, 10/79 and GH-T.16.28, 1/82.

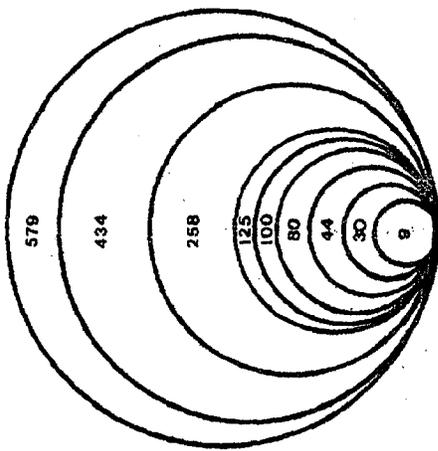
Figures are computed on basis of averages for first half of the year as reported on the referenced tables.
*Adjustments were not made for a route change in Central Park and Montesano rural area in the fall of 1977.
**This includes all remaining areas of the county with the majority of this population being concentrated on the north and south beach areas.

TABLE 1.7
ANNUAL CHANGE IN RESIDENTIAL UTILITY SERVICES
DURING CONSTRUCTION
(Percent)

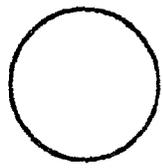
AREA	1977-1978	1978-1979	1979-1980	1980-1981
Central Park	-5.4	2.0	1.3	1.7
Elma/McCleary Area Total	7.7	10.6	4.5	5.8
Elma City	7.3	16.7	1.2	7.3
McCleary Town	1.3	1.5	2.1	4.8
Rural	10.5	10.1	7.6	5.2
Montesano Area Total	13.2	6.5	3.7	2.8
Montesano City	4.8	2.1	2.4	0.7
Rural	21.4	10.3	4.7	4.4
Oakville Area Total	6.8	3.8	4.4	1.2
Oakville City	-0.5	1.9	2.8	1.8
Rural	11.7	4.9	5.3	0.8
Study Area	7.0	7.4	3.8	3.9
Urban Area	2.3	1.8	0.4	0.7
Other Areas	6.1	4.8	5.3	3.9
TOTAL	4.5	4.1	2.6	2.4

This electrical service information has some advantages over population data in that it is available bimonthly and is very detailed. However, it has some disadvantages in that it does not directly measure population growth (it measures households instead) and is available in this detail only since 1974. As indicated on Table 1.6, east county growth increased

LEGEND

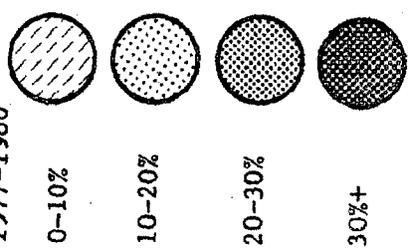


TOTAL AREA GROWTH RATES

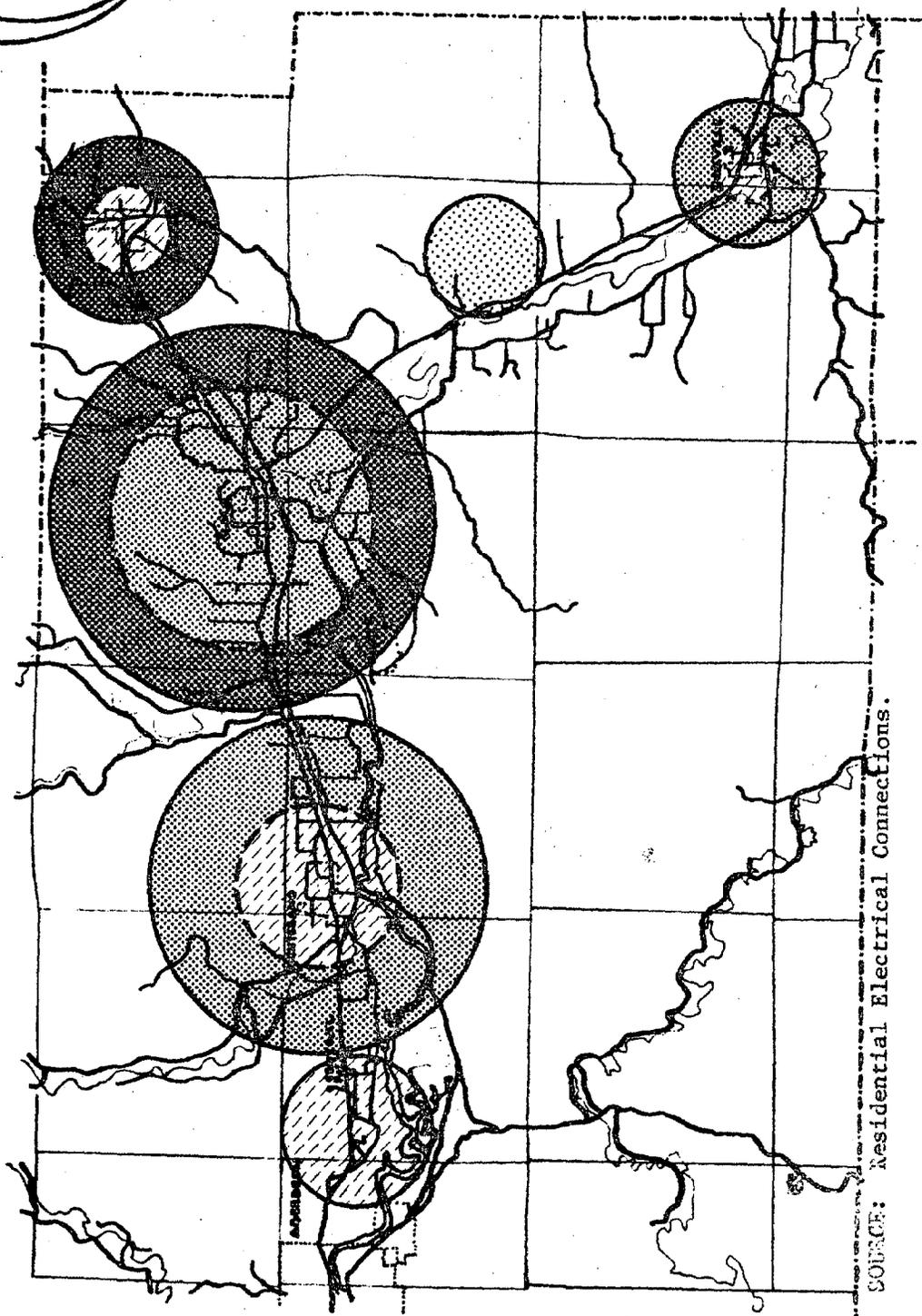


CITY GROWTH RATES

% CHANGE 1977-1980



MAP 1.1
EAST COUNTY GROWTH PATTERNS
1977-1980



SOURCE: Residential Electrical Connections.

substantially since the start of the construction project. Table 1.7 indicates that while this growth was particularly rapid during the first years of construction, it has slacked somewhat during the later years. As in the case of population growth, this growth exceeds the county as a whole and was particularly strong in the unincorporated areas of east county.

As compared to east county, the urban area of the county grew at even a slower rate during the last two years than the prior periods. Also, the remainder of the county (consisting mainly of the beach areas) continues its steady growth in new electrical connections. While this rate continues, data from the U.S. Census for 1980 indicates that many of these new connections may² be second and vacation homes or trailers and not permanent residents.

Comparison of Tables 1.4, 1.5, and 1.6 indicates that growth was not uniform during the entire decade; 1974 to 1977 has slower rates of growth than later in the decade. The highest growth rates occurred during the first two years of construction in the eastern portions of the county.

1.4 Conclusion: After a period of moderate population growth during the late 1960's and probably the early 1970's, population growth again slacked to a slow pace. After a very low growth rate during 1974 and 1975, population growth spurted forward reaching a peak rate of growth during the construction period. This recent growth is occurring most rapidly in the Elma-McCleary area, but over a longer trend the beach communities tend to have a stronger growth rate. The urban area of the county tends to be slowest growing, both over the long and short term.

CHAPTER 1 NOTES

1. The reliability and accessibility of this information is particularly good since there are only two electrical utilities in the county, Grays Harbor County Public Utility District Number 1 and McCleary Light and Power. Both are public agencies, both are members of the Regional Planning Commission, and both are participants in the project. All electrical utility information used in this report was generously supplied by these utilities to the Monitoring Program.
2. There generally was a high discrepancy in the beach areas between recorded utility connections and occupied housing units, while these counts were much more consistent in other parts of the county. Correspondence between the Grays Harbor Regional Planning Commission and the Bureau of Census has led to the conclusion that many of the recorded "residential connections" serve unoccupied trailer spaces and other situations where a "housing unit" by Census definition does not exist.

CHAPTER 2

GENERAL CAUSES OF GROWTH

2. GENERAL CAUSES OF GROWTH

2.1 Introduction: From the preceding chapter it is clear that substantial growth in new households has been occurring in the county since the start of the Satsop Project. Since much of this growth has been focused on east county, there appears to be a relationship to the project. However, quantifying the relationship between this growth and the project is a difficult task due to complex interrelationships between population growth, household formation, economic change, and other factors which influence population growth and how it is manifested. Three major factors would include:

1. The declining average household size;¹
2. General economic growth in the county;² and,
3. The Satsop Project itself.

Since all of these influences are operating within the county, each of these influences on county growth patterns must be understood before the role of the project can be quantified.

2.2 Declining Household Size and Growth: Growth in the number of households is not necessarily the same as growth in population. Population studies have, in fact, demonstrated that households are generally increasing at a faster rate than the rate of population growth. This is generally attributed to several important causes including:³

1. A declining birth rate and hence smaller families;
2. High (and increasing) divorce and separation rates, e.g. a divorce generally creates two households in place of one; and,
3. Changing family structures with young adults and senior citizens forming their own households instead of living with other family members.

The effects of these influences tend to vary from place to place. Past reports have utilized a generally recognized rate of decline in the average household size of 1.42% per year.⁴ This factor can now be evaluated on the basis of 1980 U.S. Census data as compared to Table 2.1. Coincidentally, the 1.42% factor was correct, and this report will continue to use this factor to attribute the effect of the declining household size to population growth. Table 2.2 attributes the amount of county growth that is due to new households formed by population growth by year.

In the county the declining household size accounts for a portion of the increase in the number of households as measured by electrical connections. Table 2.2 portrays the growth which is occurring in the study area beyond that which can be attributed to the decrease in average household size, the net new households. This computation of declining household size is based on an average trend which might be assumed to be an expression of the overall tendency. However, the actual rate of

TABLE 2.1

AVERAGE ANNUAL DECLINE IN RATIO OF POPULATION
PER RESIDENTIAL ELECTRICAL SERVICE, 1970-1980

<u>YEAR</u>	<u>POPULATION</u>	<u>SERVICES</u>	<u>RATIO</u>
1970	59,553	22,919	2.5984
1980	66,314	29,463	2.2507
Percent Change	11.4%	28.6%	-13.3%
Average Annual Percent Change	1.1%	2.5%	-1.4%

TABLE 2.2

HOUSEHOLD SIZE AND HOUSEHOLD GROWTH
IN GRAYS HARBOR

<u>YEAR</u>	<u>ACTUAL APRIL P.U.D. ELECTRICAL SERVICES</u>	<u>PROJECTED AVERAGE HOUSEHOLD SIZE*</u>	<u>CONNECTIONS NEEDED TO MAINTAIN HOUSEHOLD SIZE</u>	<u>NET NEW HOUSEHOLDS SINCE 1970</u>	<u>ANNUAL INCREMENT FROM 1970</u>
1970	22,919	2.5984	22,919	-	-
1971	23,305	2.5615	23,249	56	56
1972	23,797	2.5251	23,584	213	157
1973	24,274	2.4892	23,925	349	136
1974	24,983	2.4538	24,270	713	364
1975	25,342	2.4190	24,619	723	10
1976	25,760	2.3846	24,974	786	63
1977	26,428	2.3507	25,334	1,094	308
1978	27,562	2.3173	25,699	1,863	769
1979	28,677	2.2843	26,071	2,606	743
1980	29,463	2.2519	26,446	3,017	411
1981	30,149	2.2199	26,826	3,323	306
Percent of Net New Households to 1980				13.16%	
Percent Population Growth to 1980				11.4%**	

*1970 ratio of population to electrical connections reduced by 1.42% per year. **13.16% reduced by -13.3% for effect of declining household size in new households.

decrease is highly subject to local conditions which can vary substantially from place to place and time to time. These conditions may include availability of dwellings, social conditions, divorce rates, employment opportunities (especially for the young), etc. As indicated on Table 2.2, the

most rapid growth in net new households occurred after the start of the project in 1977.

Table 2.3 indicates that the increase in the number of households in east county between 1974 and the beginning of the Satsop Project had not been significantly greater than that needed to accommodate the effect of the declining household size. After the start of the project, the increase in households was much greater than that which can be attributed to the decline in household size. While Central Park and the urban area declined, growth rates in east county were very high, followed closely by the beach areas of the county. In east county households grew fast enough to accommodate over a 5% increase in population each year. As indicated on Table 2.3, however, this growth in east county was not evenly spread throughout the construction period. While considerable variation occurred, most of the rapid growth in the study area occurred from 1977 to 1979 when the average annual rate of approximately 6% was well over twice the rate of 1979 to 1981. It is also significant that the peak of growth in the Elma area did not occur until the second year. Also in contrast with the rest of the county, the growth rate in the Elma/McCleary area increased last year over 1979-1980 rates, as did east county slightly.

TABLE 2.3

GROWTH IN RESIDENTIAL ELECTRICAL CONNECTIONS ABOVE
GROWTH ATTRIBUTABLE TO DECLINING HOUSEHOLD SIZE

	BEFORE CONSTRUCTION		DURING CONSTRUCTION	
	Total New	Annual Rate	Total New	Annual Rate
	Connections	of Growth (%)	Connections	of Growth (%)
	1974-1977	1974-1977	1977-1981	1977-1981
Central Park	-13	-0.4	-78	-1.6
Elma/McCleary Area	115	1.3	792	5.9
Montesano Area	26	0.4	489	5.3
Oakville Area	27	1.9	58	2.7
Primary Study Area	155	0.8	1,261	4.3
Urban Area	-81	-0.2	-62	-0.1
Other Areas	369	2.1	1,005	3.8
Total County	442	0.6	2,204	2.1

ACTUAL PERCENT CHANGE DURING CONSTRUCTION

	1977-1978	1978-1979	1979-1980	1980-1981
Central Park	-6.8	0.5	-0.2	0.2
Elma/McCleary Area	6.3	9.4	3.4	4.8
Montesano Area	11.8	5.3	2.6	1.7
Oakville Area	5.4	2.5	3.1	-0.1
Primary Study Area	5.6	6.2	2.6	2.8
Urban Area	0.9	0.4	-1.0	-0.7
Other Areas	4.7	3.5	4.1	2.7
Total County	3.1	2.7	1.3	1.2

SOURCE: Analysis of Tables GH-T.32.16.20 and 22, 10/79 and GH-T.16.28, 1/82. Because of rounding, figures might not tally.

2.3 Economic Change and Growth: A major stimulus to any growth, either in terms of total population or households, can be an increase in employment opportunities. Table 2.4 describes the change in employment in the regional economy which has occurred during the last decade, especially since 1975. This table indicates a dramatic growth in employment since 1975. As shown on Graph 2.1, 1975 was a poor year economically, and much of the growth that has recently occurred may be considered a recovery from that year.⁵

TABLE 2.4
LABOR FORCE AND EMPLOYMENT CHANGE
1975-1980
(ANNUAL AVERAGES)

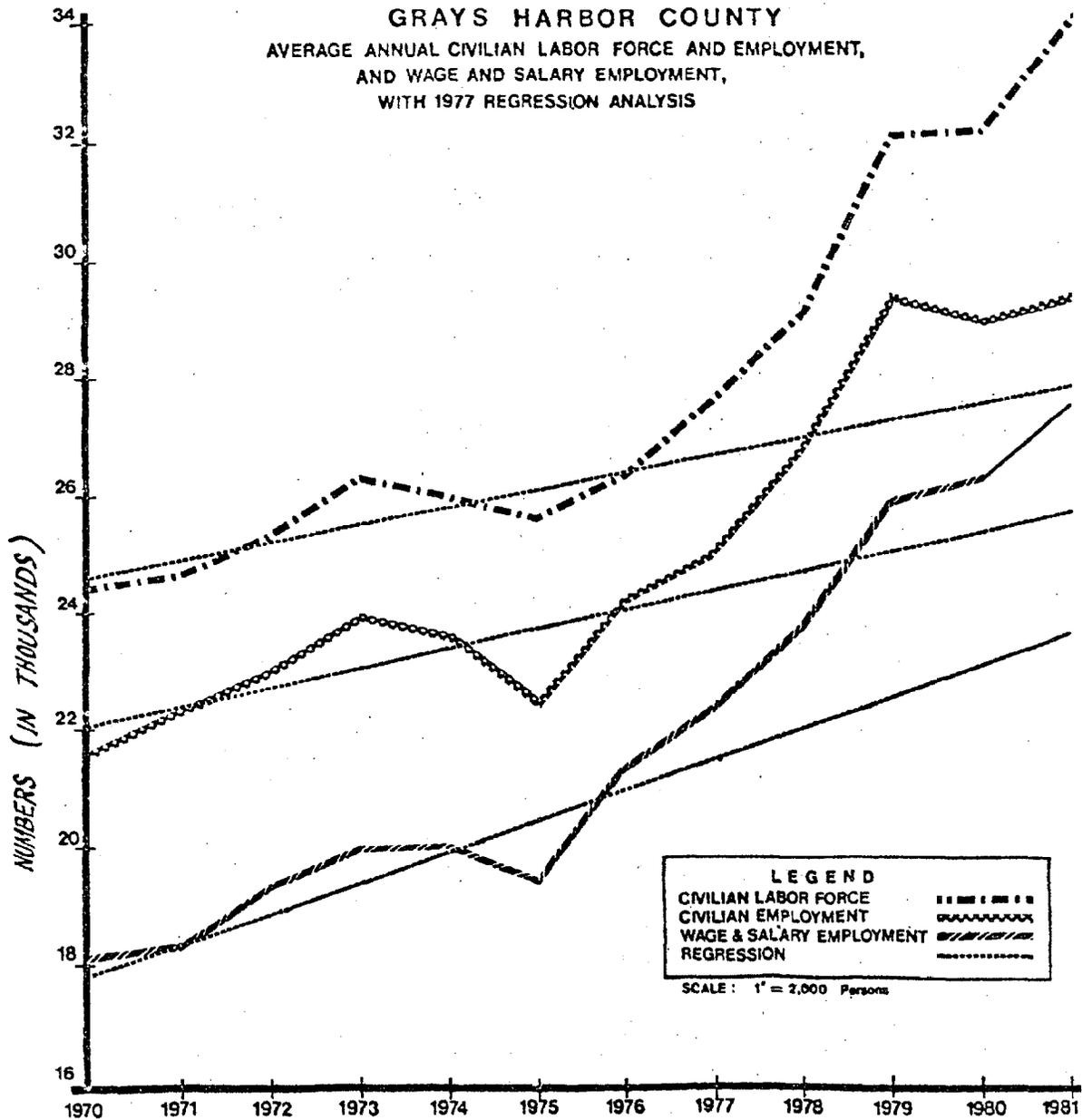
	1970	1975	1977	1979	1980	1975-1980 Number Change	1975-1980 Percent Change
GRAYS HARBOR:							
Labor Force	24,370	25,544	27,540	32,020	32,175	6,631	25.96
Employment	21,570	22,388	24,884	29,250	28,849	6,461	28.86
Unemployment	2,800	3,156	2,656	2,770	3,326	170	5.39
WAGE AND SALARY:							
Wood Products	4,014	4,440	5,530	5,460	4,800	360	8.11
Other Manufacturing	2,776	2,180	2,560	2,440	2,580	400	18.35
MANUFACTURING TOTAL	6,790	6,620	8,090	7,900	7,380	760	11.48
Construction & Mining	730	760	1,200	2,700	3,730	2,970	390.79
Transportation, Communications, and Utilities	1,020	920	1,040	1,190	1,090	170	18.48
Trade	3,550	3,790	4,400	4,710	4,620	830	21.90
Finance, Insurance, & Real Estate	500	500	600	720	700	200	40.00
Service	2,450	3,070	3,540	4,080	4,360	1,290	42.02
Government	3,030	3,640	3,590	4,140	4,480	840	23.08
NONMANUFACTURING TOTAL	11,280	12,680	14,370	17,540	18,980	6,300	49.68
TOTAL WAGE & SALARY EMPLOYMENT	18,070	19,300	22,460	25,440	26,360	7,060	36.58

SOURCE: Tables under Employment Section of various Monitoring Reports.

In order to separate the effect of the economic recovery from the intrinsic long-term growth which might be occurring in the region, a regression analysis was done on the annual average employment between 1970 and 1977 in order to establish the basic trends in employment prior to the construction project. This analysis "averages out" the differences which occur in the economy in any particular year to give a view of the overall trend. The result of this analysis is presented on Graph 2.1. (The regression lines are the straight lines.) This graph portrays, in spite of the poor performance in 1975, an overall growth potential occurring in the economy.

As illustrated on Tables 2.2 and 2.3, growth in net new households in the county has apparently accelerated since the Satsop Project began. In order to examine whether there is a relationship between household growth (especially growth above that which is needed to accommodate a declining household size) and employment growth (especially growth above that necessary to recover from the 1975 recession), Table 2.5 was prepared. This table contrasts the actual employment levels of the county

GRAPH 2.1



Wage and Salary Employment figures are preliminary for 1981.

in 1976, 1980, and 1981 with long-term employment trends as determined by regression analysis. Before the project started, total employment levels in 1976 were almost even with the long-term trend although manufacturing was ahead and nonmanufacturing (especially trade) was lagging. In 1980, the long-term trend in employment levels was significantly exceeded by the actual, though manufacturing lagged far behind. The increase in total employment even accelerated. Preliminary figures for 1981 show that employment growth is still substantially above long-term trends. However, since this data included the Satsop Project, its influence accounts for all the current margin above the long-term trends. (See Graph 2.2.) In fact, without the project, employment levels would have dipped below long-term trends.

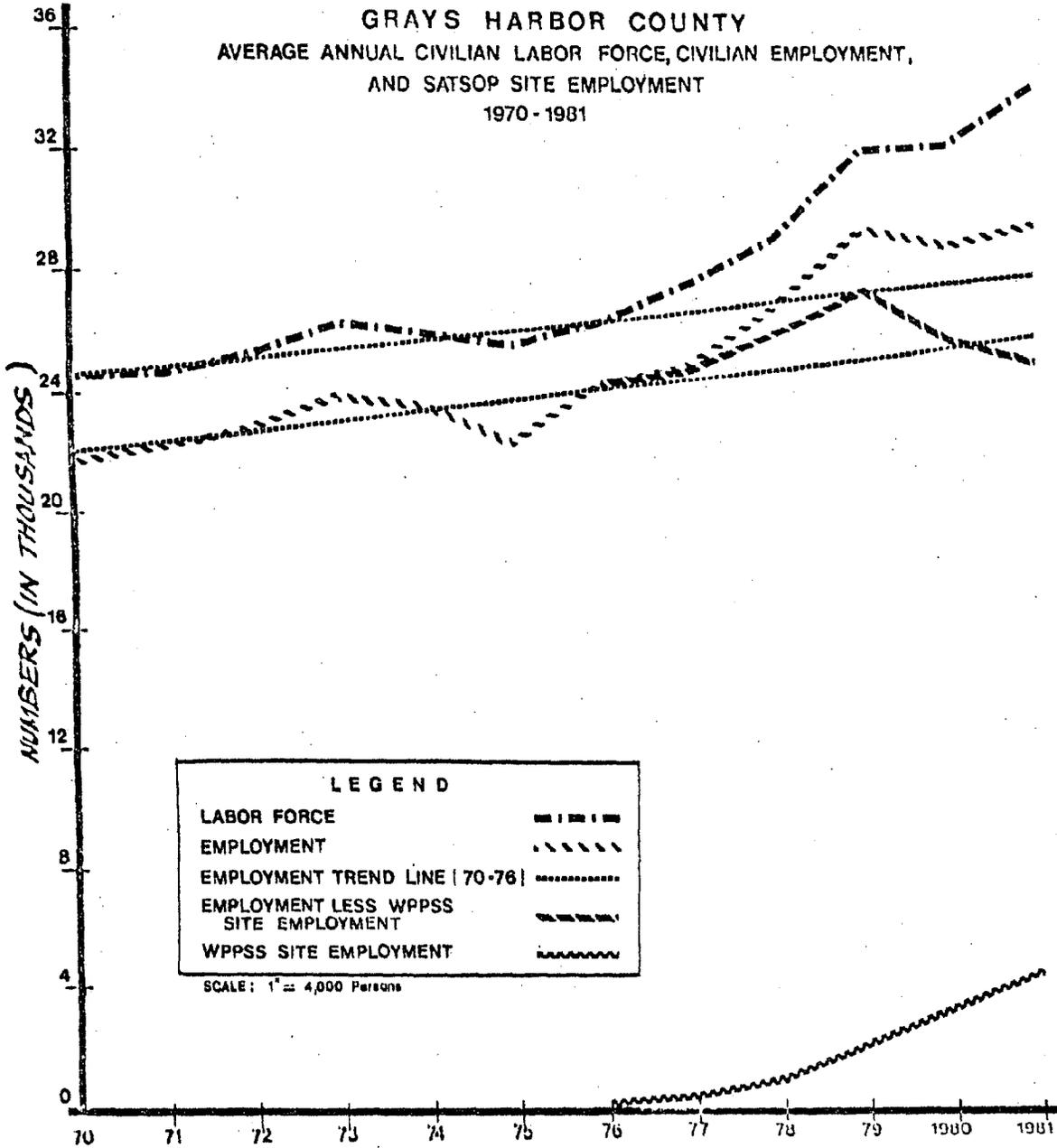
TABLE 2.5
TREND DEVIATION IN EMPLOYMENT AND LABOR FORCE
1976-1981 ANNUAL AVERAGES

	1976			
	Expected	Actual	Number Deviation	Percent Deviation
Labor Force	26,387	26,249	-138	-0.52
Employment	24,055	24,142	87	0.36
Wage and Salary	21,030	21,210	180	0.86
Manufacturing	7,699	7,880	181	2.35
Nonmanufacturing	13,331	13,330	-1	s/1
Trade	4,144	4,060	-84	-2.03
	1980			
	Expected	Actual	Number Deviation	Percent Deviation
Labor Force	27,567	32,175	4,608	16.72
Employment	25,371	28,849	3,478	13.71
Wage and Salary	23,158	26,360	3,202	13.83
Manufacturing	8,348	7,380	-968	-11.60
Nonmanufacturing	14,810	18,980	4,170	28.16
Trade	4,709	4,620	-89	-1.89
	1981*			
	Expected	Actual	Number Deviation	Percent Deviation
Labor Force	27,862	33,987	6,125	21.98
Employment	25,700	29,278	3,578	13.92
Wage and Salary	23,690	27,040	3,350	14.14
Manufacturing	8,510	6,560	-1,950	-22.91
Nonmanufacturing	15,180	20,480	5,300	34.91
Trade	4,850	4,520	-330	-6.80

SOURCE: Tables in various Monitoring Reports under Employment Section. Expected figures were derived from regression analysis. *1981 figures are subject to revision by the Department of Employment Security.

Graph 2.2 portrays the very apparent relationship between the Satsop Project, economic growth in other sectors, and growth. As indicated,

GRAPH 2.2



between 1976 and 1978, direct Satsop employment accounted for less than half the growth in employment above the long-term trends. Since 1979, however, all of the employment above long-term growth trends could be attributed to the Satsop Project. Since, as will be discussed in detail in Chapter 3, this direct Satsop employment also creates a multiplier effect, employment levels would be substantially below long-term trends without the project.

Between 1976 and 1977, a substantial part of the growth in net new households was due to other economic factors than just the Satsop Project. Since 1979, however, the influence of other economic factors would be of negligible importance to net new household formation. Also, between 1976 and 1979, the combined factors of general economic growth and the Satsop Project appear to account (more or less equally) for the very high growth rates in new households that occurred during this period. Since then the loss of general economic growth stimulus led to lower (but still high) growth rates attributable to the project alone.

As employment rises, new entrants to the labor force are needed. New entrants to the labor force can come from three major sources:

1. People may enter the labor force upon the availability of new jobs who generally may not be even seeking work when jobs are not generally available. The largest group of such people are housewives and youth who work periodically. Another group are long-term unemployed people who may be discouraged from looking for work during bad times.
2. Youth may enter the labor force for the first time--for example, after graduation.
3. New in-migrants may be attracted to the area by potential jobs. The more employment grows the more likely that new migrants will be attracted to the area.

Initially, significant growth in employment is likely to draw heavily upon the first two groups. As employment continues to increase, such growth begins to rely on in-migration. The next chapter will assess the role of in-migration to meet employment needs.

In summary, a moderate rate, long-term employment growth was occurring along with a gradual increase in households before the project began. The advent of the construction project coincided with a spurt in employment growth which reflected the recovery from a recession to a longer-term trend of economic growth and an increase in manufacturing activity. The combined effects of general economic growth and the Satsop Project led to an acceleration of household growth during the study period. This is reflected in the spurt of growth in residential utility connections at the same time. As shown on Table 2.3, most of that growth occurred in the east county area and the beach area. Little growth occurred in the urban area though most of the growth in the key economic sectors is concentrated in the urban area (also see Table 2.5). This suggests that at least a portion of the household growth that occurred during the first two years of construction in east county was due to a suburban effect from employment growth in Aberdeen-Hoquiam. As previously noted, economic

growth reversed during the period covered by this analysis, and this situation is not occurring now. The economic influence of the Satsop Project now accounts for all new growth in employment above long-term trends.

2.4 Other General Causes of Growth: There are other causes of household growth than the decline in average household size and employment growth. The most prevalent of these could be an in-migration of retired-aged people. However, other studies by the Regional Planning Commission have indicated that the potential net effect of this influence on population growth in the east county area is minimal.⁷

In addition to the general growth of employment in Grays Harbor County, there has also been a much higher and consistent growth in employment in Thurston County (Table 2.6). This growth, in turn, has resulted in Thurston County having the highest rate of population growth (61.6% from 1970 to 1980) of any county over 50,000 population in the State.⁸ Since the study area is within commuting range to this growth, it is reasonable to assume that a portion of the growth in households in east county during the study period is due to this influence in Thurston County. However, as indicated on Table 2.6, this influence was greatly reduced in 1981, when employment in Thurston County dropped and unemployment increased significantly.

TABLE 2.6
POPULATION, LABOR FORCE, AND EMPLOYMENT
THURSTON COUNTY

	1971	1975	1977	1980	1981
Population	78,700	85,900	101,000	124,264	129,100
Labor Force	35,330	40,235	44,090	51,822	52,430
Employment	32,750	37,242	40,880	47,704	47,272
Unemployment	2,580	2,993	3,210	4,118	5,158
% Unemployed	7.3%	7.4%	7.3%	7.9%	9.8%

SOURCE: Washington State Employment Security Department and various Monitoring tables.

A further factor is the influence of the housing market and supply. When financing for new units is not available, fewer units are constructed. This tends to constrict housing growth which creates a pent-up demand for new housing. When financing becomes available, there then is a tendency for the supply to rapidly catch up with the market creating a relatively fast spurt of growth. Since 1975 was a poor year economically, this factor could have been at work in this area at that time. However, since this "pent-up" demand would only reflect other causes of growth, such as declining household size and employment growth, this factor would only affect the timing and not the ultimate number of new households. This factor is apparently contributing to the slackening in growth in household formation as shown on Table 2.3.

2.5 Conclusions: Prior to the start of the Satsop Project, the principal cause of growth in the number of households in the region was the declining average household size. Since the project began, the growth of new households attributable to new population to the area exceeded this factor. It is also apparent that the growth in population continues to be somewhat related to the general economic growth in both Grays Harbor County and Thurston County.

In the study area the focus of household growth attributable to population growth is clearly in the Elma area. However, the rate of population growth slackened significantly in most other areas of the county during the third year of construction, and has slowed substantially since then.

CHAPTER 2
NOTES

1. Declining household size is also discussed in detail in the Grays Harbor Regional Planning Commission, Grays Harbor Region Housing Element, June 1979.
2. For greater information regarding regional economic conditions during the start of the project, see Grays Harbor Regional Planning Commission, Grays Harbor Overall Economic Development Program, June 1979.
3. See:
 - Office of Fiscal Management (O.F.M.), State Population Trends 1976, Washington State, 1976.
 - O.F.M., State Population Trends, 1977, Washington State, 1977.
 - O.F.M., State Population Trends, 1979, Washington State, 1979.
 - Office of Community Development, 1978 Housing Report, Washington State, 1978.
 - See also Note 1 and 7 of this chapter.
4. While several factors are reported in the literature cited, O.F.M. 1976 op. cit. was used due to data reported in the Grays Harbor Regional Planning Commission, The First Year of the Satsop Project, 1978. A more recent report by O.F.M. in 1979 cited that the national rate is now 1.5% per year.
5. Overall Economic Development Plan, June 1979, op. cit.
6. For an excellent discussion of the relationship between migration and regional economic development see:
 - Hoover, Edgar, An Introduction to Regional Economics, Alfred A. Knopf, New York, 1975.

7. - Grays Harbor Regional Planning Commission, Part One, City of Montesano Comprehensive Plan, City of Montesano, November 1977.
 - Grays Harbor Regional Planning Commission, Part One, City of Elma Comprehensive Plan, City of Elma, September 1978.
 - Grays Harbor Regional Planning Commission, Part One, Town of McCleary Comprehensive Plan, Town of McCleary, September 1978.
 - Grays Harbor Regional Planning Commission, Part One, City of Oakville Comprehensive Plan, City of Oakville, September 1978.
8. Derived from 1980 U.S. Census reports. Only Island and San Juan Counties exceeded Thurston County growth.
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CHAPTER 3

SATSOP PROJECT INFLUENCE ON GROWTH

3.0 SATSOP PROJECT INFLUENCE ON GROWTH

3.1 Introduction: The foregoing discussion has documented that the number of households in the county is increasing, and recent growth has been focused on east county and the ocean beaches. The discussion has suggested that two major underlying causes of this increase can be found occurring in this area:

1. A decreasing average household size; and,
2. A general growth in employment opportunities in Grays Harbor and Thurston Counties.

Within the economic growth of Grays Harbor is the Satsop Project. Since population is focused on the area within the immediate vicinity of the construction project, there may be a relationship between the project and population growth. This chapter will explore this potential relationship.

The Satsop Project is adding large numbers of new jobs to the economy of the area. This increased just during 1981 from 3,556 to a peak of 5,388.¹ The project is currently the largest single employer in the county and at peak was equal to 15.5% of the total county employment. Ordinarily, a new employer of this magnitude would produce a substantial increase in population growth. However, a construction project, by its more temporary nature of employment, may not have as direct a bearing on population growth as many other types of employment.

In practical terms, the impact of a major construction project on population growth is largely a question of whether the construction force tends to be people who commute to the project from residences in other locations or of people who migrate to the construction area.² Furthermore, for the purposes here, the number of people who migrate to Grays Harbor County rather than to neighboring counties is the primary concern for estimating the amount of county growth due to this factor. In-migrating workers also fall into at least two categories: (1) very temporary residents who may reside in rooming houses, recreation vehicles, motels, and other temporary accommodations; and (2) new residents who establish households of a more permanent nature.³ Obviously, the impact of the first group on population growth will be somewhat less significant than the latter, although the first group may create special types of social impacts not necessarily related to household growth (as commuters may likewise produce).

In addition to in-migrating workers are, of course, local residents who gain employment on the project. These residents may impact potential employment and population growth in several possible ways:

1. The employment on the project could reduce any propensity these workers might have to migrate out of the county for employment;
2. These workers may leave another job in the county which needs to be filled; and,

- These two factors plus possible higher incomes for the resident worker would stimulate a multiplier effect creating new jobs.

The Monitoring Program has collected substantial data which can be applied to estimating the number of workers who are residents (both prior residents and new migrants) of Grays Harbor County. While other means have been used in the past, the main source of information now used is a computerized worker survey conducted by WPPSS of persons hired. This information was developed to identify in-migrating workers and workers who were residents of the area prior to the start of the Satsop Project. To identify in-migrants, survey respondents were asked to indicate whether they moved to their present address since the start of the project.⁴

The WPPSS' worker survey also makes it possible to go one step further and separate those in-migrants who would be very temporary residents as it requested information regarding type of living quarters where each worker resided. If it were assumed that those residing in motels/hotels, rooming houses, and recreation vehicles would be transient, temporary residents, these then can be subtracted to identify more permanent residents of the area. This tends to underestimate transients since many apartment and mobile home renters could also fall into this category.

As indicated on Table 3.1, a large number of Satsop Project workers are residents of the county; 32% of the total work force. Of these, about one-fourth (28%) are transient, while another quarter (24%) were residents of the county prior to the start of the Satsop Project. Almost half (48%) of the workers who are now residents of the county are in-migrants to the county who are residing in permanent type of structures.⁵

Elma has the largest proportion of workers residing within the county (41%) with Aberdeen having the second highest (22%). However, in both of these areas a large proportion of these workers are transients (41% in Elma and 30% in Aberdeen). Elma also has the highest number of "permanent" in-migrants while the Aberdeen area has the highest number of prior residents. While 71% of all new in-migrants moved to the eastern part of the county, only 53% of the prior residents reside in this area.

TABLE 3.1
DISTRIBUTION OF SATSOP PROJECT LABOR FORCE
GRAY'S HARBOR COUNTY
JUNE 1981

AREA	DISTRIBUTION OF ALL WORKERS	TRANSIENTS	NON-TRANSIENT IN-MIGRANTS	TOTAL IN-MIGRANTS	LOCAL RESIDENTS
Primary Study Area					
Elma	710	288	314	602	109
McCleary	115	4	89	92	23
Montesano	230	54	105	159	71
Onkville	55	0	47	47	8
Satsop	41	17	16	33	8
Subtotal	1,152	362	570	933	219
Urban Area					
Aberdeen	379	112	129	241	138
Hoquiam	102	8	55	63	39
Cosmopolis	21	6	4	10	10
Subtotal	502	126	189	314	187
Other Grays Harbor County Areas	68	0	60	60	9
TOTAL GRAYS HARBOR COUNTY	1,722	488	819	1,306	415
TOTAL WORKERS ON SITE	5,388				

SOURCE: Estimates by Grays Harbor Regional Planning Commission based on WPPSS' Work Force Survey data. Numbers may not tally due to rounding.

3.2 Secondary Effect of Project Construction: The "secondary effect" of a project is derived from the economic base theory of how regional economies function. The concept of regional economics observes that the economy of any region must be analyzed as a part of a larger national economy. A region supports itself by producing something it can sell to other areas. This income is then used to buy things the region needs. While in the process of this trading with other areas, there is also usually an exchange of goods and services among local people. (A grocer buys his goods wholesale in other areas and in turn sells them to local people.) The basic character of the economy of a region is determined by this trading relationship with other areas.

In order to buy what it needs or wants, a region must first be able to sell something to earn its income. This thing that is sold must be something with which the region can effectively compete with other areas in selling and, consequently, must relate to the particular or unique qualities of the region. The ability to effectively compete with other areas in a particular good or service is referred to as the region's "comparative advantage." Since this ability to compete and sell something is what the economy depends upon, such activities are considered "basic" economic activities to the region. Activities which in turn depend on basic activities, or which rely on the region for its market, are considered "non-basic" activities. Since non-basic activities depend upon basic activities, an expansion in basic sectors will generally lead to expansion in non-basic sectors. The degree to which basic activities support non-basic activities is measured by the relationship or ratio of non-basic activities to basic activities (measured either by employment or money). This ratio is called the "multiplier effect."⁶

Under this concept, employment on the Satsop Project can be viewed as basic employment which produces income for the region to support other economic activities. However, since much of this employment consists of commuters or very temporary residents, there is a rapid drain of this income from the county to other areas which has little affect on Grays Harbor County. For this reason, only resident project workers will be considered as basic employment in the county, and commuters will be ignored for the purposes of this analysis.

The first step in identifying the secondary effect of this resident employment is to establish an understanding of the existing basic/non-basic character in the regional economy. The Grays Harbor Regional Planning Commission has analyzed this character on the basis of the 1970 Census of Population, and the results of that analysis are summarized in the 1979 edition of the Grays Harbor Overall Economic Development Plan. That analysis estimated that as of 1970 each basic job (primarily in forest products, agriculture, tourism, and seafoods) supported another 1.5 non-basic jobs. (This ratio compares to another analysis of the regional economy based on 1970 Census data which yielded a result of between 1.1 and 1.7). The Grays Harbor Regional Planning Commission has estimated that this ratio increased from 1970 to 1978 from 1.5 to 1.85.⁷ This methodology has also been applied to recent economic trends in previous analyses of the Satsop Project by the Grays Harbor Regional Planning Commission. The analysis for the third year of the Satsop Project, based on 1979 employment data, estimated that since the start of the project each new basic job in the economy had created 1.28 non-basic jobs.⁸

In a growing economy the stimulus of a construction project will create an economic stimulus in addition to the stimulus of other economic sectors. However, if other sectors no longer produce this stimulus, the economic stimulus of a construction project will instead serve to maintain existing non-basic jobs. During the early stages of the Satsop Project, the general economic growth of the county made it possible to apply the economic base theory in its usual form rather directly. However, when other basic economic sectors started slowing down and even declining after 1979, the situation became more complex. If the rest of the county is no longer providing growth incentives, the stimulus of the project may be assisting to maintain present economic conditions in addition to providing a growth stimulus. In other words, if other basic economic sectors decline, some of the secondary impact of the project would be going to maintaining existing jobs instead of creating new jobs. One of the implications of this is that the full secondary effect of the project is difficult if not impossible to measure since some of it would be "hidden" in past employment levels. Fortunately, the early stages of this project occurred while other economic sectors were growing. As noted above, this made it possible to measure a multiplier effect. If it were assumed that this effect was still occurring even while other sectors were declining, it is then possible to apply this earlier factor (1.28 non-basic jobs for every basic job) to current employment to estimate the multiplier effect of the project on county growth patterns.

Applying this 1.28 factor to the amount of basic employment supported by the project in June 1981 will yield the amount of secondary jobs supported by the project. Since in June 1981 there were 1,722 county residents employed on the project (Table 3.1), there were 2,204 secondary jobs attributable to the project.

3.2.1 Migration for Secondary Jobs: An increase in secondary employment does not automatically yield the same increase in new households since each new family, on the average, has more than one potential labor force entrant. Based on 1970 Census information and computations in A Framework for Projecting Employment and Population Changes Accompanying Energy Development by the Argonne National Laboratory, each household in Grays Harbor County has 1.3 labor force participants.⁹ This factor can then be applied to the estimated secondary jobs created by the Satsop Project, plus the number of in-migrating workers (excluding transient workers), to derive an estimate of all in-migrating households formed in the county due to the project. These computations yield a total of 2,325 in-migrating households.¹⁰ Of these workers, 819 have at least one permanent Satsop worker which leaves 1,506 secondary households (Table 3.2 and 3.3).

3.2.2 Distribution of Secondary Workers: Once the number of in-migrating secondary worker households attributable to the project is determined, the next task necessary to measure the impact of the project on growth patterns is to distribute these secondary households to various areas of the county. Unlike the construction workers, there is no way to identify in-migrating secondary workers who are attributable to the project and, hence, to measure residence patterns. However, the residential location of such workers would probably be influenced by two major factors: (1) the location of new households (or the opportunity

to reside), and (2) the residential location of Satsop construction workers (or the location of the economic stimulus). If these factors are equally weighed, a distribution can be estimated.¹ Table 3.2 presents the in-migrating construction workers and the secondary workers and then converts this result to in-migrating households in each area. Table 3.3 evaluates these data in terms of distribution between various areas of the county.

TABLE 3.2
PRIMARY AND SECONDARY EMPLOYMENT IN-MIGRATION
AND
ESTIMATED HOUSEHOLDS
JUNE 1981

AREA	NON-TRANSIENT IN-MIGRANTS	SECONDARY WORKERS ¹	IN-MIGRATING HOUSEHOLDS ²
Primary Study Area			
Elma/McCleary/Satsop	419	901	1,015
Montesano	105	316	324
Oakville	47	66	86
Subtotal	570	1,283	1,426
Urban Area	189	463	501
Other Gray Harbor Areas	60	458	398
TOTAL GRAYS HARBOR COUNTY	819	2,204	2,325

¹Estimated on the basis of a County-wide multiplier of 1.28 distributed equally on the basis of new household formation and location of Satsop workers.

²Estimated on the basis of 1.3 workers per household.

Numbers might not add because of rounding.

SOURCE: Grays Harbor Regional Planning Commission analysis of WPPSS' Worker Survey data.

TABLE 3.3
DISTRIBUTION OF SATSOP PROJECT GROWTH STIMULUS
JUNE 1981

AREA	NUMBER OF UNITS DUE TO DIRECT IMPACT	NUMBER OF UNITS DUE TO INDIRECT IMPACT	NUMBER OF UNITS DUE TO PROJECT	PERCENT OF TOTAL UNITS IN AREA RELATED TO PROJECT	DISTRIBUTION OF PROJECT IMPACT (PERCENT)	RATIO OF NON-BASIC HOUSEHOLDS TO BASIC
Primary Study Area						
Elma/McCleary/Satsop	419	597	1,015	25.22	43.67	1.42
Montesano	105	219	324	11.73	13.94	2.09
Oakville	47	40	86	14.29	3.72	0.85
Subtotal	570	855	1,426	19.28	61.33	1.50
Urban Area	189	313	501	3.44	21.56	1.66
Other Grays Harbor Areas	60	338	398	5.18	17.12	5.68
TOTAL GRAYS HARBOR COUNTY	819	1,506	2,325	7.84	100.00	1.84

SOURCE: Grays Harbor Regional Planning Commission analysis of WPPSS' Worker Survey data.

Also see Table 1.6 in Chapter 1. Numbers might not add because of rounding.

Table 3.4 applies these estimates to the estimates of net new households to identify the amount of growth that occurred in each area which may be attributable to the effect of the project. As indicated, the project accounted for all of the growth in several areas of the county. It is clear, for example, that the urban area would have lost population if it were not for the presence of the project and its economic stimulus. Indeed, all of the estimated new growth in this area can be attributed to just the construction workers themselves. The Oakville area was similarly affected. Only in the beach areas and in Montesano was the stimulus of the Satsop Project not sufficient to account for all the growth in those areas.

The Elma/McCleary area was the most heavily affected area with all of its 1,015 units accountable to the project. Forty-one percent (41%) was attributable to direct impact. Forty-four percent (44%) of all county in-migrant workers attributable to the project located in the Elma area. The next heaviest affected area was the urban area with 22% of the workers. While many of the units attributable to the project are located in the urban area, these units comprised a very small proportion of the total units (3%). On the other hand, one-fourth of all housing units in the Elma/McCleary area are related to the project. About 5% of the units in the rest of the study area were so attributed. As can be seen, the Satsop Project has had a very significant impact on county growth patterns.

TABLE 3.4
GROWTH IMPACT OF SATSOP PROJECT
JUNE 1981

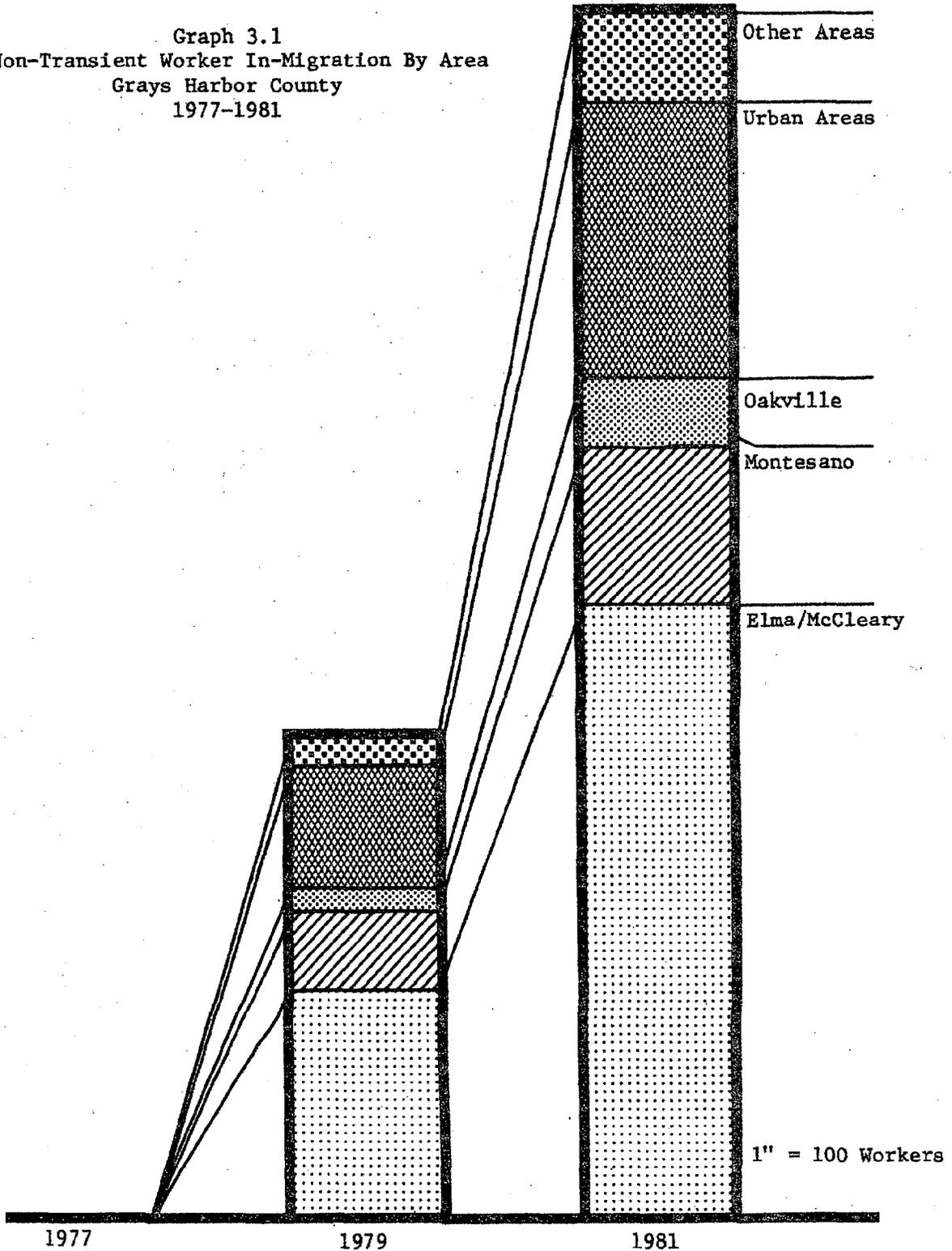
AREA	PERCENT OF AREA GROWTH DUE TO DIRECT IMPACT	PERCENT OF AREA GROWTH DUE TO IN-DIRECT IMPACT	TOTAL PERCENT OF AREA GROWTH DUE TO PROJECT
Primary Study Area			
Elma/McCleary/Satsop	52.89	75.35	128.24
Montesano	21.44	44.81	66.25
Oakville	80.66	68.40	149.06
Subtotal	42.60	63.89	106.49
Urban Area	-134.40	-222.94	-357.34
Other Grays Harbor Areas	5.93	33.68	39.61
TOTAL GRAYS HARBOR COUNTY	37.15	68.37	105.52

NOTE: Negative numbers indicate that the number of new households was not enough to compensate for decline in average household size.

SOURCE: Grays Harbor Regional Planning Commission analysis of WPPSS' Work Force Survey and public utility data. Also see Table 1.6 in Chapter 1.

3.3 Stages of Growth During Project Construction: As indicated in Chapters 1 and 2, the growth patterns of the county have varied considerably during the project period. During the first two years of the project, growth was much more rapid than later stages. In contrast to this, and earlier expectations, the amount of workers in-migrating to the area to work on the project increased during the second two years, even though overall county growth rates declined. Graph 3.1 and Table 3.5 illustrate worker migration patterns over these two time periods. In all areas of the county, the in-migration rate substantially increased during this latter period. This further supports the conclusion that other economic sectors were contributing to the rapid population growth as much as the

Graph 3.1
 Non-Transient Worker In-Migration By Area
 Grays Harbor County
 1977-1981



1977
 SOURCE: Tables 3.3 and 3.6

1979

1981

GHRPC 5/82

TABLE 3.5
DISTRIBUTION OF HIRES ON THE SATSOP PROJECT
AS PERCENT OF TOTAL NEW HIRES

AREA	BETWEEN 1977-1979		BETWEEN 1979-1981	
	IN-MIGRANTS*	PRIOR RESIDENTS**	IN-MIGRANTS*	PRIOR RESIDENTS**
Primary Study Area				
Elma	8.5	3.4	11.7	1.4
McCleary	1.4	0.7	1.9	0.4
Montesano	2.9	2.2	3.1	1.1
Oakville	0.7	0.2	1.0	0.2
Subtotal	13.9	6.6	18.5	3.2
Urban Area				
Aberdeen	3.1	2.8	4.7	2.3
Hoquiam	1.8	0.8	1.1	0.8
Cosmopolis	0.1	0.2	0.2	0.2
Subtotal	5.0	3.8	6.0	3.3
Other Grays Harbor Areas	0.7	0.2	1.1	0.2
TOTAL GRAYS HARBOR COUNTY	19.6	10.6	25.5	6.8

* Includes transients.

** Defined as resident of the area prior to the start of the project.

SOURCE: Grays Harbor Regional Planning Commission analysis of WPPSS' Work Force Survey data.

Satsop Project between 1977 and 1979. It is interesting to note that while the rate of hiring prior residents decreased in east county, it remained about the same in the urban area. In order to portray this shift in growth stimulus and its impact on the various areas of the county, Table 3.6 was prepared. Also see Graph 3.1.

TABLE 3.6
GROWTH IMPACT OF SATSOP PROJECT TO 1979

AREA	NUMBER OF UNITS DUE TO DIRECT IMPACT	NUMBER OF UNITS DUE TO INDIRECT IMPACT	TOTAL NUMBER OF UNITS DUE TO PROJECT	PERCENT OF AREA GROWTH DUE TO DIRECT IMPACT	PERCENT OF AREA GROWTH DUE TO INDIRECT IMPACT	TOTAL PERCENT OF AREA GROWTH DUE TO PROJECT
Primary Study Area						
Elma/McCleary/Satsop	156	223	379	31.49	44.92	76.41
Montesano	52	102	154	13.59	26.68	40.27
Oakville	16	16	32	38.26	39.99	78.26
Subtotal	224	341	565	24.35	37.12	61.48
Urban Area	84	135	219	101.99	163.66	265.65
Other Grays Harbor Areas	17	112	129	3.13	21.24	24.36
TOTAL GRAYS HARBOR COUNTY	324	588	913	21.21	38.46	59.68

SOURCE: Grays Harbor Regional Planning Commission analysis of WPPSS' Work Force Survey and public utility data.

Numbers might not add because of rounding.

This table applies the same system of analysis described previously to the 1979 work-force data. Comparison of Table 3.6 to Table 3.4 indicates a significant increase in the impact of the Satsop Project during the last two years. As of 1979, the project accounted for only 60 percent of the total county growth, but by 1982 it was able to account for all the growth since 1977. This indicates that during the last two years population would have declined were it not for the project. In several areas of the county, the impact of the project significantly accelerated. In the Elma area the number of households attributable directly to the construction workers increased from 156 in 1979 to 419 in 1981. Similarly, an increase occurred from 17 in 1979 in other areas of Grays Harbor County to over 60 in 1982. Overall, new households attributable directly to project workers increased from 324 in 1979 to 819 in 1981. The indirect impact increased from 588 to 1,506. In all, the impact of the project more than doubled between 1979 and 1982.

3.4 Conclusion: The stimulus of the Satsop Project can account for all of the net growth of the county that has occurred since it started construction in 1977. Within the county, however, this relationship varies between areas where the stimulus of the Satsop Project could account for more than all the growth that has occurred to areas where it may account for only a small share of the growth. Much of the relationship of the project to county growth patterns is due not only to the stimulus of this project but also to the loss of other economic stimulus during the last two years. While the project now can account for all the net growth in the economy, it only accounted for about 60% of the growth between 1977 and 1979.

Much of the growth stimulus of the project was focused on the Elma/McCleary area where 44% of the project's impact could be accounted. This stimulus accounts for 25% of all housing units in the Elma/McCleary area. The beach area of the county, on the other hand, received only 17% of the total impact of the project, and almost all of this was in the form of secondary influences. It is apparent from an analysis of the stages of growth during construction that the impact of a major construction project on an area is related to the interaction of other economic stimulus in the regional economy.

CHAPTER 3 NOTES

1. Various manpower reports furnished by the Supply System. June 1981 has proven to be the peak of the construction labor force.
2. Community Development Service Inc., op. cit. (Introduction, Note 2).
3. Community Development Service Inc., Socioeconomic Impact Study WNP-1 and WNP-4, Volume 4, Final Report, Washington Public Power Supply System, May 1979.

4. All known hiring data have been used to prepare these estimates. Until July 1980, Grays Harbor Regional Planning Commission routinely compared the lists of workers employed on the project with 1977 telephone books in the impact area. The results of this comparison were then adjusted to account for people who would be unlisted, have common names, or likewise not be readily identifiable. This proved to be a reasonable estimate of worker in-migration. The results of this process were reported each quarter in each Monitoring Report. However, the method was abandoned in 1980 primarily because of its expense. Instead, the "movedate" question described in the text of this report was substituted and is currently used as the means to make this analysis. During the first half of 1980, both methods were employed to establish whether they would produce similar results. This comparison indicated that generally the two methods yielded similar results. This analysis employs the results of both methods over the life of the project.
5. It should be noted that the method used by the Grays Harbor Regional Planning Commission classifies anyone who physically moved into the area after the start of the project as an in-migrant. This differs from the Washington Public Power Supply System's (WPPSS) methodology reported in the Monitoring Reports. WPPSS' method is based on the workers' response in the work force survey to a question regarding whether the worker moved to the area to work on the project. Since such a move can be based on a variety of motivations, these methods measure different issues. The Grays Harbor Regional Planning Commission staff feels that the physical move is what is important, not the motivation.
6. While the concept of secondary impacts and multipliers is almost universally accepted among those responsible for analyzing the impact of projects, it receives extensive criticism from literature relating to regional economics. A particularly strong criticism is voiced by Harry W. Richardson in Regional Economics, University of Illinois Press, Urbana, 1979, where he discusses this concept more for its "nostalgia" than for its "potential" (p. 83). A more moderate and useful discussion is found in Edgar Hoover's text, an Introduction to Regional Economics, Alfred Knopf, New York, 1975. In spite of these theoretical objections to this concept, it is still the most used (indeed, the only one used) method of estimating the total effect of a major project. This is probably due to practical limitations and the expense of any other type of analysis. While we are then left with relying on this concept for practical reasons, its crudity, as correctly noted in the theoretical literature, must be kept in mind. It is interesting to note that Richardson's text speaks to the stimulative effect of investment on regional growth. He refers to this as the "dynamo of growth" and as being particularly overlooked in regional economic analysis (p. 132). With this in mind, the "investment" aspect (both directly in the project and indirectly in such things as housing, business development, and government facilities) of this project far exceeds the employment aspect upon which the analysis in this report rests. In other words, the reliance on employment as the indicator of growth (or secondary effects) is likely to be an understatement from the logic presented by Richardson.

7. Erik J. Steneham and James E. Metzgor, A Framework for Projecting Employment and Population Change Accompanying Energy Development, Phase II, Argonne National Laboratory, Argonne, Ill., 1976, and Overall Economic Development Plan, op. cit. (Chapter 2, Note 2).
 8. Grays Harbor Regional Planning Commission, The Third Year of the Construction Project and Socioeconomic Change in Grays Harbor County, April 1981. In that report the actual change is estimated in basic and non-basic employment between 1977 and 1979, and this change was used to establish the ratio. For every basic job added to the economy during that period, 1.28 non-basic jobs were also added.
 9. Erik J. Steneham, op. cit.
 10. There were 819 non-transient in-migrants (Table 3.1) who presumably would create households. This number added to the 2,204 secondary jobs yields 3,023 in-migrating workers in households. This divided by 1.3 yields 2,325 households. See Table 3.2.
 11. The Grays Harbor Regional Planning Commission computer program developed to make this analysis has explored the implications of other assumptions. Based upon a subjective analysis of the results, these factors were selected as a reasonable portrayal of the influence of the Satsop Project.
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CHAPTER 4

LAND USE AND DEVELOPMENT CHANGES

4. LAND USE AND DEVELOPMENT CHANGES

4.1 Introduction: Since a major construction project may stimulate land development activity, such activity has been closely monitored. Change in land use patterns which may be produced by induced growth and other effects of the Satsop Project could be one of the most lasting results of this construction project.

Land development activities and land use changes proceed along a logical sequence of events through the obtaining of proper zoning for an anticipated use, partitioning of land for sale, acquiring any necessary zoning permits, and obtaining a building permit. Of course, any of these particular steps may or may not be needed for all development or for any particular development or use of land. However, when growth occurs one may expect all these activities to increase. The early steps (zone changes and land divisions) should occur well in advance and, indeed, are usually expected to be the first signs of a potential change in the actual use of land. These early activities may occur only on the basis of an expectation that growth may occur.

4.2 Zoning: Good records of zone changes are available only for the unincorporated area jurisdiction of the Grays Harbor County Planning Department. This, however, does not pose a serious problem since it is in the unincorporated area where it is generally necessary to obtain a zone change as a prelude to development. Table 4.1 summarizes the activity that has occurred over the last nine years. Several points are significant:

1. While east county has been the focal point for zoning attention over the past nine years, the greatest activity inside this area occurred during 1978. There was a decrease in zoning changes in 1980, although 1980 zoning changes were still double the 1977 level.
2. While there was an increase in zoning activity in the east county area during 1977 (the first year of construction), it was not as pronounced nor as high as it was in 1973. In 1978, however, the increase was dramatic.
3. While almost all zoning changes from 1977 to 1981 in east county were to more intense use classifications (mostly conversion of agricultural areas), the opposite was true in 1976 when all zoning changes were to a less intense use. These could indicate that the threat of development pressure may lead some land owners to seek greater protection.
4. The greatest impact of zoning changes has been the loss of agricultural areas to other potential uses.¹
5. Rezoning activity had not yet increased significantly by the end of 1977, but in 1978 a sharp increase occurred. This was well after the start of the Satsop Project.

6. The overall pattern of zoning activity consisted of a rapid increase in conversions to more intense use as the project started. Then, while still high, it moderated somewhat.

TABLE 4.1
ZONING CHANGES²
GRAYS HARBOR COUNTY
1973-1981

	1973	1974	1975	1976	1977	1978	1979	1980	1981	TOTAL CHANGES
EAST COUNTY										
TOTAL CHANGES	10	5	4	5	8	22	20	16	21	111
Changes to More Intense Use:										
From Agriculture	7	3	2	-	7	20	18	15	13	85
From General Development	6	3	2	-	5	17	15	10	9	67
From Other	1	-	-	-	-	1	-	1	2	5
From Other	-	-	-	-	2	2	3	4	2	13
Changes to Less Intense Use:										
To Agriculture	3	1	1	5	-	2	2	1	2	17
To General Development	-	-	1	2	-	1	-	-	-	4
To Residential	2	1	-	2	-	-	1	-	1	7
To Other	1	-	-	1	-	1	-	1	1	5
To Other	-	-	-	-	-	-	1	-	-	1
Same Intensity	-	1	1	-	1	-	-	-	6	9
OTHER AREAS OF COUNTY TOTAL CHANGES										
More Intensive	2	1	1	1	4	6	6	4	6	31
Less Intensive	1	-	1	-	3	5	5	2	6	23
Same Intensity	-	1	-	1	1	-	1	1	-	5
Same Intensity	1	-	-	-	-	1	-	1	-	3

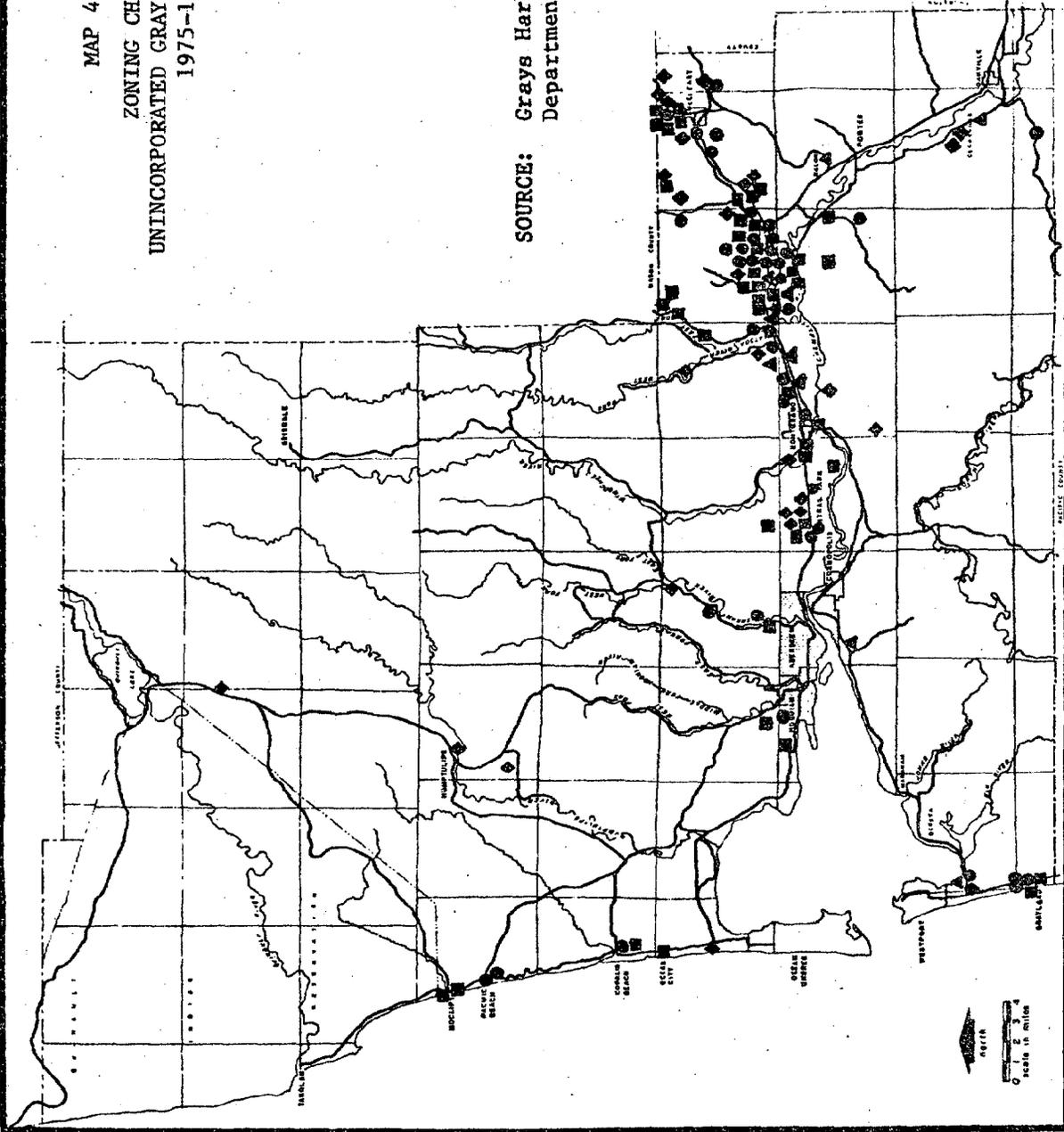
SOURCE: Monitoring Tables GH-T.9.48, 10/80, and GH-T.9.76, 4/82.
Figures include only unincorporated Grays Harbor County activity.

Zoning changes are illustrated on Map 4.1. This map clearly demonstrates the focus of this activity in the Elma area.

MAP 4.1
 ZONING CHANGES
 UNINCORPORATED GRAYS HARBOR COUNTY
 1975-1981

SOURCE: Grays Harbor County Planning
 Department.

▲ 1975 And 1976
 ● 1977 || 1978
 ■ 1979 || 1980
 ◆ 1981



4.3 Land Divisions: For various reasons not completely understood, actual subdivisions of land (division of land into more than four separate parcels) had been fairly rare in this county from 1972 to 1978. As recorded by the Assessor, as of January 1978 there had been only one approved subdivision in east county since 1972 (10 lots inside McCleary). Prior to 1978, the last subdivision in the unincorporated area of the county was in the north beach area (42 lots) in 1973. In 1978, however, six subdivisions of 76 lots were recorded with 63 of those lots being in east county. This surge of subdivision activity apparently subsided in 1979 in east county, but increased in other parts of the county, primarily in Ocean Shores. Renewed subdivision activity occurred in 1980 in east county but halted again in 1981.

Subdivision, however, is not the only method of land division. Short platting involves the creation of four or less lots out of one parcel. In east county, activity had been increasing until 1980 when a slight decline occurred. Activity picked up again in 1981. East county activity comprises much of the activity in the county (69% since the start of the Satsop Project). Since requirements and standards are less demanding for short plats than for subdivisions, the reliance by potential developers on short platting rather than subdividing indicates that lower quality, but less intensive, lots are generally being created.

TABLE 4.2
SUBDIVISION LOTS CREATED
(Excluding Condominiums)
GRAYS HARBOR COUNTY
1974-1981

	LOTS			TOTAL SUBDIVISIONS
	EAST COUNTY	OTHER	TOTAL	
1974	0	0	0	0
1975	10	0	10	1
1976	0	13	13	1
1977	0	0	0	0
1978	63	13	76	6
1979	0	56	56	5
1980	31	18	49	2
1981	0	40	40	1

SOURCE: Monitoring table GH-T.9.46, 10/80, and GH-T.9.74, 4/82.

TABLE 4.3
SHORT PLAT LOTS CREATED
GRAYS HARBOR COUNTY
1975-1981

	East County	Other	Total
1975	18	17	35
1976	26	6	32
1977	49	24	73
1978	79	22	101
1979	86	16	102
1980	74	36	110
1981	83	68	151

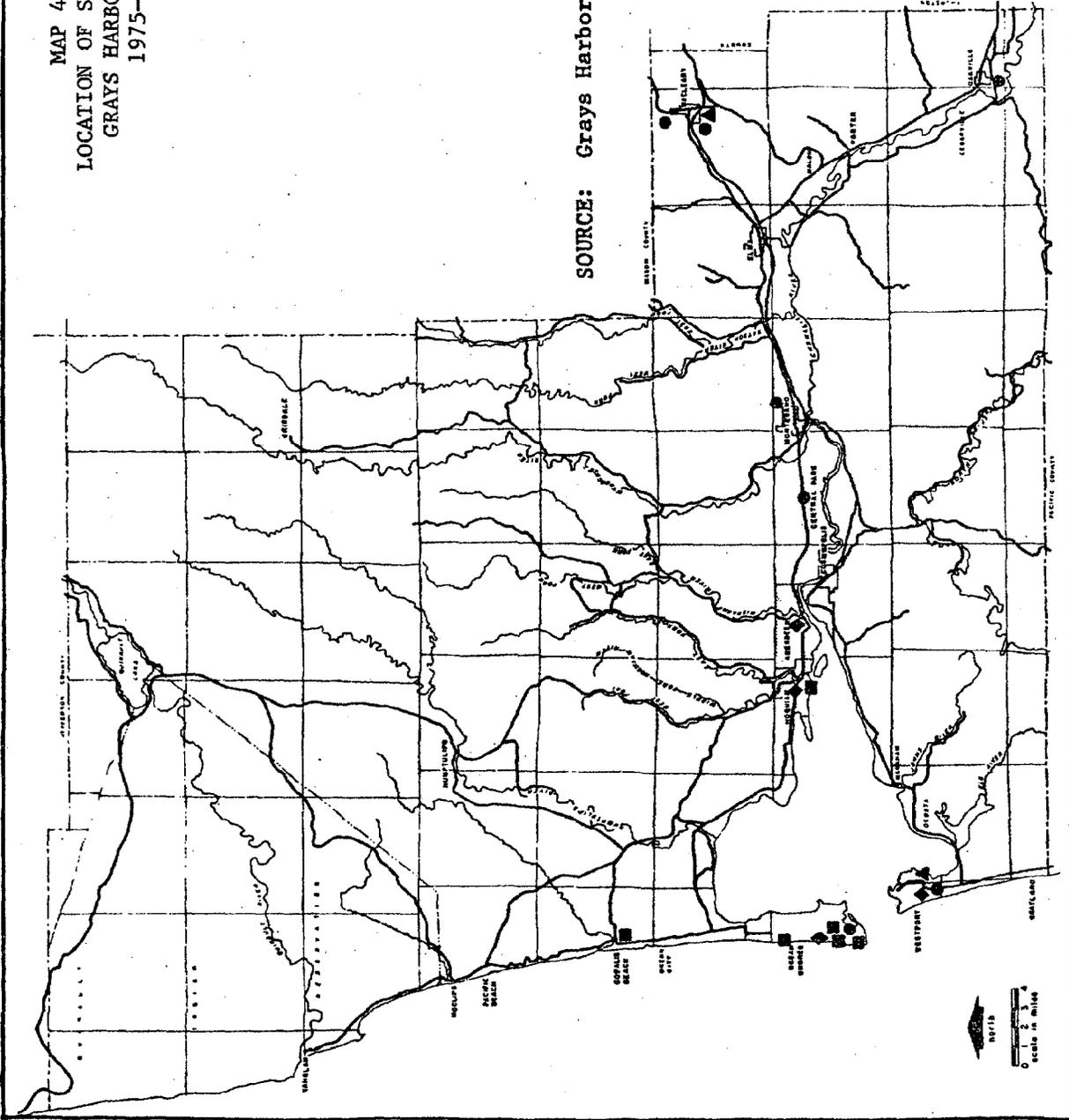
SOURCE: Monitoring Table GH-T.9.47, 10/80, and GH-T.9.75, 4/82.

See location of both subdivisions and short plats as illustrated on Maps 4.2 and 4.3. Map 4.3 again shows the high level of activity occurring in east county although not particularly focused on the Elma area as in the case of zoning. In addition to these types of development, large lot divisions (where all lots created are greater than 5 acres in size) are not regulated and, hence, not recorded here.

MAP 4.2
 LOCATION OF SUBDIVISIONS
 GRAYS HARBOR COUNTY
 1975-1981

SOURCE: Grays Harbor County Assessor.

- ▲ 1975 And 1976
- 1977 " 1978
- 1979 " 1980
- ◆ 1981



4.4 Other Zoning Actions: In addition to obtaining the proper zoning for a development, there are often other zoning actions that may be necessary before a project or activity can continue. These actions include conditional uses and variances. While only a small percentage of all development requires such permits, their presence can indicate a general interest in land development. As these permits increase, development activity also tends to increase.

As in the case of other activities, conditional use permits increased rapidly in the east county area at the start of the project (from 2 in 1973, to 24 in 1977, and 23 in 1978; then moderating in 1979 to 18, in 1980 to 10, and to 8 in 1981). These permits have been generally of two types both closely related to the Satsop Project: (1) permits for gravel operations, 60% of all permit activity in east county and (2) mobile home parks, 19% of the use permits granted in east county from 1973 through 1981.

The rapid increase in the number of gravel permits has been one of the most apparent and significant impacts of the project. Not only does the activity significantly alter the character of the land where they are granted, but they also determine the flow of construction trucks and related concerns of traffic congestion, wear on streets, accidents, etc. Granting of these permits, furthermore, adds to the conversion of agricultural land³ discussed earlier since during the first three years of the project over two-thirds of the permits were in the agricultural zone. Map 4.4 illustrates the distribution of these permits in the county. This activity dropped substantially in 1980 when the demand for gravel at the project had subsided.

TABLE 4.4
CONDITIONAL USE PERMIT ACTIVITY
GRAYS HARBOR COUNTY
1973-1981

	EAST COUNTY				TOTAL COUNTY
	MOBILE HOME PARKS, ETC.	GRAVEL	OTHER	TOTAL	
1973	1	0	1	2	10
1974	4	1	1	6	8
1975	2	5	3	10	19
1976	4	7	1	12	17
1977	3	18	3	24	30
1978	3	17	3	23	47
1979	1	13	4	18	29
1980	2	4	4	10	18
1981	1	3	4	8	20
TOTAL	21	68	24	113	198

SOURCE: Monitoring Table GH-T.9.49, 10/80, and GH-T.9.77, 4/82.
Figures include only unincorporated Grays Harbor County activity.

MAP 4.4
 LOCATION OF CONDITIONAL LAND USE PERMITS
 APPROVED FOR GRAVEL EXTRACTIONS,
 ROCK QUARRIES, AND SURFACE MINING
 UNINCORPORATED GRAYS HARBOR COUNTY
 1975-1981

SOURCE: Grays Harbor County Planning
 Department.

- ▲ 1975 And 1976
- 1977 " 1978
- 1979 " 1980
- ◆ 1981

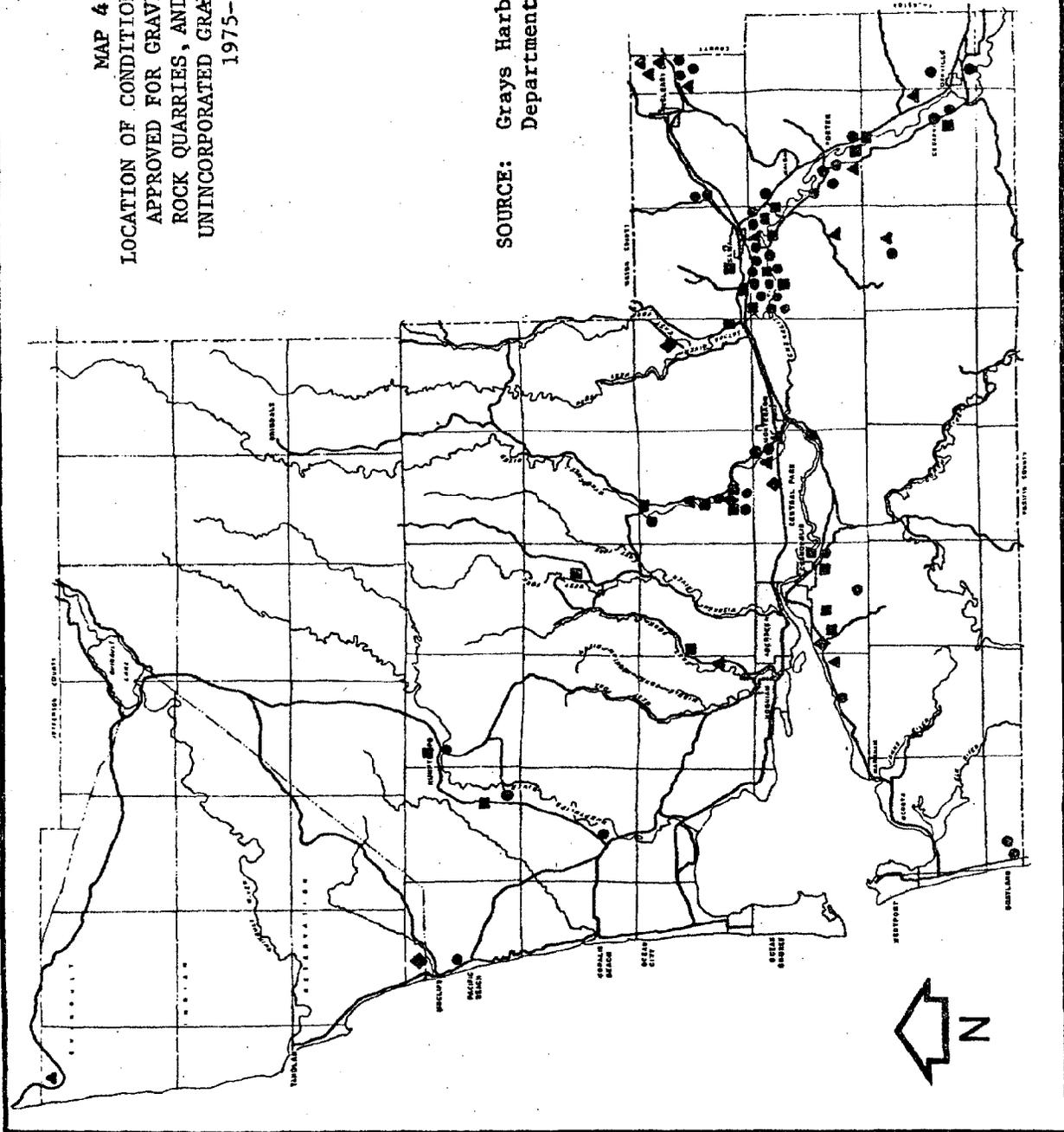


TABLE 4.5
 AGRICULTURAL AREAS AND GRAVEL PERMITS
 GRAYS HARBOR COUNTY
 1973-1981

	TOTAL CONDITIONAL USE PERMITS FOR GRAVEL EXTRACTION		NUMBER GRANTED IN AGRICULTURAL ZONES	PERCENT GRANTED IN AGRICULTURAL ZONES
	EAST COUNTY	OTHER AREAS		
1973	0	0	0	0.0
1974	1	0	1	100.0
1975	5	2	2	28.6
1976	7	1	4	50.0
1977	18	3	15	71.4
1978	17	6	15	65.2
1979	13	5	12	66.7
1980	4	3	4	57.1
1981	3	2	2	40.1
TOTAL	68	22	55	63.6

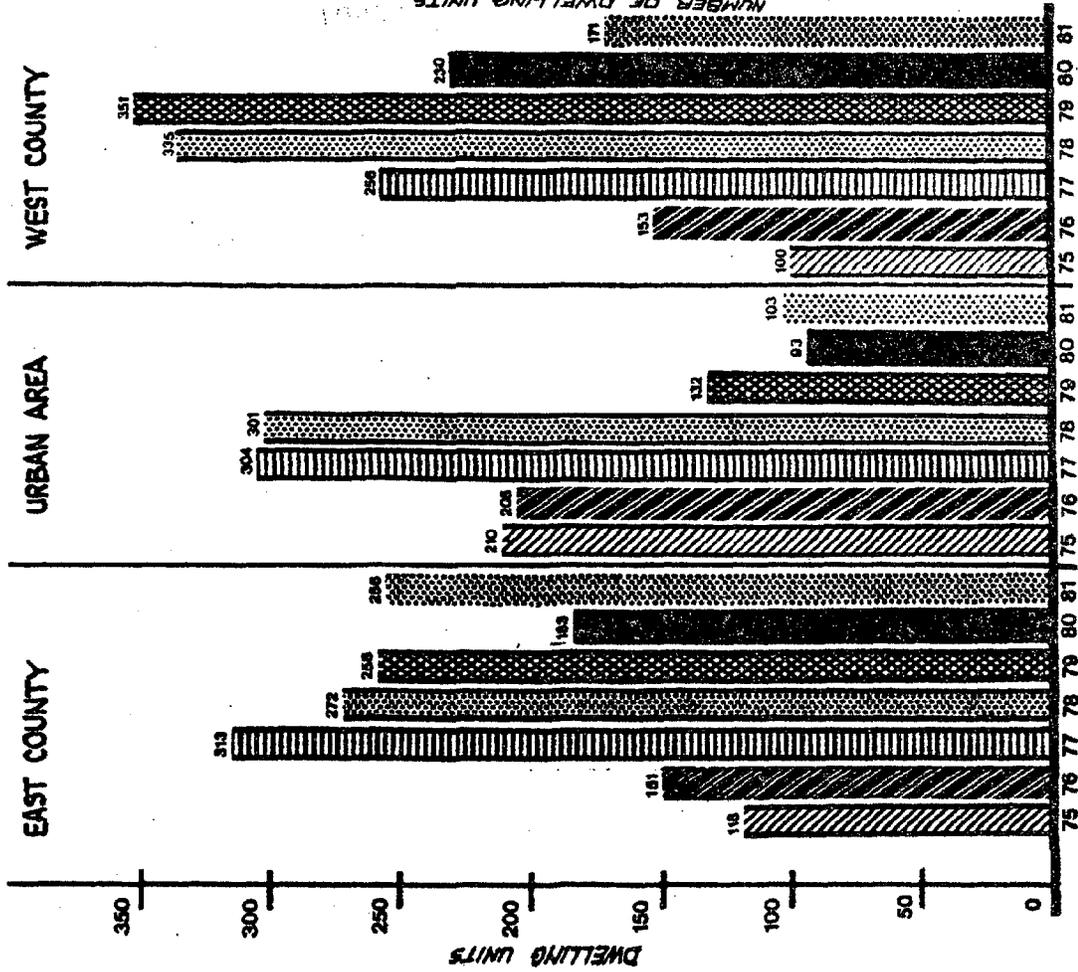
SOURCE: Monitoring Table GH-T.9.50 and 51, 10/80, and GH-T. 9.78 and 79, 4/82.

Figures include only unincorporated Grays Harbor County activity.

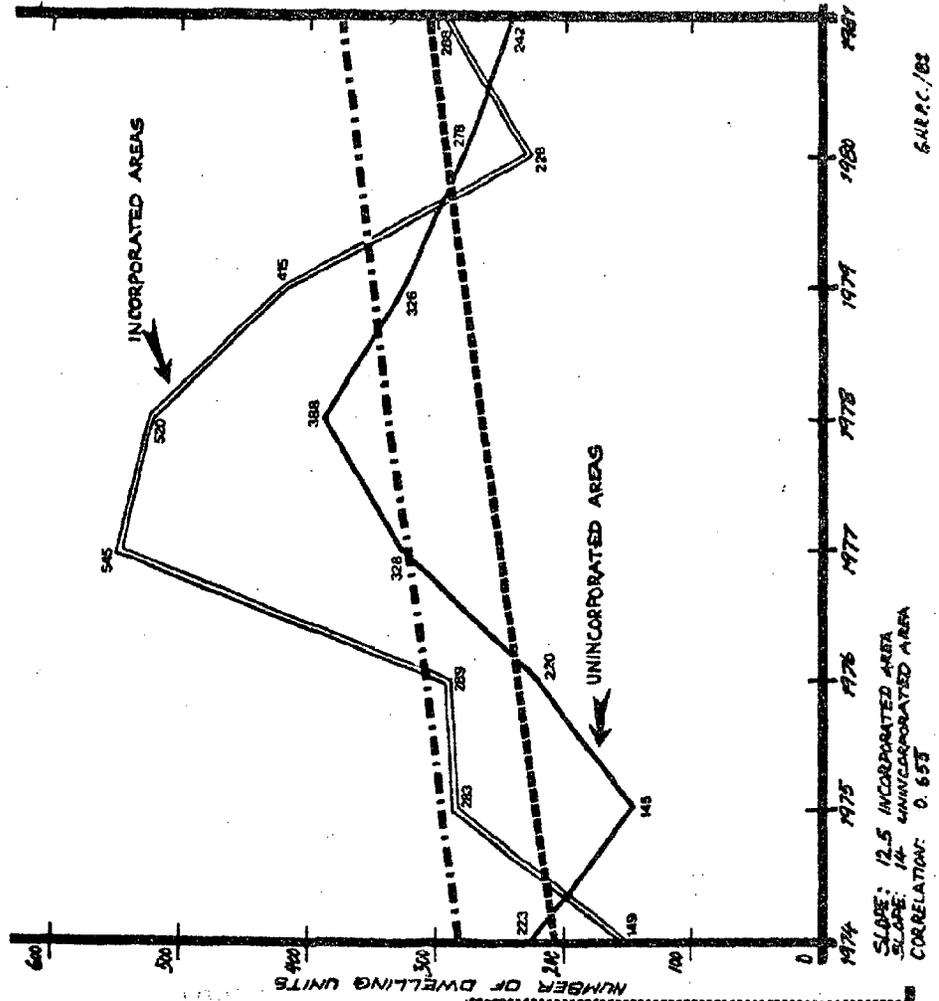
4.5 Building Permits: After all necessary zoning permits are obtained, a building permit is usually the next required step for development. Graphs 4.1, 4.2, 4.3, and 4.4 illustrate the activity which is occurring throughout the county. Building permit activity reached a peak in the entire county in 1978 with east county peaking in 1977. Since 1977, however, building starts in east county have declined, while the beach areas continued to increase into 1979 before declining. During 1981, building starts have again increased in east county. While the bulk of all permits in east county during 1977 (45%) were for multiple family units, multiple family dwellings dropped to a more characteristic level during 1978 and 1979. They were only about 11% of all units in 1980, but increased again in 1981 to 59%. Single family and mobile home starts reached a peak for the county in 1978.

Table 4.6 identifies the location of new starts in eastern Grays Harbor County. As shown, total activity doubled in east county since 1975 with most of the building activity being focused on the Elma area, followed closely by the Montesano area. Building permit activity seems to be closely related with household growth as measured by electrical connections (Chapter 2). The Elma area (including the City) leads in both activities, followed closely by Montesano.

GRAPH 4.1
 AUTHORIZED DWELLING UNITS BY AREA
 GRAYS HARBOR COUNTY
 1975 - 1981



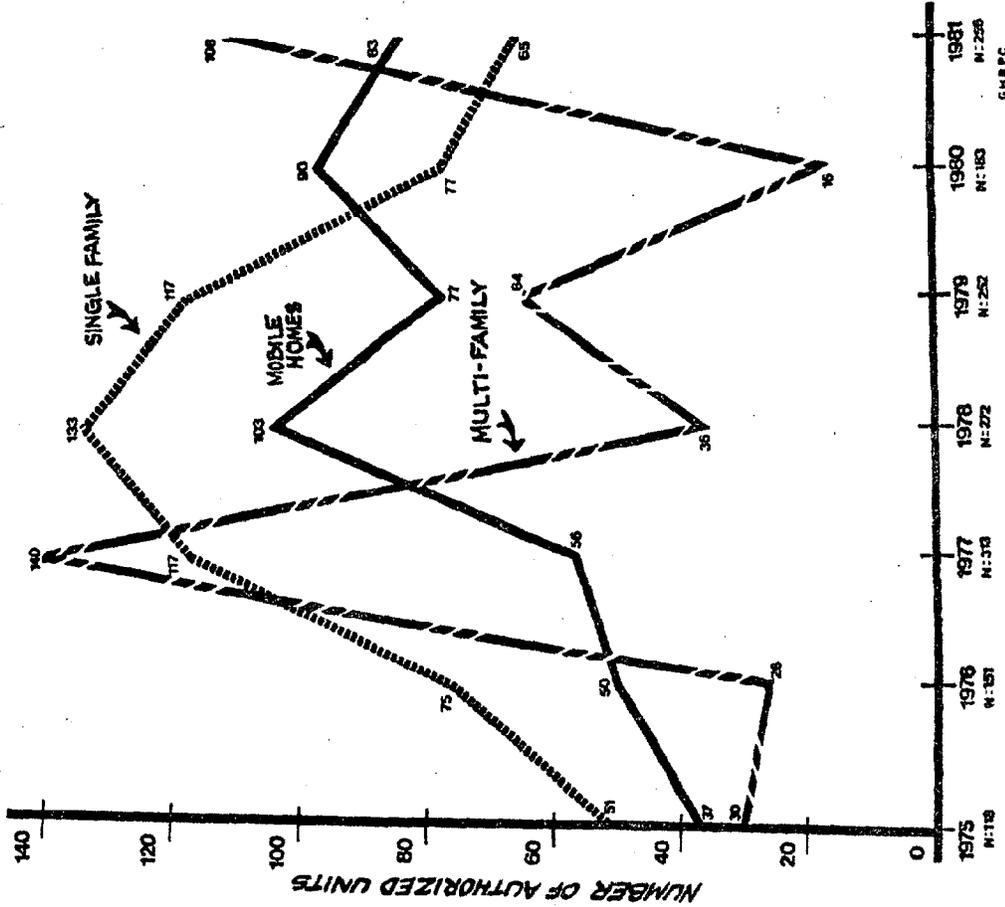
GRAPH 4.2
 AUTHORIZED DWELLING UNITS BY
 INCORPORATED AND UNINCORPORATED AREAS WITH REGRESSION
 GRAYS HARBOR COUNTY
 1974 - 1981



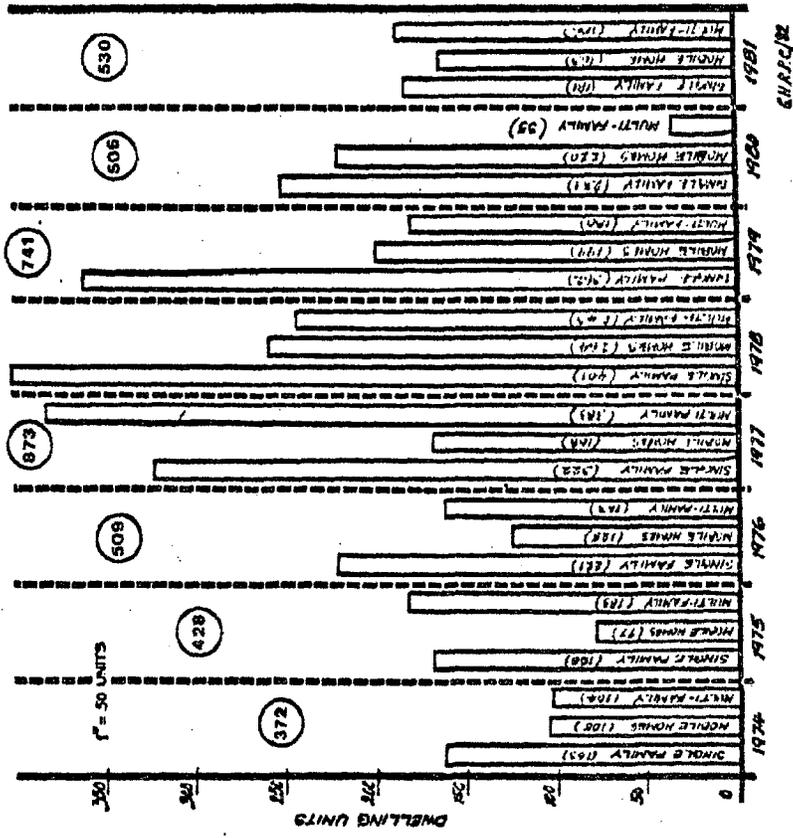
6/8/82

SOURCE: Monitoring Table GH-T.5.103, 1/81 and GH-T.5.128, 4/82.

GRAPH 4.3
 AUTHORIZED DWELLING UNITS BY TYPE
 EASTERN GRAYS HARBOR COUNTY
 1975 - 1981



GRAPH 4.4
 AUTHORIZED DWELLING UNITS BY TYPE
 GRAYS HARBOR COUNTY
 1974 - 1981



SOURCE: Monitoring Table GH-T.5.103 1/81 and GH-T.5.128, 4/82.

TABLE 4.6
NEW BUILDING STARTS BY LOCATION
GRAYS HARBOR COUNTY
1975-1981

	1975	1976	1977	1978	1979	1980	1981
Central Park	11	15	14	19	22	15	8
Montesano City	17	8	48	32	18	5	32
Montesano Unincorporated Area	14	33	67	43	39	50	50
Elma City	12	26	71	14	47	8	59
Elma Unincorporated Area	24	27	58	74	59	41	52
McCleary Area	16	9	17	20	5	8	0
McCleary Unincorporated Area	5	7	9	24	37	16	19
Oakville Area	N/A	4	2	8	7	6	2
Oakville Unincorporated Area	13	13	19	25	18	21	15
Satsop	6	9	8	13	6	13	19
Total East County	118	151	313	272	258	183	256
Urban Area	210	205	304	301	132	93	103
Beach and Other Areas	100	153	256	335	351	230	171
TOTAL COUNTY	428	509	873	908	741	506	530

SOURCE: Monitoring Tables GH-T.5.103, 1/81 and GH-T.5.128, 4/82.

4.6 Actual Land Use Change: Zoning and land division actions do not automatically lead to an actual change in use. Consequently, such actions are only an indication of where land use change might occur in the future, and other information is needed to assess the actual change that is occurring in the area. As a part of the Monitoring Program, actual changes in use are being observed.

In 1977 all land uses were physically inventoried in areas where settlement patterns were focused in east county.⁴ These original inventory areas are identified on Map 4.5. This inventory was then updated in 1978, 1979, 1980, and 1981. Thus, all change can be identified by comparing these inventories. The expanded areas, also shown on Map 4.5, were physically inventoried for the first time in 1980 and all changes were noted from base information taken from 1977 aerial photographs.

Table 4.7 tabulates the acres of land use change identified from this process from 1977 to 1981. Within the inventoried area, a total of 1,203 acres changed use. Table 4.8 tabulates the number of land use changes that have occurred, a total of 1,230. The most significant new use is residential, comprising 43% of the total acres changed and 83% of the total number of changes. The most frequent type of new residential use is classified as low density. In all inventoried areas, a total of 966 changes, comprising 468 acres, created new, low-density, residential uses. Of the total area inventoried, 202 acres changed to low-density residential use which had been forest lands, 148 had been vacant (i.e. not in an identifiable use), and 116 acres had been in agricultural uses.

MAP 4.5
 LAND USE INVENTORY AREAS
 EASTERN GRAYS HARBOR COUNTY
 1977-1981

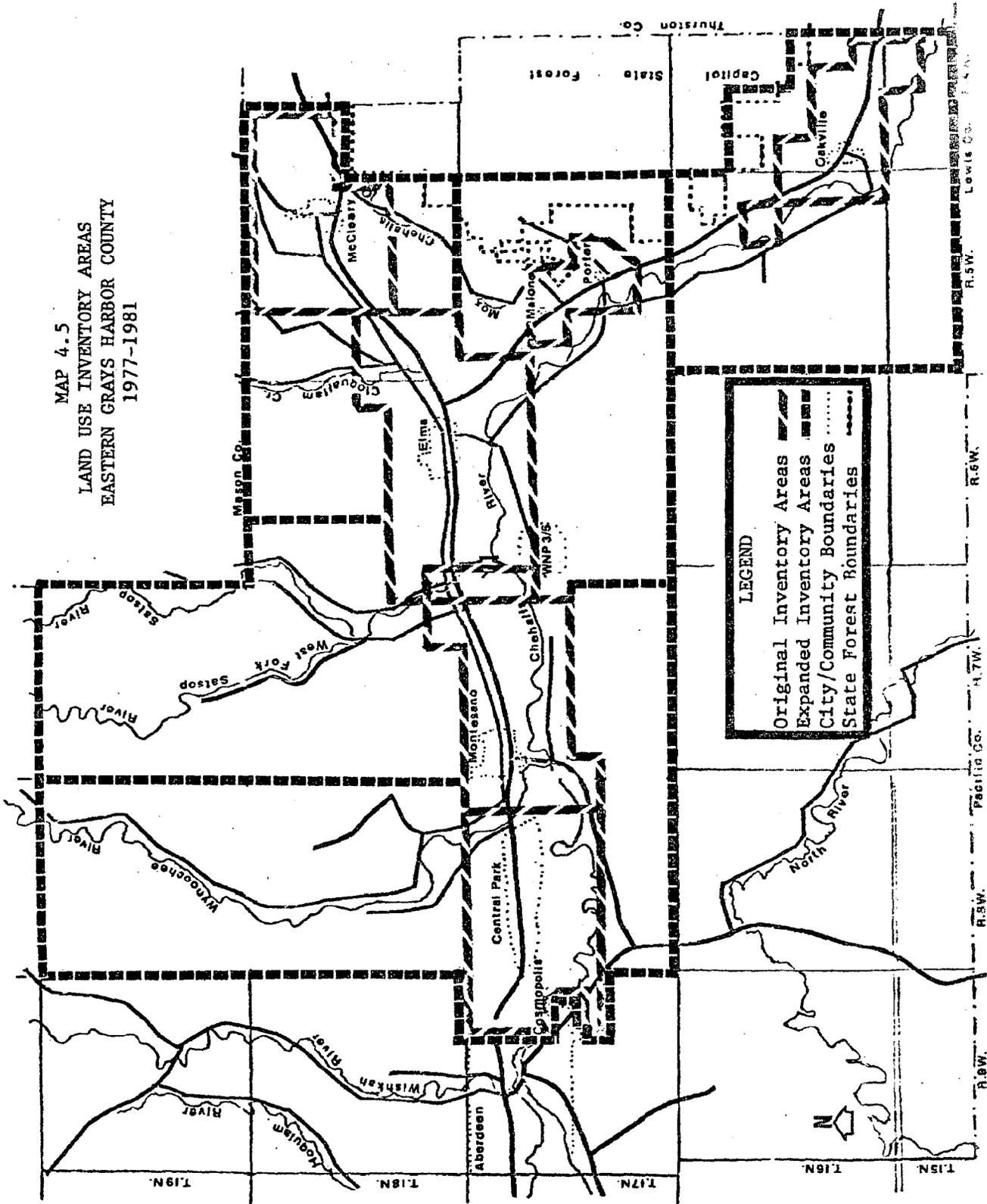


TABLE 4.7
TOTAL ACRES OF LAND USE CHANGES-ORIGINAL AND EXPANDED INVENTORY AREAS
EASTERN GRAYS HARBOR COUNTY
1977-1981

New Use	Original Use and Acres of Change							Total Change	% of Total Change
	Residential	Agricultural	Industrial	Commercial	Public/ Semi-Public	Vacant	Forest		
Residential	.56	128.25	.70	1.67	.23	172.24	207.9	511.55	42.5
Low Density		(116.25)	(.70)	(1.67)	(.23)	(147.85)	(201.65)	(468.35)	(38.9)
Moderate	(.56)	(12.00)				(21.12)	(6.25)	(39.93)	(3.3)
High						(3.27)		(3.27)	(0.3)
Agricultural						4.30	94.00	98.30	8.2
Industrial Total	3.76	177.32				16.80	172.40	370.28	30.8
Gravel		(153.52)				(13.80)	(162.60)	(329.92)	(27.4)
Commercial	6.2	2.00			.50	11.97	1.50	22.17	1.8
Public/ Semi-Public	10.70	5.00		.61		12.08	100.00 ¹	128.39	10.7
Vacant	28.64	38.15		1.71	.16	2.50		71.16	5.9
Forest	.50	1.00						1.50	0.1
TOTAL	50.36	351.72	.70	3.99	.89	219.89	575.80	1203.35	100.0X
Percent	4.2X	29.2X	0.1X	0.3X	0.1X	18.3X	47.8X	100X	

Percentages might not total 100% due to rounding.

¹Represents the west laydown area for the Satsop Construction Project; one change of 2 acres for intensification of use is excluded.

SOURCE: Various Monitoring Tables reported under the Land Use Element.

TABLE 4.8
TOTAL NUMBER OF LAND USE CHANGES-ORIGINAL AND EXPANDED INVENTORY AREAS
EASTERN GRAYS HARBOR COUNTY
1977-1981

New Use	Original Use and Number of Changes							Total Change	% of Total Change
	Residential	Agricultural	Industrial	Commercial	Public/ Semi-Public	Vacant	Forest		
Residential	4	213	2	6	1	444	351	1021	83.0
Low Density	(1)	(207)	(2)	(6)	(1)	(400)	(349)	(966)	(78.5)
Moderate	(3)	(6)				(39)	(2)	(50)	(4.1)
High						(5)		(5)	(0.4)
Agricultural						1	2	3	0.2
Industrial Total	3	9				5	12	29	2.4
Gravel		(4)				(1)	(6)	(11)	(0.9)
Commercial	24	4		4	1	25	3	61	5.0
Public/ Semi-Public		6		4		7	2	19	1.5
Vacant	86	2		5	1			94	7.6
Forest	1	2						3	0.2
TOTAL	118	236	2	19	3	482	370	1230	100.0X
Percent	9.6X	19.2X	0.2X	1.5X	0.2X	39.2X	30.1X	100X	

Percentages might not total 100% due to rounding.

One change of two acres for intensification of use is excluded.

SOURCE: Various Monitoring Tables reported under the Land Use Element.

New industrial uses constituted 31% of the total changes in acres. Out of the total 370 acres which changed to industrial use, 330 acres or 89% are now used for gravel pits. The land now used for gravel pits was originally in forest (172 acres), agricultural uses (154 acres), and vacant (14 acres). With the exception of public/semi-public uses (11%) and agricultural uses (8%), all other new uses (commercial, vacant, and forest) amounted to 6% or less of the total new use of acreage. The

west laydown area for the Satsop Project accounted for 100 acres of the 128 total acres changed to public/semi-public use. Almost all new uses occurred on land previously classified as forest, agricultural, or vacant land. The amount of forest land lost to development was 576 acres, accounting for almost half of the total. Development occurred on 352 acres of former agricultural land (29%) and on 220 acres previously classified as vacant (18%).

Tables 4.9 and 4.10 show the acres of change and the number of changes for the incorporated areas of east county. New, low-density residential use occurred in the incorporated area on only 36 acres out of the east county total of 468 (8%) acres and 149 changes out of the total 966 (15%). This indicates that this kind of development is far greater in the unincorporated areas of east county.

TABLE 4.9
TOTAL ACRES OF LAND USE CHANGES-INCORPORATED AREAS
EASTERN GRAYS HARBOR COUNTY
1977-1981

New Use	Original Use and Acres of Change							Total Change	% of Total Change
	Residential	Agricultural	Industrial	Commercial	Public/ Semi-Public	Vacant	Forest		
Residential	.56	2.75		.47		41.87	2.50	48.15	63.8
Low Density		(2.75)		(.47)		(30.73)	(2.25)	(36.20)	(48.0)
Moderate	(.56)					(9.87)	(.25)	(10.68)	(14.2)
High						(1.27)		(1.27)	(1.6)
Agricultural									
Industrial Total	.14						1.00	1.14	1.5
Gravel								9.26	12.3
Commercial	2.28				.50	6.48			
Public/ Semi-Public				.51				3.09	4.1
Vacant	5.27	8.15		.21	.16	2.58		13.79	18.3
Forest									
TOTAL	8.25	10.90		1.19	.66	50.93	3.50	75.43	100.0%
Percent	10.9%	14.5%		1.6%	0.9%	67.5%	4.6%	100.0%	

Percentages might not total 100% due to rounding.
Does not include one change for an intensification of use in Montesano.
SOURCE: Various Monitoring Tables reported under the Land Use Element.

TABLE 4.10
TOTAL NUMBER OF LAND USE CHANGES-INCORPORATED AREAS
EASTERN GRAYS HARBOR COUNTY
1977-1981

New Use	Original Use and Acres of Change							Total Change	% of Total Change
	Residential	Agricultural	Industrial	Commercial	Public/ Semi-Public	Vacant	Forest		
Residential	4	5		3		(150)	6	168	70.9
Low Density	(1)	(5)		(3)		(135)	(5)	(149)	(62.9)
Moderate	(3)					(13)	(1)	(17)	(7.2)
High						(2)		(2)	(0.8)
Agricultural									
Industrial Total	1						1	2	0.8
Gravel									
Commercial	13				1	12		26	11.0
Public/ Semi-Public				3		3		6	2.5
Vacant	31	1		2			1	35	14.8
Forest									
TOTAL	49	6		8	1	165	8	237	100.0
Percent	20.7%	2.5%		3.4%	0.4%	69.6%	3.4%	100.0%	

Percentages might not total 100% due to rounding.
Does not include one change for an intensification of use in Montesano.
SOURCE: Various Monitoring Tables reported under the Land Use Element.

Tables 4.11 and 4.12 give the general distribution of all land use change by acres and number in the inventoried areas. Map 4.6 graphically compares the changes in each of the inventoried areas. Since these tables and this map exclude gravel pits, new land use consists primarily of residential activities, mostly of a low-density character. As in virtually every other factor of change, the Elma area has the most acres changed (38% of the total) and also the most number (26% of the total). Oakville has been the site of significant activity in land use change comprising 19% of the change in acreage (the second highest behind Elma) and 11% of the total number of changes. The Montesano area is third in the number of acres changed (16% of the total) but has the second highest number of changes (21% of the total). The expanded inventory areas had only 15% of the total acreage that changed use and 20% of all land use changes. In the expanded inventory areas, the most activity appears to be in the Satsop and Wynoochee Valleys and in the vicinity of the Oakville planning area.

TABLE 4.11
ACRES OF LAND USE CHANGE (EXCLUDING GRAVEL PITS)
ORIGINAL AND EXPANDED INVENTORY AREAS
EASTERN GRAYS HARBOR COUNTY
1977-1981

Original Inventory Areas	Original Use and Acres of Change				Total	Percent
	In Incorporated Areas	In Agricultural Areas	In Forest Areas	In Other Rural Areas		
Central Park	--	1.00	6.80	29.15	36.95	4.3
Montesano and Area	12.28	44.15	19.60	59.48	135.51	15.7
Elma and Area	36.21	57.10	180.40	50.16	323.87	37.5
McCleary and Area	12.87	16.70	17.50	19.10	66.17	7.7
Porter/Malone Area	--	3.00	4.00	2.40	9.40	1.1
Oakville and Area	13.89	30.50	107.50	14.30	166.19	19.2
Subtotal	75.25	152.45	335.80	174.59	738.09	85.4
Expanded Inventory Areas						
South of Central Park and Montesano Planning Areas	--	--	1.00	--	1.00	0.1
Wynoochee Valley	--	7.50	16.00	6.00	29.50	3.4
Satsop Valley	--	12.00	16.00	6.00	34.00	3.9
North of Elma Planning Area	--	--	10.50	1.00	11.50	1.3
South of McCleary Planning Area	--	--	--	.50	.50	*
Vicinity of Elma and Malone/Porter Planning Areas	--	6.00	12.00	.50	18.50	2.1
Vicinity of Oakville Planning Area	--	11.00	15.00	5.50	31.50	3.6
Subtotal	--	36.50	70.50	19.50	126.50	14.6
Grand Total	75.25	188.95	406.30	194.09	864.59	100.0
Percent	8.7%	21.9%	47.0%	22.4%	100.0%	

*Less than .1%

Percentages might not total 100% due to rounding.

SOURCE: Various Monitoring Tables reported under the Land Use Element.

TABLE 4.12
NUMBER OF LAND USE CHANGES (EXCLUDING GRAVEL PITS)
ORIGINAL AND EXPANDED INVENTORY AREAS
EASTERN GRAYS HARBOR COUNTY
1977-1981

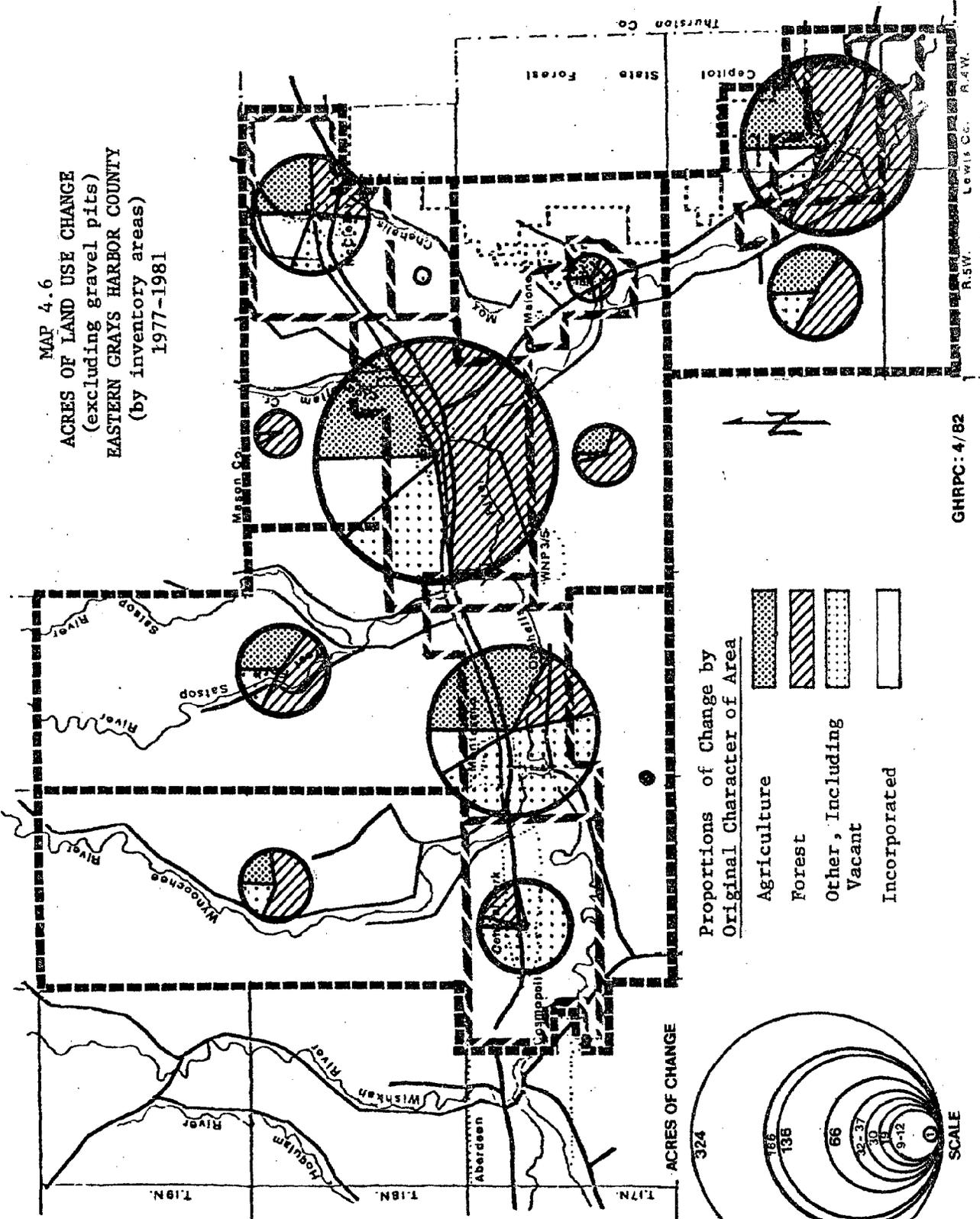
Original Inventory Areas	Original Use and Number of Changes				Total	Percent
	In Incorporated Areas	In Agricultural Areas	In Forest Areas	In Other Rural Areas		
Central Park	--	5	20	87	112	9.2
Montesano and Area	57	22	34	135	248	20.5
Elma and Area	92	42	115	67	316	26.1
McCleary and Area	44	25	32	36	137	11.3
Porter/Malone Area	--	6	5	8	19	1.6
Oakville and Area	44	53	22	19	138	11.4
Subtotal	237	153	228	352	970	80.0
Expanded Inventory Areas						
South of Central Park and Montesano Planning Areas	--	--	2	--	2	0.2
Wynoochee Valley	--	15	18	13	46	3.8
Satsop Valley	--	24	34	12	70	5.8
North of Elma Planning Area	--	--	21	2	23	1.9
South of McCleary Planning Area	--	--	--	1	1	*
Vicinity of Elma and Malone/Porter Planning Areas	--	12	24	1	37	3.0
Vicinity of Oakville Planning Area	--	22	30	11	63	5.2
Subtotal	--	73	129	40	242	20.0
Grand Total	237	226	357	392	1,212	100.0
Percent	19.6%	18.6%	29.5%	32.3%	100.0%	

*Less than .1%

Percentages might not total 100% due to rounding.

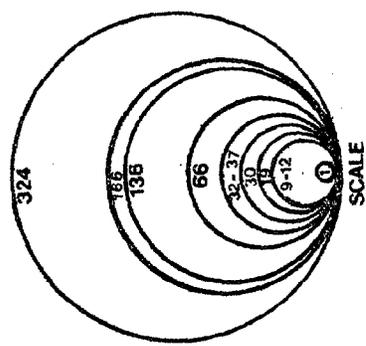
SOURCE: Various Monitoring Tables reported under the Land Use Element.

MAP 4.6
 ACRES OF LAND USE CHANGE
 (excluding gravel pits)
 EASTERN GRAYS HARBOR COUNTY
 (by inventory areas)
 1977-1981



Proportions of Change by
 Original Character of Area

- Agriculture
- Forest
- Other, Including Vacant
- Incorporated



GHRPC: 4/82

Table 4.11 also illustrates that only 9% of the total acres changed (excluding gravel) are in incorporated areas, while 47% of the total acres changed are in unincorporated forest areas, and 22% are in unincorporated agricultural areas. Most of the agricultural land losses occurred in the Elma area (57 acres), the Montesano area (44 acres), and the Oakville area (31 acres). Of the incorporated areas, the City of Elma changed the most followed, surprisingly, by Oakville. The fact that 91% of the acres changed (again, excluding gravel pits) and 80% of the number of changes has occurred in the unincorporated areas may be one of the observations of the Monitoring Program which has long-term implications.

Table 4.13 illustrates that the intensiveness of land use change varies significantly between areas. In Central Park the land area involved in each change is very small, about one-third of an acre, while in the Elma and Oakville areas each change averaged more than one acre.

TABLE 4.13
RATIO OF ACRES OF CHANGE TO NUMBER OF CHANGES
(EXCLUDING GRAVEL PITS)
EASTERN GRAYS HARBOR COUNTY
1977-1981

Original Inventory Areas	Number Of Acres	Number Of Changes	Acres Per Change
Central Park	36.95	112	.330
Montesano and Area	135.51	248	.546
Elma and Area	323.87	316	1.025
McCleary and Area	66.17	137	.483
Porter/Malone Area	9.40	19	.495
Oakville and Area	166.19	138	1.204
Subtotal	738.09	970	.761
Expanded Inventory			
Areas			
South of Central			
Park and Montesano			
Planning Areas	1.00	2	.500
Wynoochee Valley	29.50	46	.641
Satsop Valley	34.00	70	.486
North of Elma			
Planning Area	11.50	23	.500
South of McCleary			
Planning Area	.50	1	.500
Vicinity of Elma and Malone/Porter			
Planning Areas	18.50	37	.500
Vicinity of Oakville			
Planning Area	31.50	63	.500
Subtotal	126.50	242	.523
Grand Total	864.59	1,212	.713

SOURCE: Various Monitoring Tables reported under the Land Use Element.

The changes noted herein can be described appropriately as urban sprawl in areas with minimal, if any, public services and facilities. If this sprawl continues, additional public expenditures may be needed to support these new developments. A growing body of literature at the national, state, and local levels are suggesting that continued urban sprawl creates considerable long-term costs to local governments and that more orderly patterns of growth may significantly reduce these costs.⁵

In addition to such costs, sprawl into agricultural areas interferes with the retention of these areas in agriculture. Not only do residents themselves displace agriculture, residential uses also conflict with adjacent farming activities. Families often object to farming practices such as fertilizing and spraying, and children or pets may interfere with farm activities. This, coupled with increased land values induced by new development, frequently leads to further conversion of agricultural land and the breakup of economic farm units.

4.7 Land Development and the Project: Except for the obvious example of gravel pits, the relationship between the Satsop Project and the adverse effects of land development discussed in this chapter (increased urban sprawl and conversion of agricultural land) is indirect at best. While there is an obvious relationship between the project and land development, the project cannot be held completely responsible for the specific location of development and, hence, the undesirable aspects. It is clear that the population and economic growth, either created or induced by the project, has created a significant portion of this market for this land development. It also appears that the presence of the project has tended to attract and focus investment and, thus, land developers in east county and Elma in particular. It might even be asserted that without the project, the focus of this development might not have been on the Elma area. However, the Satsop Project has little, if any, influence on whether land development will occur on agricultural land or in incorporated areas. This effect could occur only if there were no opportunities in appropriate locations, but this generally is not the case.⁶ Specific development decisions are made by land owners and residential developers acting independently in a competitive market. Only local government planning and zoning authority has the ability to reduce these problems once the market develops. The ability of a local government to respond to these problems is determined by a complex interaction of political pressures, public awareness, and financial ability.

While the Satsop Project is responsible for much of the market leading to these problems, its presence has also, again indirectly, assisted in increasing the ability of the local area to respond to these pressures. This has occurred in several ways:

1. Direct financial assistance to local governments to build infrastructures and provide services;
2. Direct tax payments and indirect tax revenue from increased economic activity;
3. Planning assistance to cities;

4. Qualifying the area for grants to address these issues;
5. Financing the Monitoring Program which increases knowledge about these problems; and,
6. The Satsop Project's controversial nature stimulates greater attention and concern for these problems than would otherwise exist.

The combination of added growth pressure, the resulting adverse land use impacts, and financial assistance for planning has produced significant changes in the county's land use management system. These include:

1. Adoption of completely new comprehensive plans in all four cities in the primary impact area;
2. Development of new zoning and other land-management ordinances in all cities and the county;
3. Adoption of a plan to protect and enhance the agricultural resource of the county;
4. Development of new policies by the county to guide the development of rural lands;
5. Significant increases in the planning staff in or available to the affected jurisdictions. (Available, professional, land use planners in the primary impact area increased from one full-time equivalence in 1976 to approximately 4 in 1982.)
6. Development of a county recreation plan.

The land development now occurring in the region does have significant positive effects. None the least of these is the increase in housing supply. The region in general and east county in particular, especially Elma, has had for many years severe housing problems, both in terms of undersupply and in condition. The economic stimulus and its related improvement in investment climate in east county unquestionably has assisted in creating good years in housing construction. Even with the growth stimulated by the Satsop Project, housing construction has kept pace leading to an increase in availability. This housing supply will remain available after the project is completed.

4.8 Conclusion: Land development activities have increased dramatically since the start of the Satsop Project proceeding at a particularly rapid pace during the first two years of construction, then moderating somewhat with some resurgence of activity in 1981. This increase has occurred in all phases of the development process from zoning actions to actual changes in land use. This activity is generally focused on the Elma area. Land development occurs more frequently in unincorporated areas rather than in the cities of east county. Land development activities of both the speculative nature and of actual construction are leading to an increase in the loss of agricultural land and in urban sprawl. As such,

these activities have long-term implications on the area. Land development activities have also greatly increased the housing supply and housing availability in east county.

The project itself has a very significant and direct impact on land development and use patterns in the form of creating large expanses of gravel pits. This is probably the most significant visual impact of this project to date and has resulted in the permanent loss of many acres of farm lands. The relationship of the project to other aspects of land development is basically indirect--creating a major part of the market and improving the investment climate, especially as it relates to the Elma area. The Satsop Project has also tended to increase public concern about and attention to land development activity.

CHAPTER 4
NOTES

1. The number of zone changes and conditional use permits granted in agricultural zones warrant particular attention since it portends a significant environmental impact of the project. These conversions have led to the establishment of stronger agricultural policies by the county.
2. Until 1981 the agricultural zone consisted of a 10-acre classification. After 1981, a 40-acre minimum zone was added.
3. See Note 1 above.
4. The methodology for this inventory is discussed in the December 1978 Monitoring Report, and in a series of planning analyses for each of the planning areas. These analyses also discuss land use patterns and trends prior to the Satsop Project:
 - Grays Harbor Regional Planning Commission, Part One, Inventory and Analysis, City of Montesano Comprehensive Plan, 1977.
 - Grays Harbor Regional Planning Commission, Part One, Inventory and Analysis, City of Elma Comprehensive Plan, 1978.
 - Grays Harbor Regional Planning Commission, Part One, Inventory and Analysis, Town of McCleary Comprehensive Plan, 1978.
 - Grays Harbor Regional Planning Commission, Part One, Inventory and Analysis, City of Oakville Comprehensive Plan, 1978.
 - Grays Harbor Regional Planning Commission, Part One, Inventory and Analysis, Planning Analysis for Central Park, 1978
5. Problems associated with urban sprawl in Grays Harbor County are discussed at length in the Grays Harbor Regional Planning Commission, Grays Harbor Region Housing Element, 1979. Other major studies include

Real Estate Research Corporation for the Council on Environmental Quality, Costs of Sprawl, 1974, and King County, Cost of Growth: Public Costs of Alternative Development Patterns, 1979.

6. See land use analyses cited in Note 4, and the Region Housing Element cited in Note 5. These reports have generally concluded that sufficient area is available in appropriate locations to accommodate much of this growth pressure. The major exception to this may be in the City of Montesano.
 7. Unlike many nonmetropolitan counties, Grays Harbor County was completely zoned prior to the Satsop Project with an extensive agricultural zone on most agricultural lands. Furthermore, much of the prime agricultural land is also controlled by means of a strong shoreline management program in the floodplains. (Indeed, residential development on floodplains has been minimal.) These controls have probably diverted a considerable amount of development pressure. The project and the development discussed in this chapter has stimulated far greater interest in land use problems than existed before. All four cities and the county have completed or are undertaking massive adjustments to their land use programs with a significant portion of these efforts being funded by the Power System or by grants made available because of this project.
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CHAPTER 5

GROWTH COMPARED TO ORIGINAL IMPACT PROJECTIONS

5.0 GROWTH COMPARED TO ORIGINAL IMPACT PROJECTIONS

5.1 Introduction: In part due to the implications of the construction project, the communities in the primary impact area sought in late 1976 to undertake a comprehensive planning program to assist them in responding to the potential impact of the project.¹ Funding for these plans came from the Washington Public Power Supply System (WPPSS), Section 308 of the Coastal Zone Management Program through the Department of Ecology, and the affected local governments.

Since a major concern in each of these planning processes was the anticipated impact of the Satsop Project on each community, each plan devoted an entire section to projecting the growth that was expected from the project. This projection involved several significant questions:

1. What was the anticipated manpower requirements of the project and from where was that manpower expected to come?
2. How much of this manpower would in-migrate into Grays Harbor County?
3. How much additional employment would be created by the secondary effects of the project, and how many new families would this employment attract to the county?
4. How would these new families (both project workers and secondary workers) be distributed within the county?

The background for the first two of these questions came from published reports of the Power System itself; most notably An Analysis of the Socioeconomic Impacts of WNP-3 and WNP-5 (supplemented by a then more current manpower projection by the Power System).² The answer for the third question, as an input into the projections, was derived from extensive discussions between Grays Harbor Regional Planning Commission (GHRPC) staff and Washington Public Power Supply System (WPPSS) staff regarding the secondary impact of the project on school enrollments. The fourth question of the distribution of growth in the county was the subject of an unpublished GHRPC staff report, Satsop Impact Distribution, which analyzed the potential residential patterns of Satsop workers and served as the basis for the projections in each of the published plans. This report not only projected the expected impact of the project on the east county area but also on the urban area. The urban area projections in that report will be used to compare the actual experience in the urban area.

5.2 Expected In-Migration and Population Factors: The WPPSS' study of the anticipated socioeconomic impact of the Satsop Project on Grays Harbor County examined a range of factors relating to the supply of labor in the northwest and the potential in-migration of workers into Grays Harbor and Thurston Counties. On the basis of varying assumptions related to these factors, they prepared three alternative projections of in-migration to Grays Harbor County. No attempt was made by that study to suballocate these in-migrating workers to various areas of the County.

These alternatives were labeled Condition A, B, and C.

Condition A: This assumed that the construction project would be a part of the total construction within the labor market area of the Puget Sound region. As such, in-migration would be in response to that total activity and therefore would be distributed in a similar way as the present labor force within the total region. Since Grays Harbor County composed only a very small part of that total labor force, in-migration into the county would be small.

Condition B: Under this condition, selection of a residential location would be highly influenced by the availability of work on major projects. Since the Satsop Project represented such a project, in-migration to Grays Harbor County would be higher, but restricted by available housing.

Condition C: This assumed that the available supply of housing in Grays Harbor and Thurston Counties would greatly increase and thereby influence the locational decisions of in-migrating workers. This condition also assumed that there would be some relocation of construction workers within the Puget Sound region (e.g. Seattle workers relocating closer to the project).

The author of this report concluded that Condition B was the most likely to occur.

At the time this report was published (September 1975), the expected peak manpower was to occur in 1980 and reach a level of 2,259 craft manpower. Under Condition B, 19% of those workers were expected to in-migrate to Grays Harbor County, 3% were estimated for Condition A, and 25% for Condition C. When this analysis was utilized in the community plans in 1976 and 1977, the project schedule had slipped by one year and anticipated project peak craft employment had increased to 2,643. Consequently, appropriate adjustments were made in the original estimates.

Once the anticipated in-migration to the county was estimated, the next step was to derive estimated population impacts. The first relationship to examine was the amount of secondary employment which would be expected from the project (commonly referred to as the "multiplier effect"). This factor was derived from a subjective process of reviewing literature and discussions with the Power System staff. It was assumed at that time that each in-migrating construction worker would stimulate 0.6 additional jobs in the community that would be filled by in-migrants (or each in-migrating construction worker would result in 1.6 in-migrant total jobs). Each such "in-migrating" job then would bring additional family members to the community. This factor was estimated on the basis of studies in other areas and was expected to be 2.2.³

5.3 Subcounty Distribution Factors: More complex was the question of where within the county would the workers reside? This question was vitally important to each community since it would indicate the level of

growth for which they needed to prepare. For this purpose, four mathematical distributions were prepared by the Grays Harbor Regional Planning Commission staff. Each model portrayed a different set of assumptions regarding the spacial relationship of the project and the potential residential preferences of the in-migrants. All models were based on the "gravity" concept of spacial interaction which assumes that the distribution of workers would be related primarily by the population size of communities and their distance from the project site.⁴ These models were labeled X, Y, Z and Z₂:

- X: Model X assumed that workers would be distributed on the basis of the existing distribution of population and its distance (squared) from the project site. This is considered a "pure" gravity relationship.
- Y: Model Y, in contrast, postulated that distance in this rural area would be a far less significant determinate between areas within the county, and in-migration would be, roughly, equally split between the urban area and the eastern part of the county. This assumption provided the greatest distribution to the urban area.
- Z: This model attempted to balance the concepts of Model X and Y with the following assumptions:
1. In-migrants would tend to view the entire area east of the project site as one area to seek housing. The worker would tend to look to this eastern area first since their next jobs would likely be oriented in that direction.
 2. After seeking housing to the east of the site, the worker would then look to the western neighboring area of Montesano and Central Park.
 3. Those workers looking for urban environments would view Aberdeen-Hoquiam-Cosmopolis as one area.
 4. A few workers (particularly those from inland areas) might take this opportunity to live near the ocean.
- Z₂: Model Z₂ is greatly similar to model Z, except that the significance of distance as a determinate was mathematically reduced (distance was raised by the exponent of 1.5 rather than using the exponent of 2). This produced a more dispersed distribution than model Z.

A series of projections were made for each community reflecting these various assumptions. A total of twelve projections was possible (three "conditions" regarding in-migration to the county and four distribution models). These projections provided a full range of potential scenarios ranging from very low impact to very high impact. To illustrate this range, six projections of worker in-migration were published in the plans for each community in the format of two distribution models for each

condition. These were selected on the basis of which seemed the most appropriate from the point of view of each area. Three of these, in turn, were translated into population projections which were analyzed in depth for their implications on the communities. One of these was then selected as the most likely from the perspective of the community and was designated the planning projection.

To iterate, these assumptions were applied and analyzed in each community from the point of view of each community. Consequently, the sum of the "planning projections" for each community did not necessarily add to the total expected in-migration under any of the conditions. Therefore, at the county level, another "planning projection" was prepared with a consistent set of assumptions regarding in-migration and its distribution. This projection was based on "Condition B," Distribution Z₂, and was used for various purposes by the Grays Harbor Regional Planning Commission staff.

5.4 Actual Population Factors: Table 5.1 compares the original, projected population factors with the Grays Harbor Regional Planning Commission estimates to be the actual. The current Grays Harbor Regional Planning Commission estimate of the worker in-migration rate is higher than that originally projected. It should be noted, however, that WPPSS' staff has a significantly lower rate (18%) based on somewhat different methodology.⁵ The sharpest contrast lies in the relationship between in-migrating workers and secondary households. The "actual" estimate is three times the original.⁶ The primary cause of this difference lies in a much improved understanding of secondary relationships now than was originally applied. The projected household factor for construction workers has proved to be fairly accurate as the actual is based upon the results of a survey of construction workers.⁷ The average household size for secondary workers on Table 5.1 is the average for the Elma area, 2.6.⁸

TABLE 5.1
IN-MIGRATION AND POPULATION FACTORS
SATSOP PROJECT
1977-1981

	<u>Original Projections</u>	<u>Current GHRPC Estimates</u>
Percent of Total Workers Who In-Migrated to Grays Harbor County	19%	25.5%
Ratio of In-Migrating Secondary Households to In-Migrating Construction Workers	0.6	1.84
Average Household Size:		
Construction Workers	2.2	2.2
Secondary Workers	2.2	2.6*

*1980 Elma Census Division

5.5 Community Comparisons of In-Migrating Workers: Table 5.2 compares the projection of each community plan with the "actual" estimates. Unfortunately, due to data limitations in making some "actual" estimates, the communities of Elma and McCleary must be combined although they were originally projected separately. In each community (except Oakville), the actual experience exceeded the planning projection. In the Elma/McCleary area the actual experience far exceeded even the highest projection (nearly triple the planning projection). In Montesano experience runs more consistent but is still about 40% higher than the planning projection. In the urban area the actual is significantly above the planning projection but is not quite to the highest projected under Condition B. If the transient workers are not included in the comparison (although since the original projections did not differentiate, these workers should be included), the distribution patterns of in-migrating workers comes closer to the original projection. However, the Elma area is still substantially higher than its planning projection.

TABLE 5.2
PROJECTED AND ACTUAL SATSOP CONSTRUCTION WORKER IN-MIGRATION
AT PEAK OF CONSTRUCTION
1977-JUNE 1981

	PROJECTED						ACTUAL	
	Condition A		Condition B		Condition C		With Transients	** Without Transients
	Low	High	Low	High	Low	High		
Elma	27	44	177*	286	232	370	635	330
McCleary	3	13	20	82*	26	107	92	89
Montesano	18	26	116*	172	153	225	159	105
Oakville	1	8	5	52*	6	69	47	47
Urban Area	26	58	167*	319	219	497	314	189
Other Areas	N/A	N/A	N/A	N/A	N/A	N/A	60	60
TOTAL	N/A	149	N/A	911	N/A	1,268	1,306	819

*Planning Projection.

**Comparisons should include transients since original projections did not differentiate between type of residence.

Numbers might not add because of rounding.

Table 5.3 compares actual experience in attributable population growth with the projection. Due to the higher than anticipated multiplier factor, these actual experiences are even higher than the planning projections than in the case of in-migrating construction workers. The distribution of secondary workers, which is determined on the basis of where both construction workers are located and where growth is occurring in the county, is more dispersed than just the distribution of construction workers. This factor particularly intensifies the impact of the project on Oakville and the urban area.

TABLE 5.3

PROJECTED AND ACTUAL POPULATION IMPACT
AT PEAK SATSOP PROJECT CONSTRUCTION
JUNE 1981

	Projected			Estimated Population Supported By Project
	Condition A	Condition B	Condition C	
Elma/McCleary	137	841*	1,098	3,968
Montesano	128	496*	656	1,224
Oakville	26	90*	183	283
Urban	91	588*	771	1,801
Other	0	403	460	985
County	382	2,418	3,168	8,261

*Planning projections.

In reviewing this result, however, several key concerns must be kept in mind. First, it is very difficult to assess population factors due to limited data for subareas of the county. This is why the growth analysis in Chapter 3 focused on households rather than population. Consequently, these figures should be used very cautiously. Second, since in most cases the growth stimulus of the project exceeds the actual growth in most areas (Chapter 3), these estimates would exceed the actual net population growth that has occurred in several areas. Third, in comparing this data with the analysis in Chapter 3, it should be noted that this table (and Table 5.4) includes transients which were not attributed to "new growth" in the later tables in that chapter. (The original projections did not differentiate between transients and non-transients.)

5.6 Distribution of Construction Workers: Table 5.4 provides a comparison of the county-wide planning projections with the actual experience for in-migrating construction workers. As in the case of the earlier tables, the actual concentration of workers in the Elma/McCleary area exceeds the projection the most. The concentration of workers are very equivalent to projections in Montesano, lower in Oakville, and significantly higher in the urban area. Consequently, the impact is more concentrated than expected.

TABLE 5.4
PROJECTED AND ACTUAL SATSOP CONSTRUCTION WORKER DISTRIBUTION BY YEAR
1977-1981.

Year	Elma/McCleary		Montesano		Oakville		Urban Area		County	
	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual	Projected	Actual
1977	36	-	18	-	6	-	39	-	100	-
1978	92	86	46	32	16	7	101	28	258	162
1979	198	219	100	39	35	14	219	111	558	420
1980	198	366	100	92	35	22	219	155	560	658
1981	244	727	123	159	63	47	162	314	687	1,306
1981 X Of Total	35.5	55.6	17.9	12.2	9.2	3.6	23.6	24.0	100.0	100.0

NOTE: Differences between subtotal of areas and the County total are workers located in the beach areas of the County.

5.7 Conclusion: The peak of the impact of the project on Grays Harbor County growth patterns greatly exceeded expectations in both numbers of people and distribution of impact. The total amount of growth was approximately three times the original projection. While the impact exceeded expectations in all areas, the impact was more focused and concentrated on the Elma area than was originally expected.

CHAPTER 5 NOTES

1. Grays Harbor Regional Planning Commission, Part One, City of Montesano Comprehensive Plan, City of Montesano, November 1977.
Grays Harbor Regional Planning Commission, Part One, City of Elma Comprehensive Plan, City of Elma, September 1978.
Grays Harbor Regional Planning Commission, Part One, Town of McCleary Comprehensive Plan, Town of McCleary, September 1978.
Grays Harbor Regional Planning Commission, Part One, City of Oakville Comprehensive Plan, City of Oakville, September 1978.
2. Community Development Services Inc., Analysis of Socioeconomic Impacts of WNP-3 and WNP-5, Washington Public Power Supply System, September 17, 1975.
3. Construction worker profile, A Study For The Old West Regional Commission.
4. For a detailed discussion of gravity models and their application see:
 - Edgar Hoover, an Introduction to Regional Economics, Alfred A. Knopf, New York, 1975.
 - Erik J. Steneham and James E. Metzger, A Framework For Projecting Employment and Population Changes Accompanying Energy Development, Phase II, Argonne National Laboratory, Argonne, Ill., October 1976.

5. See Chapter 3, Note 5.
 6. See Table 3.3.
 7. See Table 4.4 in Grays Harbor Regional Planning Commission, The Third Year of The Satsop Construction Project and Socioeconomic Change In Grays Harbor County, April 1981.
 8. Average household factor derived from 1980 U.S. Census of Population for the Elma Census Division.
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