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Economic Impacts of Land Use Control: the California Coastal Zone Conservation Commission

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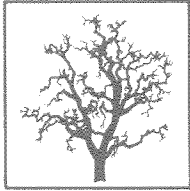
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ECONOMIC IMPACTS OF
LAND USE CONTROL:
THE CALIFORNIA COASTAL ZONE
CONSERVATION COMMISSION

Robert Kneisel

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Environmental Quality Series No. 30
Institute of Governmental Affairs and Institute of Ecology
University of California, Davis
February 1979

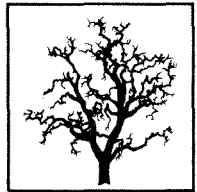
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ABSTRACT

While there is much discussion of the impact of land use controls, economic research on their effects has lagged. This study examines the economic rationale of such controls from the perspective of economic theory and notes that only recently have theorists begun to develop and test models of land and housing markets explicitly incorporating zoning and other land use controls.

A summary of the econometric research reveals mixed results concerning the impact of zoning upon property values. Some studies indicate that zoning has raised property values, while others claim that it has resulted in a random pattern; these mixed results are usually attributed to improper model specification. Studies on the cost impact of building codes have also yielded disparate conclusions, some claiming a weak cost-raising effect and others a substantial one. Variations among the markets and building codes of different jurisdictions are cited as reasons for the variation in findings.

However, even against this background of inconclusive findings, research on the land use controls instituted by the California Coastal Zone Conservation Commission is poor. The studies conducted to date generally lack the theoretical underpinning, methodological sophistication, and quality of data base which characterize other economic studies of land use controls. Many of these studies were intended as preliminary assessments aimed at identifying impacts and providing rough initial estimates upon which to base policy decisions. And while most of these descriptive or analytical studies do not violate economic theory, they are not sophisticated in their application of it. The empirical studies of the coastal commission do not, with one exception, utilize statistical tests of inference. Interestingly, the sole statistical test performed yielded counter-intuitive results. Furthermore, the data used in the empirical studies is typically much too aggregated to identify and ascribe effects to the coastal commission alone.

The poor quality of existing research argues for new studies of better research design which will utilize economic models, statistical tests, and a suitably disaggregated data base. Several specific proposals of this type for research on various aspects of the coastal commission's impact are provided in order to stimulate further study.

ACKNOWLEDGMENT

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ECONOMIC IMPACTS OF LAND USE CONTROL:
THE CALIFORNIA COASTAL ZONE CONSERVATION COMMISSION

Robert Kneisel *

I

INTRODUCTION

Increasing demands on limited coastal resources for commercial, residential, and recreational uses, combined with the "externality" and "public good" nature of these resources, have led to problems in their allocation by the market. Economists, with their traditional concern over allocative efficiency, have recently become interested in overcoming these problems through appropriate government regulation of land use.¹ From a different perspective, the equity effects of both market and regulated means of coastal resource allocation have also become an important issue.

Coastal zone management is the term applied to governmental planning and regulation of land uses along the coast. Though a few--mostly metropolitan--sections of coast have historically been subject to land use control in the form of municipal zoning, controls have only recently expanded to include entire stretches of coast. Coastal zone management includes not only the implementation of coastal land use controls but encompasses a diversity of fields such as land use planning, environmental impact assessment, public finance, and other concerns necessary for sound regulation of land use on the coast.

Coastal zone management is a prime example of the "Quiet Revolution" in land use controls.² The Quiet Revolution describes the recent shift in decision-making authority over the uses of land from municipalities to state and regional agencies. A major cause of the shift has been the inability or unwillingness of the numerous separate municipalities to provide an integrated, rational, and externality-minimizing system of regionwide land use controls, especially in critical areas such as the coastal zone.

Coastal zone management has quite rapidly become an important issue at the state, local, and national levels. In passing the Coastal Zone Management Act of 1972, Congress recognized the timeliness of such management. And the voters of California, in particular, felt strongly enough about public management of land use on the coast to approve Proposition 20 by a 55 percent majority (Deacon and Shapiro, 1975).

Despite the importance of the coastal zone management issue, scant research has been undertaken to date to determine the economic consequences of various coastal zone management approaches (as distinguished from the economics of land use controls in general, as discussed in Chapter III). The literature that exists is mostly descriptive rather than analytical and qualitative rather than quantitative. Especially lacking are empirical studies of the economic impact

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of coastal zone management programs.³ These deficiencies have meant that decisions by coastal zone policymakers and implementers have often been made in the absence of any precise or systematic knowledge about the results of those decisions. A great deal of additional detailed and comprehensive information is clearly needed. It is hoped that the present report will provide background and direction for such research.

This study begins with a general discussion of the economic theory of land use controls--their rationale, benefits, and costs. This is followed by a survey of recent empirical research in the general area of the economic impact of land use controls. This "state of the art" review then serves as a baseline for discussing the growing number of economic studies of the coastal zone management programs of California's Coastal Zone Conservation Commission and the regional commissions established by Proposition 20. It will be seen that research on the economic impact of the commissions lacks the methodological sophistication of the general research on land use controls.

Deficiencies in existing research can serve as a guide to the design of future studies; Chapter V describes a number of feasible research projects on issues posed by coastal land use controls, along with an explanation of how these studies can complement and extend existing research.

ECONOMICS OF LAND USE CONTROLS

A. Economic Rationale for Land Use Controls

A large and well-known literature exists on the topics discussed below--externalities, public goods, option values, etc., so that only a brief summary of major conclusions which pertain to the economics of land use controls is presented here. References to sources for further elaboration on these basic topics appear in the Notes at the end of this study. Representative research on these issues as they relate to land use controls are treated in Chapter III.

1. Reducing Externalities - The traditional rationale for zoning is that it spatially separates incompatible land uses, such as residences and industry.⁴ Land uses are incompatible when they impose "negative externalities"--unintended damaging side effects--upon neighboring uses. For example, multi-family apartments are said to be incompatible with single-family residences because they supposedly draw into the neighborhood families characterized by lower socioeconomic status, less concern for the neighborhood, and greater transience. The extent of this negative externality is measured by the (hypothesized) lower property values in neighborhoods containing multi-family apartments.⁵

The unregulated market is often unable to minimize these negative externalities. This may be because the number of disadvantaged parties is large, making bargaining (to reduce or remove the externality) between them and the responsible party an unwieldy affair. Or the cost of arranging a suitable solution between even a few parties may be prohibitive.⁶

When the market mechanism cannot provide a solution to the externality problem, a government agency may provide one of the following types of regulation: (1) prevent the externality or externality-causing activity outright; (2) prevent the activity from generating an externality by separating incompatible uses through land use controls; or (3) force the party responsible for the externality to compensate the injured party by an amount equal to the damage. When negative externalities are reduced or eliminated by these means, the general economic welfare is increased.

2. Providing Public Goods - A public good is defined as a good for which the condition obtains that one person's consumption of it is not diminished by another person's consumption of it. Scenic beauty, open space, and fire protection are examples. In the private market, individuals have little incentive to make expenditures for public goods because of the "free rider" effect. That is, once an individual purchases a certain amount of a public good, other consumers can enjoy it free of charge. This stems primarily from the fact that other consumers cannot be excluded from enjoying a public good once it is provided for any consumer.⁷

Land use controls are one means of providing a suitable level of public goods. For example, a municipal height limitation can benefit all viewers.

Yet, without such a governmentally set limitation, it is unlikely that separate individuals would value their own viewing experience sufficiently to pay voluntarily for the reduction of obtrusive structures or signs.

3. Providing Environmental Quality and Protection of the Environment - The private market's failure to ensure acceptable levels of environmental quality is a result both of the public-good nature of the environment and of environmental externalities in production and consumption. Unhindered land development may generate environmental costs which are not charged against the developer, but instead are incurred by the community as a whole. Community land use agencies therefore regulate environmentally destructive activities of private developers in the name of their constituency. However, environmental effects are often so widespread and pervasive that *local* governments are unable to regulate them adequately. This is the rationale behind the superseding of local zoning authority by regional and statewide land use control agencies. Such supra-local land use controls are especially prevalent in "critical areas" such as swamplands or coastal zones, where benefits of preservation accrue to a larger populace than the immediate community (Bosselman and Callies, 1971).

4. Establishing, Preserving, and Enhancing an Economic Base - Communities usually act so as to preserve their tax base. One means of doing this is to reduce or eliminate, by zoning, uses which cause the community a net fiscal liability and to increase those uses which provide a net fiscal gain. This is known as *fiscal zoning* (Sagalyn and Sternlieb, 1972:3-4). "Bedroom" communities may exclude industry in order to preserve the character of their community and hence the residential property tax base. Other communities may seek to attract industry for the tax base it provides, but separate it by zoning so that negative externalities are not inflicted upon the remaining community.⁸

The resulting "menu" of property taxes and tax-financed public services across communities allows potential residents to "shop" among communities for the most preferred combination. (This is known as the Tiebout-Oates Hypothesis [Oates, 1969].) Thus zoning decisions, by determining the pattern of taxes and revenues, also largely determine the income and class character of the community.

5. Preserving Option Value - Economists have come to realize that there is value in preserving resources in an idle state, even if their present use or exploitation is profitable. Since land development usually precludes alternative uses for the foreseeable future, options are effectively eliminated. The inability of the market to include completely the values which future generations may place on land provides a rationale for land use controls which preserve land for future use.

B. Costs and Criticisms of Land Use Controls

The benefits of land use controls accrue both to the public and to private individuals. Public benefits tend to be diffuse, both geographically and over time. Benefits to private individuals occur, for example, in the form of increases in property values when the supply of similar land is restricted or when nearby negative externalities are eliminated. These gains are likely to receive less attention, however, than the windfall losses or "wipeouts" caused by land use controls.

Windfall gains and losses due to land use controls are essentially a distributional effect. To counteract this effect it is theoretically possible to implement a system of compensation.⁹ Besides creating distributional effects, land use controls also impose *real costs* upon society, i.e., losses in economic output or productivity. Both types of costs are examined below.¹⁰

1. Reduction in the Market's Allocative Efficiency - Allocative efficiency is, most simply, a state of affairs in which resources go to their highest-valued use. By limiting the amount of land available for certain uses and expanding the amount of land available for other uses, the land use control authority impairs the allocative efficiency of the market. Surpluses and shortages of land for various uses thus arise. For instance, a common criticism of municipal zoning is that it restricts new building to lots of large minimum size. Homebuyers who wish to purchase homes on smaller lots are thus frustrated. In effect, the supply of large-lot houses is artificially increased, while the supply of small-lot houses has a ceiling placed on it. Increasing the supply of the large-lot houses tends to lower their price and contributes to "urban sprawl"--rapid spatial growth of cities--by making large parcels on the urban fringes cheap relative to small ones inside the city. When the allocative efficiency of the market is impaired in this manner, the general economic welfare is diminished.

2. Increased Costs of Administration - Competitive markets have the desirable effect of reducing the costs of obtaining information about goods. Buyers and sellers have an incentive to exchange information in order to maximize their own gains. Imposition of land use controls necessitates an administrative structure to impose the community's values over those of private individuals. To the degree that land use controls replace the private market as an allocation mechanism, the information cost-minimizing feature of the market is impaired. Buyers and sellers must expend greater effort in determining which transactions are allowed or have conditions placed upon them, and in assessing how future profit prospects are altered with changes in land use controls.

The direct costs of administration by the land use control authority should be included as well. These costs are borne by the community, whereas in unregulated private markets only the individuals engaging in transactions pay the costs of information and transactions.

3. Costs of Delay - Among the more important costs imposed on developers by land use controls is the cost of delay in the process of approval of permits, variances, etc. Various schemes exist for classifying the costs of delay. But it should be noted from the outset that many of these costs of delay are not *real costs* to the economy. Rather, they are transfers of wealth among present and future owners of land. For example, interest charges and taxes on land awaiting development may be partially or wholly passed on to future purchasers.¹¹ Delay may also be to the net advantage of the landholder if inflation in land prices is greater than the other costs of delay. An additional point to be emphasized is that many developers wait until a building permit is approved before taking out the construction loan and therefore do not incur many of these costs of delay. Estimates of the component costs of delay are provided in Chapter III.

4. Effects Upon Growth - Besides altering the type of growth a community experiences, land use controls can also be used to affect the amount of growth. This is particularly so in the case of "slow growth" or "no growth" controls. "Critical area" land use controls are sometimes pointed to as diminishing growth absolutely in their attempt to preserve present uses. In fact, however, the effect on the *absolute level of growth* depends strongly upon possibilities of substituting other land for the regulated land, though the possibilities of substitution diminish as more land comes under land use controls. This becomes especially significant when it is realized that the impetus for imposing land use controls comes from the attempt to preserve a dwindling supply of available land.

There is another type of substitution effect due to land use controls: the substitution of other goods for housing when land use controls restrict buyers from entering the housing market. To the extent that would-be home buyers substitute other consumer goods rather than savings for housing, aggregate demand in the economy is not diminished.

5. Distributional and Equity Effects - Windfall gains and losses to property owners are only the most obvious distributional effects of land use controls. More subtle is the effect of land use controls in presumably pricing lower- and middle-income families out of the market. By restricting the remaining supply of buildable land, critical area zoning is said to push prices beyond the reach of lower-income families. The costs of delay and land use control administration also raise prices; current owners of property stand to gain from these effects. But since property ownership is skewed toward higher-income families, lower-income families are not equally benefited by price increases induced by land use controls.¹²

III

REPRESENTATIVE RESEARCH

While there is a weighty body of literature dealing with economic concepts such as externalities and public goods, little theoretical literature exists concerning these concepts specifically in terms of land use controls. Representative examples of this scant theoretical literature on the economics of land use controls are discussed below, organized by the topics of the previous sections.

The empirical research on the economic impact of land use controls focuses almost exclusively on measuring and explaining changes in housing and land prices. This is undoubtedly because property values are the most easily observable and readily available data to the researcher. In the following discussion, therefore, it is primarily these studies which are considered.

The research reported here was located through three primary searches: (1) Bergman's (1974) "Development Controls and Housing Costs." His extensive search netted a meager dozen "good quality" studies utilizing the following sources:

...a mail survey of 300 selected individuals and organizations; a computer search of the National Technical Information Service file via the Lockheed Information Services Laboratory; and a thorough library search which relied upon scanning several reference indices, cross-checking of footnotes and bibliographies, and sorting through the card files or catalogs of several libraries--including that of the Department of Housing and Urban Development (Bergman, 1974:529).

The criteria he used for selection of studies were:

1) an appraisal of the validity of techniques and methods used in each report, 2) an appraisal of the findings of all research reports, and 3) the policy relevance (Bergman, 1974:528-29).

(2) A November 1976 literature search of land use control impacts utilizing the inform data base was conducted by the University of California, Riverside, General Library and yielded additional sources. (3) A personal library search by the author uncovered even more studies, especially recent ones. Criteria used in selecting studies from this search were: (a) specific relevance to land use controls, (b) economic content, (c) methodological sophistication, and (d) statistical significance of results.

Especially lacking are economic impact studies of state and regional land use controls. Healy (1976:168) laments that "The economic effects of controls are difficult to assess, both because of the short time period in which most controls have been in operation and the almost complete absence of scholarly studies of the issue."

A. Externality Zoning and the Reduction in Market Efficiency

In their theoretical analysis of externality zoning, Ohls, Weisberg, and White (1974) have shown that in general one cannot predict if or in which way the price structure will change with the imposition of or a revision in zoning practices. The resulting price structure for land depends on the "price elasticity of demand" for specific types of land and upon the number of municipalities practicing zoning in the same land market. The fewer the number of municipalities practicing similar zoning, the more choice the consumer has among types of zoning, including unzoned land. If the land whose supply is restricted by zoning is inelastic in demand (a 1 percent rise in price induces a less than 1 percent cut in the amount demanded), the value of that land will increase. (One would expect the demand for coastal land to be more price inelastic than inland land because in the latter there are few close substitutes for the package of coastal attributes, which includes beach access, ocean view, and air quality. Unfortunately, no empirical study has attempted to measure the price elasticity of demand of land on the California coast.) Courant (1976) has extended the analysis of Ohls, Weisberg, and White to a general equilibrium approach and found that their conclusions remain valid.

The empirical study covering the largest geographical area of all studies considered is Siegan's (1972) analysis of land use in *unzoned* Houston, Texas. In comparing Houston with similar cities practicing zoning, he concluded that the patterns of land use were essentially the same. In Houston, residential uses tended to congregate and to separate themselves from industrial and commercial uses, largely in response to real estate market forces. This result leads him to question the efficacy of zoning as a means of reducing externalities from "incompatible uses." He notes two minor differences in land use between the cities which, however, do not alter his basic conclusion:

- (1) Houston has a greater variety of land uses in any given area, which is ascribed to demand factors. For example, the corner grocery store is alive and well in Houston, serving a neighborhood need, while it may be excluded from residential neighborhoods in zoned cities.
- (2) Changes in land use tend to be more rapid than in zoned cities. Decaying neighborhoods attract a motley assortment of enterprises as property values fall and marginal businesses locate there. More rapid decay means that demolition occurs sooner, hastening new development.

A number of more localized studies have attempted to determine the effects of varying land uses upon property values in zoned cities. The disparity in their results also calls into question the economic rationale for externality zoning.

Bergman (1974), in a study related to the one quoted above, found "a weak to moderate, but uniformly positive, relationship between single-family housing costs and zoning controls in metropolitan areas."¹³

A study of land values in Fairfax County, Virginia, found land prices "highly sensitive" to zoning classification. At close-in

locations, the study found, lots zoned for ten units per acre sold at prices almost seven times as great as similar lots zoned for one unit per acre.¹⁴

In one of the first of such studies, Crecine, Davis, and Jackson (1967) found no discernable pattern of property values differing with nearby "undesirable" land uses (such as multi-family apartments in single-family neighborhoods). They expected to find lower property values associated with the proximity of such uses. But in half the city blocks in their analysis they found property values *positively* correlated with undesirable uses. The remaining half showed the expected negative correlation. This even split led Crecine et al. to reason that the presence of undesirable land uses exerts a *random* effect on nearby property values. Since this finding was at odds with the prevailing rationale of zoning as a separator of incompatible uses, Crecine et al. concluded that much municipal zoning is superfluous. They posited the existence of "a process of self selection which helps to remove the externalities relevant to the market" (Crecine, Davis, and Jackson, 1967:94). Their major conclusion is that:

The evidence which was examined in this paper casts doubt upon the notion that neighborhood effects abound in the urban property market. The evidence suggests independence rather than interdependence....If neighborhood effects do exist but are local so that they could not be observed by the methods used in this paper, then present zoning methods would appear to be less than fully appropriate. Efforts should be made to find restrictions which create independence in the market (Crecine, Davis, and Jackson, 1967:95).

Reuter (1973) conducted a similar study in the same city (Pittsburgh) as Crecine et al. did. He correlated the price of a parcel with the different types of land use within 150 feet and again within 300 feet. This procedure was an improvement on that of Crecine et al., which considered land uses solely within the same city block of the parcel. Reuter, like Crecine et al., found a random pattern of positive and negative influences of land uses on price. His conclusions are:

1)...there is much more independence in urban property markets than the zoning ordinance anticipates. 2)...there is little likelihood that all of the external effects anticipated by the zoning ordinance actually arise in urban property markets (Reuter, 1973:334-36).

Reuter also questions the efficacy of municipal zoning in light of the inconclusive statistical results.

Stull (1975) puts the results of Reuter and of Crecine, Davis, and Jackson in perspective by noting that:

...several other investigators, though not as directly concerned with the relationship between land use environment and property values as Crecine et al., have reported results which

differ from those of the Pittsburgh study. For example, John Kain and John Quigley, in an important and comprehensive study, found that an index which measured the presence of commercial and industrial uses on a parcel's block face exerted a significant negative effect on both apartment rents and single-family home values (Stull, 1975:552).

Stull lists two other studies as finding similar results: Harris, Tolley, and Harrell (1968); and Wieand (1973). Stull reports:

The substantive results of the research reported in this article are directly contrary to those obtained by the two Pittsburgh studies. I found that property markets in the Boston SMSA [Standard Metropolitan Statistical Area] were characterized by a substantial amount of interdependence in that the value of the typical single-family property depended significantly upon community land use patterns (Stull, 1975:552).

He does not, however, see policy implications opposite to those of Crecine et al. and Reuter, who urge the weakening of zoning regulations. Stull poses two alternatives:

- (1) The statistical significance of nearby land uses may imply that zoning has not, in fact, separated such uses. Zoning may be inherently ineffectual because of the pressures of its political setting. If this is the correct analysis of zoning's effect, then Stull entertains the notion of scrapping the zoning apparatus and saving the cost of administration.
- (2) If zoning is not ineffectual, there are still other reasons for restricting its application, such as its exclusionary nature (Stull, 1975:553).

Another variety of externality zoning is the building code, which is designed to ensure uniform housing quality within the community, thereby lessening the negative externality which "substandard" housing imposes on adjacent property. In these studies there is also a wide disparity of results.

Local imposition of "unnecessary" building codes is estimated to contribute additional costs to residential construction ranging from a few percent to a substantial fraction of the structure cost. ("Unnecessary" here means overly stringent from the point of view of health and safety considerations.) The estimate generally depends on the estimation techniques used and the affiliation of the author, i.e., whether he is associated with the construction industry or not.

But there are more important and far-reaching impacts of building codes than increases in structure costs. Field and Rivkin (1975) in their book, *The Building Code Burden*, assert that "Misuses of regulatory powers has resulted in higher than necessary housing costs, obstruction of new building technologies, inefficient use of scarce national resources, and discrimination against lower income families" (Field and Rivkin, 1975:129).

For example, besides the familiar case of local building codes pushing housing costs up, there are "system costs" imposed by features of the building code regulatory apparatus as a whole. McConnaughey (1977) describes the building code system as follows:

In addition to local and state building codes, major elements of the building code system are model codes, voluntary standards which are referenced in codes, and the public and private testing, certifying, research, or coordinating organizations which are specifically concerned with building codes and standards (McConnaughey, 1977:12).

McConnaughey's examples include (1) costs of overlapping jurisdictions and regulations, and (2) inhibition of economies of scale by variation in building codes over local authorities. He summarizes:

Building Code System impacts upon the cost of housing may be substantial. It is this type of impact which has been the central concern of the ACIR [Advisory Commission on Intergovernmental Relations], Douglas Commission, and Kaiser Committee reports. Moreover, most of the reforms initiated or recommended address reforms of the building code system (McConnaughey, 1977:12).

In one of the most thorough and methodologically well-conceived empirical studies, Sagalyn and Sternlieb (1972) conduct multiple regression analysis using the prices of recently built New Jersey homes and specific features of local building and zoning codes. They find that variables representing specific provisions in zoning ordinances and building codes, as well as delay in building permit approval, are statistically significant. However, the influence of each variable independently is weak (Sagalyn and Sternlieb, 1972:66-70).

In a recent study, Muth and Wetzler (1976) include variables representing constraints on the housing market in a previously derived "best fit" regression equation of house price on various structural characteristics. One result is that "the coefficient of the locally modified national building code variable, while positive, suggests that such codes add only about 17¢/sq.ft. (in 1966-67 dollars) to structure costs or less than two percent of the average for all observations in the sample" (Muth and Wetzler, 1976:65). This finding agrees with the results of a study by Maisel (1953) in which he concluded that "unnecessary" building codes had but slight effect on house costs.

These results conflict with construction industry studies showing substantially greater cost effects of building codes. McConnaughey cites two reasons for the disparate results: first, the building code of any given municipality may contain both restrictive and lenient provisions. Characterizing local building codes as either restrictive or lenient (or something intermediate) may mask their detailed effect on housing costs. Furthermore, each study uses a different measure of restrictiveness of building codes, which quite reasonably can be expected to lead to differing results.

A second reason for conflicting study results is that they are conducted in vastly different code jurisdictions. A finding in one code jurisdiction that restrictive local codes increase direct construction costs by a substantial amount need not conflict with an opposite finding from a different location. Although each study may be valid, attention is likely to be focused upon the study finding substantial cost impacts. Moreover, some persons may commit the fallacy of composition by believing that since building codes substantially increase the cost of housing in one location they substantially increase the cost of housing for the nation as a whole as well (McConnaughey, 1977:8).

No study which examines the cost impact of state or regional code provisions (such as for earthquake safety) across various jurisdictions and regions has come to light.

Finally, studies differ in the degree of aggregation of data. While one study (such as Muth and Wetzler's) may attempt to extract statistical generalizations from individual units as large as a Standard Metropolitan Statistical Area, other studies focus on individual subdivisions.

B. Additional Rationales for Land Use Controls: Public Goods, Environmental Quality, and Option Value

These aspects of land use controls remain poorly researched at both the theoretical and empirical levels. Theoretical work on these topics is at a general level, with land use controls being a straightforward application of the theory. From the broadest perspective, environmentally related land use controls can be said to segment the market for residential land into two distinct markets: (1) one market which consists of land immune from regulation, usually because of its being already--partially or wholly--built up (there is only a limited supply of this type of land available); and (2) another market, for new land subject to the controls. While the supply of land in this market is potentially large, regulations on its use limit its availability and raise its price (Solomon, 1976:16-17).

Empirical studies are hampered by measurement problems. For example, to determine the community demand for public goods such as open space and unobstructed views, individuals' willingness to pay must be known. But this is difficult to discern from questionnaires, since respondents may bias their responses downward if they perceive that they can act as "free riders." And since public goods generally affect the entire community, within-community comparisons of property values to determine the effect of the public good are of little benefit. A similar problem exists in attempting to find the value of environmental quality, so that land use controls can be designed to provide the optimal amount of it. A major problem in determining option value lies in estimating the value which future generations will ascribe to land preserved for their use.

Despite these problems, there is much fruitful research still to be done in the field of local controls on growth and environmentally related land use controls such as critical area zoning in floodplains and coastal areas. The lack of literature on these increasingly important forms of land use controls reflects not only the difficulties mentioned above but the absence of data and the recent origin of many of these controls as well.

C. Maintaining and Increasing the Economic Base

One of the most outstanding and thorough empirical studies of land use controls is *The Costs of Sprawl* by the Real Estate Research Corporation (1974), which documents the fact that unhindered private development imposes public service costs much greater than the costs of a denser, more planned type of development. Once the existing public service capacity is exceeded, the increased public service cost of new development may outweigh the tax revenue it generates. Such a situation necessitates three alternatives: (1) increase the local property tax rate, (2) lower the level of public services provided, or (3) control growth. "The Economics of Petaluma," by Claude Gruen (1975), provides one of the few discussions available of the applications of the *Costs of Sprawl* study to land use control policymaking in a town which has attempted to control its own growth.

Molotch (1976) has provided a theory of why cities adopt either growth-oriented or "slow growth" policies. He argues that most cities act to maximize their growth rate because local businesses gain from growth and city councils are composed primarily of local businessmen. However, when growth would damage the character of the city and impair the general business climate, or make it a less attractive place for powerful local residents to live, zoning controls which restrict growth may be adopted.

In addition, Molotch is one of the few writers to stress that local growth controls, viewed within the context of large geographical areas, probably *transfer* growth among areas but do not diminish it absolutely.

D. Cost of Delay

Various estimates of the cost of delay due to land use controls exist;¹⁵ they vary widely, depending upon the assumptions of the author. These studies lack explanatory power because they do not trace the hypothesized causes of cost through to the sale prices of actual houses by employing current statistical techniques. The following table shows some of the highest estimates of the cost of delay. It is taken from *California Environmental Quality Act and the Cost of Delay*, by the Construction Industry Research Board (1976).

<u>Components of Delay Costs</u>	<u>Annual Cost of Delay Low-High Ranges</u>
Land holding costs	1.2%-2.2%
Building cost inflation	3.0-13.0
Overhead costs	4.0-10.0
Foregone revenues	1.2-1.4

Muller and James provide a much lower estimate of the impact of the same act: a total cost increase of only 0.6% (Muller and James, 1975:15-20).

One aspect of delay which is often ignored is the benefits of delay. Delay is necessary in order to compile information which public decisionmakers require. Without such information, public regulation of land use would be perfunctory at best. (A study to measure both the benefits and costs of delay is described as the seventh priority in the Research Needs chapter that follows.)

Furthermore, many of the costs of delay are not real costs in the sense of losses in real output to the economy. Rather, they are transfers from developers to other groups such as landowners, banks, and subcontractors.

E. Distributional Effects

Only recently have economists attempted to provide a rigorous theoretical base to zoning's distributional effects. White (1975) constructs a mathematical model which reaches two main conclusions:

- (1) Zoning's effect on city size and on land values can be either positive or negative, depending upon various characteristics of the real estate market.
- (2) "...the major benefit of zoning may be the ability to ensure that one's neighbors have the same income, the same taste for housing and demand for public services as oneself. In this sense the benefit from zoning accrues to suburban dwellers generally, while its cost is borne by center city residents who have no such exclusionary power" (White, 1975:290).

F. Summary

The studies discussed show the extent to which the literature addresses the economic considerations involved in land use controls. Deficiencies in both the theoretical and empirical literature exist. The inconclusiveness of even well-designed studies argue for expanded research, especially empirical research using current statistical methodology.

Almost all of the studies reviewed are concerned with property values and construction costs. Also, they are from a *micro* perspective (focusing on a specific locale and market) as opposed to a *macro* approach, which would survey a broader geographical area and incorporate other economic variables, such as mobility of the labor force, industrial plant siting choice, and land use controls in adjacent areas. (The economic studies of the coastal commissions, by contrast, are generally more macro in focus; they estimate the coastal commission's effect over a broader geographical area and for a variety of sectors of the economy.) The total number of studies on the economic impact of land use controls is so small that generalizations made from them are tenuous. For example, from the disparate results of Crecine et al., Reuter, and Stull, it is difficult to draw conclusions regarding the actual effects of zoning on

property values. A greater number of similar studies must be completed before unambiguous conclusions can be reached.

For purposes of the present report, the studies of the preceding section are most important in that they *do* provide *statistical tests* of the impacts of land use controls. Such tests are, given the current "state of the art," the ultimate criteria by which the economic impact of land use controls can be measured.

ECONOMICS OF LAND USE CONTROL IN THE COASTAL ZONE:
THE CASE OF CALIFORNIA

A. The Economic Character of Coastal Zone Resources

1. Physical rationale for the scarcity of coastal zone resources - The value of the coastal zone and its resources is derived from its unique attributes of limited quantity and the high demand for them. Since it is a thin interface between thousands of miles of ocean on the one side and thousands of miles of land on the other, the coastal zone is, in strictly physical terms, less abundant than either the land or the sea. This in itself does not imply that the coastal zone will have a high value. But when we add the desire for the attributes of the coast to its physical uniqueness, it is evident that coastal zone resources will command a high price.

The unique attributes of the coastal zone as an interface or passageway between the land and the sea is the basis of its location value. The location value of the coastal zone is to some degree reflected in the value of resources existing in the coastal zone, or in the value of products produced there. Among the locational attributes of the coastal zone are: (1) proximity to transportation networks which have expanded from the port to inland and overseas routes; (2) access to population centers, many of which have grown up around initial coastal sites; (3) scenic beauty, which is an important determinant of the demand for coastal housing; and (4) moderate climate, which reduces heating and cooling costs for all economic activities and is a prime input in coastal agriculture.

2. Competing demands for coastal resources - One of the major conflicts over coastal resources is their use as inputs to production versus their direct consumption by individuals. The market allocates coastal resources according to their highest valued use of any type. In doing so, the market automatically considers the highest valued alternative use of the resource, its "opportunity cost." For example, the opportunity cost of using a scenic beach for a nuclear power plant site may be the value of the beach's scenic amenity which must be forgone in constructing the plant there. The market assures that the opportunity cost of a given activity is less than the value of the activity itself, otherwise the alternative activity would be undertaken.

There are at least two major problems that arise with market allocation, however. First, many coastal resources cannot be easily priced and efficiently allocated by the market because of their externality or public-good nature.

Second, the distributional consequences of the market may contradict social goals. The widely held view that the coast should be accessible to all individuals conflicts with the market criterion of coastal resources' going to the highest bidder. It was partially in response to the distributional consequences of the market that voters approved California's Proposition 20, placing interim development controls on the coastal zone (Hetrick et al., 1974).

B. Costs of Coastal Zone Management

In discussing the economic costs imposed by coastal zone management, it is important to understand several concepts. First, much of the economic dislocation due to coastal zone management is not a net loss to the economy, but a transfer of wealth and income among economic agents. Much of this dislocation can be viewed as the response of the public to the inability of the private market to provide sufficient quantities of public goods such as open space, beach recreation, and clean coastal air. The public agency involved in coastal zone management is in effect performing a desired function which the market cannot. To label the transfers involved in aiding the market in this manner as "costs" therefore obscures the function of public choice which coastal zone management performs.

Second, other costs imposed by coastal zone management are actually inter-generational transfers. Preserving a coastal resource for the use of future generations places a cost on the present generation in terms of forgone current output (an "opportunity cost"). The flow of environmental services which this resource may provide during its preservation must also be counted as a benefit. In assessing these benefits and costs, the choice of an appropriate discount rate to apply to these services is critical. It is generally held that the market rate of interest *undervalues* future consumption at the expense of present consumption because present consumers will not live to consume in future generations. The coastal zone management authority must therefore find a rate of discount that will enable it to calculate how much of the complement of coastal resources to preserve over time.

Third, there is a net loss to the economy when a coastal zone management decision decreases the productivity of coastal resources. But it should be borne in mind that not all coastal resources are counted as "productive" in the calculation of Gross National Product. For example, a decision not to build a refinery in the coastal zone may diminish the productivity of the facility, but it may also maintain the "productivity" of the coast to provide scenic vistas, clean air, suitable marine habitat, etc., all of which are not calculated as a strictly economic gain.

The costs of coastal zone management, then, include: (1) loss in productivity, in purely economic terms; (2) loss in welfare for those individuals prevented from personally consuming coastal amenities (as residents); (3) loss in output due to non-substitutability of inland resources for coastal ones; (4) direct costs of administration; and (5) costs of delay.

C. Research on the California Experience

A large part of the case study literature on the economics of coastal zone management focuses on the California experience. Many of these studies were undertaken to evaluate the potential economic impact of the suggested policies in the *California Coastal Plan*, prepared by the coastal commissions and submitted to the 1976 California Legislature. The California studies are generally superior to those describing coastal zone management in other states because

they can rely upon the experience of the commissions. Where the studies of other states' programs hypothesize, the California studies have a data base upon which to judge economic impacts, at least in the aggregate. Unfortunately, even the California studies are for the most part not thorough empirical studies using appropriate disaggregated data and current methodology. Rather, they are something akin to an economic version of the most loosely construed and speculative environmental impact report required today of many development projects. To evaluate the strengths and weaknesses of each study, to facilitate comparison, and to indicate the direction necessary for research, the following evaluative criteria are applied: (1) methodology; (2) data base; (3) time frame; (4) types of costs and benefits considered; (5) assumptions; (6) conclusions; and (7) validity, based on economic theory and related studies.¹⁶ Of course, because of the variation in the studies not all of the criteria can be applied to each instance.

1. California Coastal Zone Economic Study: An Area Profile and Statistical Appendix, by Security Pacific Bank Research Department (April, 1975).

This is a compilation of data on the economic characteristics of the coastal zone to the extent possible from existing sources. It is the most comprehensive general data base available to researchers of the California coastal zone. Besides its hundreds of statistical tables, the study provides a discussion of the major economic features of the coastal zone and their change over time. Where possible, generalizations are derived from the statistical tables. While it does not attempt to link changes in economic variables with the activities of the coastal commission, the study does provide data from which some conclusions may be inferred. (These will be reported below in discussing research which uses this work as a data base.)

The data are tabulated by three separate geographical divisions: (1) coastal counties; (2) the five-mile "planning area"; and (3) where data exist, the 1,000-yard "permit zone" of the coastal commission. There is relatively scant information on the all-important permit zone. Studies using this work as a data base have therefore frequently opted for comparisons using the five-mile planning area as the relevant area affected by the coastal commission's regulation. Since only 1,000 yards of the five-mile planning area are under the coastal commission's permit regulation, this technique can lead to serious mistakes in estimating the commission's economic impact. The topics under which the *California Coastal Zone Economic Study* organizes the presented data include public land ownership, population, employment, personal income, retail trade, financial institutions, housing, building and construction, home price trends, assessed value of property, basic industries, international trade, and transportation. Data entries begin with 1960 and continue until 1974. Heavy reliance is placed upon 1970 Census data.

2. The Economic Context of the California Coastal Plan, by Robert F. Rooney (1975).

This volume is not an empirical study but a discourse upon present and predicted changes in the state and national economy, with emphasis upon the

California Coastal Plan as a strategy for facilitating these changes and minimizing the cost of transition in coastal areas. The methodology of Rooney's study consists primarily of identifying and quantifying trends in economic variables, then analyzing their impacts and relating these predicted impacts with the plan's policies. Data on these trends come from three sources:

1. General economic data such as the cost of labor, capital, and farm commodities.
2. Surveys of future resource availability: Paley Commission (1952), Lansberg (1963), Committee on Resources and Man (1969), The Club of Rome (1972), and the National Commissions on Materials Policy (1973).
3. Data on energy consumption in California.

Rooney consciously eschews the benefit/cost methodology widely used to assess economic impacts of programs such as the California Coastal Plan:

This benefit/cost study would involve placing economic values on such *public* goods as scenic vistas, beach recreational resources, biologically optimum populations of marine organisms, cleaner air and water, maintenance of unique or lower income coastal communities, and a whole host of environmental and social factors which contribute significantly to the overall quality of life. Since these environmental and social factors are public goods which are not bought and sold on competitive markets, there is no reasonable way to place economic values on them (Rooney, 1975:37).

He concludes that "the direct and indirect economic impacts...on private goods and services must be measured along with, but independently of, the basically qualitative assessments of...environmental and social impacts" (Rooney, 1975: 42).

Rooney, himself a former chairman of the South Coast Regional Coastal Commission, does not purport to measure these impacts in his study. Instead, he provides a qualitative discussion of environmental and natural resource policy, focusing on the California coast. Policies at issue which are likely to yield benefits and costs are: (1) recycling, (2) aiding and directing technical progress, (3) resource conservation, (4) energy consumption, (5) open space preservation, (6) "sustained yield" exploitation, (7) agricultural--and other--land conversion, and (8) "planning" vs. the market mechanism.

The time frame of Rooney's study is perhaps the longest of all those reviewed. His assumptions about future resource availability are derived from the trend of historical and recent data, then projected into the future to yield the scenario against which the California Coastal Plan's policies are evaluated. A major assumption is that the prices of food, land, capital, natural resources, and environmental goods are increasing and can be expected to increase relative to the price of labor. Furthermore, Rooney assumes that the market mechanism alone is incapable of providing a transition to this new

economic era without great social and private costs, bottlenecks, inefficiencies, etc., unless it is complemented by planning and policy implementation.

The main conclusion of Rooney's study is that the plan provides the policies which will ease this transition:

...[it] generally encourages and facilitates the kinds of economic adaptations that are essential if California's economy is going to progress in the economic, social and ecological environment of the next couple of decades (Rooney, 1975:66).

The validity of Rooney's conclusions rests on two factors: the projection of relative price trends and the efficacy of the market mechanism. Though no projection is foolproof, Rooney's does seem to capture the essence of recent price changes and their implications when extended into the future. Whether the market mechanism, unaided, can provide an efficacious transition is an assertion left unproved. Perhaps a more relevant question for analysis would be, "Is the present panoply of government regulations sufficiently flexible to provide the transition at minimum cost?" The practical question is not one of the market versus nonmarket means of allocation. The question is *how much* regulation is sufficient. Rooney's analysis does not really provide an answer to that question other than to elaborate upon the *direction* in which the plan's policies will shape the economy. In order to begin to answer the question of how much regulation is needed, a study of the effects of *past* coastal commission regulation must be undertaken.

3. *Benefits of Coastal Zone Management*, by the Urban Land Institute (1976).

This paper lists and describes the benefits of coastal zone management and provides dollar estimates of the benefits taken from existing data sources. No attempt is made to describe or measure the costs of coastal zone management. The authors' assumptions are made clear by the following passage:

...there are no "universal" benefits or costs related to coastal zone management. Neither is it certain that all management programs will result in net positive impacts. On balance, however, it seems conceptually possible in most cases to use management techniques to generate more benefits than costs, but the extent to which that objective is realized will depend on the good judgment exercised in program development and implementation. Both benefits and costs are highly variable and only a systematic, complete analysis of conservation and development options will ensure a net benefit of results (Urban Land Institute, 1976:2).

The benefits of coastal zone management fall under the following categories:

- a. environmental protection
- b. recreational and tourist uses

- c. aquaculture, mariculture, and coastal agriculture
- d. oil, gas, and mineral extraction
- e. energy generation, transport, and processing
- f. port facilities
- g. planning of development, especially residential
- h. regulatory agency streamlining

Estimates of past and current value of resources produced and/or consumed in the coastal zone most likely are accurate, given the sources used. Projections of the future value of these resources, however, are less reliable, since assumptions about future economic trends and events underlie them. More important, however, the study generally overlooks the "exclusionary" nature of certain benefits in calculating their value. Many uses of the coastal zone exclude other uses by their very nature. Use of the ocean's assimilative capacity to neutralize sewerage excludes its use for aquaculture and mariculture, and perhaps recreation. Plant siting and residential development preclude the use of these locations for open space and habitat preservation. Though the report does mention the competing nature of uses in the coastal zone, the point is not stressed adequately.

Projection of economic values derived from the coastal zone without consideration of the conflicts between alternative uses results in serious *overestimates* of the total value of coastal zone resources and its constituent categories. In short, the report makes a "fallacy of composition." The point is not made that a major function of coastal zone management is to weigh the value (both dollar and unquantifiable) of economic activities in the coastal zone, and decide *which* conflicting uses shall be reduced or eliminated.

The report is on safer theoretical ground when it discusses the (non-quantifiable) benefits of wise coastal zone management, as opposed to its discussion of the values of coastal zone resources and coastal zone economic activity themselves. Its major conclusion is that coastal zone management is needed for the following reasons:

- (1) The private market does not value coastal public goods in a way which represents people's demands.
- (2) The private market values present consumption so much more than future consumption that there is a tendency for nonrenewable coastal resources to be rapidly depleted.
- (3) Coastal land use controls administered by local authorities frequently result in patterns of use which disadvantage regional, state, and national needs. Unwillingness of towns to site port and energy facilities within their boundaries are examples.
- (4) The complex, uncoordinated, and overlapping regulatory structure in the coastal zone produces uncertainty and inefficiency for the public and private users of the coastal zone.¹⁷

The shortcomings of the market mechanism listed are generally acknowledged in economic theory. But it is also acknowledged that regulation of the market

has historically led to the difficulties mentioned in the last two points. The problem of the "optimal level of regulation" is an important and unresolved issue in economic theory. *Benefits of Coastal Zone Management* would make more of a contribution if it addressed this issue. Simply describing the benefits without specifying the level and degree of regulation involved allows one to choose a "best-of-all-possible-worlds" approach without considering the difficulties of attaining this optimal level and degree of regulation. This shortcoming is closely related to the report's failure to discuss the costs of coastal zone management.

4. *Business Prospects Under Coastal Zone Management*, by the Real Estate Research Corporation (1976).

The title of the report is a misnomer since only the benefits of coastal zone management are seriously discussed. *Prospects* was prepared as a companion to *Benefits*, discussed above. It focuses even more heavily than the latter on the impacts of the California Coastal Plan. The report considers three categories of impacts "because they account for the preponderance of potential change (both positive and negative) in business prospects that might result from implementation of the policies and programs outlined in the California plan" (Real Estate Research Corporation, 1976:2). These categories are:

(1) public investment in facilities and services (with and without the Plan), (2) the Plan's effect on land values, and (3) economic development--e.g., its impacts on employment, business investment and profitability, and construction activity (Real Estate Research Corporation, 1976:2).

(1) Public investment: *Prospects* relies largely on the Real Estate Research Corporation's *The Costs of Sprawl* (1974) for data on the costs of alternative densities of development and public investment required. The *Sprawl* study is an example of thorough, detailed empirical research and its conclusions have been frequently cited. The major finding of *Sprawl* is that situating development in the interstices of already developed areas (known as "infilling") incurs less cost in terms of public service investment than developing virgin land. The coastal commission preferred infilling to sprawl development in its de facto guidelines. But in contrast to the conclusions of *Sprawl*, the commission favored low- rather than high-density development, a policy which results in higher unit costs.

(2) Land values: *Prospects* uses accepted economic theory in concluding that "restricting land use options will lower land values of subject properties, but will also transfer any unsatisfied demand to other competitive sites not subject to use restrictions" (Real Estate Research Corporation, 1976:8). A table which lists expected results from the California plan's policies on land values agrees with the conclusions derived from economic theory.

(3) Economic development: The report provides qualitative estimates of plan policies on specific sectors of the economy. Categories of potential effects tabulated include employment, construction activity, investment/profitability in other business sectors, and benefits/costs to the consumer. Their

conclusions appear to be the result of applying standard economic theory. Their methodology, however, does not capture the multiplicative and interconnective effects of initial economic impacts, effects which can be quite large. A more appropriate methodology is to construct an input-output model of the coastal economy and trace the mutliplicative and interconnective effects throughout various sectors.

In addition, they describe the plan's effects as being short-run. There is no adequate empirical basis for this assertion. Indeed, economic theory implies that altering the pattern of land use as the plan anticipates will have *long-range* repercussions on the fabric of the coastal economy.

5. California Coastal Plan, by the California Coastal Zone Conservation Commissions (December, 1975)

The plan itself contains a scant two pages devoted to its possible economic impacts. The pages contain mostly a justification for plan policies by citing the benefits they will provide. The plan stresses that benefits from its policies will accrue over the long term, while losses can be expected to be short-term in nature. It cites the economic advantages of developing tourism as opposed to alternative uses of the coast; refers to the *Costs of Sprawl* study as a source of its "balanced" development policies; and discusses the value of preserving coastal agriculture, forests, and fisheries. Though estimates of the value of some of these economic activities are provided, cost estimates of the plan's policies are not given. In response to the deficiencies of the plan in documenting its economic impact, the California Senate passed a resolution sponsoring an economic impact study of the plan. The impact study was published as two sequential reports, discussed below.

6. Economic Impacts of the Proposed Coastal Plan--A First Report and Further Proposals, by Economics Research Associates and Alvin H. Baum & Associates (October, 1975).

This report is a "feasibility study" of performing economic impact analysis of the California Coastal plan. It does not rely on a specialized data base and its conclusions are qualitative rather than quantitative. "Impacts" describes its methodology:

The research recommended in this report will not involve either a complex computer-based economic model, nor much computer time for data handling. This may disappoint some economists, particularly university economists who deal in broad projections. We are aware of the work going on at the frontiers of the profession, but we do not feel that it can be made to apply to the questions involved here. Our method--breaking down the impacts into recognizable and researchable components, and constructing data, however crude, that can be used with manageable assumptions--seems to us most likely to provide the Legislature with understandable and best-possible estimates of what the Coastal Plan would actually mean to legislators' constituents (Economic Research Associates et al., 1975:9).

Impacts contains a novel "summary matrix" for the identification of economic impacts of each of the plan's policies. The matrix is qualitative rather than quantitative. It tabulates the policies of the plan in terms of various categories of impacts: (A) commerce and industry; (B) housing; (C) "emerging economic values," such as scenic quality, social equity, public use, etc.; (D) land values; (E) public costs; and (F) public revenues. Since many of the de facto guidelines followed by the coastal commissions are carried over as plan policies, the matrix organizes impacts of the commissions in a manner that allows easy reference.

The next section analyzes the "Most Significant Economic Issues" by grouping the plan's major policies around several issues and explicitly stating the arguments "for" and "against" each issue. The scope of the research needed to provide data on each issue is elaborated in detail. The discussion of each issue is of such high quality (from the perspective of applied economic analysis) as to make each one a small "grant proposal" in itself. The probing questions that should be asked from both sides of an issue are addressed. For example: (1) the efficacy of subsidizing coastal agriculture is questioned, because such agriculture could perhaps operate on unsubsidized inland; (2) to determine the benefits of providing increased recreation facilities, it is urged that the components of coastal recreation demand be estimated; (3) to provide data on the costs of the plan's implementation as well as its benefits, *Impacts* suggests that the costs of review and delay in the power plant siting process be estimated, using coastal commission experience as a guide; and (4) in general, *conflicting* implications of plan policies are brought to light and research on the value of the alternatives implied is stressed.

Impacts sees the "most significant economic issues" as: (1) agricultural preservation and protection, (2) orderly balanced development, (3) recreation, (4) energy, and (5) ports. "Other significant issues" include: (1) marine environment, (2) coastal land environment, (3) appearance and design (of development); (4) public access to the coast, (5) transportation, (6) low and moderate income housing, (7) coastal dependent and industrial development, (8) development in hazardous areas, and (9) restoration of coastal resources.

Given its very specific and explicitly limited methodological orientation, "Impacts" provides a thorough and objective economic analysis of the issues involved and elaborates the means for researching them. If anything, the suggested research goals, while methodologically possible, are too extensive. A competent research program, including all their suggestions, would cost many times the \$250,000 which the report estimates.

7. Review of the California Coastal Plan, by ICF Associates, published by the Office of the California State Legislative Analyst (April, 1976).

This economic impact study resulted from the recommendations made in *Impacts*. A number of reports by various authors are included:

- (A) "Assessing the Impact of the California Coastal Plan on Commercial and Residential Development," by ICF Associates. The methodology of this study

involved two steps: (1) "development of a general framework within which to realistically assess impact" (ICF:2)(successively more specific assumptions about the area under study and the plan's policies are applied to subject developments); and (2) "analysis of specific costs that affect subject developments and benefits that accrue from them." The study is quite open in discussing its limitations: "Three factors limited the methodology and affected the degree of specificity of the findings and conclusions" (ICF:2). These were: (1) "Empirical data are scarce....Data which are available relate to the interim permit processing experience....Experience under the interim process cannot be simply extrapolated to what might occur under the plan itself" (ICF:32); (2) "A consistent base line from which to evaluate the impact of Coastal Plan policies does not exist....The land use picture throughout the state is in considerable flux....One would find it extremely difficult to establish a base line that represents the current land use planning situation of all communities along the coast" (ICF:32); and (3) "The study was limited by resource constraints and thus is intended to provide only a preliminary assessment" (ICF:33).

The study makes assumptions which define a specific type of development area, which characterizes only a portion of the coastal zone, albeit the "developable" portions. Assumptions include the type of land use and development pressure, geography, governmental structure, utilities and transportation, and the degree of public ownership of land. The areas of the coastal zone which fit these assumptions are listed.

Coastal Plan policies are divided into three categories: those that have direct, indirect, or no impact. Direct impacts stem from explicit regulations. Indirect impacts "affect all projects on an aggregate basis by affecting the amount or scale of development permitted" (ICF:37). The indirect impacts are then interpreted in one of two scenarios: minimum or maximum implementation of plan policies.

Costs and benefits of implementation to developers and government are then detailed. Costs to the developer include regulation, delay, uncertainty, mitigation, and scarcity of development opportunities. Costs incurred by government include investment and compensation. Unfortunately, costs are not analyzed according to whether they are a real cost to society or a redistribution, and whether a particular developer can pass these costs on in the sale price is not discussed. The study concludes that the plan will make large developments more costly in relation to small ones, but that some small- and medium-scale developers will be disadvantaged because of lack of experience in designing the type of projects specified in the plan.

Benefits studied include (1) more efficient use of common resources (public investment), (2) higher demand for existing and newly developed housing and commercial space, and (3) increased public voice in development.

Overall, "Assessing" is quite explicit about its assumptions. They are chosen so as to typify most of the developable land along the coast. The focus is perhaps a bit too micro-economic oriented, the result of dividing up the affected economic units into categories for ease of analysis.

(B) "Economic Indicators of the Effects of the Appearance and Design Policies in Open Coastal Areas," edited by Jerry Yudelson. The study begins with the observation that:

The basic problem in evaluating the economic effects of the *Coastal Plan* visual policies is that the benefits are mostly diffuse and qualitative, while the costs are concentrated and mostly quantitative (Yudelson, 1976:21).

With this in mind, the study proceeds:

The basic study methodology was to identify which policies were binding for various development types, in a range of coastal situations, to identify design, planning and action responses available to meet the policy goals; and to assess the economic effects and benefits of such responses....The cumulative costs of adopting these policies were not evaluated. Several carefully chosen special case studies were used to illustrate the major categories of economic impact (Yudelson, 1976:1).

The choice of case studies rather than an overall approach seems wise in evaluating the plan's widely varying policies on appearance and design. In addition, much of the implementation of these policies is discretionary and subjective and many of the areas affected are unique.

In the case studies a number of explicit assumptions are made, including: (1) visual policies will affect primarily the areas seaward of the nearest coastal highways; (2) "visual policies are applied 'at the end,' following all other important Coastal Plan policies...which will take precedence"; and (3) a baseline of "no Plan" is used where policies are unclear; otherwise "the costs of a range of potential interpretations are given" (Yudelson, 1976:6).

The cost/benefit analysis in the study is undertaken with the following observations:

It is not possible to make a determination of the actual economic impacts of the policies in the Plan because (1) future development patterns are not certain whether with or without the Coastal Plan: and (2) limitations are severe on obtaining data which have the area within the Coastal Zone as a basis (Yudelson, 1976:21).

The analysis is performed, nevertheless, in the following steps:

- a) *identification* of impacts of a specific policy....
- b) *evaluation* of those impacts in terms of *who* is affected *how*, *how much*, and for *how long* (Yudelson, 1976:21).

It lists the major economic impacts derived from the case studies as (1) changes in local and state tax bases, (2) increased public investment, (3) increased planning and administrative costs; and (4) changes in private construction costs.

The study is one of the few to recommend the construction of a system of accounts:

A system of cost/revenue accounts would be used in each case to record the fiscal impacts of the applicable policies on each sector of interest....These economic functions [used in the system of cost/revenue accounts] are particularly useful in estimating the net impact of a policy which may induce a cost to one party and a benefit to another... (Yudelson, 1976:23).

The main conclusion of the study is that implementation of visual policies may increase the cost of public and private developments by 5 to 10 percent over the baseline of "no Plan." Most of these costs are seen as short-term.

8. California Coastal Plan Employment Impact, by Olive Mayer and Associates (May, 1976).

Originally commissioned as a section of the above *Review*, this study was never published. It is the most thorough and detailed analysis of the employment effects of coastal zone management undertaken anywhere to date. Although it did not utilize a data base of individual employers, its treatment of more aggregated data is comprehensive. Focusing on San Diego, Mendocino, San Mateo, and San Luis Obispo counties, it contains an analysis of various California Coastal Plan policies under reasonable assumptions, many of them based on the experience of the coastal commissions. Categories of employment analyzed include agriculture, construction, tourism, and fishing/fisheries.

The study attempts to provide a picture of the plan's employment impacts, but is cautious about such figures as it generates.

The main task of this study is even riskier than most, since it involves producing estimates of numbers of jobs affected by the plan....It is not the purpose to create predictions or even estimates, in the strictest sense of the word....The matter cannot be one of simply projecting past occurrences into the future, although in some cases this has been done in the study as the only feasible means of arriving at estimates. Those estimates of jobs that have been derived in this study are not to be taken as predictions, but simply as indications of the *magnitude* of possible impacts (Mayer, 1976:1).

The methodology employed in the study is reflected in the section on construction employment impacts. The steps involved are:

1. List and describe *Plan* policies affecting construction.
2. Plot the trends of the entire construction industry and its sub-categories in the study area.
3. Project the rate of construction activity into the future for each sub-category by providing two or more projections.
4. Estimate construction jobs lost as well as generated by *Plan* acquisition of developable land.

5. Calculate construction jobs lost under the Coastal Commission and use as a proxy for jobs lost under the *Plan*.
6. Combine the estimates and summarize the impacts.

With regard to using the past commission experience as a predictor of the plan's impact, they note:

A comparison of the language of the 1972 Coastal [Zone] Conservation Act and the policies of the proposed Coastal Plan indicates that the latter is more lenient toward construction, or at least no more restrictive than the old one. Therefore, it can reasonably be assumed that the quantitative impacts of the proposed Coastal Plan will be lesser or no greater than those of the present plan (Mayer, 1976:19).

The analysis of the commission's past effect on the volume of construction indicates an awareness of the important theoretical concept of substitutability, or "displacement":

...whenever a particular project is denied because of conflict with Coastal Plan policies, the same project or an equivalent will be built elsewhere within the Coastal Zone or within the region, provided that a substantial demand exists for that project. The displacement concept is both an assumption and a conclusion. It is an assumption because it is logical and an expression of basic supply and demand forces. It is a conclusion based on the experience of the past several years. For example, the construction trends in Los Angeles, San Diego, and San Luis Obispo have followed the same pattern as the state and national trends for the past six years. Clearly, this is not a coincidence, but a solid indication that the primary determinant of construction activity is the state of the national economy, and the cost of materials, labor, energy and money (Mayer, 1976:20).

Unfortunately, the correlation of trends in the aggregate is in no way a "solid indication" that the commission had little effect. Such an assertion must rest upon a sophisticated statistical analysis which includes all of the determinants of the rate of construction (such as the interest rate on construction loans, construction costs, prices of existing homes, etc.). Regional differences in these variables must also be measured and included. Only then is it possible to isolate and determine the coastal commission's effect upon the volume of construction.

A rough estimate of the commission's impact on construction *within* the coastal zone is given by its permit denial rate,¹⁸ but this gives no basis for determining the "displacement effect." In the final analysis, the reader is left to judge for himself how much of the construction denied is lost forever and how much is simply displaced inland or undertaken later. Thus, though the study recognizes the displacement effect, no effort is made to estimate it:

...it is estimated that the Coastal Plan could displace 7,810 construction jobs in San Diego County over the next

ten years. But for someone who totally rejects the concept of displacement and assumes that the Coastal Plan will cause the loss of such employment, it is just as easy to say that 7,810 jobs will be lost (Mayer, 1976:22).

In using the displacement effect as both assumption and conclusion, the missing link is an empirical study which calculates its magnitude.

9. Governmental Costs and Revenues Associated with Implementing Coastal Plan Policies in the Half Moon Bay Subregion, by George Goldman and David Strong (September, 1976); and Private Sector Economic Impacts Associated with Implementing Coastal Plan Policy in the Half Moon Bay Subregion, by George Goldman, David Strong, Darryl McLeod, and A. T. Nakazawa (1977).

These studies detail the private and governmental economic impacts by constructing an input-output table and by detailed examination of government agency accounts. The input-output table is one of the most sophisticated tools yet applied to the analysis of economic impacts in the coastal zone. The *Private* study utilizes the input-output table to estimate the secondary ("responding" or multiplier) economic impact of six alternative growth strategies upon six of the county's major economic sectors. (The six strategies are based on California Coastal Plan policies and local development plans and range from "least restrictive" to "most restrictive.") The *direct* economic impacts are calculated as in most other studies by qualified extrapolation of past and present trends.

The *Half Moon Bay* input-output model has also been applied to estimate the indirect effects of development of the Sea Ranch project. An unpublished master's thesis by Bruce Buel at the University of California, Davis, found that total buildout of the Sea Ranch project would have a positive fiscal impact on Humboldt County and a negative fiscal impact on Mendocino county.

10. The Cost of Environmental Protection: Regulating Housing Development in the Coastal Zone, by Dan K. Richardson (1976).

This study, of the impacts of New Jersey's Coastal Area Facilities Resource Act (CAFRA), provides a comparison to California's experience. The act requires permits for subdivision developments on the coast. Richardson studies the effects of the act by surveying developers on length of delay caused by the permit process, value of construction, size of development, etc. His main conclusion is that the cost of delay plus incidental costs of the permitting process result in an additional cost of \$1,100 for a single-family residence and \$750 for a unit in a multiple-family structure.

His methodology can be criticized first for determining the total number of new developments by relying upon questionnaires to a sample of developers rather than upon information from objective sources such as sales data and assessors' records. Developers are likely to respond with a bias, while sales data record mutually agreeable transactions. Also, the use of a flat-sum estimate for the cost of delay obscures the economic nature of the "cost." Costs may not be real

losses in housing output or quality; they may be simply transfers of wealth from developer to consumer. No attempt is made to determine the effect of the housing price rise in reducing demand. Furthermore, Richardson's cost estimate is based on standard materials costs and final selling price ratios which may be applicable to the developments studied. Richardson's results cannot simply be "added on" to the price of a house to measure the effect of regulation; they must be qualified and cautiously applied.

11. *The Economic Impact: Land Use and Land Values*, by H. E. Frech III and Ronald N. Lafferty (1976).

Using graphical economic analysis, they decompose the coastal commission's impact into a "monopoly effect" and an "open space effect" and trace the consequences of each. In addition, they provide the only existing statistical test of the coastal commission's effect on property values. Their results indicate that:

...the average increase in the inland residential developed sample was actually larger than the average value increase of the coastal zone sample. This difference is significant at greater than the 99% level. It is far from conclusive, but this test then indicates that the residents of the permit zone do not gain much benefit from the provision of "nearby open space." Apparently owners of developed land in the permit zone have not reaped great gains from the Coastal Commission's restrictions on competing land (Frech and Lafferty, 1976:84).

Furthermore, "the Coastal Commission regulation has...reduced the value of undeveloped land in the permit zone by about 15%" (Frech and Lafferty, 1976:83). This relative decrease in value compared to undeveloped *non*-coastal zone land agrees with the coastal commission's de facto guideline of prohibiting development on large vacant parcels in undeveloped areas. Frech and Lafferty openly qualify their findings by stressing the statistical limitations of using such a small sample and urge a study using a large sample of actual sales.

The theoretical and statistical analysis of this study is the most sophisticated of any yet conducted on the coastal commission. It is logical and complete, and considers effects to which most other studies give but scant attention. It is a good example of the application of accepted economic analysis and "state-of-the-art" statistical methods.

12. *Economic Analysis: California Coastal Zone Conservation Act*, by the Construction Industry Research Board [CIRB] (1976).

The CIRB study is more objective than those which calculate the effect upon construction directly from the commission's permit denials. It attempts to identify the commission's influence from observed data on the coastal economy itself. The study uses "location quotients" to compare the "attractiveness" of coastal sites (regulated) to inland ones (nonregulated). Unfortunately, there

are severe methodological difficulties with the CIRB study. First, the concept of the "location quotient" does not distinguish between commission-induced effects and extraneous ones operating in the coastal zone. The location quotient is simply the ratio of coastal zone building activity to coastal zone population, divided by the ratio of building activity in the state to the state's population. Since population is roughly correlated with building activity, the remaining change in each ratio can be ascribed to other factors, such as commission regulation. CIRB's calculations show that the coastal zone ratio has declined relative to the state ratio during the period of the commission's regulation. This is taken to imply that building has not been as active in the coastal zone as inland because of the commission's making the zone less "attractive." This is a rather tenuous conclusion, however, since several other factors could easily account for the difference in ratios. For example, since the coast has always been relatively more attractive as a building site, it is reasonable to expect that more of the coast is already built up than are inland areas. The location quotient may simply be picking up the spread of suburban areas inland, a spread which cannot occur on the coast (obviously) because the ocean stands in the way.

Furthermore, the data in the CIRB study are not data from the coastal zone (1,000 yards) itself, but from "coastal cities," which have only *part* of their area in the coastal zone. In fact, the coastal zone is but a minuscule fraction of the land area of the cities studied. To the extent that the location quotient is a measure of land use controls (and this is only one of many effects it picks up), it measures the effects of zoning controls of the coastal cities as well as any effect the commission may have had. As a result of these shortcomings, the findings of the CIRB study must be considered as very rough estimates.

The Olive Mayer study discussed above provides a much different interpretation of the same facts:

The most striking trend in new residential construction...*is the shift from coastside to inland.* In 1970, 60% of all new units were being built in the coastal cities. In 1971, the rate shot up to 67% and has declined ever since, until in 1975, it was slightly less than half. The decline began in 1972, before the Coastal [Zone] Conservation Act was passed or implemented, and has continued at a fairly steady rate. Therefore, it can be concluded that the Act did not start the shift, and probably only encouraged it slightly once it had started (Mayer, 1976:27).

Determination of the commission's true effect must await a carefully conducted empirical study using individual parcels as its data base.

The CIRB study calculated that from 17,802 to 37,730 construction man years were lost as a result of the regional commissions' first three years of permit decisions (1973-75). When support industries were included, the figures rose to equal from 39,459 to 83,608 man years lost (Construction Industry Research Board, 1976:37).

13. An Economic Profile of the California Coastal Zone, by the California Council for Environmental and Economic Balance [CEEB] (1976).

This report is basically a summary of data derived from other studies rather than in independent empirical effort. It reports on changes in property values on the coast:

...from October 1972, just prior to the passage of Proposition 20, to April 1975, market prices of existing single family homes have increased an average of 41% in the coastal planning area and 27% in the portions of the coastal counties inland from the planning area....Large parcels of vacant land in the coastal planning area, whose future development is restricted or uncertain, have dropped sharply in value. In Los Angeles County, for example, the drop has been so abrupt that the Assessor's Office two years ago found it necessary to reduce assessed values on that type of property by as much as 40%--and again in 1974 they made a further cut of as much as an additional 25% (California Council, 1976:11-12).

These figures are for the five-mile strip defined as the planning area, which includes only 1,000 yards of land (the permit area) actually regulated by the coastal commission. Changes in value in the remaining portion of the planning area are therefore not as much an indication of the coastal commission's restrictions as they are a response to expectations concerning future development, future expansion of the permit area, and the question of whether there would be a successor agency to the coastal commission.

14. An Economic Interpretation of the California Coastal Commissions, by Robert G. Healy (1977).

While not an empirical study, Healy's contribution is important because it identifies the major issues in economic theory applicable to the coastal commission's regulation. And it provides a case study analysis of major categories of permits with comparisons of denial rates for each category.

Healy discusses the displacement (or substitution) effect in coastal housing markets and notes that the opportunity cost of restricting construction (in terms of job loss, for example) depends upon the current level of unemployment. He breaks down the effect of a decision on a coastal building permit into two categories: (1) the decision establishes property rights by either dashing or confirming expectations; and (2) the decision specifies exactly how these property rights are to be used (i.e., what conditions are placed on the permit approval).

Overall, Healy analyzes the coastal commissions' performance by the criterion of economic efficiency, including unquantifiable as well as measurable costs and benefits.

D. Summary

Considered as a group, the studies of the coastal commission above treat the major economic issues relevant to the commission's impact. But they lack the theoretical underpinning, methodological sophistication, and quality of data base which characterize the studies of local land use controls discussed in the first section. This can be attributed partly to the recent origin of the commission.

The shortcomings are also a function of the audience addressed by the reports. Many of them were not intended as definitive statements of the kind one finds in academic journals. They were instead preliminary assessments aimed at identifying impacts and providing initial estimates based on existing data. Some of the studies prepared for the state legislature were performed under severe time constraints.

Though the studies generally do not violate the conclusions of economic theory, few of them make explicit reference to it. Instead, the theory is implicit in the framing of the questions and the search for answers. Of all those considered, the Frech and Lafferty study (1976) develops the soundest and most explicit theoretical base for its empirical work.

Many of the studies lament the poor quality of available data, yet disaggregated data suitable for analysis does exist. For example, records of individual real estate sales and descriptions of the property sold are available. One obstacle to the use of such data is identifying a subset composed of observations solely within the 1,000-yard coastal zone. The Yudelson, Mayer, CIRB, and CEEB studies did not manage to overcome this difficulty. Only the Frech and Lafferty study constructed a data set limited to the 1,000-yard zone.

Since statistical tests are the most definitive methodologies, the failure of the studies reviewed to use them severely limits the reliability of their results. And since the only statistical tests performed (again, by Frech and Lafferty) yielded counter-intuitive results, there is a clear need for further extensive statistical research.

The studies can also be criticized for failing to distinguish short-term economic impacts from longer-term ones. Where these effects are distinguished, empirical support is not provided.

Another shortcoming is that the studies often consider only the *initial* economic impacts. Inclusion of the "multiplier" or "re-spending" effects, as Parable Beach advises (see note 16), is not considered. One outstanding counter-example is the Half Moon Bay *Private Sector* study, which incorporates these effects through the use of an input-output table.

To provide clear, precise, and statistically valid answers to the questions which the studies reviewed address will obviously require additional research. Moreover, there are additional issues which have not yet been researched, but for which the suitable methodology can be designed. Detailed suggestions for performing research in both of these categories are made in the following section.

RESEARCH NEEDS

The deficiencies of the existing studies of the economic impacts of the coastal commission, coupled with the sheer magnitude of the economic values affected, argue that research continue--and at a more sophisticated level. Despite the volume of research which has been performed, there is very little evidence to support any particular hypothesis concerning the commission's impact. The greatest need, therefore, is for *statistical verification* of such alternative hypotheses, using current methodology and the most disaggregated data available. The research recommended below is primarily of this type.

To establish research priorities and evaluate the feasibility of each project, the following criteria are applied:

1. Importance of each project in terms of economic magnitudes involved; necessity of answering some questions before others; urgency of the issue(s) investigated (with respect to legislative action, imminence of irreversible development, etc.).
2. Cost of the project.
3. Quality and availability of data. If data is generated by the study itself, what is the cost for data of appropriate quality?
4. Applicability of current methodology to the subject, or feasibility of designing innovative methodology.

FIRST PRIORITY: COMMISSION'S EFFECT UPON SINGLE-FAMILY DWELLING PRICE
AND CONSTRUCTION RATE

The most important issue unresolved by the studies reviewed in the previous chapter is the strength of the "displacement" or "substitution" effect in the coastal real estate market in the wake of the coastal commission's permit review decisions. The central issue is whether the commission's impact has been to decrease construction absolutely or to transfer it inland. This question is related to the national controversy over "growth controls": Do they diminish growth absolutely, or simply displace it to an area without controls? There are really two separate but related questions involved in the "displacement effect":

- (1) Have property values in the coastal zone changed because of the coastal commission's assumed restrictions, and have these price changes caused buyers to substitute inland property for coastal zone property, thus altering the structure of prices inland?
- (2) Has the presumed difficulty in obtaining coastal commission approval of building permits induced developers to choose alternate sites inland?

Research is presently being conducted by the author toward a Ph.D. dissertation at the University of California, Riverside, to determine the magnitude and statistical significance of these two effects. In answering the first question, the data base utilized is the *complete* record of single-family dwelling sales transacted through the Multiple Listing Service during 1969-76 in the coastal zone and adjacent areas of Los Angeles and Ventura counties. The set contains data on more than 450,000 sales. The data include not only sale price, but an exhaustive listing of structural characteristics of the residences studied as well. Characteristics include square footage of living area; number of bedrooms, bathrooms, and other rooms; number of stories; age; condition; and many other particulars. Lot size is also included. Distance from the coast and the median income of the census tract in which each parcel is situated are measured independently and included as measures of neighborhood quality.

Use of a detailed description of each property sold is essential. Previous comparisons of house prices between the coastal zone and inland have ignored differences in housing quality (size, condition, age, etc.) in the two areas. This study, in effect, standardizes housing quality by using the current statistical methodology known as "hedonic prices." Valid comparisons in house prices between the two areas can then be made.

A monthly time series of hedonic prices for each significant house characteristic is constructed. This series is then correlated with several time series of relevant economic variables affecting the coastal housing market, such as the rate of interest on construction loans, mortgage interest rates, personal income, and the existence of the coastal commission. This technique separates and quantifies the various influences on the housing market and provides the first comprehensive and statistically valid test of the commission's effect on house prices. Furthermore, the strength of the displacement effect can be determined by following changes in the time path of house (characteristics) prices in the coastal zone and inland.

The second aspect of the displacement effect--concerning developers' locational decisions--is investigated by correlating the level of building activity over time with the various time series of economic indicators mentioned above by employing multiple linear regression analysis. The data base used is the record of individual building permits both within the coastal zone and inland.

Since this is the first statistical test of the displacement effect in construction, it should help settle some issues concerning the presumed decline in coastal housing construction and loss of construction jobs. Preliminary results on both of these displacement effects are expected in late 1978.

SECOND PRIORITY: COMMISSION'S EFFECT UPON NEW SINGLE- AND MULTI-FAMILY DWELLINGS

Since the bulk of new homes are sold by the developer rather than through the Multiple Listing Service, they are not included in the author's study. It is important to examine new homes as distinct from existing ones because here the coastal commission's effect is expected to be most marked, since it was

new-home permits that were decided upon. Data collection may present a problem, since there exists no centralized data source for new homes as there does for existing ones. Assessors' records and local building permits are the only available sources of this information.

Since a prime concern of the coastal commission is regulation of the density of coastal development, multiple-family dwellings have come under close scrutiny. Examination of the detailed denial record¹⁹ shows that most of the permits denied were for multiple-unit dwellings, so that one would expect the coastal commission's influence on multiple-unit prices and construction rates to be strong. An additional reason for studying multiple-unit dwelling construction is that its value is greater than the value of single-family dwellings. This type of data can be obtained from independent realtors and from building permit authorities.

The major costs for these studies are data collection and computer processing, since the methodology has already been developed in the author's study.

Results of these studies would include the displacement effect for new homes and multi-unit dwellings. Hence they would provide additional evidence to the debate over the true impact of land use controls.

THIRD PRIORITY: MEASUREMENT OF BEACH ACCESS AND VALUE OF BEACH VISITATION

Maintaining public access to beaches was a key issue in the debate over Proposition 20. Some commentators have even pointed to this issue as the deciding factor in Proposition 20's passage. In addition to being politically important, beach access has considerable economic value--to beachgoers themselves and to beachgoer-dependent businesses. Since no admission fee is charged at most beaches, and since beach access is a "public good" (provided whether few or many consume it), there is no ready measure of its economic value; it would be desirable to conduct a study to determine how much beachgoers would be willing to pay for that experience. Among other things, the results of such a study would indicate the economic value of expanded beach access.

McConnell (1977) has performed such a study on several Rhode Island beaches. Beachgoers on beaches of varying quality and levels of congestion were asked about their willingness to pay for the visitation privilege. Multiple regression analysis was then applied to this data to determine the public's valuation of beach characteristics such as temperature and congestion. A similar study could easily be performed for California beaches, using the same methodology. The costs would be modest, and would include professional consulting, interviewers, and computer time.

Another, and perhaps more basic question is also worthy of research: To what extent has beach access actually changed over the recent past? Additionally, was it indeed true that development along the coast prior to Proposition 20 had created a "Chinese Wall" preventing public penetration? And how much increased beach access can be attributed to the coastal commission?

Recent reports in the popular press²⁰ have indicated that although accessways have been dedicated, they are still not in operation. A further aim of the study would thus be to identify obstacles to increased access both with and without prior dedication and to suggest alternative means for overcoming these obstacles.

Several approaches to measuring beach access over the recent past are available:

- (1) Measure past beach *visitation* by (a) compiling existing records of past attendance counts (one source is the California State Department of Parks and Recreation); and (b) photo-interpreting past aerial photographs taken from high-flying aircraft (information to be gleaned includes traffic flow, parked vehicles, and body count). The success of this approach depends on how complete and accurate the past records and photo-surveys are. A program which collects this type of data for present beach visitation would be more certain of obtaining high quality data.
- (2) Measure past access by locating access points. Aerial photo-interpretation would be employed to identify these points. Land ownership records would then be inspected to determine whether the land was publicly or privately held in order to ascertain rights of entry.
- (3) Measure the past trend of beachgoer-dependent commercial activity. The object is to determine the relative visitation levels among various beaches over time.
- (4) Examine the record of coastal commission permit decisions to determine which have enhanced or limited beach access.

The cost of performing each alternative project is likely to vary substantially with the quality and availability of past data or the ease of generating current data.

FOURTH PRIORITY: COASTAL COMMISSION DATA COLLECTION SYSTEM

In their contribution to the *Review of the California Coastal Plan*, ICF Associates made the following suggestion:

The California Coastal Plan, if implemented, will be unique in the nation, and as it progresses it will be continually breaking new ground. (For this reason, it may be appropriate to consider the establishment of an ongoing evaluation, monitoring and reporting process so that lessons learned from this experience are not lost.) (ICF:32)

Therefore it may be useful to design a more comprehensive and accurate data collection system for measuring coastal zone management impacts. Possible features include: (1) a detailed description of each coastal building permit

including value of land and structure, delay, and modifications; and (2) determination of issues involved in the approval or denial of each permit considered for public hearing.

A detailed, month-by-month picture of the commission's decisions would then be available to correlate with real estate price changes, rates of new construction, etc. Such a system would also be of value to political scientists studying the commission's decisionmaking process.

The initial application of the system could be to the past record of the California Coastal Commission. (A preliminary effort to record and categorize features of each permit was begun in the South Coast region, but was not followed through.²¹) An ongoing system could then be set up in conjunction with the record-keeping activities of the present coastal commissions. If successful, the system could be applied, with appropriate modifications, to the coastal zone management programs of other states.

The feasibility of such a project is demonstrated by the initial efforts of the researchers who have studied the permit decision record. Though the cost may be substantial, the benefits, in terms of more precise assessment of Coastal Zone Management Act implementation, should not be overlooked. Additionally, much of the uncertainty and confusion stemming from the lack of explicit guidelines under the coastal commission could have been eliminated if a properly summarized record of permit decisions were available.

FIFTH PRIORITY: COMMISSION'S EFFECT UPON THE AVAILABILITY OF LOW- AND MODERATE-INCOME HOUSING IN THE COASTAL ZONE

Maintaining the availability of low- and moderate-income housing was a de facto guideline of some of the regional commissions, but it is not known to what extent this goal was realized in practice. A related guideline was the preservation of unique coastal neighborhoods, some of which were low- and moderate-income in character. Low- and moderate-income housing in the coastal zone has also been an important political issue. It was voiced in the testimony of consumer activist groups at commission hearings. The initial 1976 coastal bill was defeated in committee because of the lack of effective provisions for insuring low- and moderate-income families access to coastal housing and to the beach for recreational purposes.

Furthermore, it has been asserted that the commission has induced price increases in coastal housing such that these families have been priced out of the market. While the commission's price effects are being investigated by the author (see First Priority, above), the current income composition of coastal households remains unresearched.

A study is needed to examine target neighborhoods, using data available from the county assessor's office, the real estate Multiple Listing Service, and building permit issuing authorities. Property and structure values can be traced over the period of the commission's regulation in order to be correlated with household income. (Data on household income and other economic and demographic

characteristics would be obtained by survey and compared with U.S. and local census data.) Special attention would be given to permit decisions in the target and surrounding areas as indicators of neighborhood change, change in tenure type, and change in property and structure values. Statistical tests to determine the magnitude and significance of various effects would be performed.

Costs of the research would include professional consulting, interviewing, data compilation, and computer time. Cost is estimated to fall within the range of many small- to medium-size projects.

SIXTH PRIORITY: ANALYSIS OF THE RECENT ECONOMIC HISTORY OF THE COASTAL ZONE

The shortcomings and conflicting interpretations of many of the studies discussed above stem from poor quality data. Construction of time series of important economic indicators in the coastal zone would help resolve some of these problems. Furthermore, a *continuing* monitoring system would aid policy-makers and implementers by giving them more rapid feedback and identifying areas in need of policy change.

A program which accomplishes the following tasks would provide the relevant information:

Construct the recent economic history of the coastal zone and adjacent inland areas. Correlate economic variables with social, market, and government trends and events. Trends to be constructed include: (1) rate of construction (from building permit data); (2) real estate sales volume, housing stock, dwelling and land prices; (3) air quality; (4) beach visitation; (5) transportation capacity and use; (6) personal income and its distribution; and (7) demographic characteristics.

A major benefit of such a research effort is to make clear the changing pattern of the coastal economy in its important dimensions. This is essential to the success of more specialized empirical studies because it establishes a "baseline" by which to compare the results of these studies.

Portions of such data have already been compiled by the Research Department of Security Pacific Bank from census data, real estate market data, and other sources.

SEVENTH PRIORITY: THE COSTS AND BENEFITS OF DELAY IN THE COMMISSION'S PERMITTING PROCEDURE

Though several studies exist of the costs of delay due to review by land use control authorities, their results vary widely. Furthermore, no study exists which examines the costs of delay according to the following two criteria: (1) a loss in real output to the economy, and (2) a transfer of wealth and income between economic agents and groups. This constitutes a serious deficiency in the literature on the economic impacts of land use controls. From the

perspective of economic analysis, the above criteria represent the distinction between a loss in efficiency and a redistribution of value, a central distinction in applied and theoretical research.

Categories of cost delay which the study would investigate include: (1) land holding costs, (2) interest charges, (3) inflation in land and construction, and (4) forgone economic opportunities.

Though the costs of delay have been the object of past research, no serious study of the *benefits* of delay exists. Benefits are likely to receive less attention because they are, for the most part, non-monetary. They are also frequently long term and diffused over the entire population. Examples are preservation of coastal air quality and siting of potentially dangerous facilities in remote areas.

Benefits of delay include (but are not limited to) the following categories: (1) increased public participation in decisionmaking; (2) adequate time for information gathering before decisions are made; and (3) better project design and integration into existing development.

The methodology best suited to such research is a series of properly chosen case studies. Since detailed descriptions exist of many of the projects reviewed by public hearing at the San Diego and South Coast regional commissions, research could profitably begin there. Interviews with commission staff and commissioners would yield additional clarification. The costs of delay are calculable from proper interpretation of readily available economic indicators such as the rate of interest on construction loans and the rate of profit in construction.

Categories of expense entailed in performing the study include professional consulting, interviewing, and data collection. Cost range is estimated to be that of the usual small-to-moderate-size study.

NOTES

1. For a discussion of the economic issues involved see Rettig (1974).
2. A term coined by Bosselman and Callies (1971).
3. A larger literature exists on the economics of land use controls in general than on the specific controls which have been applied in coastal zone management programs. However, because of the unique features of the coastal zone and the complex interplay of economic forces upon it from a variety of sectors in the economy, conclusions drawn from research on the economic impact of land use controls in general may not be applicable. For example, municipalities frequently separate industrial uses from residential ones and concentrate them in appropriately defined areas. The "agglomeration economies" thus achieved lower costs and may make this type of land use control viable. But in the narrow coastal zone, land use controls which preserve viewshed, public access to beaches, and open space may leave so little land for industrial uses that industries cannot congregate there, even if specific areas are set aside. Hence the agglomeration economies in such limited coastal industrial areas may be insignificant. Consequently, the land use control strategy which produced good results inland may be a poor choice for the coast.
4. For a discussion of the externality rationale for zoning see Mandelker (1971:23-27). Hirsch (1972:419-24) gives a standard textbook treatment of the rationale for zoning.
5. A discussion of the testing of this hypothesis by various authors is presented in ch. 3 of this study, under "Externality Zoning and the Reduction in Market Efficiency."
6. For an early recognition of this difficulty, see Coase (1960).
7. For a more detailed (though quite readable) discussion of this effect see Freeman, Haveman, and Kneese (1973).
8. For a discussion of the fiscal impacts of *unregulated* land development see Muller (1975).
9. For a description of one such scheme see Hagman (1974).
10. For a treatment of the economic impact of development (other than the retarding of development through land use controls used as growth controls) see Schaenman and Muller (1974:44-55).
11. Robert G. Healy, *An Economic Interpretation of the California Coastal Commission* (Washington, D.C.: The Conservation Foundation, 1977).
12. Two general discussions of the distributional effects of growth controls and environmentally oriented land use controls, respectively, are Franklin (1973) and Babcock and Callies (1973).

13. Quoted in Healy (1976:187) from Bergman et al. (1974:196).
14. Quoted in Healy (1976:187) from Peterson (1974).
15. See Construction Industry Research Board (1975 and 1976), as well as Richardson (1976).
16. One of the most valuable related studies is a new book which provides a sound methodological basis from which to evaluate coastal zone management: *Parable Beach: A Primer in Coastal Zone Economics*, by J. W. Devanney III, G. Ashe, and B. Parkhurst (1976). It is basically a guide to the analysis of economic impacts of alternative coastal zone management projects, utilizing current methodological tools. In style it is a heuristic account of a hypothetical coastal zone management experience utilizing realistic data, but is not itself an empirical case study. *Parable Beach* is useful, as its title implies, in teaching coastal policymakers and implementers how to go about evaluating alternative projects and studying the economic impacts of their decisions.

Parable Beach begins by discussing several concepts which are frequently only vaguely understood and which therefore lead to mismanagement of the coast:

(1) Real municipal income--Devanney et al. define this as the total income, adjusted for inflation, which the town's inhabitants receive. It is distinctly separate from any consideration of the distribution of income in the town. This distinction is in keeping with standard economic analysis, which decomposes economic changes into changes in total magnitude and in distribution, and which regards questions of income distribution as ethical rather than scientific problems.

(2) The black box concept--In order to analyze impacts consistently, it is necessary to demarcate the geographical boundaries of the town being considered. Only then is it possible to make statements about the impact on the town itself.

(3) Market prices as a measure of value--It is noted that many coastal resources are not priced by the market, but those which are tend to have prices which reflect in some rough way consumers' willingness to pay. Also, these prices are usually fixed for the smaller units of local government and cannot be altered by them.

(4) Present value and the choice of an interest rate--The *time* pattern of the flow of income to the municipality is important to its welfare: a dollar ten years hence is not as desirable as a dollar today. How much less desirable the future dollar will be depends on the interest rate over the future. The economic analysis in *Parable Beach* considers alternatives which differ according to plausible values of the interest rate.

(5) *Net* economic effect--When considering alternative uses of a particular coastal resource, the crucial economic policy variable is the *net* economic effect. That is, the *difference* between the economic impacts of various

projects is what is important. This difference depends critically upon the alternative opportunities for using the coastal resources in question. When coastal agricultural land is converted to residential use, the net effect on, say, employment, is the construction and continuing maintenance jobs created *minus* whatever jobs are lost by the cessation of agriculture. (Of course, if the agriculture is moved inland, the loss to society is not as great as it is to the municipality itself.)

Another important reason for using the *net* economic effect rather than a gross effect is to estimate accurately the "re-spending" or "multiplier" effect. Without the proper base impact to begin these calculations, errors from estimation of the base impact become multiplied.

Devanney et al. go on to suggest a framework for analysis of the economic impacts of proposed projects, a framework to guide coastal zone management policymakers in a before-the-fact assessment.

(1) The construction of a set of accounts--This must be done in order to avoid "double-counting," that is, including an economic impact more than once in the calculation of the net effect. The set of accounts should also be constructed so that no income changes are excluded. A separate account is constructed for each group involved: municipal government, consumers, industry, commerce, etc. The choice of accounting method will depend on the alternative projects (including present or "no" use) used for comparison and the type of municipality involved.

(2) The choice of a baseline--Here "baseline" means "the situation against which changes are measured" (Devanney et al., 1976:29). In order to properly compare alternative projects, the baseline must be *consistent*--the same one must be applied to each alternative. (This may not happen when proponents of alternative projects present independent analyses.)

(3) Calculation of "re-spending" or "multiplier" effects--The net difference in income created by alternative projects, compared with the baseline, is only the direct initial economic impact. When that income is re-spent further economic activity is generated. This effect must be added to the initial direct effect. Various assumptions about the size and variation of the multiplier or re-spending effect can be made, based on knowledge of the situation at hand. This is the final step in a thorough and consistent calculation of a project's economic impact.

17. For the opposite view, see Russell and Kneese (1973), especially p. 50.
18. See Rosentraub and Warren (1974) and Rosentraub, Warren, and Gould (1975). These studies utilize the South Coast Regional Commission's permit decision record to construct numerous statistical tables. The tables categorize permit decisions by location, building type, value, and many other variables. Though the use of the data is exhaustive, there are some flaws in the treatment overall: (1) Though permit data is disaggregated into separate groups for permits on the consent calendar and those scheduled for public hearing, only a sample, rather than the full population, was analyzed. Given the

variation in permit characteristics, significant relationships may not be revealed from such a sample. (2) Subsequent approvals of denied permits were not included. For a more up-to-date computation of the aggregate denial rates see South Coast Regional Commission (1977).

19. See South Coast Regional Commission (1977).
20. Sweeney (1977:4).
21. See note 18 for a description of this previous study.

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