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Adding Social Science Knowledge to Environmental Decision Making

INTRODUCTION

While social scientists have had impact on the formulation of federal policies, social science input has not been considered essential to prudent decision making at any level of government. This has frustrated social scientists with an inclination toward applying their knowledge to solving human problems. Recent developments in some states, however, have created a mechanism which may provide social scientists a formal device through which their knowledge can influence some of the most important decisions made on the local level. This device is the environmental impact report (EIR).

The present paper describes the emergence of the environmental impact assessment process in California and the use of the EIR by local government. The potential of the process as a mechanism for injecting social science knowledge into decision making will be demonstrated using environmental psychology as an example.

THE EMERGENCE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS IN CALIFORNIA

The California Environmental Quality Act of 1970

In response to intensive pressure from Californians concerned with the protection of their environment, the California State Legislature passed the California Environmental Quality Act¹ (CEQA) in the summer of

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¹ CAL. PUB. RESOURCES CODE, §§ 21000-21151. The bill was signed by the Governor on September 18, 1970, and became effective November 23, 1970.

1970. The Act declares that it is state policy to "take all action necessary to protect, rehabilitate, and enhance the environmental quality of the state."² The principal means created to implement CEQA is the environmental impact assessment process. State agencies, boards, and commissions are to include in any report on a project "they propose to carry out" a detailed statement on the environmental impact of the project, if the project is one which could have a "significant effect"³ on the state environment.

CEQA was largely ignored for the first year and a half after its passage. Since the Act appeared to refer to projects that a state agency carried out or funded itself—such as a state building or road—private builders apparently were not affected.⁴ Even many state agencies, clearly covered by the Act's provisions, ignored the environmental impact reporting requirements, perhaps due to the failure of the State Office of Planning and Research to offer adequate guidance for the agencies, as required by the Act.⁵

The Friends of Mammoth Decision

The lack of attention to CEQA changed dramatically in September 1972, when the State Supreme Court handed down the *Friends of Mammoth* decision.⁶ In that case, a developer had applied to the Mono County Planning Commission for a conditional use permit to build a condominium complex. Mono County is predominantly rural, and has been experiencing a rapid increase in second home and resort construction during the last half decade. Many local residents believed the proposed condominiums would overload local water supply and sewerage disposal facilities, as well as spur more construction. Despite this resistance, the Mono County Planning Commission approved the project and the County Board of Supervisors upheld the decision. The citizens formed an association called the "Friends of Mammoth" and argued in the courts that CEQA's requirement of an EIR should apply to local government's approval of

² *Id.* § 21000(a).

³ *Id.* § 21100. See *infra* for a detailed discussion of the most recent requirements of the environmental impact reporting process.

⁴ The State Attorney General opposed this limited application; see the Attorney General's Petition, *In re Proposed Guidelines for the Preparation and Evaluation of Environmental Impact Statements Under the California Environmental Quality Act of 1970*, 13-20 (1971), as did members of the Center for Law in the Public Interest, conversation of Frederic P. Sutherland of the Center for Law in the Public Interest, with author, January 30, 1973.

⁵ See Seneker, *The Legislative Response to Friends of Mammoth, Developers Chase the Will-O-the-Wisp*, 48, No. 2 CALIF. STATE BAR J. 126, 128 (March/April 1973).

⁶ *Friends of Mammoth v. Board of Supervisors of Mono County*, 8 Cal. App. 3d 1, mod., 8 Cal. 3d 247 App., 500 P.2d 1360, 502 P.2d 1049 (1972).

privately initiated projects. The case eventually reached the California Supreme Court.

The State Supreme Court concluded that the legislature intended to require EIRs for private activities for which a government permit was necessary. The Court concluded that the word "project" in Section 21151 includes "the issuance of permits, leases, and other entitlements"⁷ by state and local agencies. Since "project" is not defined in the Act, this conclusion was based on an interpretation of the Legislative intent sections, and on the fact that the CEQA was patterned after the National Environmental Policy Act (NEPA)⁸ which requires environmental impact reports for federal agency actions, including federal leases or permits. Consequently, California's local governmental agencies are now required to consider whether such projects have a significant effect on the environment, and, if so, to file an EIR on the project. The Mono County Planning Commission and Board of Supervisors had not followed this procedure.

The *Friends of Mammoth* decision created an uproar. Now, every kind of structure or development would conceivably require an environmental impact report before construction could begin. The EIR might reveal things that would prevent the project from going forward. And projects which had already been started might have to be halted. Several cities stopped issuing building permits altogether. Los Angeles attached a disclaimer to its building permits informing the builder that he proceeded at his own risk. Mono county would not even issue building permits for garage additions.⁹ The Court decision was criticized by law review writers¹⁰ as well as by the construction industry and the labor movement.¹¹

The Aftermath of the Mammoth Decision

Despite the protests, the Supreme Court did not waiver. On November 6th, in a modified opinion, the Court refused to make its decision prospective only, and refused to delay the effective date.¹² The Court did

⁷ 8 Cal. App. 3d 247, 202, 502 P.2d 1049, 1059 (1972).

⁸ 42 U.S.C.A. §§ 4321 *et seq.* (1970).

⁹ See article in the Wall Street Journal, Oct. 9, 1972 at 25, col. 1.

¹⁰ See Breyer, Recent Cases Friends of Mammoth v. Board of Supervisors of Mono County, 42 U. CIN. L. REV. 563 (1973).

¹¹ According to the Los Angeles Times, business and labor leaders feared "economic disaster," with the possibility of one million workers losing their jobs and "construction of all kinds" stopping throughout the state. The Los Angeles Times, Oct. 22, 1972, § A, at 18, col. 1.

¹² *Friend of Mammoth v. Board of Supervisors of Mono County*, 8 Cal. App. 3d 247, 502 P.2d 1049 (1972).

stress, however, that most private projects for which some kind of a government permit was necessary, such as individual dwellings or small businesses, would, under normal circumstances, probably have no effect on the public environment and, therefore, would not require an EIR.

The state legislature, pressured by interests seeking both clarification of what was required under CEQA and relief from the Court's decision, soon amended CEQA.

An amendment passed by the legislature afforded the construction industry some relief.¹³ Private projects approved prior to the effective date of the Amendment (December 5, 1972) were validated, with some exceptions,¹⁴ and a moratorium was declared on the Act's applicability to private projects for 120 days after the effective date of the Amendment again with some exceptions.¹⁵ The legislature, however, confirmed the Supreme Court's opinion that CEQA applied to private projects requiring public permission. The amended Act specifically defined "project" to include activities funded by public agencies and activities "involving the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies,"¹⁶ as well as activities directly undertaken by public agencies. Only "discretionary projects" would be covered by CEQA,¹⁷ and a list of totally exempt classes of projects would be prepared and regularly reviewed.¹⁸ The State Office of Planning and Research was charged with developing guidelines for the implementation of project review procedures by public agencies. These guidelines were adopted on February 5, 1973.¹⁹

The amended act provides a definition of "environment" where none had existed before. Under the added wording,

Environment means the physical conditions which exist within the area which will be affected by a proposed project, including land, air, water, minerals, flora, fauna, noise, objects of historic or aesthetic significance.²⁰

This definition appears to emphasize the impact on the physical environment per se, leaving the status of social science concern and/or input

¹³ Stats. 1972, Ch. 1154, effective Dec. 5, 1972.

¹⁴ CAL. RESOURCES CODE §§ 21169, 21170 (West Supp. 1973). The Mono County decision in the Friends of Mammoth case fell into the category of exceptions. The developer's project was being judicially contested, and substantial construction had not begun.

¹⁵ *Id.* § 21171 (West Supp. 1973).

¹⁶ *Id.* § 21065 (West Supp. 1973).

¹⁷ *Id.* § 21080 (West Supp. 1973).

¹⁸ *Id.* §§ 21084, 21085, 21086, 21087.

¹⁹ Order Adopting Regulations of the California Resources Agency Pertaining to the Environmental Quality Act of 1970, adopted into Division 6, Title 14, California Administrative Code.

²⁰ CAL. PUB. RESOURCES CODE, § 21060.5.

uncertain. However, a strong case can be made for not only permitting, but requiring social science input under CEQA for many proposed projects. Implicit in the definition's listing of noise, and "objects of historic or aesthetic significance" is the recognition that social science analysis is central to impact assessment. Noise is important because of its impact on people. No one, hopefully, would argue that noise levels can be considered too high only when physical damage is done. The problem of establishing acceptable noise standards clearly involves the social science techniques of attitudinal and psychological testing. The historical and aesthetic significance of environments, moreover, are, by definition, established through social interaction and held attitudinally. Sites of significance are valued for their positive effect on human behavior and well being. This effect and its alteration through actions assessed in EIRs can only be measured by the social scientist.

Explicit language oriented toward social science input is also found in the statute's discussion of environmental impact reporting. A finding of "significant effect on the environment" is required if "the environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly,"²¹ and Environmental Impact Reports must include statements on "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity,"²² and "the growth-inducing impact of the proposed action."²³ Considering the example of high density housing discussed *infra*,²⁴ an environmental psychologist's review of possibly severe crowding stress would appear essential if "substantial adverse effects on human beings" are to be honestly appraised. A planner's input would appear critical in assessing "growth-inducing" impact in surrounding neighborhoods as would an economist's in assessing impact on potential productivity. Thus the wording of the operative sections of the amended act, in its explicit and implicit reliance on behavioral attitudinal and economic measurement can be construed to require social science input on projects where people will be potentially affected.

Furthermore, the operative sections of the statute must be read in light of the legislative intent sections, which emphasize the need to provide humans with an adequate environment. The legislature intends that "a high quality environment . . . healthful and pleasing to the senses and

²¹ *Id.* § 21083(c).

²² *Id.* § 21100(e).

²³ *Id.* (g). One author notes that the "physical conditions" limitation of § 21060.5 is undermined by the § 21100(g) requirement that an impact statement must include 'the growth-inducing impact' of the proposed action." Ackerman, *Impact Statements and Low Cost Housing*, B. *The Post—Friends of Mammoth Legislative Compromise*, 46 S. CAL. L. REV. 754, 783 (1973).

²⁴ See p. 16 *infra*.

intellect of man"²⁵ be provided, that "there is a need to understand the relationship between the maintenance of high-quality ecological systems and the general welfare of the people of the state, including their enjoyment of the natural resources of the state,"²⁶ and that "critical thresholds for the health and safety of the people"²⁷ must be identified. In addition, the state must "take all action necessary to provide the people of this state with clean air and water, enjoyment of aesthetic, natural, scenic, and historic environmental qualities, and freedom from excessive noise,"²⁸ must "create and maintain conditions under which man and nature can exist in productive harmony to fulfill the social and economic requirements of present and future generations,"²⁹ and must "Require governmental agencies at all levels to consider qualitative factors as well as economic and technical factors and long-term benefits and costs, in addition to short-term benefits and costs and to consider alternatives to proposed actions affecting the environment."³⁰

To fully carry out this sweeping declaration of legislative intent, environmental impact assessment must look at the effect of proposed physical change on human beings. The fulfillment of the human desire to live in adequate surroundings is indeed the primary purpose of the statute. The definition of environment discussed *supra*, which appears to emphasize physical effect, should not blur this primary objective. As Justice Frankfurter has written,

Statutes are not inert exercises in literary composition. They are instruments of government, and in construing them the general purpose is a more important aid to the meaning than any rule which grammar or formal logic may lay down. . . . This is so because the purpose of an enactment is embedded in its words even though it is not always pedantically expressed in words.³¹

Justice Frankfurter's views have particular force with respect to CEQA, for the California Supreme Court has ruled that the statute "is to be given a liberal construction"³² and that the court will "give a broad interpretation to the acts' operative language."³³

The Guidelines issued pursuant to CEQA's authorization indicate that certain social effects should be part of an EIR. "Population distribution,

²⁵ CAL. PUB. RESOURCES CODE, § 21000(b).

²⁶ *Id.* (c).

²⁷ *Id.* (d).

²⁸ *Id.*, § 21101 (b).

²⁹ *Id.* (e).

³⁰ *Id.* (g).

³¹ United States v. Shirley, 359 U.S. 255, 260, (1959).

³² 8 Cal. App. 3d 247, 261, 502 P.2d. 1049, 1058 (1972).

³³ 8 Cal. App. 3d 247, 259, 502 P.2d. 1049, 1056, 7 (1972).

population concentration, and the human use of the land (including commercial and other residential development) . . . scenic quality and public services”³⁴ should be described. Those preparing EIRs are instructed: “Don’t neglect impacts on any aesthetically valuable surroundings, or on human health,”³⁵ and “Increases in the population may further tax existing community service facilities so consideration must be given to this impact.”³⁶ The Secretary for Resources, in his cover letter to the guidelines, disagreed with several witnesses at the public hearings on the guidelines who expressed a strong belief that EIRs should be strictly limited to physical conditions. The Secretary wrote: “Strict limitation to physical effects did not appear to be the intent of the Legislature as reflected by the insertion of AB889 of Section 21083(c) speaking of adverse effects on human beings and Section 21100(g) dealing with growth-inducing impact.” The Secretary expresses a “strong hope” that those writing EIRs will “keep a sensible balance between environmental and economic factors.”

One final legal basis for including social science data as part of the EIR process should be mentioned. NEPA and federal court interpretations of that national act, have significant force in interpreting CEQA. The California Supreme Court’s reliance on NEPA in the *Friends of Mammoth* decision has already been noted. As stated in one California Court of Appeal, the two statutes are so parallel in content and so nearly identical in words that judicial interpretation of the federal law is strongly persuasive in our deciding the meaning of our state statute.³⁷ A brief look at NEPA reveals that social science data is relevant under the federal statute.

Part of the NEPA section which describes what should be in federal environmental impact reports instructs all federal agencies to

utilize a systematic, *interdisciplinary* approach which will insure the integrated use of the natural *and social sciences* and the environment design arts in planning and in decision making which may have an impact on man’s environment.³⁸

The Second Circuit Court of Appeals, in discussing NEPA, states

[W]ithout question, its aims extend beyond sewage and garbage, and even beyond water and air pollution. . . . The Act must be construed to include protection of the quality of life for city residents. Noise, traffic,

³⁴ 14 CAL. ADM. CODE 15132(a).

³⁵ *Id.* (b).

³⁶ *Id.* (g).

³⁷ *Environmental Defense Fund, Inc. v. Coastside County Water District*, 27 Cal. App. 3d 695, 701 (1972), 104 Cal. Rptr. 197, 200 (1974).

³⁸ 42 U.S.C.A. § 4332 (A). (Emphasis added).

overburdened mass transportation systems, crime, congestion and even availability of drugs all affect the urban environment.³⁹

As put by a federal district court,

It is incontrovertible that NEPA requires administrative consideration of factors affecting "the quality of life for city residents." . . . Anything that influences urban dwellers' quality of life is relevant when weighing significance.⁴⁰

The *Friends of Mammoth* decision and the new guidelines, reenergized CEQA. Local governmental units throughout the state now are attempting to comply with the law's requirements. Thousands of private projects are being scrutinized to determine their impact on the physical and human environment. Social scientists should be utilized in increasing numbers at all levels of government to help in the assessment process.

THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The Mechanics of the Environmental Impact Assessment Process

Assessing the impact of privately sponsored projects involves five major tasks. The process typically begins when a developer approaches local government with a proposed activity which requires some form of public permission. After the developer has provided the local agency with basic data describing the location and nature of the activity, the agency must first make a series of preliminary determinations. The first of these is whether the activity has the "potential" to affect the environment.⁴¹ The second is whether the activity is a "project" as defined by the state guidelines.⁴² The third determination is whether the project requires a "discre-

³⁹ Hanly v. Mitchell, 460 F.2d 640, 647 (2nd Cir. 1972).

⁴⁰ Town of Groton v. Melvin Laird, 353 F. Supp. 344, 349 (1972).

⁴¹ The state guidelines offer no instructions as to assessing "possible significant effect," and the reason why this has been stipulated as a first step, given the determination of "significant effect" required in step two, is unclear. It is probably accurate to state that this preliminary screening at the reception desk level is intended to keep nuisance proposals from consuming staff time. It is not likely any proposed actions of even marginal potential effect would be excluded from the E.I.R. process at this decision point.

⁴² The guidelines define a project as:

. . . the whole of an action, resulting in physical impact on the environment, directly or ultimately, that is any of the following:

1. an activity directly undertaken by any public agency including but not limited to public works construction and related activities, clearing or grading of land, improvements to existing public structures, enactment and amendment of zoning ordinances and the adoption of local General Plans or elements thereof.

tionary," as opposed to a "ministerial," action on the part of the permitting agency (an agency's action is discretionary if its decision involves a judgment as to the appropriateness of the project rather than a determination only of whether a prerequisite, such as paying a fee, is met).⁴³ The final preliminary determination is whether the project is of a type "categorically exempt" from CEQA. Categorically exempt projects usually are related to the construction of one single-family home or the replacing of previously existing structures.⁴⁴

The second major step is to determine whether the project will have a significant effect on the environment.⁴⁵ This decision involves the judgment of professional staff. If the finding is positive, an EIR must be prepared. If no significant effect is foreseen, a "Negative Declaration"⁴⁶ is prepared and the permit is handled as it would have been before the enactment of CEQA.

The third major step is the preparation of a draft EIR. This document, described more fully in the next subsection, is a compilation of expert judgments on the likely impact of the proposed project and a listing of the measures that may be taken to mitigate undesired impacts.

The fourth major step is the solicitation of comment on the adequacy of the draft EIR. Comment is solicited from all public agencies believed to have an interest in the project as well as from the public and private organizations.

The fifth step is to certify the EIR as adequate. This step usually follows the revision of the EIR to satisfy or rebut the comments received during step four.

Once certified as adequate, the EIR goes to the decision making agency which grants or denies the permit, using the EIR as one source of data. A finding of significant adverse environmental impact does not bind a decision maker to deny a project. In theory, he must weigh the EIR's findings against other "goods," such as added employment and make the decision on total benefits accrued after costs. How representative his weights or values are of the community's will determine how effective the EIR process is in bringing the community's environment into line with its environmental goals.

2. an activity undertaken by a person which is supported in whole or in part through public agency contracts, grants, subsidies, loans, or other forms of assistance from one or more public agencies.

3. an activity involving the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies. (CAL. ADMIN. CODE, ch. 3, div. G, § 15037).

⁴³ CAL. ADMIN. CODE, ch. 3, div. G, § 15037.

⁴⁴ *Id.* § 13083.

⁴⁵ *Id.* § 15640.

⁴⁶ *Id.* § 15033.

While the state has been very specific in its requirement of the above steps, it has given local jurisdictions considerable freedom in assigning the processing steps to special boards or commissions to facilitate the handling of the reports. A recent survey of California counties indicates that there is a great deal of variation in the procedures they have adopted.⁴⁷ Almost all local jurisdictions, however, have made outside expert participation possible in the significant effect/negative declaration decision (step 2) and in the preparation of the EIR (step 3).⁴⁸

The Contents of an EIR

The EIR must contain a wide range of information, but what makes the assessment process important to social scientists is the requirement that the effect of projects "on human beings either directly or indirectly"⁴⁹ be assessed. State law requires that an EIR have three principal sections, described briefly below.

1. Description of the project's location, objectives, and technical and economic characteristics.

2. Description of the existing environmental setting of the project—The description must include not only the local environment, but also the regional setting.

3. Assessment of how the project will change the environmental setting—This section is the core of an EIR, for it is concerned with the project's impacts and potential mitigating measures. The impact on several systems and resources must be assessed. These include natural settings, public services, water and air quality, land use, scenic quality, and most important for this paper, human health and safety.

SOCIAL SCIENCE AND THE EIR

The social scientist can contribute to the environmental impact assessment process in three ways. The first is through direct participation as a citizen or consultant in either the preparation or review of the EIR. The second is by teaching social science methods to professionals involved in environmental management. The third is to turn research attention to the development of models capable of predicting the social impact of project types likely to undergo environmental impact assessment.

Participation in the Preparation of the EIR

Few local governments have the fiscal capacity to maintain the skilled

⁴⁷ Catalano and Reich, *Processing Environmental Impact Reports in California Counties*, CALIFORNIA EIR MONITOR, Vol. 3, No. 2 (February 1974).

⁴⁸ CAL. PUB. RESOURCES CODE §§ 21104, 21059.

⁴⁹ CAL. ADMIN. CODE, Ch. 3, Div. 6, § 15082(d).

staff required to make the wide range of technical assessments required in an EIR. As a result numerous consulting firms have been commissioned by either the project initiator or local government to prepare EIRs.⁵⁰ Such firms have also been retained by local governments to assess the adequacy of developer-commissioned EIRs. Consultants often subcontract to academics such as geologists, archeologists, and marine biologists in order to provide the technical assessments relating, for example, to earthquake hazards, water quality, and conservation of prime archeological sites.

Among social scientists involved in EIR work, economists tend to be in highest demand. Assessments of the demand for public services, and of the long range fiscal implications of proposed projects, have allowed sound economic data to come before local administrators. Other social scientists, however, have not been as frequently consulted. The input of sociologists and psychologists has been limited for at least two reasons. First, few sociologists or psychologists are aware of the EIR process or, if they are, they tend to assume it relates only to such things as protecting trees or collecting discarded cans and bottles. Second, few professionals in positions to broaden the scope of EIRs have been sensitized to the sociological and psychological ramifications of physical development.

This situation may be changing for the federal government has begun to require social impact analyses in the impact statements required under NEPA. Consultants and agencies will surely begin to hire social scientists to perform such analyses. The ability of social scientists to perform such analyses is, however, an important unknown that may frustrate any immediate progress.

Participation in the Review of the EIR

As noted earlier, each draft EIR must be reviewed by the local planning commission and can be reviewed by any agency potentially affected by the project. In addition to these agency reviews, many jurisdictions have established committees, which often include citizens, to review the adequacy of EIRs. Both agency and citizen committee review have made it possible for social science knowledge to be reflected in EIRs. On the agency level, for example, at least one county, Humboldt, has required that the Department of Mental Health review all EIRs and comment on the proposed projects' likely impact on the demand for services.

How much social science knowledge is reflected in committee reviews largely depends on how actively the social scientist as citizen seeks ap-

⁵⁰ The fact that local governments have allowed developers to hire the consultants who prepare draft EIRs on projects has been a source of much criticism based on the adage "He who pays the piper calls the tune."

pointment to such committees, or how willing he is to influence environmental groups to push for appointment of committee members who will listen to social scientists. Most meetings of these committees, and of planning commissions, are open to the public and testimony is solicited from citizens. A concerned social scientist could present his analysis of an EIR's adequacy in such a forum and possibly gain the support of environmental groups.

Increasing the Social Science Component of Environmental Management Curricula

Perhaps the most fruitful strategy for insuring that social science knowledge is reflected in environmental impact assessments is to increase the social science knowledge of impact assessors. While social scientists seem unconcerned with management strategies intended to control environmental change, they have exhibited an increasing interest in the influence of environment on man. Human ecology and environmental psychology, for example, have emerged from the shadow of their parent disciplines and become increasingly popular among students and researchers.⁵¹ Indeed, the influence of environment on individual and organizational behavior has become the subject of new academic programs drawing heavily from the social, natural, and design sciences.⁵² These programs, and the research they generate, are beginning to find their way into the training of personnel who will staff the agencies responsible for preparing and reviewing EIRs. Planning schools, schools of architecture, and public administration programs are adding man/environment or environmental management components to their curricula. Even more responsive to the need for professionals sensitive to the complex balance between human behavior and environmental factors are the several multidisciplinary academic programs recently established to train community service professionals through curricula based on, and integrated by, human ecology models.⁵³

Of course, any serious attempts to train individuals to perform social impact assessments assume the social sciences have generated and empirically tested hypotheses concerning the impact of physical and economic change on human behavior. While some of this crucial work has been done, much more remains.

⁵¹ For examples of recent works in Human Ecology and Environmental Psychology, see A. HAWLEY, *URBAN SOCIOLOGY: AN ECOLOGICAL APPROACH* (1971) and R. MOOS and P. INSEL (Eds.), *ISSUES IN SOCIAL ECOLOGY* (1973).

⁵² An example of such programs is the Program in Social Ecology, University of California, Irvine.

⁵³ The Program in Social Ecology at the University of California, Irvine, for example, offers a curriculum in Environmental Impact Assessment.

Research Needs: Models of Social Impact

The social science research that is most needed if social impact assessment is to be possible, involves testing the hypotheses positing significant correlations between changes in the community's physical or economic structure and the behavior and health of its people. Such research, if the findings are positive, must evolve into predictive modeling of impacts expected from projects affecting physical quality and economic structure.

This type of research has existing conceptual bases in the social sciences. Since the early 1920s, human ecologists have used analogies between the human community and natural trophic organizations to explain the impact of physical environment, trophic role, and societal norms on human health and behavior.⁵⁴ There is evidence to support the hypothesis that as changes in regional systems of production and consumption cause shifts in population distribution, division of labor, and values, perturbations will occur in human behavior patterns and health. In addition to the traditional work of sociologists dealing with societal norms,⁵⁵ criminal behavior,⁵⁶ and social disorganization,⁵⁷ recent work by psychologists,⁵⁸ and public health experts,⁵⁹ indicates that the hypothesized relationships between trophic role and mental as well as physical health have validity. The emergence of environmental psychology, moreover, has begun to shed light on the relationship between place and behavior.

ENVIRONMENTAL PSYCHOLOGY: AN EXAMPLE OF SOCIAL SCIENCE'S POTENTIAL CONTRIBUTION

The origins of environmental psychology can be traced to developments within both the field of psychology and society at large.⁶⁰ During the past few decades, for example, some psychologists have become disenchanted with theoretical approaches overemphasizing "person" variables while giving little attention to environmental determinants of behavior.⁶¹ Build-

⁵⁴ G. THEODORESON, *STUDIES IN HUMAN ECOLOGY* (1961); M. MIKLIN, *POPULATION, ENVIRONMENT, AND SOCIAL ORGANIZATION: CURRENT ISSUES IN HUMAN ECOLOGY* (1973).

⁵⁵ W. THOMAS, and F. ZNONIECKI, *THE POLISH PEASANT IN EUROPE AND AMERICA* (1920).

⁵⁶ H. VOSS, D. PETERSEN, *ECOLOGY, CRIME AND DELINQUENCY* (1971).

⁵⁷ R. FARIS, *SOCIAL DISORGANIZATION* (1968).

⁵⁸ H. BRENNER, *MENTAL HEALTH AND THE ECONOMY* (1973).

⁵⁹ J. CASSEL, *Health Consequences of Population Density and Crowding*, in *RAPID POPULATION GROWTH: CONSEQUENCES AND POLICY IMPLICATIONS*. American Academy of Sciences (1971).

⁶⁰ H. PROSHANSKY, W. ITTELSON AND L. RIVLIN, eds. *ENVIRONMENTAL PSYCHOLOGY*. (1970). J. Wohlwill, *The emerging discipline of environmental psychology*, 25 AM. PSYCHOLOGIST 303-312 (1970).

⁶¹ W. MISCHEL, *PERSONALITY AND ASSESSMENT* (1968). R. MOOS, *Sources*

ing on the work of scholars such as Kurt Lewin⁶² and Henry Murray,⁶³ these psychologists insisted that behavior must be viewed as a joint function of personal and environmental influences. This increased research interest in the interaction between individual and situational determinants of behavior is clearly reflected in recent work⁶⁴ on the ecology of behavioral setting and on personal space.⁶⁵

The development of environmental psychology as a coherent field of inquiry was also precipitated by a growing societal concern over the quality of the physical and social environment. Contemporary ecological problems associated with rapid urbanization and population growth have captured the attention of scientists working in a variety of academic disciplines. A fundamental assumption underlying ecologically oriented research is that an understanding of the relationship between organisms and their environment, gained through scientific inquiry, will ultimately improve the quality of management decisions affecting environmental quality and, ultimately, human behavior.

The environmental impact assessment process provides an important mechanism through which environmental psychologists can actualize their commitment to application of their findings. Environmental psychology can contribute both to the immediate need for more "people oriented" data and to the long run demand for evaluating the accuracy and efficiency of the theoretical constructs and operational techniques suggested for psychological assessments.

Environmental Psychology's Immediate Contribution

The relevance of environmental psychology for the process of impact assessment can be illustrated by a project involving the construction of high density housing units in a middle-income residential neighborhood. Two of the most frequently asked questions concerning such projects are: (1) what impact will the high density units have on the people living in them?, and (2) will this impact "spill over" to affect surrounding neighborhoods?

Although comprehensive theories of man/environment relations are currently lacking, it is possible to identify two theoretical constructs which provide insights into the above questions, and will probably serve as a foundation for future environmental psychological theories. These are

of Variance in Responses to Questionnaires and Behavior, J. OF ABNORMAL PSYCHOLOGY 405-412, (1969).

⁶² K. LEWIN, PRINCIPLES OF TOPOLOGICAL PSYCHOLOGY (1936).

⁶³ H. MURRAY, EXPLORATIONS IN PERSONALITY (1938).

⁶⁴ R. BARKER, ECOLOGICAL PSYCHOLOGY (1968).

⁶⁵ R. SOMMER, PERSONAL SPACE: THE BEHAVIORAL BASIS OF DESIGN (1969).

the constructs of "intersystem congruence"⁶⁶ and "psychological stress."⁶⁷

The notion of intersystem congruence refers to behavioral settings in which the physical and social dimensions of an environment are compatible with the cultural values and personal needs of its users. An optimal setting would be one in which there is a "fit" between attributes of the environment and its users. While there are certain human functions which must be supported within any environmental context, the congruence model of optimality places an emphasis upon the situationally specific determinants of environment-behavioral fit. A body of literature is emerging which operationalizes the concept of congruence.

Edward Hall,⁶⁸ an anthropologist, has conducted extensive research on cultural parameters of environmental amenity. He has distinguished, for example, between "polychronic" and "monochronic" cultures. The former type is represented by close-knit ethnic groups which tend to engage in a high degree of sidewalk interaction. By contrast, the latter type includes "low-involvement" groups which value personal privacy and minimal contact with strangers. From the standpoint of environment-behavioral congruence, monochronic groups would probably feel more uncomfortable and crowded in a neighborhood which fosters social interaction through its architectural features (*e.g.*, the North End of Boston) than in one which minimizes opportunities for interaction (*e.g.*, rural or suburban areas).

The concept of psychological stress is closely related to the notion of intersystem congruence. Stress occurs when there is an imbalance between environmental demand (*e.g.*, abrupt changes in temperature, noise) and an organism's capacity to cope with it. Much of the early research on stress has focused on physiological dimensions—for example, heightened adrenal secretion and intestinal ulcers.⁶⁹ Recent research has begun to consider psychological as well as physical dimensions of stress.⁷⁰ The concept of psychological stress assumes that the individual's interpretation of the environment is highly influential in determining whether or not he will feel stressed or unable to adjust to the situation. Psychological stress reflects a lack of fit between the attributes of an individual and the salient features of his environment. Under such circumstances, the intervention task would be to ascertain which cultural or psychological needs are incongruent with the environment, and to determine whether modifications

⁶⁶ W. MICHELSON, *MAN AND HIS URBAN ENVIRONMENT: A SOCIOLOGICAL APPROACH* (1970).

⁶⁷ R. LAZARUS, *PSYCHOLOGICAL STRESS AND THE COPING PROCESS* (1966).

⁶⁸ E. HALL, *THE HIDDEN DIMENSION* (1966).

⁶⁹ H. SELYE, *THE STRESS OF LIFE* (1956).

⁷⁰ J. MCGRATH, *SOCIAL AND PSYCHOLOGICAL FACTORS IN STRESS* (1970).

in the physical and/or social context would in fact promote a greater degree of congruence between the person and his surroundings.

The theoretical constructs of intersystem congruence and psychological stress provide important axioms for environmental impact assessment. First, criteria of environmental amenity must be situationally defined; *i.e.*, they must be derived in terms of the particular cultural, psychological, social, and physical factors operative within a given behavioral setting. Second, the potentially hazardous effects of certain environmental conditions can be understood only through an analysis of psychological and cultural variables. Thus, even in relation to "stressor variables" such as noise, density, and pollution, the degree to which these conditions prove harmful to health and safety will depend upon the unique attributes of the exposed individuals.

The impact of high densities on behavior has been documented in studies involving nonhumans. A well-established finding is that the prolonged exposure of animal communities to conditions of high density leads to social disorganization and a variety of physiological anomalies.⁷¹

The behavioral effects of density on humans are considerably more complex. Surveys suggest that detrimental effects of high density may be offset by cultural traditions,⁷² and laboratory investigations demonstrate that when group size is held constant, high density exerts virtually no ill effects on task performance.⁷³ Research on humans suggests that density is not invariably correlated with psychological and behavioral maladies.

The results of studies involving humans have led researchers to distinguish between the terms, *density*, a physical condition involving the limitation of space, and *crowding*, a psychological state in which the restrictive aspects of limited space are perceived by the individuals exposed to them.⁷⁴ Recent research indicates that the effects of high density are most detrimental in those settings involving social interference.⁷⁵ Social inter-

⁷¹ J. Calhoun, *Population density and social pathology*, 206 SCIENTIFIC AMERICAN 139-148 (1962). D. Davis, *Physiological Effects of Continued Crowding*, A. ESSER, ed., BEHAVIOR AND ENVIRONMENT—THE USE OF SPACE BY ANIMALS AND MEN (1971).

⁷² R. Schmitt, *Implications of density in Hong Kong*, J. AM. INST. PLANNERS, 210-217 (1963).

⁷³ Freedman, Klevansky and Ehrlich, *The Effect of Crowding on Human Task Performance*, J. APPLIED SOCIAL SCIENCE 7-25 (1971).

⁷⁴ Stokols *On the distinction between density and crowding: some implications for future research*, 79 PSYCHOLOGICAL REV. 275-77 (1972). H. PROSHANSKY, W. ITTELSON, AND L. RIVLIN (eds.), ENVIRONMENTAL PSYCHOLOGY (1970). Zlutnick and Altman, *Crowding and Human Behavior*. In J. WOHLWILL AND D. CARSON (eds.), ENVIRONMENT AND THE SOCIAL SCIENCES: PERSPECTIVES AND APPLICATIONS (1972).

⁷⁵ Galle, Gove, and McPherson, *Population Density and Pathology: What Are the Relations for Man?* 175 SCIENCE 23-30 (1972), Stokols, Rall, Pinner, and Schopler, *Physical, Social, and Personal Determinants of the Perception of Crowding*, ENVIRONMENT AND BEHAVIOR 87-115 (1973).

ference might result from coordination problems, competition for scarce resources, excessive noise and interpersonal contact, or perceived infringements by others on one's privacy and behavioral freedom.

Extrapolating from psychological research on density and crowding, it would appear that whole communities might minimize the negative effects of population concentration through implementation of urban design interventions which reduce social interference at the societal level. Useful strategies might be the improvement of transportation systems to diminish the frictions of moving through space,⁷⁶ or the incorporation of mixed primary functions within city districts to promote a more efficient and continuous use of space over time.⁷⁷

Yet, even assuming that the logistical problems of congestion, pollution, and reduced pedestrian safety, often associated with high densities, can be offset through innovative planning strategies and advanced architectural design, local values and attitudes concerning the potential consequences of density will be of major importance in determining a community's sensitivity to crowding. Some of the most common fears associated with density are that increased proximity to others will make it difficult to retain control over one's privacy, physical safety, and economic security.

Any assessment of psychological impact would, therefore, involve determining how congruent a particular project will be with the psychological and demographic features of a given population. In an attempt to evaluate the potential congruence between a high-density housing project and the needs of local residents, social psychological methods such as value analysis and attitude assessment could be employed.⁷⁸

Data pertaining to demographic factors such as social class, cultural norms, life styles, and stage in the life cycle should also be incorporated into impact reports for these variables are predictive of a community's preference for, or aversion to, high density conditions. Childless couples with "cosmopolitan" life styles, for instance, are more receptive to conditions of high density than would those who manifest more provincial orientations and are involved in the process of child-rearing.

When a representative profile of community values and attitudes has been compiled, a basis exists for examining features of a project which are judged by residents to be most detrimental. Density-related fears

⁷⁶ Hawley, "Population Density and the City." Presented as a presidential address to the Population Association of America, Toronto, Canada, April, 1972.

⁷⁷ J. JACOBS, *THE DEATH AND LIFE OF GREAT AMERICAN CITIES* (1961).

⁷⁸ G. Fielding "Group dynamics in the urban freeway decision process." Research report, School of Social Sciences, University of California, Irvine, 1971. *Lamanna Value Consensus Among Urban Residents*, J. AM. INST. PLANNERS 317-323 (1964).

concerning physical safety and economic security may not be based in reality. Expressing such fears in attitude surveys and public hearings enables the community to ascertain both majority and minority opinions, and to examine divergent viewpoints in the context of factual information. Information describing how a given community is likely to be affected by and react to a project can be added to the other data included in the EIR, thereby increasing the potential rationality of the permit decision.

The Long Term Contribution of Environmental Psychology

Environmental psychology's long term contribution involves measuring environmental impacts once a particular project or intervention has been adopted. Longitudinal data on postimplementation effects would be useful in developing environmental impact reports for similar project proposals in the future. The long-term effects of environmental manipulations can be empirically assessed through the use of quasi-experimental designs. Among these designs, the time-series paradigm⁷⁹ is especially appropriate for assessing the impact of density on human populations. The time series strategy could be used, for example, to compare the varying effects of density in residential neighborhoods of similar size which either have or have not adopted specific policies designed to minimize traffic congestion, noise, and other sources of social interference commonly correlated with high densities. Evaluative strategies such as these could form the foundation for a new and vital dimension of environmental impact assessment—comparison of anticipated intervention impacts with those that actually occurred.

SUMMARY AND CONCLUSION

The environmental impact report provides a formal device through which social scientists can inject their knowledge into local decision making. While the current environmental impact assessment process draws most heavily from economics, other social scientists, such as criminologists and environmental psychologists, are being consulted more frequently.

The significance of social science contributions to the environmental impact assessment process depends, in the short run, on how effectively concerned social scientists participate as citizens. This means using available forums to insist that sound social science assessments be included

⁷⁹ Campbell and Stanley *Experimental and Quasi-Experimental Designs for Research on Teaching* in N. GAGE (ed.), *HANDBOOK OF RESEARCH ON TEACHING* (1963); Gattman, McFall, and Burnett, *Design and Analysis of Research Using Time Series*, *PSYCHOLOGICAL BULL.* 299-306 (1970).

in the EIR. Such participation may be in the form of attendance at public hearings on the adequacy of EIRs or on the appropriateness of city or county's EIR processing guidelines. Another effective short run means of increasing the social science input into EIRs is to support local environment groups which can bring political pressure to bear on local decision makers. These groups generally have the inclination and experience to utilize the most potent tool to insure the comprehensiveness of EIRs—threat of legal action.

The long run requirement is to identify existing, and generate more, social science knowledge useful to decision makers.

This means that the alternative of a more "applied" social science must be developed as fully as the traditional "pure" social science disciplines. Recent movement in this direction, such as that made by environmental psychology, must be reinforced.