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ABSTRACT This is one of several study guides on contemporary problems produced by the American Association for the Advancement of Science with support of the National Science Foundation. This document is a state of the art report on "social impact assessment." Four components of this process are examined: (1) the problem of social impact assessment; (2) approaches to social impact assessment; (3) the methodology of social impact assessment; and (4) the future of social impact assessment. Included in the document are a narrative, a variety of papers and exhibits, and two extensive bibliographies related to the topic. (RH)

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Arthur H. Livermore

# SOCIAL IMPACT ASSESSMENT

CP WOLF

AAAS Congressional Science Fellow  
Office of Technology Assessment

|A|A|A|S| Study Guides on Contemporary Problems

A part of the  
NSF Chautauqua-Type Short Courses for College Teachers Program

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We hereby gratefully acknowledge the services of Joan G. Creager, Consulting Editor, and Orin McCarley, Production Manager for this series.

Arthur H. Livermore  
Acting Director of Education  
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## AUTHOR'S PREFACE

This draft Study Guide is only a fragment of the outline that follows. That outline is a promissory note I will be redeeming throughout the year by supplements to the Guide. The "Study Guide" is just that; it is far from an integrated text that the subject requires and whose preparation continues. The principle I have followed in assembling these materials is to make available the most useful collection possible at this time in a dynamic and volatile field of study. These materials are meant to be used in conjunction with other course materials: C. P. Wolf (ed.), Social Impact Assessment (Milwaukee, WI: Environmental Design Research Association, 1974); the special issue of Environment and Behavior on "Social Impact Assessment" (September 1975); and what is to my mind the most practical guide to field practice now available, Dave Smith's Social Impacts Notebook. It should be emphasized that this latter is also presently in review draft form, and your comments on it will be welcome.

There are large segments of the outline missing from the present Study Guide, notably in the second half of the "text." Chapter 4, "The Methodology of Social Impact Assessment," will be filled within the next few months by a collection of methodological essays and applications edited by Kurt Finsterbusch and C. P. Wolf (Stroudsburg, PA: Dowden, Hutchinson and Ross, 1976). The material contained in Chapter 1 is basically a condensation of the "state of the art" article in (Wolf 1974). It will appear in Sociological Practice, 1, 1 early in 1976. The material in Chapter 2 was drawn from a paper, "Social Impact Assessment: An Agenda for Future Research," presented at the Quail Roost Workshop on Urban Water Resources Research, Quail Roost, NC, 25 July 1975. Hence its orientation toward urban water resources development and management. The portion of Chapter 3 that appears was given as a paper entitled "Socially Oriented Impact Assessment," given at the Environmental Impact Analysis Conference, Allerton House, IL, 8 September 1975.

In compiling other materials in the Guide I have freely drawn on the work of many colleagues, among them:

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C. P. Wolf  
23 September 1975

## Overview

This is a state of the art report on "social impact assessment." We will examine four components of this process: (1) the problem of social impact assessment; (2) approaches to social impact assessment; (3) the methodology of social impact assessment; and (4) the future of social impact assessment.

### THE PROBLEM OF SOCIAL IMPACT ASSESSMENT

#### Technology as Environment?

The relationship between environment and technology, or nature and culture, has become inverted in the evolution of society. Originally, social life was environmentally conditioned if not outright determined. A great reversal occurred with the advent of cultural controls over environmental conditions, primarily through the agency of technology. By means of such cultural interventions, passive at first and later actively asserted, the technosphere has come to dominate the biosphere. This "environmental revolution" (Nicholson, 1970) may yet encounter its counterrevolution, wherein these roles are reversed--that is the message of various catastrophisms and doomsday scenarios. But in the historical present, it is the human impact on environment that predominates.

Now a curious transposition has taken place. Technology, socially directed or influenced from its inception, has merged with the environment. It is not only a matter of environment as the recipient of technological damage and the carrier of its malignancies. Technology has been assimilated to environment in respect to its pervasiveness, its externality or human estrangement and the precariousness of cultural controls exercised over it. In this emergent

condition of "technology as environment" (Ogburn, 1956), it appears that technology is acting on--"impacting"--us rather than we directing its course. The problem of social impact assessment (SIA) is not so much what we are doing to the environment; it is what we are doing to ourselves through the medium of environment by technological mis-applications.

In the past, social scientists' own definition of the analytic situation has tended to reflect and reinforce technologic basis. The main pattern for SIA was set in Ogburn's (1922) classic formulation of the "cultural lag hypothesis," wherein changes in material culture are said to induce alterations in the non-material, "adaptive culture." A classic study of this relationship--apart from Ogburn's own pioneering work (e.g. 1946)--was W. F. Cottrell's "Death by Dieselization" (1951):

. . . here is the average American community with normal social life, subscribing to normal American codes. Nothing its members had been taught would indicate that the whole pattern of this normal existence depended completely upon a few elements of technology [e.g. high tensile steel for locomotive boilers] which were themselves in flux. For them the continued use of the steam engine was as "natural" a phenomenon as any other element in their physical environment. Yet suddenly, their life pattern was destroyed by the announcement that the railroad was moving its division point, and with it destroying the economic basis of Caliente's existence. (p. 359)

As Cottrell observes (1951: 360), "The story is an old one and often repeated in the economic history of America. It represents the 'loss' side of a profit and loss system of adjusting to technological change. Perhaps for sociological purposes we need an answer to the question, 'just who pays?'" Who paid most in Caliente were those who, by traditional American standards, were most moral--most conforming to settled community and family life and accepting of "our traditional

system of assessing the costs of technological change . . . on the theory that the costs of such change are more than offset by the benefits to 'society as a whole.'

The effects of engineering works are thus distributive in nature, the incidence of social benefits and detriments falling unevenly and unequally over various sectors and segments of the population. This will increase the more highly differentiated the society becomes. Conversely, there are differing claims and demands for public goods and services to be honored or refused. One value ascendant since "Great Society" days is that of social equity; projects are meant to have redistributive effects on the availability and accessibility of social opportunities--in employment, recreation, cultural participation and other areas (Lampman, 1974).

The strained assumption of a "market" model of society working distributive justice has in recent years been replaced by an assertion of public responsibility in adjusting to technological change (Turvey, 1966; Levitan and Sheppard, 1963). The "socialization" of technological change now enters on both sides of the equation, however--cause and effect. "Social technology" goes beyond recognition of the social knowledge in policy formulation and plan implementation. It has become active and often decisive in shaping the contours of society, and itself represents a source of major social impact.

#### What Is SIA?

Perhaps the most direct way of defining SIA is by analogy with the environmental impact assessment required by Section 102 of PL 91-190, the National Environmental Policy Act of 1969 (NEPA). Following the NEPA precedent, "social impacts" are then understood

as an extension or broadening of environmental impacts and, indeed, procedures for SIA do generally resemble those prescribed for environmental impact assessment. But at the most general level, the problem of SIA is a problem of estimating and appraising the condition of a society organized and changed by large-scale applications of high technology.

If the broad definition of SIA can be given "simply" as the relatedness of social things, it can be narrowed to particular situational and institutional contexts and specified in particular aspects and concerns. Situationally, it can be located in those circumstances and cases where human, usually governmental, intervention is intended or believed to affect the social condition. SIA is thus a procedure for anticipating, in Merton's (1936) phrase, "the unanticipated consequences of purposive social action," and thereby to forestall or offset adverse effects to which it may give rise. SIA is in this sense a hedge against uncertainty in the planning process.

Institutionally, familiar contexts of concern for SIA have involved such areas of public works and private enterprise as dams and reservoirs (Wilkening and others, 1973), nuclear reactors (Peelle, 1974), power transmission lines (Young, 1973), highways (Perfater and Howell, 1973), large installations (Breese and others, 1965), weather modification (Haas, 1973), industrial location (Ireland, n.d.), planned community development (Bird, 1973), urban renewal (Williams, Jr., 1970) and resource exploitation (Krebs, 1973). Less common are studies of "natural" conditions where to "do nothing" is to hazard human community and hamper social progress (White, 1974).

SIA symbolizes the assumption of social responsibility on the

part of public authorities and its imposition on private interests. What is being requested--indeed, demanded--is nothing less than the use of social forecasts as a planning base. Insofar as participatory planning is involved, this becomes an exercise in what Toffler (1973) calls "anticipatory democracy." Clearly this implies a significantly higher standard of governmental performance than that previously attained or seriously contemplated. What SIA proposes is to place the expectation of desired outcomes, of legislative enactments and program operation, on a reliable and rational basis--to augment judgment with analysis.

SIA differs from "pure" science largely because of its special relationship to prediction and control. SIA is operationally lodged in these phases by virtue of its "social engineering" and social (policy) planning emphases. Prediction is entailed in making "with" and "without" project projections of the impact area, and control is implied in the requirement to mitigate adverse effects of project construction (Office of the Chief of Engineers, 1972: A-2-5).

What is the substance behind this impressive symbolism? "Is social science ready?" (Spengler, 1970). Can the scientific quality of social knowledge bear the analytic weight being pressed upon it? Does this ambitious program incline towards utopian planning on the one hand (Boguslaw, 1965) and totalitarian planning on the other (Popper, 1957)? Boguslaw's "new utopians," it will be recalled, were not social scientists but systems analysts; still the apprehension remains. Since the days of Joseph Wood Krutch's humanistic critiques, there has been an equal and opposite fear--not that social scientists will fail, but that they will succeed only too well. The

Federal prison experiments on behavior modification, with all their "Clockwork Orange" overtones, betrayed (and belied) this great fear (Holden, 1974). There is a respectable body of opinion that holds social science will never be predictive in the same sense as physical science. A scientific attitude compels the reply, "That is an empirical question." And, on the faith of a rationalist, it is knowledge most worth the having.

The "need to know" in SIA has been invoked primarily in regard to the "social effects" of technological change. As Eigerman (1973: 1) says, "Technology can visit upon its implementers wholly unforeseen and undesirable consequences . . . It follows that prudent men will scrutinize the intensive application of any new technology and try to anticipate the changes in physical, social and economic environments that it may induce. Impact assessment is precisely this forecasting and analysis exercise."

The common characterization of social impacts as "secondary" underscores their relative neglect. Coupled with this is the often impressionistic nature of SIA, contrasting with the more certain and precise knowledge of technical effects. Fundamentally though, what engineering is about is people and their values; it stands in the relation of providing material means to the satisfaction of human needs. From this sociological commonplace it follows that civil works projects, say, are supposed to have social impacts. Such impacts are not merely incidental; rather they are the essence of engineering practice.

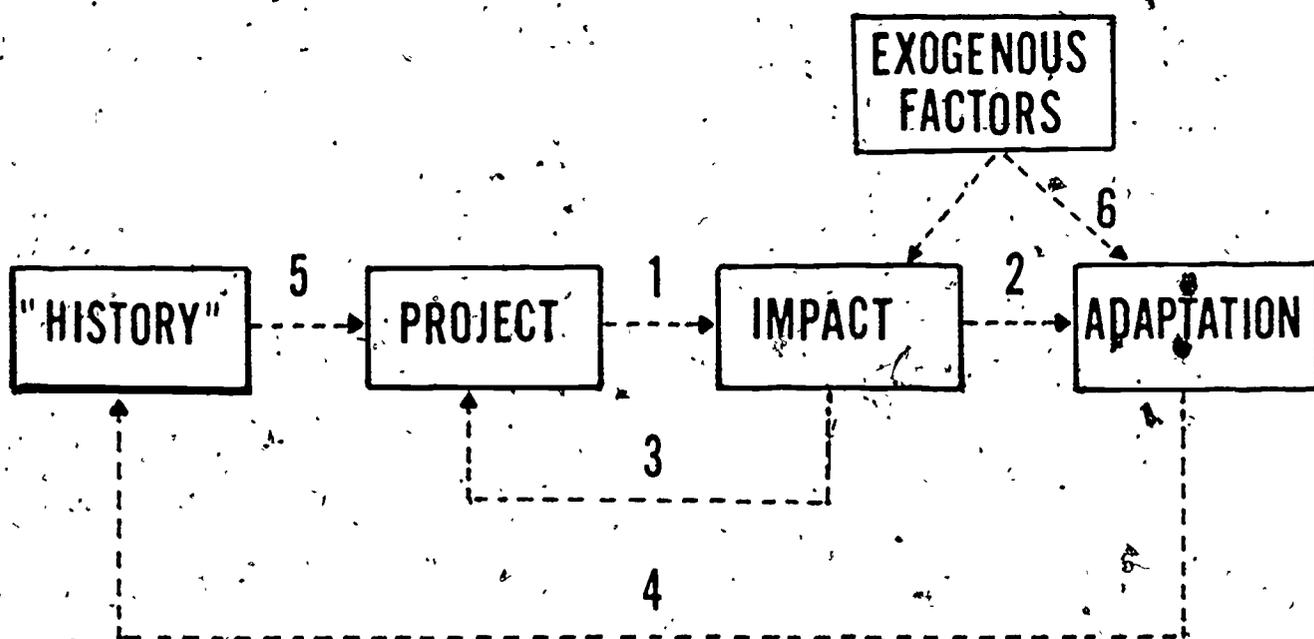
## APPROACHES TO SOCIAL IMPACT ASSESSMENT

With this preliminary statement of the analytic problem, we can proceed to a review of approaches by which it might be effectively engaged. The leading contender is what Baur (1973: 3) terms the "interactive approach." He gives this rationale: "Instead of assuming that the social effect is the result of a specific cause or a chain of causes that are traced to a technological innovation, I propose that we think of an effect as the outcome in the form of altered human conduct of the interaction between the agents of change and the people who have an interest in the proposed public works project." On this approach we understand that social factors are as much the cause of SIA as they are the effects.

### The Interactive Approach to SIA

Consider a simple S→R model where the stimulus is provided by some engineering project in planning, construction or operation, and the response is the social impact of that phase of project life. Undoubtedly, that is the simplistic view of the matter held by some. Complications arise when it is seen that in no case can the impact be considered a "point event"; rather the effects linger and intermingle with others appearing later. When these "interaction effects" are recognized, together with exogenous factors, the analytic problem appears anything but simple. The figure below suggests a number of complexities:

# INTERACTION EFFECTS IN S.I.A.



The direct impact (1) is a deformation in the state variables describing initial conditions, but if analysis were to end there it would severely distort the reality situation of SIA. The continuing effects of readjustment and adaptive change represent a sort of "feed-forward" (2). We can further hypothesize a differential social responsiveness on the part of impacted units. Conversely, in the planning phase the direct impact may result in a kind of "reaction formation" which impinges on project planning itself (3), in the form of public opposition and plan modification. Moreover, the project itself may be regarded as the social effect of a social cause--its "history" as a prospective solution to preexisting concerns, problems and issues residing in the affected area (4), and this history conditions public receptiveness at the points of impact and subsequent adaptation (5). Finally, the intrusion of exogenous variables (6), whether random or systematic, compounds the problem of attributing measured effects to planned interventions.

### Substantive Approaches

What selections and sets of variables can be drawn from the universe of impact parameters? Answering this question leads back into the cataloguing of social impact categories, and indeed, to the very conception of "social" itself. Within the social category proper there are various aspects that receive varying emphasis: cultural impacts, which have been given operational definition in archeological sites and ethnic groups; value impacts; esthetic impacts (possibly a joint effect of "cultural" and "value" impacts); demographic impacts; institutional impacts, including specific functional areas such as recreation and family structure. The list could be extended and

refined, and in keeping with the interactive approach we could introduce corresponding categories of social cause as well.

Perhaps the most strategic approach to SIA might be expected to model itself on the growing research tradition of program evaluation. The first condition of evaluative research is that program objectives be clearly stated; failing that, there is nothing to evaluate. The chief obstacle to SIA's adopting the evaluative research model is the unwillingness or inability to elevate social performance to the rank of a planning objective. Rather, social impact assessors are asked to treat their subject systematically, as unwanted and undesirable by-products or side effects of the serious planning business.

Senate Document 97 (U.S. Senate, 1962): 2) announces, "Well-being of all the people shall be the overriding determinant in considering the best use of water and related land resources." Its successor, the Water Resources Council's "Principles and Standards" (1973), reaffirms the overriding consideration for "quality of life" and purports to express "societal preference" in its planning guidance. The extent of its success in this endeavor appears quite limited. "Social well-being" dwindles to the depressed status of an "account" consisting of real income distribution, health and safety, and a leftover from obsolete legislation on emergency preparedness.

Methodological Approaches

Exploring different content categories entails differing methodological approaches--for instance, the application of standard ethnographic techniques in assessing cultural impacts. Here our concern is with alternative research strategies, of which the



"deductive", and "inductive" approaches are emblematic. On a deductive approach we would ideally begin with a concept, convert it to a variable, hypothesize a relationship between variables, to achieve a theoretical formulation, then develop indicators (referents) and measurement techniques to determine the direction and test the strength of association, finally arriving at a parameter estimation. This ultrarational procedure is seldom followed, although experimental and quasi-experimental designs have been urged in evaluative research (Caporaso and Roos, Jr., 1973). To all appearances SIA is still in the "natural history" stage of science-building, at a point far removed from the mature stage of deductively formulated theory.

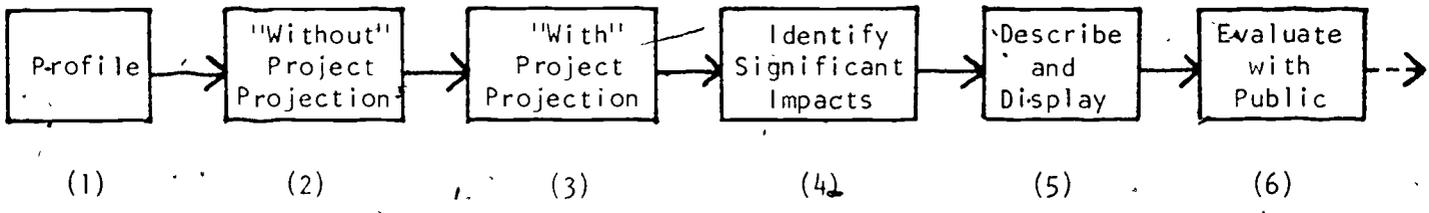
This being the case, inductive approaches--such as case studies of the community research variety--may be felt more fitting. Lest SIA remain in perpetual infancy, however, they should be fielded with a view towards building a cumulative knowledge base. The optimal strategy of inquiry may be a "mixed" one, combining both inductive and deductive approaches.

METHODOLOGY OF SOCIAL IMPACT ASSESSMENT

Impact Assessment Steps

The series of impact assessment steps postulated in Section 122 Guidelines (Office of the Chief of Engineers, 1972), "tells the story" of SIA as operational procedure:

Fig. 2 IMPACT ASSESSMENT STEPS (SECTION 122 GUIDELINES)



These steps form a continuous, "value-added" process, each of which is analyzable in terms of the input received, the analysis performed, and the output produced. In principle, the cumulative effect should be the systematic and comprehensive identification, measurement and evaluation of all significant impacts and their interrelations. In practice, this logic has yet to be carried through to a successful conclusion, though fragments of it have been assembled.

(1) Profiling: The purpose of profiling is to develop a set of social baseline data--in effect, a "before" measure of the impact situation, in anticipation of project-induced changes. Examples of this kind of analysis are Smith (1970) and Wilkening and others (1973). Two methodological problems intrude at this point: (1) defining the impact area boundaries and (2) determining the data points that will dimensionalize and describe the referent system. The extent of impact predicted--and by implication the extent of system impacted--bears on the first question. Roughly speaking, the magnitude of impact can be assumed as proportional to the magnitude of the project, with intensity falling off as a gradient of undetermined steepness from the epicenter of impact.

Two basic attitudes can be taken towards bounding the impact area. One is "project-related" and presupposes an existing project proposal; the other and more difficult is "area-related" and focuses more on accurate problem identification than on specific project justification. "Project-related" area bounding has the advantage of determinancy in what the presumed causative factors, and hence the predictable impacts, are to be--a harbor dredging operation, a floodway clearance, an upstream reservoir or whatever, while "area-

related" is less well specified but more open to consideration of a wider range of social conditions and planning possibilities. On the former, one might ask, "What are the impacts?"; on the latter, "What is the system?" While the water resources planner's typical unit of analysis is a hydraulic system, the social impact assessor's is likely to be a social system, in which the extent of functional dependence and degree of functional integration are crucial to stamping unit character. The "community bias" is especially pronounced in social analysis, though hard to localize in large-scale project planning.

Social impact assessors should not bemuse themselves with visions of "instant analysis." Data interpretation is as much a part of SIA as data gathering and processing, and Kemper's (1974) inconvenient question, "What does it mean sociologically to be of a given age, sex, social class, educational level, race, religion, region, ethnicity, occupation, etc.?" is not easily answered. Conceptual analysis and elaboration of categories such as "community cohesion" is a pressing need; the tacit assumption is one of a consensus model, whereas community conflict is often the situation of fact.

(2-3). Projecting: The system profiled is a dynamic one; time series data must be generated for purposes of trend extrapolation, to forecast deviations from base conditions established in the profiling step. There are two states of the system projected over project life, which may be upwards of 100 years: "without" project and "with." As Eigerman (1973: 4) observes, "everything changes whether a given plan is implemented or not. Therefore, plan-induced change is not the difference between what is forecast 'with' a plan and some steady-state 'today.' It is the difference between two

forecasts; what is anticipated 'with' the plan and what is anticipated 'without' it." The second anticipation, "without project," entails making a general social forecast; "project-related" definitions of area and derivations of impact are insufficient.

(4) Identifying significant impacts: This is not a simple operation. The criteria of significance are already preconceived the categories of effect that enter the profiling of step (1). Moreover, the net balance of effects can only be measured here and not weighed in comparative judgment until evaluative factors come into focus in step (5). What is sought in this step is an objective appraisal of impact magnitudes, without fear or favor. Yet even that dispassionate analysis is beset with difficulty.

The general methodological requirement for SIA is essentially the same as for any controlled scientific experiment. Unfortunately, social impact assessors are seldom in a position to exert the requisite experimental controls. Moreover, they cannot establish truly experimental conditions because the analytic problem is predictive in nature. At best, they can perform what Weber called "mental experiments" and hope that the outcome will be isomorphic to the unfolding reality situation within some tolerable margin of error. The problem of social prediction is further complicated by the condition Duhl (1967) depicts of planning "when you don't know the names of the variables." Worse still, prediction must be contingent on public authorities and private interests orienting their future actions in accord with present expectations.

The kind of experimental controls a social impact assessor can exercise over independent and dependent variables is given in the

available mix and choice of planning alternatives. But assignment of hypothetical values, uncorrelated in the predictive case by application of empirical controls, stretches the deductive chain to tenuous lengths after a few interactions. Although second-order consequences are generally acknowledged, little analysis has been directed to tracing indirect effects. Coates (1971: 228-9) has assessed the effects of automobiles, refrigeration and television through sixth-order consequences (all of them found conducive to breakdown in community and family life, perversely enough), and cross-impact computer programs such as Trend Impact Analysis (Becher and Gerjuoy, 1973) provide at least the technical capacity for analyzing complex interactions. Similarly with respect to "internationalizing externalities," through more comprehensive systems mappings or other means, the methodological problems engendered by acceptance of an interactive approach appear overwhelming in the present state of the art. The social scientists' response to analytic complexity has been to intensely cultivate a wide variety of methodological approaches more or less adaptable to SIA.

(5) Displaying and describing impacts: Information displays based on inoperable or invalid methodologies will be artifactual at best and mischievous at worst. Without denying the useful work of Miller and Byers (1973) and others, it seems fair to say that a clear and present danger exists of "premature quantification," foregoing the hard analysis prescribed above. The conjunction of terms, "describe and display," does signify a willingness to entertain "qualitative" variables, values and analyses, but the empiricist trend, propelled by the social indicators "movement" and allied forces,

seems irresistible. Whether the outcome will be numerical analysis or numerology is in greater doubt.

(6) Evaluating with the public: Display features are encouraged as providing a basis for public participation in impact evaluation. A sharp distinction is made in Corps doctrine between "assessment" and "evaluation." To this point in the SIA process, technical neutrality has been the norm. "Going public" means now the attaching of values and assigning or weights as to the desirability or undesirability of the impacts assessed. Strict adherence to the fact-value dichotomy, and the segmentation of expert-public roles and relations attending it, is relaxed however in the initial problem identification phase, and the criterion of significance applied in (4) must be colored to an extent by subjective impressions of public preference. Moreover, the dichotomy may be false if it is assumed that "objective" assessments are value-free or that value positions lack factuality. Two essential conditions must be met to elicit participation for purposes of impact evaluation: (1) the identification of publics (plural) and (2) some preliminary structuring of the situation to which their response is invited.

Public reaction is too easily dismissed as apathetic or ignorant; where an expectation of public input is encouraged, at least some attention should be paid to grounds on which the public is approachable and responsive. Use of simulation games such as Impasse (Impact Assessment) (Duke and others, 1973) and visual stimuli such as LAND (Landscape Analysis and Natural Design) (Everett, 1973) are richly deserving of much fuller employment. The discounting of public input occurs also in contention with expert judgments.

The unpalatable alternative is to restore planner biases as to "what the people want." Manifestly, a method of articulating expert judgment and public opinion must be devised. Crawford's (1972) technique of expert responses to a Delphi instrument validated by a random sample's value analysis is instructive to this point.

There are two unavoidable problems of survey methodology we must confront, however. Supposing we succeed at obtaining verbal responses from a representative public, what is their relation to actual behavior? As matters presently stand, "the assumption that feelings are directly translated into actions has not been demonstrated" (Wicker, 1969: 75). But even if we grant some tenable relation between attitudes and actions, we are also aware of shifts in the schedules of public preference expressed over time. The advent of environmental concern as a public issue in the 1960's is one imposing instance. Moreover, we may further suppose that attitude change is itself a function of public involvement. If effective, public participation is a learning process throughout which attitude formation, crystallization and change occur. Anticipating shifts in public preference then becomes part of the predictive problem. Whatever the difficulties, we must agree with Baur's (1973: 2) assessment, "an understanding of social effects cannot be made without regard to the kind and extent of public involvement in the planning and management of the project."

#### THE FUTURE OF SOCIAL IMPACT ASSESSMENT

Our summary impression of SIA is a mixed one. While the imperative for SIA is manifest in statutory requirement and societal interest, its legal and administrative history has been ambiguous

and ambivalent. The opportunity and occasion for social science knowledge making, effective contact with pragmatic situations of genuine concern abound, yet proponents of SIA and the condition of organized knowledge in their field are in serious disarray. In the fact of this, we might well heed Spengler's (1970: 70) cautious advice: "What is needed is that practitioners of each social science greatly improve its analytical apparatus, limit research commitments to what that apparatus is capable of doing, and so intensify internal discipline as to minimize the influence of ideology and the persistence of fallacy." Yet for reasons stated above, SIA is a radical act. Its adherents must be prepared to assume as much risk of ignorance and error as those who willingly proceed in its absence. In the midst of this confusion, we can however discern some central tendencies and impending trends.

### The Legal Challenge

Ours is a legalistic society; the legal system is our chief means of conflict resolution, of relief and redress, as well as prime mover of social change. It would be surprising indeed if requirements and provisions for SIA were not subjected to the same legal challenge as environmental impact assessment. Often the two are inseparable, as one informant, a penologist, disclosed in this communication:

Ever since the 1969 environmental protection legislation, we have become increasingly involved in formulating statements regarding social, cultural, and physical impact of proposed correctional institutions. Our most recent work pertains to the proposed correctional institution at Lorton, Virginia. While construction of this facility would have been a grave error from a correctional point of view, it has been largely our environmental impact study which has brought the project to a halt.

In this instance, penology and not ecology is the point at issue. Is

this barely hidden agenda to be lightly regarded as a perversion of Congressional intent? Or does it rather place a proper emphasis on social impacts and their involvement in physical alterations? The courts will decide, on the grounds of historical and cultural heritage as well as environmental protection. Yet as Greenberg and Hordon (1974: 174) contend, the legal route is a hazardous one: Moreover, although legal sanction is sometime thought to constitute the sole means of enforcing official conformity, they conclude, "judging by the several score of impact statements we have reviewed, the courts have had a minimal, if any, effect on the preparation of the vast majority of environmental impact statements." It may be that SIA will be dragged through the courts and that "impact fees" requiring developers to pay, beyond normal property taxes, the cost of capital improvements that the presence of a project would ordinarily place on the community (Nordheimer, 1974) will be ruled constitutional. However necessary legal compulsion may appear, it is not likely to prove sufficient. Certainly it will not substitute for the regular performance of professionally competent assessments on the part of responsible administrators and their staffs.

#### Acquiring Competence in SIA

For their part, responsible social scientists will strive to place their best knowledge and judgment at the disposal of social impact assessors. Their reward system will need realignment, extending professional recognition to colleagues who dedicate professional lives to this calling, or who volunteer their expertise in advisory roles. Academics will have to come out of their cloisters to engage real world problems on its terms, not their own. They must grant the

social truth of others' experience, even as they demand respect for their own learning. In consultant roles, they will regard the problem of SIA more as intellectual challenge than income supplement.

### Conclusion

Practice makes better. Though still primitive, the state of the art of SIA is rapidly improving. Two years ago there was no such field, and scarcely more than a glimmer of interest. Today there is a fast-growing body of literature (Wolf, 1974; Shields, 1974; Vlachos and others, 1975; Wolf, 1975; Finsterbusch and Wolf, 1976) and research in progress. The real cutting edge of SIA however is the actual practice of growing numbers of social impact assessors, in all quarters and sectors of an increasingly knowledgeable society. It is too early to speak of a SIA "movement," but the directions are set and movement is perceptible across a broad front of interest and activity. There will be obstacles in our path; nobody said it was easy. Overcoming them will be the work of perhaps generations to come, but a beginning has been achieved. What matters now is what follows afterward.

## References

- Baur, E. J. (1973) "Assessing the Social Effects of Public Works Projects." Research Paper No. 3. Fort Belvoir, VA: Board of Engineers for Rivers and Harbors, U.S. Army Corps of Engineers, July.
- Becker, H. S. and H. Gerjuoy (1973) "Management of Risk Using Trend Impact Analysis: An Application of Computer Techniques for Corporate Planning and Decisionmaking." Glastonbury, CT: The Futures Group.
- Bird, H. P. (1972) "Environmental and Economic Impact of Rapid Growth on a Rural Area: Palm Coast," *Environmental Affairs*, 2, 1 (Spring), 154-71.
- Boguslaw, R. (1965) *The New Utopians: A Study of System Design and Social Change*. Englewood Cliffs, NJ: Prentice-Hall.
- Breese, G. and others (1965) *The Impact of Large Installations on Nearby Areas*. Beverly Hills, CA: Sage.
- Caporaso, J. A. and L. L. Roos, Jr. (eds.) (1973) *Quasi-Experimental Approaches: Testing Theory and Evaluating Policy*. Evanston, IL: Northwestern University Press.
- Coates, J. F. (1971) "Technology Assessment: The Benefits . . . the Costs . . . the Consequences," *The Futurist*, 5, 6 (December), 225-31.
- Cottrell, W. F. (1951) "Death by Dieselization: A Case Study in the Reaction to Technological Change," *American Sociological Review*, 16, 3 (June), 358-65.
- Crawford, A. B. (1972) "A Method of Multiple Criteria Evaluation," Center Paper 72-2. Alexandria, VA: Center for Advanced Planning, Institute for Water Resources, U.S. Army Corps of Engineers, June.
- Duhl, L. J. (1967) "Planning and Predicting: Or What to Do When You Don't Know the Names of Variables," *Daedalus*, 96, 3 (Summer), 779-88.
- Duke, R. D. and others (1973) "Regional Planning for Monterey Bay: A Trilogy of Issue-Oriented Games for Citizen Use." Ann Arbor: Environmental Simulation Laboratory, University of Michigan, December. (I owe this reference to Cathy Greenblat.)
- Eigerman, M. (1973) "Social and Economic Impacts of Waste Water Management in the Merrimack Basin." Paper presented at the National Meeting of the American Society of Civil Engineers, 30 January. 6 p.

- Everett, M. (1973) "LAND/Landscape Analysis and Natural Design," Bulletin of Rhode Island School of Design, Alumni Edition, 60, 3 (December), 7-12.
- Finsterbusch, K. and C. P. Wolf (eds.) (1976) The Methodology of Social Impact Assessment. Stroudsburg, PA: Dowden, Hutchinson and Ross.
- Greenberg, M. R. and R. M. Hordon (1974) "Environmental Impact Statements: Some Annoying Questions," Journal of the American Institute of Planners, 40, 3 (May), 164-75.
- Haas, J. E. (1973) "Social Aspects of Weather Modification," Bulletin of the American Meteorological Society, 54, 7 (July), 647-57.
- Holden, C. (1974) "Butner: Experimental U.S. Prison Holds Promise, Stirs Trepidation," Science, 185, 4149 (2 August), 423-26.
- Ireland, J. V. (n.d.) "Research Group in Planning Impact Evaluation Studies." London: Department of Social and Environmental Planning, Polytechnic of Central London. 27 p. mimeo.
- Kemper, T. D. (1974) "What Does It Mean Sociologically to Be of a Given Age, Sex, Social Class, Educational Level, Race, Religion, Region, Ethnicity, Occupation, Etc.?" Paper presented at the 44th Annual Meeting of the Eastern Sociological Society, Philadelphia, PA, 6 April.
- Krebs, G. E. (1973) "The Social Impact of Surface Mining," pp. 1076-77 in House Committee on Interior and Insular Affairs, U.S. House of Representatives, Washington, DC, 16 April. Regulation of Surface Mining, Part II. Washington, DC: U.S. Government Printing Office, Serial No. 93-11.
- Lampman, R. J. (1974) "What Does It Do for the Poor?--A New Test for National Policy," The Public Interest, 34 (Winter), 66-82.
- Levitan, S. A. and H. L. Sheppard (1963) "Technological Change and the Community," pp. 158-89 in G. G. Somers; E. L. Cushman and N. Weinberg (eds.), Adjusting to Technological Change. New York: Harper and Row.
- Merton, R. K. (1936) "The Unanticipated Consequences of Purposive Social Action," American Sociological Review, 1, 6 (December), 894-904.
- Miller, W. L. and D. M. Byers (1973) "Development and Display of Multiple-Objective Project Impacts," Water Resources Research, 9, 1 (February), 11-20.
- Nicholson, M. (1970) The Environmental Revolution: A Guide for the New Masters of the World. New York: McGraw-Hill.

- Nordheimer, J. (1974) "A Tiny Florida County Undertakes the Struggle against Too Much Growth," *The New York Times*, 17 February.
- Office of the Chief of Engineers (1972) "Guidelines for Assessment of Economic, Social, and Environmental Effects of Civil Works Projects." ER 1105-2-105. Washington, DC: U.S. Army Corps of Engineers, 15 December.
- Ogburn, W. F. (1922) *Social Change*. New York: B. W. Heubsch.
- Ogburn, W. F. (1946) *The Social Effects of Aviation*. Boston: Houghton Mifflin.
- Ogburn, W. F. (1956) "Technology as Environment," *Sociology and Social Research*, 41, 1 (September-October), 3-9.
- Peelle, E. (1974) "Social Effects of Nuclear Power Plants," pp. 113-20 in C. P. Wolf (ed.), *Social Impact Assessment*. Milwaukee, WI: Environmental Design Research Association.
- Perfater, M. A. and D. R. Howell (1973) "Evaluation of Social Impact: A Suggested Approach." VHRC 73-R10. Charlottesville: Virginia Highway Research Council, September.
- Popper, K. R. (1957) *The Poverty of Historicism*. London: Routledge and Kegan Paul.
- Shields, M. A. (1974) *Social Impact Assessment: An Analytic Bibliography*. IWR Paper 75-P6. Fort Belvoir, VA: Institute for Water Resources, U.S. Army Corps of Engineers, October.
- Smith, C. R. (1970) *Anticipation of Change: A Socio-Economic Description of a Kentucky County before Reservoir Construction*. Research Report No. 28. Lexington: Water Resources Institute, University of Kentucky.
- Spengler, J. J. (1970) "Is Social Science Ready?" pp. 54-73 in L. A. Zurcher, Jr. and C. M. Bonjean (eds.), *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler.
- Toffler, A. (1973) "Anticipatory Democracy and the Prevention of Future Shock," pp. 74-78 in G. Chaplin and G. D. Paige (eds.), *Hawaii 2000: Continuing Experiment in Anticipatory Democracy*. Honolulu: University Press of Hawaii.
- Turvey, R. (1966) "Side Effects of Resource Use," pp. 47-60 in H. Jarrett (ed.), *Environmental Quality in a Growing Economy*. Baltimore, MD: Johns Hopkins Press.
- U.S. Senate (1962) "Policies, Standards, and Procedures in the Formulation, Evaluation, and Review of Plans for Use and Development of Water and Related Land Resources," Document No. 37. Washington, DC: U.S. Government Printing Office.

- Vlachos, E. and others (1975) Procedural Guidelines for Social Impact Assessment. Fort Belvoir, VA: Institute for Water Resources, U.S. Army Corps of Engineers, June.
- Water Resources Council (1973) "Water and Related Land Resources: Establishment of Principles and Standards for Planning," Federal Register, 38, 174 (10 September), 24778-869.
- White, G. F. (ed.) (1974) Natural Hazards: Local, National, Global. New York: Oxford University Press.
- Wicker, A. W. (1969) "Attitudes Versus Actions: The Relationship of Verbal and Overt Behavioral Responses to Attitude Objects," Journal of Social Issues, 25, 4 (Fall), 41-78.
- Wilkening, E. A. and others (1973) Quality of Life in Kickapoo Valley Communities. Report 11. Madison: Institute for Environmental Studies, University of Wisconsin, September.
- Williams, J. A., Jr. (1970) "The Effect of Urban Renewal upon a Black Community: Evaluation and Recommendations," pp. 377-86 in L. A. Zurcher, Jr. and C. M. Bonjean (eds.), Planned Social Intervention: An Interdisciplinary Anthology. San Francisco: Chandler.
- Wolf, C. P. (ed.) (1974) Social Impact Assessment. Milwaukee, WI: Environmental Design Research Association.
- Wolf, C. P. (ed.) (1975) Social Impact Assessment, Environment and Behavior; 7, 3 (September) (special issue).
- Young, L. B. (1973) Power over People. New York: Oxford University Press.

1. The problem problem. Simply stated, the "problem problem" is that there is no specific legislative or analytic requirement to perform social impact assessment (SIA). On the side of agencies, there is the easy assumption that either social impacts are adequately covered in benefit-cost analysis or that there is no warrant to cover them at all. Beset as they are with normal operating pressures and planning complexities, they are scarcely receptive to the additional complications that SIA introduces. Such concerns are not real, merely "self-inflicted." From the side of the professions, the attitude is that SIA is "what we always do." If so, it remains that until NEPA there was no operational context with which such research made effective contact. The origin of SIA in the public sector and the impetus given it there have served to reinforce professional insularity. A further manifestation of this problem, when recognized, is the divergence in approaches between academic professionals and operating agencies, the former typically adopting a research orientation and the latter adhering to more routine planning practice.

2. The problem of interest. Federal recognition of the problem of SIA has been slowly evolving since the early 60s; highway legislation was an early leader in this respect. The Federal interest in SIA might be said to have culminated in NEPA, except that "human environment" is highly equivocal in that landmark act. Only now are judicial interpretations beginning to address substantive social concerns and demand positive social content. More explicit language is written into PL 91-611 (Sec. 122) and 92-500 (Sec. 208), but in both these cases SIA occurs in conjunction with economic and environmental impact assessment and cannot be said a particular emphasis of either (except for its relative neglect in previous legislation). Concurrent requirements for public involvement do suggest a direct social impact of the statutes themselves, however. Counterpart to legislative requirements are administrative procedures such as DOT's "Policy and Procedure Memorandum 90.4" and the Corps' ER 1105-2-105, "Section 122 Guidelines." Recent Federal actions have devolved similar responsibilities on state and local authorities, as in the Action Plan implementation procedures required of state highway planners.

Effective assertion of the Federal interest in SIA will likely create pressures to impose similar standards of accountability and performance on private interests as well. Corporate social responsibility can be expressed and enforced both internally through the mechanism of the "social audit" and externally through the exercise of investor responsibility. While both are extremely tenuous at present, a viable alternative to governmental regulation -- which is to say compulsion -- seems necessary and desirable. Corporate image management will require more than a public relations gesture in this direction.

The problem of interest is basically a quest for constituents. Who is demanding SIA? How effective is that demand? In whose interest is it that SIA be adequately performed? Three publics would appear most directly affected: environmentalists, consumer protectionists and social scientists. The former two have been only slightly responsive to date, while the latter is just now starting to assert its right of interest. Environmentalists might well seize upon social impacts as yet another ground for legal intervention. The public interest research effort has been largely devoted to product safety and general health concerns, with some branching out to environmental issues however. Social scientists' professional interests are whetted by tightening academic job markets, shrinking research budgets and expanding non-academic employment opportunities. Pecuniary interest aside, it is also true that the intellectual challenge of SIA spans a broad spectrum, from technology assessment to historic preservation.

3. The criterion problem. Supposing a "mandate" for SIA to be embodied in recent legislation and acknowledged by the parties-at-interest, still the question remains: What are we solving for in SIA? At the most general level, this is the criterion problem. Were social well-being to be established as a planning objective the answer might be sought in coherent goals, consistent policies and effective programs of collective decision and action designed to achieve that end. In the absence of such we are nevertheless faced with the necessity to formulate guidelines for "adequate" SIA. "Adequate" for what? Pro forma compliance with legislative

and administrative requirements clearly falls below professional standards, however shaky the consensus on which those judgments rest. Rather what is required is a searching examination of the full and proper use of social knowledge and social research in EIS preparation; review, and other administrative practices.

Principles and Standards' predecessor, Senate Document 97, states that the "Well-being of all the people shall be the overriding determinant in considering the best use of water and related land resources." Perhaps that noble sentiment was never intended as more than a rhetorical flourish. The intervening years have witnessed the dwindling away official concern for social well-being until now that account is bereft if not totally bankrupt. The latest thinking reduces the "social" (or, more anonymously, "fourth") account to a consideration of health and safety factors associated with water resources development and management. At that, the deduction of "real income distribution" and "emergency preparedness" is no great loss; both were anomalous to distinctively "social" concerns.\*

We are bound to recognize that even when well-intentioned, agency experience has not been altogether favorable. EPA has not succeeded in operationalizing the quality of life concept as a tool for environmental management. The Water Resources Council has not been able to address the SWB account on an analytic par with

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\*"Real income distribution" would properly be placed in the National Economic Development account, but for the redistributive effects implied. The individualistic treatment of social concerns is an unfortunate inheritance from earlier economic thinking; fuller attention to collective and group characteristics is now warranted. "Emergency preparedness" is illustrated by the efforts to offset a pretended shortage of chlorine for water supply treatment in 1974.

those of national economic development (NED), environmental quality (EQ) and even regional development (RD). Social impact assessment criteria and guidelines have been sought without great success by the Corps of Engineers, the U.S. Forest Service and other Federal agencies. The record in this area seems consistently poor. It should be said at once that this problem is by no means unique to government. Private and professional groups have struggled with it fruitlessly. For example, Critical Choices for '76's "bottom line" is in effect a social well-being criterion, but what goes on that line remains mysterious. Clearly we are in the presence of an acute, and perhaps chronic, state-of-the-art problem.

This merely confirms a marked reluctance on the part of Federal agencies to fully acknowledge the range of concerns implied in such concepts as "quality of life" (QOL) and "social well-being" (SWB). Rather than ascribing such resistance to natural recalcitrance and bureaucratic caution, it might be fairer to say that social scientists have yet to present a convincing case for their cogency and inclusion. If we are someday able to generate a "QOL" or "SWB" with the same facility as economists produce a "BCR," such interest might find readier acceptance. How primitive the present state of social accounting is glimpsed in Cook's (1974: 1.54) reckoning.

From the standpoint of social wellbeing, the evidence is on the side of justification. The threat of sudden death and destruction from floods, although far from eliminated, has been lessened substantially by Canyon Dam. The use of Canyon Lake by more than a million visitors each year with negligible problems of litter, vandalism, or other crime, suggests that the reservoir provides social therapy on a large scale.

What accounts for impoverishment of the social account? One argument is that social well-being in its larger sense--something akin to "the general welfare"--should never have been a goal or even a concern (much less a "determinant") in water resources planning. Social conditions and problems, of health and housing, education and employment, can be attacked frontally through direct social legislation. On this view, shifting the misplaced emphasis on social objectives is cause for relief, not regret. While there is merit to the argument for direct action to cure social ills, recent experience on this score is hardly reassuring. Social legislation of the 60's is badly in disarray; social problems have proved obdurate if not intractable. Conversely, the use of environmental quality controls such as sewer moratoria to stem urban growth has been an effective indirect measure. Coupled with the general acceptance of multiobjective planning, the social implications--if not the social purposes--of urban water resources planning seem inescapable.

A further and more plausible account for the lowly estate of social well-being is the current failure to achieve societal consensus on any major social issue or public program. The dithering over energy policy is but symptomatic of a general paralysis of societal guidance. Caulfield's "blockbuster" paper on dismantling the Federal water resources development establishment implies a more serious erosion of political consensus regarding population and growth, urban and regional development, and perhaps

even environment. The "new federalism" appears an effort to achieve consensus on a less grand scale where, in fact, it may be achievable. Yet the emergent "new urban majority" he recognizes scarcely amounts to an effective urban coalition for all its numerical strength.

Social well-being "objectives" are not operational because they are not objectives. This is not a problem of conceptual understanding or operational measurement; we can very well know and gauge when people are (and think they are) better or worse off. There is no shortage of definitions of the "good life" and the "good society," or of "quality of life" indicators. To the contrary, they can be understood and measured in many various ways. There is no definitive definition or exhaustive measure, however; conceptually and operationally the phenomena are "overdetermined," not underdetermined. Rather the essential problem is one of value consensus and value commitment, and a corresponding commitment of institutional resources. The real problem is the faulty mechanisms of goal formation and consensus building for collective decision and action. To remedy this calls for a normative approach to water resources and related land use planning, not a sterile and pseudo-rational exercise in benefit-cost estimation.

One reason for wanting to assert the primacy of social well-being is the desire to legitimize and authorize Federal actions that now fail to carry under prevailing, basically market, standards. Traditionally our view of government has been that it should undertake only those actions that cannot be performed economically and efficiently by the private sector. This implies that legitimate

governmental operations are confined to those that are dis-economical by market standards. It is a testimony to the prevalence (I am tempted to say "virulence") of those standards that we now find them applied where they do not belong--to governmental actions. Nobody wants to see the public purse squandered (except in his own private interest); everybody wants the most economical and efficient use of limited planning resources. But the misapplication of market rationality to the public household stringently limits planning options and initiatives.

The irrationality of existing decision rules is nowhere more apparent than in regard to Principles and Standards. Here we find the peculiar situation of "two objectives, four accounts." Of what account are those other two accounts, "regional development (RD) and SWB? What weight in the decision process are they supposed to carry? As matters presently stand, we are invited to examine the social consequences of Federal actions without regard to their causes. We may mitigate adverse effects (or then again, we may not) but must not induce beneficial ones--except as those can be subsumed under market-valued criteria, e.g. the economic benefits of recreation opportunity.

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\*Ideally, I would conceive only three accounts, NED, EQ, and SWB, each occurring on four levels--national, regional, state and local. The existence of PD as a separate account seems largely a question of equity, but that requires an external (national) criterion. If interest comes to rest on Appalachia, for instance, that is because of its regional disparity relative to national standards.

In short, the position I am arguing emphasizes the 'social goods' that can be delivered through public planning and public works. The neighborhood upgrading effects of middle-income housing (DeSalvo 1974) is one case in point. On this view the anticipated payoffs are not for urban water management per se but for the social well-being of urban communities in which it operates. To think otherwise is to invert the relation between means and ends.

Discussion to this point has focused on "social well-being" as a planning objective. The "Straw Man" (later Techcom) research was aimed at devising a planning methodology whereby this goal might be approached, and while their final report (Technical Committee 1974) has been received, it still awaits critical evaluation. This is the "ambitious" program, and doubtless it should be supplemented by other cognate research. A second and complementary level of research is the "modest" program of developing and refining the methodology of social impact assessment. Here it is argued that useful work can be carried on even assuming that "social well-being" remains a category of effect rather than of cause. While the longer-term goal of normative social planning should be pursued, more immediate and legitimate is one considering social concerns in the relation of effects. Progress on this level of analysis would consolidate the knowledge base on which to advance the more ambitious program. What is wanted at this stage then is a concerted and coordinated program of research in social impact assessment. Before outlining that "modest" program, it is necessary to review a number of problems seeming to stand in its way.

4. The analytic problem. Critics have argued that the legislation on which SIA is based is not "analytically sound," and indeed, such legislation generally prescribes an ill-defined procedure for analyzing social impacts without ever addressing substantive issues. Agency guidance has been correspondingly vague, and often promulgated without serious feasibility testing. Any decent professional standards of adequacy must contribute to solving the analytic problem of SIA. At a minimum this means the problem of knowledge must be seen as a whole and be seen in context. Holistically, the analytic problem is one of mutual causal relations, with social factors standing as causes as well as effects. It is highly interactive, in the sense that responsiveness to change becomes a causal factor in tracing out higher-order consequences. Contextually, SIA can be said to occur on levels of policy, program and project impact. Analysis proper to one is frequently misdirected towards another, although the three are (or ought to be) closely interrelated. A good example of this is the case of Locks & Dam 26, where what was really at issue was a question of national transportation policy--not a local replacement project whose local effects were practically negligible.

If the analytic situation of SIA is fraught with complexity, however, counsels of perfection--perfect knowledge, perfect consensus, and so on--are definitely misplaced. If SIA is to become an operational planning methodology it must be made workable. An incremental strategy of inquiry is perhaps the only one

supportable at present levels of study effort. The implication of this is that substantial basic research is required outside the operational context of mission-oriented agencies such as the Corps. Orders of magnitude improvements in the state of the art are required for developing the methodology of SIA. Presently we have arrived at a stage of methodological inventorying; beyond that lie codification and translation to actual user needs. Systematic work on these lines is barely discernible, even to the extent of fully assimilating methodological developments in causal modeling, social indicators, cross-impact analysis, etc. already extant. Equally, the problem of science-building in this area implies the cumulation of social science knowledge, its fast retrieval and flexible deployment. The intellectual and institutional apparatus to support these operations are nowhere in existence.

A subset of the analytic problem of SIA may be termed the "predictive problem." Unlike evaluation research, which gauges the effect of functioning programs, the analytic requirement for SIA is anticipatory research. Its purpose is to predict and evaluate the social effects of a policy, program or project while it is still in the planning stage before those effects have occurred. In reference to public planning, the trick is to make decisions that will look good in 50 or 100 years, allowing for shifts in the evaluative criteria by which those decisions will be adjudged. Hence the prediction of value change is an integral part of SIA and the relevance of futures research should be obvious.

5. The problem of integration. If the problem of social knowledge SIA must address is practically coextensive with that of social science as a whole, its true proportions can be grasped only in conjunction with those of economic and environmental impact assessment. Together, they comprise a generic "effect--assessment" process in which questions of resource conservation and development, environmental preservation and enhancement, and social progress and equity must be balanced. The methodological integration of effect assessment--economic, social and environmental --is a fundamental "state of the art" problem both for academic social science and pragmatic societal guidance..

Here is an analytic problem of fundamental importance to a number of disciplines and professions, one which expresses an urgent "need to know" on the part of operating agencies as well. It involves a generalization of economic analysis to internalize the "externalities" of social cost by means of marginal utility theory, input-output modeling and benefit-cost analysis. At the most general level, it implies a solution to the long-standing quest for a general welfare function. It involves a broadening of environmental impact assessment methodologies to encompass significant features of the human environment. It further involves application of decision theory in an effort to "compare incommensurables" within a framework of multiobjective planning. It calls for a "socialization" of the methodology of technology assessment and for the methodological integration of all these in a general planning methodology.

Foremost among the methodological innovations required is a unified analytic framework for coming interdisciplinary approaches and a comprehensive accounting scheme for "comparing incommensurables." Attempts at extending the present boundaries of benefit-cost analysis or enlarging a PPBS framework have grossly underachieved these aims. While the ultimate solution will approximate the general utility function long sought by welfare economists, some partial solutions appear possible in the generalization of input-output modeling, in decision theoretic applications such as multiple-attribute utility theory (MAUT), in energetics and elsewhere. SIA must actively participate in these methodological approaches, whereas today we find it thoroughly submerged in hyphenated appendices that are vastly more economic and environmental than "socio-."

6. The system problem. Just as SIA does not subsist in an intellectual vacuum, neither does it reside in a social one. The "environment" of SIA is densely populated by actors in a maze of overlapping and intersecting systems: the Congressional system, the agency system, the legal system, the professional system, the consulting system and the planning system, to mention only the most prominent among them. The basic question here is how to institute the "SIA system" as a working part in this total systemic context.

For example, a frequent complaint is that SIA is mainly a rationalization for project justification after key planning decisions have been already made. To counteract this unfortunate tendency, so the argument runs, SIA must be moved forward in the planning process so as to influence problem identification and the formulation of alternative plans. Conversely, at the end of the planning process the need is for validation studies of social predictions and for reassessments of social impact situations that continue to change as longer-run and higher-order effects are experienced. The logical conclusion to the SIA process would be a system of continuous monitoring as a permanent fixture in long-range comprehensive planning information systems.

Along with the institutionalization of SIA in the planning process goes a related question of professionalization. Acquiring competence in SIA means some reorientation of professional attitudes towards applied social science and personal adjustments to work situations and working conditions that are far from professionally ideal. The typical SIA study is one of short duration, meager funding and low priority. A "conscientious withdrawal of efficiency" (as Veblen phrased it) would not be surprising under the circumstances and has occurred in some instances, leaving open the question of who, if not reputable professionals, will perform these needed studies. One distressing answer is subprofessionals, and indeed there is some evidence for staffing being done on these depressed levels. Sociological technicians can play a vital supporting role in assessment team activities, but hardly the lead.

Not only do professional attitudes need adjusting to the reality situation of SIA; that situation must itself be adjusted towards accommodating more fully professional standards of competence and excellence. The overriding standard of SIA practice should be no different--and no less--than in comparable assessments of economic and environmental impacts. Nothing less should be asked; nothing less will suffice.

I have directed my remarks towards clarifying the general situation affecting SIA as regards goal structures and research settings in the belief that getting the right answers depends crucially on getting the questions right. If any single conclusion emerges, it is that the problem of SIA must be engaged on a broad front and in concert with others in the planning situation. Solving the analytic problem of SIA entails the creation of a social process as well as the generation of analytic systems. A major reason why the problem of knowledge remains intractable is that we have scarcely begun working through this process. More generally, the Federal interest in SIA has been faint and the Federal investment, slight. On this research topic as on others, a system of "research-by-objectives" seems imperative. It implies, among other things, the fuller institutionalization of SIA in scientific research and professional practice. If we concede a clear and present "need to know" in this area, then it follows we require a heavier concentration of resources and a higher density of activity to solve the analytic problem of SIA.

## ENVIRONMENTAL IMPACT ASSESSMENT

Without question, the major impetus to SIA has been passage of the National Environmental Policy Act of 1969 (NEPA). As practiced to date, environmental impact assessment under NEPA has slighted a critical "human" dimension. The following pages explore possibilities for "socializing" this vital center of SIA.

### The Humanistic Coefficient

Environmental impact assessment is nothing if it is not an effort to engage the human--that is, social--consequences of environmental modifications. Those consequences are themselves the products of actions by human agents. As Harvey (1972: 325) observes, "The sensibilities of mankind cannot remain permanently immune from the environmental changes man is bringing about through his own actions. It is, therefore, salutary to remind ourselves occasionally that 'the long-range question' is not so much what sort of environment we want, but what sort of man we want."<sup>1</sup> That social impacts are what are really at stake in environmental impact assessment is cogently argued by Pattison (1974: 4):

Any assessment of environmental impact--to be meaningful--must necessarily be built upon assumptions as to public attitudes as well as on technical findings. Our benchmarks for clean air, clean water, or clean streets have less to do with a definable "degree above zero" than with what various members of the public consider acceptable or attainable. No matter how accurately the probability and magnitude of, say, certain fish kills are quantified, the impact of such kills is essentially subjective, loaded with emotional factors not amenable to cost-value analysis. It is the impact of a particular set of findings or predictions on the minds of men--not the impact of the pollutant on the environment per se--that is our key unknown.

Thus it would appear that those responsible for environmental impact studies really should begin with attitude measurement in the affected communities. This might well call for a scientific opinion profile of a representative sample of citizenry to determine their levels of concern for changes in the environment, good or bad, from the standpoints of health, economics, recreation and aesthetics.

Only with such a public opinion study at hand can the significant impact of probable environmental changes be forecast. . . . Without such an analysis to set a baseline for an impact study, the findings of scientists and engineers will never satisfy the ecologists, the anti-ecologists, or the folks who pay the bills.

<sup>1</sup>The quote is from Robert Sommer. Similarly, The New York Times of 17 April 1972 quotes a congressman, "I like wildlife and fish life and animal life, but mainly the environment exists for human life, and we are improving the environment for human life."

The social definition of environmental quality underscores a reciprocity of human environment and human experience. It is the social environment which is our experience, and expression. Environment is the carrier of human value; it is shaped to human purpose. "Environmental quality" must therefore resolve to "quality of the human environment." Correspondingly, the aim and achievement of environmental planning and management must be to enlarge and enhance the quality of life. A good deal of the intellectual work required of social scientists at this point is to effectively formulate these "quality of life" criteria and to accurately gauge their indicators. Both are needed, to deepen conceptual meaning and refine operational measurement. NEPA affords the operational context, in which this social knowledge and social research can make a positive connection. The environmental impact assessment process it establishes is a powerful social technology for regulating the human causes and consequences of environmental modification.

### The Social Orientation of NEPA

The social orientation of NEPA is found in its stated purpose to "encourage productive and enjoyable harmony between man and his environment and stimulate the health and welfare of man. . . ." NEPA further recognizes "the profound impact of man's activity on the interrelations of all components of the natural environments" and prescribes the use of "all practicable means and measures . . . to create and maintain conditions under which man and nature can exist in productive harmony and fulfill the social, economic and other requirements of present and future generations of Americans." The means and measures cited, including those "which will insure that presently unquantified environmental amenities and values may be given appropriate consideration," entail an interdisciplinary approach "to insure the integrated use of natural and social sciences . . . in decision-making which may have an impact on man's environment." While distinctively "social" impacts have tended to be implicit, indirect, and qualitative under these provisions, recent administrative regulations and legal interpretations have broadened and deepened the social concerns admissible and the social content required under NEPA (Savatsky 1974; Francis 1974). Three main provisions in NEPA seem especially pertinent to socially oriented impact assessment: (1) designation of the "human environment," (2) "interdisciplinary approaches" and (3) "indirect effects."

(1) A broadened concept of "environment" which encompasses its human dimension enters into official definitions, e.g. "The environment in this case includes both the natural environment and the social and economic environment" (Department of Agriculture 1973: 31937). More broadly still, "Environment is not defined in NEPA or in the CEQ Guidelines. However, it is clear from Section 102 to the Act and elsewhere that the term is meant to be interpreted broadly to include physical, social, cultural, and aesthetic dimensions."

<sup>1</sup> (Department of Housing and Urban Development 1973: 19183). "Examples of environmental considerations are: air and water quality, erosion control, natural hazards, land use planning, site selection and design, subdivision development, conservation of flora and fauna, urban congestion, overcrowding, displacement and relocation resulting from public or private action or natural disaster, noise pollution, urban blight, code violations and building abandonment, urban sprawl, urban growth policy, preservation of cultural resources, including properties on the National Register of Historic Places, urban design and the quality of the built environment, the impact of the environment on people and their activities."

The Department of Housing and Urban Development (1973: 19183) outlines "existing social environment" in these categories:

- a. Community facilities and services. Description (general description, location, responsible body, relation of capacity to existing demand) of school, park, recreational and cultural, police and fire and health facilities servicing the site and area.
- b. Employment centers and commercial facilities servicing the site and area.
- c. Character of community. Socioeconomic and racial characteristics.
- d. Other. Not included in above categories.

(2) For the first time, NEPA has provided an effective means for enforcing standards of environmental quality across traditional boundaries of political jurisdiction, agency operation and disciplinary affiliation. But increasingly, Federal enactments and agency procedures call for the assessment of the economic, social and environmental impacts of public policies, programs and projects. This overall "effect assessment" process is intended to make possible the rational choice among means for achieving multiple goals. It is aimed at creating an analytic framework of comprehensive and multiobjective planning. As in NEPA, interdisciplinary collaboration between natural and social scientists is implied as a condition for performing this operation. The methodological integration of assessment procedures is a major challenge to economists, social scientists and environmentalists alike.

(3) A further point of entry for social impact assessment concerns the assessment of "indirect" or "secondary impacts." "Primary impacts" are defined as "those that can be attributed directly to the proposed action" (Environmental Protection Agency 1975: 27). CEQ guidelines (1972: 12) require that "Secondary or indirect, as well as primary or direct, consequences for the environment should be included in the analysis."

Many major Federal actions, in particular those that involve the construction or licensing of infrastructure investments (e.g., highways, airports, sewer systems, water resource projects, etc.), stimulate or induce secondary effects in the form of associated investments and changed patterns of social and economic activities, or through changes in natural conditions, may often be even more substantial than the primary effects of the original action itself. For example, the effects of the proposed action on population and growth may be among the more significant secondary effects. Such population and growth impacts should be estimated if expected to be significant . . . and an assessment made of the effect of any possible changes in population patterns or growth upon the resource base, including land use, water, and public services, of the area in question.

Similarly, EPA (1975: 27) defines "secondary impacts" as indirect or induced changes; "If the action involves the construction of a facility, the secondary impacts would include the environmental impacts related to: (i) induced changes in the pattern of land use, population density and related effects on air and water quality or other natural resources; (ii) increased growth at a faster rate than planning for or above the total level planned by the existing community." While the secondary impacts are referred to as environmental impacts incident to changes in land use, population density and growth, usually they are construed as socioeconomic effects (e.g. Soil Conservation Service 1973: 31913).

For example, DOA (1973: 31926) prescribes that "the implications, if any, of the action on population distribution or concentration should be objectively estimated and an assessment made of the probable effects of such changes in population patterns upon the resource bases, including land use, and public services of the area in question. Include also, economic impacts on employment, unemployment, changes in local culture, social and other economic factors."

#### Social Impact Assessment under NEPA

We have seen that there is some kind of charter, if not an outright "mandate," under NEPA to examine and anticipate social impacts. Occasionally this is embodied in agency regulations, e.g. "Identify, analyze, and discuss the full range of social, physical, and biological factors which change as a result of direct or indirect effects of the proposal" (Department of Agriculture 1973: 31926); "Both long- and short-range implications of proposed action to man, his physical and social surroundings, and to nature are to be evaluated . . . the degree of public interest, potential controversy, urban or rural setting, and economic and social impacts should be assessed" (Soil Conservation Service 1973: 31910, 31912); "The environmental impact statement process should be used to explore alternative actions that will avoid or minimize adverse impacts and to evaluate both the long and short term implications to man, his physical and social surroundings and to nature" (Department of Transportation 1973: 30216).. The latter spells out social impact assessment in some considerable detail (pp. 30224-25):

Impacts of the proposed action on the human environment involving community disruption and relocation. (1) The statement should include a description of probable impact sufficient to enable an understanding of the extent of the environmental and social impact of the project alternatives and to consider whether relocation problems can be properly handled. This would include the following information obtainable by visual inspection of the proposed affected area and from secondary sources and community sources when available.

(a) An estimate of the households to be displaced including the family characteristics (e.g., minorities and income levels, tenure, the elderly, large families).

(b) Impact on the human environment of an action which divides or disrupts an established community, including, where pertinent, the effect of displacement on types of families and individuals affected, effect of streets cut off, separation of residences from community facilities, separation of residential areas.

(c) Impact on the neighborhood and housing to which relocation is likely to take place (e.g., lack of sufficient housing for large families, doubling up).

(d) An estimate of the businesses to be displaced, and the general effect of business dislocation on the economy of the community.

(e) A definition of relocation housing in the area and the ability to provide adequate relocation housing for the types of families to be displaced.

Other social impacts. The general social groups specially benefitted or harmed by the proposed action should be identified in the statement, including the following:

(1) Particular effects of a proposal on the elderly, handicapped, non-drivers, transit dependent, or minorities should be described to the extent reasonably practicable.

(2) How the proposal will facilitate or inhibit their access to jobs, educational facilities, religious institutions, health and welfare services, recreational facilities, social and cultural facilities, pedestrian movement facilities, and public transit services.

Judicial reviews have developed some legal precedent for considering social impact assessment under NEPA. *Chelsea Neighborhood Associations v. U. S. Postal Service* (7 ERC 1707) found NEPA not satisfied by an EIS on a proposed Vehicle Maintenance Facility that did not adequately consider housing aspects. *Tierrasanta Community Council v. Richardson* (6 ERC 1065) considered the EIS "did not adequately consider the psychological and sociological effects of the proposed youth facility on families residing in the community adjoining the proposed facility, surrounding property values, the character of the adjoining residential neighborhoods, or the education of elementary school children attending a school adjacent to the facility."

The ecological effect of the proposed federal youth facility in the Elliott Community is not significant, but the effect of a youth facility on the human environment in a planned residential area in close proximity to a proposed elementary school site is so significant that an agency decision to the contrary is so questionable as to render it arbitrary and capricious.

In *Scherr v. Volpe* (4 ERC 1435) it is held that "Through the enactment of these procedural requirements the Congress has not only permitted but has compelled the responsible federal agencies to take environmental values into account. . . . Not only must the environmental consequences of a particular action be considered, but Section 102 requires also that these consequences be weighed and balanced against other considerations, such as financial or social, which may be involved." *Hanley v. Mitchell* (4 ERC 1152) and *Lathan v. Volpe* (4 ERC 1487) both required demographic effects be assessed where the proposed project could reasonably be projected to impact significantly on local populations. On the other hand, *Life of the Land v. Brinegar* found no parallel in plaintiffs' claim that runway extension would cause an increase in tourists becoming permanent residents detrimental to the "quality of life" in Honolulu, and in *Nucleus of Chicago Homeowners v. Lynn* (6 ERC 1094) Justice Hoffman turned back residents' efforts to prevent the construction of low income housing in their neighborhood with the observation that

Prognosticating human behavior and analyzing its consequences on the environment is an especially difficult, if not impossible task. Sociology, a discipline attempting such prediction, has not yet attained the stage of an exact science. By its very nature, it relies upon general conclusions drawn from average propositions based on sample data. The different expert conclusions that may be drawn from the same data is evident not only in the evidence before this court, but in the literature of the social sciences. As such, these conclusions are not very persuasive in a court of law.

More specifically,

It is the court's conclusion that the evidence does not support the proposition that prospective tenants of public housing will significantly affect the environment. The evidence does not support the allegation in the complaint of differing socio-economic characteristics of the plaintiffs as contrasted with prospective tenants of public housing. There is no evidence to support the plaintiffs' allegations that prospective tenants of public housing are more likely to engage in anti-social conduct than present community residents. Indeed, there is little, if any, evidence of the social characteristics of the individual plaintiffs, none having testified. Thus the proposed construction of the housing units will not significantly affect the environment and the defendants' action in filing a negative impact statement was not in violation of the National Environmental Protection (sic) Act.

As to the actual social science content of EISs, Friesema and Culhane (1974: 4-5) make the following points:

1. The most likely social impacts to be discussed in any EIS are the economic benefits to be derived from the project, or a calculation of demand or need for such a project. The modal economic "justification" is an unelaborated statement that the project or proposal will lead to some kind of increased economic activity; since the statement is unelaborated, one can often infer that the statement represents an assumption, rather than the result of rational evaluation.

Needless to say, we view calculations concerning social impacts which are presented without reference to the ways in which they were derived, as being of little use.

2. Of course, for most of the social impacts which are identified in environmental impact statements, there is no real calculation of impact to either use or attack.
3. While impact statements will occasionally discuss and propose ameliorative or mitigative strategies to reduce the negative impacts upon wildlife, parkland, air and water quality, or aesthetics, which would otherwise accompany a project, we know of virtually no detailed plan or programs, considered in EIS's, to ameliorate or mitigate the negative social impacts which may accompany a project.
4. The analysis of social impacts in EIS's is likely to be devoid of recognizable theory. Nor is there, in our experience, any reasonable review of the social science literature applicable to anticipating the impacts of a project.
5. There is usually little, if any, primary social research conducted in preparing EIS's on programs where major social impacts are likely. In contrast, it is common to find natural science studies reported in EIS's which were conducted in preparing the EIS, or were directly related to the proposal or project.

6. Certain important social impacts of major federal actions are largely taboo subjects for public documents such as EIS's, even though they may be important considerations in agency decision-making. These would include certain political considerations, and often any measures of differential social impacts among status, class or cultural groups.
7. All the social science which appears in an EIS is marshalled as project justification, as if the EIS were an advocacy statement, and operates within the basic assumption that the project (or a very similar, acceptable alternative) is surely desirable.

They conclude, "in view of the wide and expanding range of 'major federal actions' for which environmental impact statements are prepared, which seem likely to have significant social impacts, the social consequences which are actually considered and discussed in EIS's are very limited and narrow" (p. 4). In accounting for this paucity of social science content, Friesema and Culhane (1974: 6) advance four reasons:

1. The EIS process, by law and common understanding, gives higher weight to impacts on air, water, land, and ecological systems than to social impacts. The emphasis is, and will continue to be upon evaluating impacts on the natural environment. While some of us may look wishfully at the statutory language discussing the "human environment," the CEQ guidelines, agency regulations implementing NEPA, and the settled law of NEPA suggest that evaluations of social impacts are likely to continue to be add-ons in the EIS process.
2. The background and inclination of agency decision-makers, their staffs, agency EIS writers, and even the consultant groups are not in the social sciences, but in the natural sciences. These people are frequently unaware and unappreciative of systematic social science.
3. Agencies value and need to preserve myths that their activities serve an undifferentiated public interest. Thus it would be pure political dynamite for them to publicly debate the merits of providing some positive values to some groups, at the expense of other groups. We can anticipate that many of the most consequential social impacts of major government actions will continue to be undefined or only fuzzily alluded to, in EIS's.
4. For many of the anticipated social impacts of major projects, there are serious epistemological or other research complexities which make it difficult or impossible for social scientists to give very precise or useable predictions of social consequences.

#### The Methodology of Social Impact Assessment

This last point leads directly to the chief impediment to instituting and implementing a systematic procedure of social impact assessment: operational methodology. Social impacts might be more heavily weighted, agency personnel less grudging and more responsive to differential impact assessment were social

scientists more dexterous and adept in practicing the art of social impact assessment. While it is problematic as to what is cause and what effect (just as in the analytic situation of SIA itself), that seems a reasonable hypothesis for working toward the desired result. At the same time, generalization of existing assessment methodologies for economic and environmental impacts can greatly facilitate the "state of the art" improvements needed. While results to date have been meager,<sup>1</sup> some lines of methodological development such as input-output modeling (Isard and others 1969) appear to hold promise. Mainly though it will be a matter of self-help, and here again some appreciable progress can be noted (Finsterbusch and Wolf 1976). In any case the overriding criterion must be the level of scientific quality expected and demanded on the environmental side of EIS preparation. Nothing less should be asked; nothing less will suffice.

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<sup>1</sup>For a representative sampling of environmental impact assessment methodologies see Warner and Preston (1974). A disappointing attempt to generalize on EES (Environmental Evaluation System) methodology (Dee and others 1973) is reported in Baker, Dee and Finley (1974).

## References

- Baker, Janet K., Norbert Dee and James R. Finley  
 1974 "Measuring impacts of water resource developments on the human environment," Water Resources Bulletin, 10, 1 (February), 10-21.
- Council on Environmental Quality  
 1975 "Guidelines on preparation of environmental impact statements," Environment Reporter, Supplement 250 (9 May), 9-21.
- Dee, Norbert and others  
 1973 "An environmental evaluation system for water resources planning," Water Resources Research, 9, 3 (June), 523-35.
- Department of Agriculture  
 1973 "Environmental statements: proposed guidelines for preparation" (Forest Service), Federal Register, 38, 222 (19 November), 31922-38.
- Department of Housing and Urban Development  
 1973 "Protection and enhancement of environmental quality: procedures," Federal Register, 38, 137 (18 July), 19182-94.
- Department of Transportation  
 1973 "Procedures for considering environmental impacts," Federal Register, 38, 210 (1 November), 30215-30.
- Environmental Protection Agency  
 1975 "Environmental Protection Agency regulations on preparation of environmental impact statements," Environment Reporter, Supplement 250 (9 May), 23-35.
- Finsterbusch, Kurt and C. P. Wolf (eds.).  
 1976 The Methodology of Social Impact Assessment. Stroudsbury, PA: Dowden, Hutchinson and Ross.
- Francis, Mark  
 1974 "The Environmental Policy Act and the urban environment: toward socially oriented impact statements," pp. 49-58 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, WI: Environmental Design Research Association.
- Friesema, H. Paul and Paul J. Culhane  
 1974 "The environmental impact statement process: technical assessment or political advocacy." Paper presented at the 1974 Annual Meeting of the Society for the Study of Social Problems, Montreal, P.Q., 25 August.
- Isard, Walter and others  
 1969 "On the linkage of socioeconomic and ecologic systems," Ekistics, 28, 164 (July), 28-34.
- Harvey, D.  
 1972 "Social processes, spatial form and the redistribution of real income in an urban system," pp. 296-337 in Murray Steward (ed.), The City: Problems of Planning. Baltimore, MD: Penguin.

Pattison, E. Scott

1974 "The key ecological unknown," *Technology Review*, 76, 3 (January), 4.

Savatsky, Pamela Dee

1974 "A legal rationale for the sociologist's role in researching social impacts," pp. 45-47 in C. P. Wolf (ed.), *Social Impact Assessment*. Milwaukee, WI: Environmental Design Research Association.

Soil Conservation Service

1973 "Preparation of environmental impact statements: proposed guidelines," *Federal Register*, 38, 222 (19 November), 31909-21.

Warner, Maurice L. and Edward H. Preston

1974 "A review of environmental impact assessment methodologies." EPA-600/5-74-002. Washington, DC: Office of Research and Development, U. S. Environmental Protection Agency, April.

## NEPA, Sociologists and Succession: A Position Paper

by

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The Ad Hoc Committee on Environmental Sociology, like the rest of our profession (and even most of the rest of our species) has permitted itself to remain myopic in its response to the situation now confronting humanity. Yet it is from this situation that our mandate arose.

The mandate of this committee was stated in a resolution passed by the 1973 S.A. business meeting and subsequently approved by the Council. It was conveyed to us in the Executive Officer's letter inviting us to serve as committee members. We were instructed "to develop guidelines for sociological contributions to environmental impact statements."

Environmental impact statements are required by law to be included in "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment..." In all our correspondence and discussions to date, it seems to me we as a committee have overlooked the very issue that would tend to generate the most fundamental guideline of all. In Part I of this paper I mean to show why we must question the connotations of the word "impact" as used in the National Environmental Policy Act of 1969 (NEPA) and in discussions, documents, and actions consequent thereto. In Part II, I will go on to show what can be learned from examining the most valiant effort so far made by many governments to curb manmade environmental change. Finally, in Part III, I will suggest the nature of the distinctively sociological inputs called for by these considerations.

#### I. Succession: Reaction Rather Than Impact

According to my dictionary, the noun "impact" is defined as "1. a striking together; violent contact; collision. 2. the force of a collision; shock." According to my pocket thesaurus, the word "impact" is associated with such approximate synonyms as "clash, collision, encounter, shock, brunt, crash, bump," and with "charge, onset; percussion, concussion." In neither reference source does there appear to be any connotation of sustained, long-term, indirect, ramified, latent, incipient or insidious effect.

Thus, by acquiescing in the use of the word "impact", this committee seems to have joined the authors of NEPA in assuming (presumably no less unwittingly than uncritically) that the environmental and social side-effects of purposive federal projects are inherently short-term and direct. Moreover, we have implicitly accepted the unstated premise that the "impact" of a proposed project or policy can be assessed by reference to particularized environmental contexts and segments of our society, without regard for global trends or the comprehensive situation of our species now and tomorrow.

Instead, I submit, the beginning of wisdom in the modern world consists of recognition that a human-dominated biosphere is inexorably undergoing a process of global succession. Actions and public policies whose unwanted

side-effects would have been negligible in the context of low density population using nineteenth century technology have lost their disregardability precisely because the density of population and the power of technology have increased so much.

"Succession" is a word that has been used too superficially in sociological literature. An essential component of succession is the effect of organisms upon their habitat; ecologists call this effect "reaction" (Clements, 1916: 79-80). Sociologists misconstrued the concept of reaction right from the start; e.g., Burgess (1928: 112) wrongly took the word to mean resistance to invasion. What ecologists mean by this term is more nearly what we should have had in mind when we got into the unfortunate habit of referring to environmental side-effects of human actions by the inadequate label "impact." Reaction refers to the fact that any population of organisms inevitably produces changes in its habitat by the very process of using it. This modifying effect of organisms upon habitat, unless offset by opposite reactions from other kinds of organisms, must eventually diminish the habitat's carrying capacity for the particular species or association producing the change. Reaction is not only unintentional, it is cumulative. It may be gradual and synergistic. "Impact" connotes none of these attributes.

The significance of reaction as a component process in succession can be understood by contrasting succession with its absence. Succession is absent from a "climax community" (Kormondy, 1969: 158-9). A climax community comprises a combination of species that can successfully outcompete any alternative combination that might otherwise exist in its place. A climax community can only exist when the assortment of niches within the community is such that the environmental effects of their occupants are mutually complementary and the population in each niche is kept stable as a result of influences upon each population by other populations in the other niches. The climax community is an integrated and self-perpetuating community, equilibrated in various ways. In it, for example, the organic fixation of carbon by photosynthesis (what ecologists mean by "production") is in balance with the return of oxidized carbon to the atmosphere by "respiration."

Most communities are not climax communities. They undergo continual change wherein one species is progressively replaced by another. Even more emphatically, most human communities (at least in the modern world) cannot be climax communities. Certainly in modern urban-industrial societies photosynthetic production does not match total respiration (augmented by combustion of fossil fuels). As a creator and user of technology, man's efforts to do the very things for which his species has special aptitudes have the inescapable effect of fostering this imbalance. Human ascendancy thus undermines itself.

But dominance has been self-terminating in various associations of non-human species, too. NEPA has made reaction (alias "impact") seem more unprecedented and strictly human than it really is. An orderly and directional process of community transformation results from modification of the habitat by the biotic community that exists in it at a given time. As the habitat changes, the association of plants and animals it will support must change. Succession is the process of change from one community type to another, and some sociologists have recognized it as such (Park, 1936; Park and Burgess, 1921: 554; Mukerjee, 1932).

A minimal form of succession happens when a more effectively adapted species replaces a competitor that is less effectively adapted to the same niche. A more drastic form of succession happens when, as a habitat undergoes change due to its use by its occupants it becomes less suitable for some types of organisms that once prospered in it, and they are progressively replaced by other types better adapted to the changed conditions wrought by their predecessors.

Sociologists have neglected the more drastic form of succession. Insofar as the interests of sociologists have turned toward processes they have labeled succession, their concern has been for such examples as the displacement of one ethnic group by another in some neighborhood of a city or in an occupational stratum (Cressey, 1938; Hollingshead, 1938; Lind, 1938). Important as the social repercussions may be, and traumatic as the experience may be for some of the individuals involved in the process, this represents the minor form of succession. The more comprehensive form is a process that can now be recognized in human experience on a global scale, as, for example, supertanker traffic is helping destroy the world's fisheries.

The entire sequence of community types characteristic of a given site is what ecologists call a "sere", and the developmental steps in this process of community succession are "seral stages" (Odum, 1971: 251). The key idea involving this cluster of concepts is that most biotic communities are subject to change because they do change the characteristics of their own environments. Succession is a very common (and virtually inescapable) ecological process. It happens to human communities as well as to animal communities and plant communities (Clements, 1916: 3).

Man has imagined himself to be more unlike other mammals than he really is. In the twentieth century, man's response to his own increasing numbers closely paralleled the response patterns typical of other mammal species (Russell and Russell, 1968). Mankind is part of the animal kingdom. The human species is as dependent as the rest of the animal kingdom upon the plant kingdom (Sears, 1957). As human numbers have increased, an increasing fraction of the plant kingdom's total productivity has been diverted from feeding other animals to feeding man or the animals man uses. One ecologist has estimated this fraction as one-eighth of the net production of all the world's land areas, and this does not include man's use of vegetable fibers, timber, etc. (Odum, 1971: 55). Thus, with only three more doublings of his numbers, man and his domestic animals would be consuming everything else that grows on all the continents and all the islands of the world, and eating it all just as fast as it could be grown and harvested.

Since man began to shift from hunting and gathering to agriculture, some 10,000 years ago, he has appreciably altered the structure of the worldwide web of life. He has tremendously increased the fraction of that web that consists of human flesh, and the fraction of it that consists of other organisms he consumes. In only about 400 human generations -- a short time in an evolutionary perspective -- the human population has doubled nine or ten times. Nine doublings amounts to a huge increase, for  $2^9 = 512$ . Since the dawn of agriculture, the world's human population has thus increased at least five-hundredfold and possibly a thousandfold. Together with enormous technological progress such growth in human numbers implies immensely magnified power of human activities to produce additional changes in the Biosphere and its geochemical substrate.

Worldwide, as human numbers continue to increase, the effort to divert to human use still larger fractions of the annual produce of photosynthesis becomes more and more unavoidable. Yet, obviously, the least difficult diversions must generally have been the first to be achieved. So, as the fraction already diverted to human use becomes larger, the difficulty of diverting still more to human use becomes greater, and reaction upon the environment becomes more severe.

From the early nineteenth century onwards, new tools and new techniques gave man increased power to outcompete other members of the animal kingdom in consuming the products of the plant kingdom's life processes. Accordingly, human numbers increased more rapidly than ever; two of those nine or ten doublings during the 100 centuries since the dawn of agriculture occurred in the one and a half centuries since mechanized agriculture began becoming the dominant mode of sustenance production.

Notable events of the twentieth century have simply accelerated a fate that began to overtake mankind about eight centuries ago. It was about that long ago that our species commenced using any appreciable quantity of fossil fuel (stored left-overs from photosynthesis in the Carboniferous era). The postwar population explosion and the explosive increase of technology have been only the most recent means of that acceleration. We all naively welcomed the technology, oblivious of its reactive effects, and when the term "population explosion" became common, it was too often taken to signify only a short-term occurrence, merely a bothersome part of the legacy of World War II. It is important to recognize that the exponential increase of human numbers was not nearly that recent. The increase in the world's human population by five-hundredfold (or more) since Neolithic times has foreclosed many options. Preoccupation with just the most recent doubling of world population tends to obscure the fact that even if a growth rate of zero were somehow achieved soon, the planet is already inhabited by many more people than it was able to support in its pre-manmade condition.

Until about eight hundred years ago, human communities had relied almost entirely on organic sources of energy -- plant fuels and animal muscle power -- supplemented very modestly by the energy of moving air and flowing water (Hubbert, 1969: 158). All of these energy sources were self-renewing. Man was thus living within the earth's current income of solar energy -- not from wisdom but from ignorance of the buried treasure yet to be discovered. His activities were almost entirely fueled by a small part of the organic materials produced each growing season. These materials absorbed by photosynthesis only a small fraction of the unending inflow of solar energy.

When the buried treasure began to be found (and its utility recognized), man committed himself to the fatal error of supposing that his life could thenceforth be lived on a scale and at a pace commensurate with the rate at which treasure was discovered and unearthed. No regard for its total quantity, or for the rate at which natural processes might be replenishing it, seemed necessary.

Shortsighted *Homo sapiens* took no notice of the fact that in building lifestyles based on combustion of coal (and later petroleum) he was beginning to live on the earth's savings deposits. By withdrawing these savings he could live; for

a while, on a grander scale. The rate of withdrawal was misperceived as a rise in income. This abysmal misunderstanding of what was actually being done was epitomized by a legal anomaly, the oil depletion allowance. This venerable loophole in the corporate income tax laws of the United States permitted so-called oil "producers" to offset their taxable revenues by a generous percentage on the pretext that their earnings reflected depletion of "their" crude oil reserves. The tax write-off was rationalized as an incentive to "production," but it was equivalent to paying someone interest on the rate of withdrawal of savings rather than on the principal left in the bank.

Nature's deposits were vast, but not inexhaustible. As man developed the technology that increased his ability to withdraw and spend those savings, he increased dramatically the quantity of energy per capita per year available to do useful tasks. Eventually this increase led to reduced manpower requirements in agriculture. It also led to the development of many new occupational niches for increasingly diversified human beings (Cottrell, 1955: 148-64). The new niches depend on continuing to withdraw and spend the earth's savings. When the withdrawable savings are gone, the niches will inevitably collapse. The social ramifications of the partial collapse that is already resulting from depletion of the most readily withdrawable deposits are unpleasant to contemplate. But it should be the business of this committee to point out that the Great Depression was a mild preview.

One thing that kept mankind from seeing all this, and enabled our species to rush exuberantly into occupying niches that had to be temporary, was our ability to give ideological legitimation to occupations that made no sense ecologically. In America, under both major political parties, the military-industrial complex helped obscure the fact that population was expanding to fill niches that could not be permanent because they were founded upon the use of prehistoric (and exhaustible) ghost acreage (Borgstrom, 1965; Catton, 1974). As temporary niches proliferated, population increased to fill them. As population grew, the rate of withdrawal of savings also grew. Moreover, the growing technology gave man increased access to other deposits -- mineral materials as well as stored energy. These offered enormous (but again temporary) advantages over organic (and thus renewable) materials.

If we are to understand what is now happening to us and to the world, we must learn to see that process as a crescendo of human prodigality. The human family, even if it were soon to stop growing, has committed itself to living beyond its means (Borgstrom, 1969). As long as the savings have held out, we have really been able to live it up! But the higher the rate of expenditure to which we have accustomed ourselves, the sterner the readjustment resource depletion will require.

Misled by the temporary advantages of prodigality, we allowed the human family to multiply so much that by now just three more doublings (about what Britain has already experienced in the short time since Malthus) would mean that all the net photosynthetic production on all the continents and all the islands on earth would have to be used for supporting the human community -- whose members would still be living at an abjectly "underdeveloped" level. Such total exploitation of an ecosystem by one dominant species has probably never happened, and is almost surely not possible. For Homo sapiens, it seems doubtful that we can safely divert very much more than the already unprecedented fraction of total photosynthesis to our uses.

It should thus be apparent that today's age of overpopulation is more than just the unfortunate aftermath of a memorable age of exuberant expansion into a New World. It is, much more importantly, the ominous prelude to a monumental collapse. Nature must, in the not far distant future, institute bankruptcy proceedings against prodigal Homo sapiens. The imminence of that show-down really was why the United States Congress had to enact legislation such as NEPA. The national policy declared by that law was meant to begin the process of preventing this nation's portion of the only earth we have from being rendered uninhabitable by its human passengers. Its purpose was no less than the arresting of global succession, even if it was rarely understood in such terms. The guidelines formulated by this committee will be of little significance if they fail to point this out.

Mankind's excess numbers and ravenous technology have already brought us to an ecological impasse. But man is not the first species to undergo resource bankruptcy. When yeast cells are introduced into a wine vat, for example, they find their "New World" -- the moist, sugar-laden fruit mash -- abundantly endowed with the resources they need for exuberant growth. But as their population responds to this magnificent circumstances by an "irruption" or "bloom" (population explosion), the accumulation of their own fermentation products makes life increasingly difficult (and miserable, if we permit ourselves to think of their plight anthropomorphically). Eventually, they all die (and, to be anthropomorphic again, the coroner's reports would have to attribute this "crash" or "die-off" to self-made "pollution").

Nature treated European man as man treats the yeast cells, by endowing our New World with abundant but exhaustible resources. Man responded to this circumstance as the yeast cells respond to the conditions in the wine vat. When the earth's deposits of fossil fuels and mineral resources were being laid down, Homo sapiens had not yet been prepared by evolution to take advantage of them. As soon as technology made it possible for mankind to do so, we eagerly (and without foreseeing the ultimate consequences) shifted to a high-energy way of life. We "bloomed", and we must now expect the massive die-off. The crash that typically follows an irruption is a very special (and unpleasant) version of the process of succession. It results from a population's reaction upon its habitat. We must realize that this serial pattern is what we have been experiencing. We delude ourselves when we imagine we can avoid its culmination. Guidelines from this committee ought to correct such delusion.

Even the most sophisticated are prone to reassure themselves by insisting full-scale die-off will not begin in our life time. This is probably an unwarranted assumption but anyway there is an urgent need to begin facing some of irruption's more immediate social implications. Affluent Americans deceived themselves as tragically as they misled the rest of the world by parading their own industrial development as a preview of the future condition of the underdeveloped countries. It would have been more accurate to reverse the picture. The revolution of rising frustrations in underdeveloped countries became an undeniable obstacle to environmental maintenance when expressed vituperatively at the Stockholm Conference in 1972 and still more so in Bucharest and Rome in 1974.

Economists have considered it normal to expect nations to "take off" into sustained economic growth (Hagen, 1962). But the myth that "we did it, so you can do it too" was a cultural export by the political and industrial missionaries

of developed countries that may outweigh in its ultimate cruelty the inhumane consequences of outright exploitation of colonial dependencies. Nations of the so-called Third World began to return that cruelty when their spokesmen used the World Food Conference in Rome as a forum for denouncing the industrial nations, particularly the United States, for allegedly causing famine conditions in the underdeveloped countries. It was one thing to be an underdeveloped nation in the eighteenth century when the world had no developed nations. It is quite another thing today. When the developed nations were still underdeveloped and just approaching their take-off point, European technology was just starting to harness the energy stored in the earth during the past several hundred million years. The sparsely populated New World had only recently been explored and opened for exuberant settlement and exploitation. These conditions which made take-off possible no longer prevail. The underdeveloped countries of Asia, Africa, and Latin America in the twentieth century cannot realistically be expected to follow in the footsteps of the underdeveloped nations of eighteenth century Europe, now developed. Most of today's underdeveloped nations are destined never to take off.

Hard as it is for the people and leaders of underdeveloped countries to face that fact, they are not alone in finding it repugnant. The people and leaders of the affluent societies have also resided believing it (Cottrell, 1955: 110-11). Recognition that the world's poor will mostly stay poor will destroy the comforting conviction of the world's privileged that their good fortune is pardonable because "in time, others will catch up."

Nature's limiting factors will not clear most underdeveloped countries for take-off. Worse yet, if many did somehow take off it would turn out to augment global reaction and hasten the inevitable worldwide crash, now that people are so numerous. Not only are there not enough of the substances a developed human community has to extract from its habitat in the process of living to permit a world of nearly four billion people to be all developed; the capacity of the world's oceans, continents, and atmosphere to absorb the substances a developed human community has to "get rid of" is limited. Even as a waste disposal site, the biosphere is finite.

To this day, we mislead ourselves by using so bland a word as "pollution" for this part of our plight. It is the plight of the yeast cells in the wine vat. Accumulation of the noxious and toxic extrametabolites of high-energy civilization has now become a world problem. Too many people have not yet seen that it would become a world disaster if the benefits of modern industry were bestowed as abundantly upon everyone in the underdeveloped countries as they already have been upon the average inhabitant of the overdeveloped nations.

## II. Efforts to Halt Succession: The Test Case

Sociologists wishing to assess the possibilities for minimizing human reactions upon our habitat would be well advised to give close scrutiny to a particular class of governmental actions that have been explicitly intended to avert succession. National parks provide a test case, though sociologists concerned with "more serious" forms of human organization have tended to discount their sociological importance.

National parks have been established in many lands, partly as a result of cultural diffusion from the United States where this extraordinary land-management form was invented. They are dedicated by their respective governments as sanctuaries in which human reaction on the local ecosystem is meant to be held to a minimum. On national park lands, humans as visitors rather than inhabitants partake of special kinds of benefit and enjoyment. National parks afford people edifying and re-creative contacts with more or less primeval nature, exposure to a heritage from which they may derive a special awareness of man's part in the biosphere, and encounters with interpretive displays by which they can pleasantly absorb knowledge of nature's ways.

The national park idea first took institutional form in 1872, when the U. S. Congress passed an "Act of Dedication" establishing Yellowstone National Park. In the national park systems of many countries since then, more than under any other land-use regime, Homo sapiens began consciously evolving the self-restraint that Aldo Leopold (1933) knew was mankind's only alternative to habitat destruction. In 1969, Congressional passage of the National Environmental Policy Act made a start toward generalizing this self-restraint to man's relation to the entire biosphere. Section 2 said the purposes of that Act were:

To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation...

But from examining some of mankind's experience with national parks we can see that there is reason to doubt that the measures authorized by NEPA (or any feasible measures) can accomplish so ambitious a purpose as the elimination of human damage to the biosphere.

Most visits to most national parks are recreational in the ordinary sense, but for many visitors these heritage-preserving institutions contain the possibility of illuminating the human condition in a very extraordinary way. In New Zealand's Westland National Park, for example, a perceptive visitor driving up the road toward the retreating terminus of the Fox Glacier may observe, that in the last mile as he emerges from the dense shade of a mature rain forest of rimu and totara into stands of younger and smaller trees, he looks out onto an area of tall gray shrubs, the mountain akeake. Beyond these he finds smaller bushes of native broom and the dark green tutu. Past the area of shrubs, to within perhaps a hundred feet of the glacier, he sees grass and tufts of willow herb, followed by rocks colonized only by mosses and lichens, and at last by rocks too recently uncovered to be colonized at all. Knowing he is still just a few hundred feet above sea level, the visitor may realize that these changes of vegetation type cannot be due to altitude differences but result from the different lengths of time the various parts of the valley have been exposed by the melting glacial ice.

In the park headquarters he can see this same gradient of vegetation types represented in miniature in an eloquent table-top display, accompanied by a succinct and vivid explanation of succession. The area adjacent to the plastic-simulated glacier terminus on this model represents the land most recently

vacated by the melting ice, and most recently colonized (by primitive species of plants able to live on rocks rather than soil). A foot or so from these pioneer plant specimens on the table-top model -- perhaps several hundred feet downstream in the real world -- is an area occupied by other plants that could not take root until the pioneer species had modified the rocks. And so on. The greater the distance downstream from the glacier, the longer the time since the area was uncovered and since soil-building vegetation first began to occupy it. The older the plant community on a given site, the more seral stages it has gone through.

From viewing this exhibit, the visitor can come away with the knowledge that pre-climax life forms cannot avoid enabling their successors to replace them, because they inexorably alter their habitat in the process of using it. Pondering what he has seen, the park visitor may sense the shortsightedness in man's assumption that his own species is exempt from any such process.

In the same year as the Yellowstone centennial, the United Nations was obliged by concern for the condition of our planet to convene the first world Conference on the Human Environment. After a century of experience with national parks, what the people and industries of all nations of the world were still doing to the 99-plus percent of the biosphere outside these enclaves required facing up to the most important national park lesson, namely, that mankind derives important benefits from ecosystems not dominated by man, benefits not available from ecosystems man does dominate.

The conference in Stockholm did not mean that human societies could, should, or ever would make the whole world into a "public park or pleasuring ground", but it did reflect the fact that to protect ourselves from succession we needed somehow to protect our habitat from ourselves.

Homo sapiens was slow to learn that extraction of particular resources from the earth can mean destruction of our ultimately indispensable resource -- a self-renewing world. Within 200 miles of the place where the national park idea was conceived, there had been gouged into the earth by the time of the centennial a huge manmade hole. Its edges were eating into the city it was dug to support. Butte, Montana provides sustenance for its people by undermining itself, extracting and selling metallic ore. The same principle applies more subtly to the whole world.

The 1916 Act creating the National Park Service to administer the several national parks then in existence assigned this new bureau in the Interior Department the task of conserving these specimen ecosystems. The parks were to be managed so as to "provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (Ise, 1961), language copied in the National Park Acts of other nations sharing the same ideal.

Dictionaries give two related meanings for the word "enjoyment". One is inclusive, the other, more specific. The broader meaning of "enjoyment" is "having the use or benefit of something; having as one's lot or advantage". Within this broader meaning the word can be more specifically defined as "getting pleasure from". It is of course this narrower meaning that has been applied to national parks; Yellowstone in 1872 was designated a "pleasuring ground".

The broader definition makes it apparent, though, that the task assigned by Congress in 1916 to the new Park Service was a sample of the task NEPA would belatedly set for all agencies: to enable man to have the use, the benefit, and the advantages of the biosphere in such manner as to leave it unimpaired for future generations to have its use, benefit, and advantages.

This is a large order, perhaps impossible. In the American national parks, as visitor loads increased exponentially, serious problems of overuse raised increasing doubts whether it was possible to "use" any habitat (even, in supposedly non-consuming ways) and still leave it "unimpaired." Human reaction upon even these dedicated lands began to suggest that succession was quite inescapable. Even in the national parks, which embodied an ideal of environmental preservation, realities perpetually threaten that ideal. The wider implications in their problems transcend the realm of recreation.

American Congressmen in 1969 knew too little ecology to realize that when they passed the National Environmental Policy Act they were trying to halt by legislative command the man-caused succession overtaking man.

Could Homo sapiens really suspend succession? The national parks of various nations seemed to provide a test case, shedding light on the future of mankind's world. Of all bureaucratic organizations in the United States, it would be difficult to find one (in or out of government) whose personnel were more unselfishly dedicated to a mission, whose mission was more inspired by altruism, and whose public was more unmercenary in responding to it. Park rangers, park superintendents, and Park Service directors were human and did sometimes err, and park visitors sometimes made inappropriate demands on park resources. But if there was ever going to be an opportunity for mankind to show that use of a habitat could be reconciled with its preservation, the national parks were the optimum context. Yet, by the time of the Yellowstone centennial, the volume of traffic in the park was so great it could be accommodated only by constructing an utterly unprimeval cloverleaf highway interchange adjacent to the visitor area at Old Faithful, an area replete with acres and acres of parking lot pavement.

In Britain there is increasing pressure to devastate by other means such "amenity areas." Scenic characteristics imparted by the ice age to Snowdonia National Park in Wales are threatened by strip mining for metallic ores. British industry must have to make the export goods Britain exchanges for food imports indispensable to sustaining Britons' lives. For many metals the world's richest ores have already been mined and smelted. Leaner ores are thus in increasing demand, even though the leaner the ore used, the greater the volume of rock removed per pound of metal obtained.

Stephen Mather, the founding Director of the National Park Service in America, sought during his administration to elicit widespread public support for park protection policies by encouraging park visitation. He wanted an increasing fraction of the public to have first-hand acquaintance with their collectively owned natural wonders so they would appreciate the need for protecting them. Ultimately, visitor numbers increased beyond Mather's most ambitious expectation, and overuse threatened park values just as undermining threatened Butte. By the 1970's such protective desecrations as the cloverleaf interchange at Old Faithful had become unavoidable. Such planned violations of virgin nature were required to protect this habitat from still greater damage that would have been inflicted by visitor loads left unchanneled.

The severity of visitor pressure on the national parks was not at all what the enthusiastic explorers around the campfire at Madison Junction had had in mind when they opted for a new pattern of self-restraint in human land use. We must therefore face the fact of succession. If even on these dedicated lands, administered in trust by devoted public servants, man could degrade what he meant to preserve, it ought to be evident that a biosphere dominated by Homo sapiens is no climax community. The more of us there are, and the more technological power we have to get from the earth things we need and want, the more we will change the world upon which our lives depend.

### III. Avoiding Pretense: Realistic Sociological Input

Die-off will follow irruption. We must hope that the fraction of humanity who survive the crash will have learned better than their forebears that when man began to unearth nature's exhaustible treasures he began to "un-earth" man. It is to such future generations, presumably, that our guidelines may have some meaning.

To sharpen our own insight it may be worth asking, what if the 41st Congress (instead of the 91st) had enacted a National Environmental Policy Act (in 1869 instead of 1969)? What superhuman imagination would the 39 million post-Civil War Americans have needed to be able to decide on our behalf that we would be better served by the environment they were going to bequeath to us if their descendants did not become in a century five times more numerous and twenty times more urbanized? Short of that kind of restraint, what difference would an 1869 NEPA have made?

What if Ferdinand and Isabella had been cautious and had required Christopher Columbus to submit an environmental impact statement (complete with a section on social impact) before they authorized his proposed project of exploration; what could the earnest navigator have foreseen as the consequences to be anticipated from his voyage of discovery? Suppose he had submitted a statement describing an age of exuberant colonization and national expansion, depicting the culture it would foster and the democratic institutions it would nurture. Suppose he had foretold the irruption of Homo sapiens to fill up the carrying capacity surplus in a New World, the legalistic magic and the technological Deus ex Machina by which men in a subsequent age of overpopulation would strive to perpetuate obsolescent ways. Would the explorer's royal patrons have believed such wild ideas? Would they have sought safeguards to minimize the regrettable portions of the project's probable "impact"?

No one ever had that kind of imagination and foresight. Let us therefore avoid pretending that sociologists in the 1970's can, by augmenting in our own special way the pieties implicit in NEPA, repeal laws of nature or exempt our species from succession.

The best we can do, it seems to me, is to suggest that the "social impact" sections of "environmental impact statements" should include informed estimates (or shrewd guesses) of the following:

1. The additional stresses likely to be imposed, or the existing stresses likely to be alleviated, in social institutions formed in an age of surplus carrying capacity (when the New World was still new and underpopulated) and now stressed already by niche saturation.

2. The various forms of collective behavior (e.g., milling, rumoring, covert or overt panic responses, etc.) likely to be engendered by predictable destructuring of people's life-space due to various ramifications of the proposed change of policy or proposed modification of the physical environment.
3. Probable short-term and long-term effects on public attitudes, including:
  - a. The extent to which the project or policy is likely to reinforce or counteract the illusion of limitlessness to which Americans became accustomed as a result of their expansionist history.
  - b. The extent to which the project or policy might lead people to believe an increase in environmental carrying capacity had been achieved, whether such an increase had actually been achieved or not; in case of a real carrying capacity increment, the extent to which it might be perceived as permanent even if in fact it was temporary.
  - c. The extent to which the project or policy may facilitate or impede public recognition of movement into another serial stage by the local, national, or global human community.

These estimates would be ultimately more important than the more routine sociological judgments of the fairly direct effects of a proposed project or policy upon family relations, employment opportunities, social mobility, leisure activities, crime and delinquency, migration, etc.

The shape of the world today requires that assessment of a proposal by experts in engineering, biology, geology, agronomy, chemistry, meteorology, and other sciences must aim at answering the questions: Will it enlarge or diminish the carrying capacity of man's habitat? Will it accelerate or retard the inexorable process of succession?

Social assessment must therefore aim at answering the corollary questions: Will the project or policy promote realistic understanding of the relation between population and carrying capacity? Will it facilitate or obstruct public recognition of global and local succession and man's involvement therein?

Social assessment must also ask whether a project or policy is likely to help Americans adapt to the permanent prevalence of poverty, a condition so contrary to inherited expectations. Will it heighten or soften frustration by enhancing or impeding our comprehension of increasingly rigid inequalities among men and nations? Will it help or hinder our reluctant and disjointed efforts to readjust to living on income rather than savings?

And, for a while, we ought to ask whether any given proposal will assuage or intensify the grief that must befall us as the world undergoes the crash its earlier exuberance has made inevitable.

## References

- Borgstrom, Georg  
 1965 The Hungry Planet. New York: Collier.  
 1969 Too Many: A Study of Earth's Biological Limitations.  
 New York: Macmillan.
- Burgess, Ernest W.  
 1928 "Residential Segregation in American Cities." Annals of the  
 American Academy of Political and Social Science. 140  
 (November): 105-115.
- Catton, William R. Jr.  
 1974 "Depending on Ghosts." Humboldt Journal of Social Relations.  
 (Fall):
- Clements, Frederic E.  
 1916 Plant Succession: An Analysis of the Development of Vegetation.  
 Washington, D. C.: Carnegie Institution.
- Cottrell, Fred  
 1955 Energy and Society. New York: McGraw-Hill.
- Cressey, Paul F.  
 1938 "Population Succession in Chicago, 1898-1930." American  
 Journal of Sociology. 44 (July): 59-69.
- Hagen, Everett E.  
 1962 On the Theory of Social Change: How Economic Growth Begins.  
 Homewood, Ill.: Dorsey Press.
- Hollingshead, August B.  
 1938 "Changes in Land Ownership as an Index of Succession in Rural  
 Communities". American Journal of Sociology. 43 (March):  
 764-777.
- Hubbert, M. King  
 1969 "Energy Resources." Chapter 8 in National Academy of Sciences,  
 National Research Council, Resources and Man. San Francisco:  
 W. H. Freeman. Pp. 157-242.
- Ise, John  
 1961 Our National Park Policy: A Critical History. Baltimore:  
 John Hopkins Press.
- Kormondy, Edward J.  
 1969 Concepts of Ecology. Englewood Cliffs, N.J.: Prentice-Hall.
- Leopold, Aldo  
 1933 "Conservation Ethic." Journal of Forestry. 31 ( ): 634-643.

- Lind, Andrew W.  
1938 An Island Community: Ecological Succession in Hawaii.  
Chicago: University of Chicago Press.
- Mukerjee, Radhakamal  
1932 "The Concepts of Distribution and Succession in Social  
Ecology." Social Forces. 11 (October): 1-7.
- Odum, Eugene P.  
1971 Fundamentals of Ecology (Third ed.). Philadelphia: W. B. Saunders.
- Park, Robert E.  
1936 "Succession, An Ecological Concept." American Sociological  
Review. 1 (April): 171-179.
- Park, Robert E. and Ernest W. Burgess  
1921 Introduction to the Science of Sociology. Chicago: University  
of Chicago Press.
- Russell, Claire and W. M. S. Russell  
1968 Violence, Monkeys and Man. London: Macmillan.
- Sears, Paul B.  
1957 The Ecology of Man. Eugene, Oreg.: Oregon State System of  
Higher Education.

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REVIEW OF SOCIAL IMPACTS

in the Environmental Impact Statement of the Bureau of Land Management on the  
Proposed Federal Coal Leasing Program

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for the Environmental Impact Assessment Project  
of the Institute of Ecology

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I. General evaluation:

The most striking element of the social impact sections of the EIS is the modest definition of "social." Social impacts are presented in the sections entitled "Land Uses," "Population Patterns and Considerations," and "Human-Value Resources." However, the material under the three rubrics consists chiefly of a few general comments on the conservative orientations of rural populations, the potential impact of social agencies by population increases, and possible conflict between old residents and mining-related new residents.

Missing are any documented studies of the social and cultural systems of the various groups in the areas where mining is proposed and any clear delineation of new mining populations. Just as critical is the lack of analysis of the relationship of disruptions of the eco-system by mining to probable disruptions of the social systems. Changes in land-use, water availability, wildlife habitats, air quality, transportation facilities, and other environmental factors along with long-term degradation and reclamation will all affect those who define and direct their lives together in the area. In turn, the environment is altered by the decisions of those who live as part of it.

The comments here are selected to represent the kinds of questions that ought to be addressed in a coal-related EIS. They will be restricted to the Northern Great Plains and Rocky Mountain Provinces where the largest accessible reserves are found.

An outline of the assessment of probable social impacts of mining or other traumatic environmental intervention can be developed in a three-part progression:

- I. Analysis of the present social systems including --
  - A. An historical perspective of ongoing change in the social relationships, trends, past impacts, and projections for a future without mining intervention.
  - B. Definitions of self and society among all groups in the social system. Decision-makers, representatives of constituencies including youth and women, and those marginal to the communities should be included with major economic segments in an examination of the bases of life-shaping decisions.
  - C. The institutional structures and groupings that together form the social system should be identified. These include the institutions of government, the economy, family, education, and religion along with leisure, culture, and community resources and organizations. All groups that may be affected by inauguration of mining should be identified in their institutional relationships. The premise is that change in any social institution will result in change in all others in the system.

II. Specifying the nature of the environmental change.

(For coal mining the EIS outline of impacts specifies those common to all provinces and those unique to a province, those that can be mitigated and those that cannot, and those related to the mining

processes of off-road travel, road construction, exploratory drilling, exploratory excavations, development, facility construction, production, coal beneficiation, coal marketing, and rehabilitations.)

III. Specifying impacts basic to the social system and predicting probable change. Such impacts may be to the spatial and economic resources, to social space with changes in population and distribution, to social definitions, and to the institutional structures. Bringing together the history, impacts, and social system provides data for assessment.

## II. Evaluation of the Coal Leasing Statement Social Impact Sections:

The Statement contains very little of the kind of analysis outlined above.

It is distinguished both by a high level of generality in which environmental impacts are translated into "threats" (III 1) and by what is missing. Only a few examples of the inadequacy can be suggested here.

### A. Historical perspective:

The mining history of the Rocky Mountain Province is mentioned (II 116) but without any analysis of the effect on the environment, the history of boom towns and areas, or success in reclamation. The use of up to 65 percent of the land in some regions for the increase in outdoor recreation (II 107) is not followed by predictions of the economic or social significance of this growth to the region or the potential loss from mining degradation.

The use of 60-70 percent of the federal land in the Northern Great Plains for livestock grazing (II 173) is not related to the present economy or basis of life styles, to the national and world food supplies and requirements, or to disruption by mines and power plants.

More important, the viability of these rural areas and communities for the personal and social development of the men, women, and children now there is not

assessed in any way. The relatively recent impact of paved roads, mass media, electricity, and consolidated schools has changed the communities. No data on the historical development of resources and social institutions is included. How can prediction begin without such a historical basis?

The lack of history is even more evident in the attempt to avoid dealing with the Northern Cheyenne, Crow, and other Native Americans using federal lands overlaid with coal. The reservation system, powerlessness and hopelessness, and continual economic depression are only part of the history. An ancient culture, self-definitions related to the land, and a revival of social identity are elements in the Native American's definition of the potential impact of mining on attempts to reweave a delicate social fabric.

B. Definitions of self and society:

The summary of an evolved and evolving set of self-images and orientations as "rural" and "conservative" neglects change, differences among various groupings of people, and problems of labelling one culture by values from another. Can "conservative" describe adequately the orientations of both landowners and the marginal poor, of generations of early settlers and generations of youth with new horizons, or of "cowboys" and their families and of miners and theirs? Conflict in politics and in aims is ignored, yet is quite real to residents.

A kind of contempt for the culture, especially that of the Native American, is revealed in the reference to the "social fabric for what it's worth" (V 8). Presumed improvement by the infusion of more "liberal" values from mining newcomers (V 6) is not supported by data on the values of either group.

Adequate data on social orientations requires listening, not labelling. It requires identification of different groups, not lumping by region. Just as important, the relationship of the self-images and social definitions to the probable impacts and to possible conflict, adaptation, surrender or retreat, calls for

analysis relating definitions to decisions.

However, the EIS correctly suggests that due to the very possibility of mining changes in social orientations have already begun (IV<sup>7</sup>).

C. Institutions of the social system:

The "threats" to social institutions by population increases of 800 percent (III 59) in some areas are suggested, but not specified. Impacts are defined almost entirely in terms of providing facilities and services for more people - some of whom may stay only months, others a few years, and an unspecified number indefinitely. Again, no data on previous population shifts and depletions or on experience elsewhere with strip-mining labor are provided.

However, social impact only begins with building schools, waste treatment plants, and housing. In a social system - even one with deep divisions - the institutions are interrelated. Conflicts in orientations among groups of youth are not resolved simply with a new swimming pool and more police patrols. Effects on family patterns amid growth and diversity, the loss of face-to-face relationships in which everyone knows everyone else, new mass, increased pluralism, new job opportunities for youth, new reward structures, numbers of "unassimilated" teachers in the schools, and countless other interacting institutional changes are both complex and profound.

In brief, the social fabric of the Rocky Mountain and Northern Great Plains areas will be altered in every respect by the incursion of mining and power production. The social system can be assumed to be at least as complex and at least as important as the eco-system. No less careful analysis of probable impacts can meet the requirements of the National Environmental Policy Act or of the 1973 Council on Environmental Quality Guidelines. A few examples of missing analysis follow:

-- Economic impacts predict a "boom" for the areas to be mined (V 7). However, which parts of the economy will boom, which parts will be damaged, and what kind of new economic system is likely to emerge are questions not addressed. Further, the long-term economic effects of such disruption accompanied by degradation of the land on which the present economy is based are not mentioned. Concern of the Northern Cheyenne people over control of employment opportunities related to mining on their reservation stems partly from evidence that local workers have usually been given only low-level jobs in construction and mining. The impermanence of new jobs may as well lead to the dissolution of communities as to their building.

-- The "temporary overload" of community facilities (III 16) in areas of sparse population would seem to be a problem requiring more than some planning. Governmental institutions would have to be reconstituted to deal with the "social instability" (III 43). A massive and partly temporary influx of workers (III 16) alters land use (III 20) for housing, transportation, service facilities, and recreation (III 54). Resources such as power, water, and space require radical development and reallocation.

-- In many cases, entire new communities will be built (VI 6). These will require services and facilities to be provided from existing governmental agencies and structure. Further, many will have an atmosphere of impermanence. The development of social institutions in new communities may be no less difficult than reorienting the old churches, bars, schools, and shops in existing communities.

-- Recreation impacts are related to present use of resources and to the new populations. The effects of mining and power production on the environment of parks, forests, and private development are only mentioned (II 116). New residents may exert pressure for different kinds of recreation than is now available. More of the same (III 63) is not likely to meet their expectations. The economic impact of mining on the ascendent recreation industry in Colorado is suggested as a "threat" but not analysed (II 118-9).

-- References to indices of social problems such as crime rates (V.7), to culture clashes, to waste disposal, and to impacted facilities only hint at the manifold aspects of a social system. Housing provisions, for example, affect family, economic, political, religious, cultural, and educational patterns and provisions. Social systems are complex, many-celled, permeable, and frequently quite fragile.

Predicting social impacts:

Specific impacts on land and environment are not related to the social system in the EIS. For example, the probable massive diversion of water (III 56) means that the water will not be available for other uses. The effects of this diversion on the eco-system, on agriculture, on the climate, and so on are not detailed. In arid areas, effects of diverting the little water available will leave nothing unaffected (VI 7).

The effects of strip mining may be relatively localized (I 6) although the extent of land area that may be mined is vast and stretches from North Dakota to New Mexico. However, the largest expected use of the coal is for producing electric power (I 71). Due to delivery costs much power production is likely to be at or near the mines (I 187). Separating mining impacts from those of power plants would seem to be unrealistic.

If so, then 42 or more plants in the Plains alone (III 74) would be expected to yield the social impacts suggested in the EIS. They include emissions that would endanger the health of people and livestock, consumption of vast amounts of water further draining the aquifers disrupted by the mining, fly ash that may be radioactive, and added concentrations of people (III 70-73). Add the aesthetic disfigurement and the relative permanence of such plants to the downwind dangers and the result is considerable increase in the scope of impacted areas. The grazing economy and agricultural society of vast downwind areas may be considerably degraded by power production.

The scope of the social effects of mining and power production together

would have social impacts far beyond the Plains states. What the Middle West might gain in power could be offset by the loss in meat and grain production. The possible health costs of food shortages and contamination are incalculable.

A second limit in the report, like ignoring power production, tends to minimize the social impact. The lands under consideration for mining adjoin Indian Reservations at several critical locations. Coal is also in Reservation land. Especially the Northern Cheyenne have been alerted to the potential dangers to their people, their land, and their ways of life. The efforts to renew the cultures of Native American peoples in a world controlled by laws, agencies, courts, and customs foreign to their ways face enough obstacles without massive industrialization. The fragile culture of such peoples could be expected to undergo change as radical as that forced by previous white invasions. As before, the invasion of miners would be temporary and an "interim" use of the land, but the social disruptions would last. Serious consideration of models of exercising some control over mining (II 183) is needed.

A long-range assessment of social impact would be that neither the land nor the people will ever be the same after such mining and power usage. The costs will be spread over a much greater population and for a much longer time than the EIS suggests. Changes in the systems of interrelated institutions will be profound. The draft of the EIS is simply not an assessment of social impacts at all, but a collection of general comments that are not systematically related to mining and power production.

### III. Adequate Social Impact Assessment:

If the examples of the inadequacy of the EIS draft illustrate its failure to even address the task of social impact assessment, what would be required to begin the task again?

The outline of an approach to social impact assessment in section I includes the kind of material and analysis that would be necessary. The aim is prediction of the social impact of specific interventions. In an approach that includes history, social definitions, and social institutions, a data base is already available. Social scientists need not begin de novo on each study. The assessment can begin with what is already known about, in this case, social changes of this century, social definitions and decisions, and rural social institutions.

From what is known, questions can be developed that enable the scientists to gather data that is specific to the situation and fully contemporary. Such general and specific data provide a basis for analysing the social system.

Assessing the specific impact of the intervention, in this case mining and related power production, requires knowing the requirements of the project and the likely environmental consequences. Specific changes, the nature and location of the social impacts, can be calculated only knowing the scope and nature of the environmental impacts. Prediction is then site-specific for the impact area.

The time span of each part of the project and the probabilities of restoration and reclamation are also integral to the social impact assessment. Social systems cannot be restored to a previous condition, but they are adaptable to a wide range of changing conditions. The time frame of the intervention is crucial in assessing the long-term social changes. Prediction requires both a geographical and time frame of impact reference.

Finally, an evaluation of the social costs and benefits of an intervention should be based on the most comprehensive assessment of impact possible. Costs and benefits to various populations may be compared for severity as well as the number of persons affected. Decisions on an intervention such as mining are usually based on some economic gain predicted for some segments of a total popu-

lation. Such economic gain may involve economic loss for others. The same is true of the more complex social assessment. Weighing of net gains in the quality of their life together for some against net loss for others requires at least as comprehensive an analysis of relevant data as does the economic balance-sheet.

Sue Johnson provides this context for her and Rabel Burdge's open letter:

On August 1, 1974, a meeting sponsored by the Red River Legal Defense Fund resulted in our being asked to do a household survey of residents scheduled for relocation by the controversial proposed Red River dam. This survey could not be an official university activity because the Fund could not pay the full costs of this research; interviewers were reimbursed for expenses only. Seven interviewers were hastily assembled and instructed in the use of a semi-structured interview schedule based on past relocation studies by Burdge and Johnson. On Saturday, August 3, teams of interviewers canvassed the take-area, reaching 38 households of the estimated 55. The rest were not at home. On August 5, the letter reprinted here was written. Coding of the interview schedules took a full week. Structured questions were quantified, and open-ended responses content-analyzed.

The report of the research was written in eight hours on August 12 and 13, missing the August 12 deadline by half a day. (The deadline was somewhat flexible due to the August 5 letter, but the Fund needed time to write up affidavits for their law suit.) The following Sunday, August 18, Johnson signed an affidavit alleging inadequacy on the part of the Army Corps of Engineers in their preparation of the Final Environmental Impact Statement.

The major deficiency of the (authors') study is that there was insufficient time to interview residents of Clay City, who are frequently flooded by the Red River, and flood protection for these residents is an important part of the rationale for the dam. This necessary oversight may be corrected in the future as litigation proceeds and time permits. It should be pointed out that the Red River Gorge and environs has been called the "Grand Canyon of the East," and the considerable controversy has surrounded first an attempt by the Corps to flood the upper Gorge in the early '60s and now an attempt to flood the lower Gorge, which would flood not only valuable farmland but increase the possibility that the backup may encroach upon unique ecological and scenic features of the upper Gorge.

The full report is available from Sue Johnson, Center for Developmental Change, University of Kentucky, Lexington, KY 40508. The title is "Report of Household Survey--Red River Residents Due for Relocation," by Sue Johnson, Rabel J. Burdge and William F. Schweri. Its contents corroborate the basic argument made in the letter.

An interesting postscript on this study is added by Johnson. In response, the Corps hired their own consultants, whose independent analysis confirmed the authors' findings. When this portion of the consultants' report was deleted by the Corps study managers, their own consultants joined the plaintiffs in pressing legal suit. Nevertheless, as Johnson and Burdge reflected upon their own experience as expert witnesses, the logic of social research is considerably at variance from the logic of legal proceedings. Qualifications a social scientific researcher may feel necessary tend to count against the credibility of their own testimony, as in the exhibit to follow.

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CENTER FOR  
DEVELOPMENTAL CHANGE

5 August 1974

## TO WHOM IT MAY CONCERN:

This letter addresses the issue of the adequacy of the Final Environmental Impact Statement (1974) of the Red River Lake Project undertaken by the Army Corps of Engineers, Louisville District.

The area of expertise represented by the undersigned is in the relocation of families due to reservoir construction. Vitas are appended.

The National Environmental Policy Act of 1969 (Public Law 91-190, S1075) states (Sec. 102): "all agencies of the Federal Government shall

(A) utilize a systematic interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision-making which may have an impact on man's environment; . . . . . [and]

(C) . . . . . "any adverse environmental effects which cannot be avoided should the proposal be implemented, . . . . . need a *detailed statement by the responsible official.*" (Italics ours)

It is our contention that the Army Corps of Engineers has neglected these parts of Section 102 of NEPA. With regard to the first, the inclusion of the social sciences as sociologists see that the only sociological data included in the final EIS are on pages 24-25. To quote:

"Population. The population figures for the three county area are given in Table 10, Appendix V. Wolfe and Menifee counties have experienced a decline in population over the past decade while Powell County experienced an increase over the same period almost equalling the decline of the other two counties. This is a result of Powell County's shift from a basically agricultural economy to a more service oriented economy. This trend will probably be accelerated by construction of the project as the county lies along the primary access route from major metropolitan areas. Economic conditions are also a major

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factor in the population decline of Wolfe and Menifce Counties. Per capita income in both of these counties is below that of Powell County.

"Population change due to the death rate is fairly constant within the three counties and it is expected that this rate will be sustained for the next several decades. Population change due to the birth rate depends on various socio-economic factors. The birth and death rate figures for the three counties are given in Table 10, Appendix V. A comparison of the figures for Wolfe County indicate that the outward migration from that county is predominantly of younger people of child bearing age.

"The median level of educational attainment for the three county area is 8.3 years as compared with a national average of 12.1 years.

Employment and Economic Level of Development. Although agriculture accounts for the major land use of the area, it comprises a small and constantly declining segment of the economy. The labor force is concentrated in two areas of employment: manufacturing and government employment. In general, the individual manufacturing establishments are small, usually employing less than 20 persons. In Powell County service related employment, although totaling only 6.6 percent, showed an increase of 43 percent during a four year period from 1963 to 1967. This trend can be expected to continue in the future.

"In 1969 the median family income was \$5,034 in Powell County, \$5,065 in Menifce County, and \$2,694 in Wolfe County. These are well below the national median of \$9,590. These low family incomes are reflected in the large welfare rolls of these counties. In Wolfe County, 37 percent of the families receive public assistance. Powell and Menifce Counties which have about double the median family income have about 18 percent of their family units on public assistance rolls."

The birth and death rates are not given in Table 10, Appendix V. However, this is not to say there are no socio-economic data given in terms of projected benefits during the construction and operation phases (pp. 38-41) and from the recreation potential of Red River Lake (pp. 25, 52-53).

With regard to the "Detailed statement" about the families to be relocated, we quote:

"Displacement and Relocation of Families. Resettlement of the residents displaced by inundation involves frustrations,

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difficult decisions and uncertainties. To the extent that these effects can be mitigated financially, provisions have been made for resettlement allowances, allowances for dislocation of farm and business operations, relief from higher interest rates, rebate of prepaid real property taxes, severance damages and payment for property acquired. The project will result in the displacement of approximately 55 family units" (Page 42).

The Environmental Impact Statement on page 45 lists as a long-term unavoidable adverse effect on the environment the possibility that "cultural traditions which are primarily restricted to the local area may be threatened by displacement. However, none have been elaborated during study of this area." We would suggest that this is a "significant effect" -- that is, according to Regulation No. 1105-2-105, Department of the Army, Office of the Chief of Engineers (December, 1972), "One which would be likely to have a material bearing on the decision-making process" and the determination of which "should be made at the earliest stage possible in the assessment process" (P. A-3.) Attachment A to these guidelines states that the cost of "eliminating or minimizing such adverse effects . . . [as] injurious displacement of people, businesses and farms . . ." (P. A-7). The final Environmental Impact Statement addresses one paragraph (see above) to this potential impact.

To suggest the magnitude of the omission of this human concern, on Saturday, August 3, a team of interviewers were sent to interview all the families in the table area that could be reached. A separate report of our findings will follow this letter. However, a summary of findings from previous studies is in order here to merely suggest the magnitude of the possible impact of relocation on rural Kentuckians.

- (Taylorsville and Caesar's Creek) of 259 individuals interviewed who were waiting to be relocated for the reservoirs, 63.7% stated that the change due to relocation would "probably" or "certainly" not be rewarding.
- (Taylorsville and Caesar's Creek) 79.6% of 260 individuals said it was "hard to leave" their place of residences. Reasons given for this were "ties" to place (79.6%), neighbors (83.9%), and friends (83.5%).
- (Taylorsville and Caesar's Creek) 73.5% of 260 individuals said "not knowing what to expect is unnerving," and 73.8% said that they "like this area best." 70.0% said "this area is in my blood," and 51.9% said "This is the only place I can call home."

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- (Taylorsville and Caesar's Creek) 188 of the 200 individuals could not say specifically where they would move; however, 69.7% of those preferred to move to another farm. 95% of those with unspecified locations who answered how far they'd be willing to move said either not out of the county or "not far" even if out of the county.
- (Carr Fork) 33.8% of 198 families found their financial situation had worsened after relocation. (This was before the Uniform Relocation Act of 1971.) Of these 43.6% blamed this worsening on relocation.
- (Carr Fork) More than half the people who bought acreage after relocation had less land of inferior quality and less tillable than what they had previously owned. Forty percent of the 110 families with gardens no longer had one.

To suggest that the potential problems associated with relocation are a "significant effect" of the proposed reservoir and that the Army Corps of Engineers has failed to take this potentially significant impact into account, primarily through the non-utilization of social science input into the planning process.

After the briefest possible review of the data collected on August 3, we have every reason to believe that conditions similar to those described above exist among those slated for relocation by the Red River Lake Project. A thorough analysis of the data is now being conducted.

Respectfully,

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"Note: The Academic Research Group  
as a Model for Social Impact Assessment"

The Public Lands Project of the Center for Urban Affairs, Northwestern University, engages in four types of activities. Of primary interest to readers of this number of Environmental Sociology, the project has participated in administrative agency decision making processes on, to date, some ninety governmental programs or proposals, predominantly via the environmental impact statement (EIS) review process. Second, members of the project conduct scholarly research on the politics and administration of natural resources and the public lands of the United States. Third, project members serve as consultants to a variety of citizens' organizations and government agencies, particularly conducting applied, social science research on topics related to environmental policy making. Fourth, the project maintains a library of environmental impact statements, government documents, professional and law journals, and periodicals.

The project professional staff is composed of H. Paul Friesema, Associate Professor of Political Science and Urban Affairs, Paul J. Culhane and Sam A. Carnes, Ph.D. candidates in political science and Terry L. Stranke, a political science graduate student and law student. Richard A. Liroff, a Ph.D. candidate in political science at Northwestern and member of the staff of the Environmental Law Institute, Washington, D.C., is also affiliated with the project. Mr. Culhane will be leaving the project in the near future to join the faculty of the Department of Political Science at the University of Houston. The principal research interest of Professor Friesema, Mr. Carnes and Mr. Culhane, before forming the Public Lands Project, was in the area of urban and community policy. The environmental impact statement review work of the project is primarily conducted by Professor Friesema and Mr. Culhane.

The environmental impact statement review function of the project is not now, nor has it ever been directly financed by any source. Project members have carried on their EIS commenting work as a part of their professional research function. Project overhead (office space, mailing costs, etc.) and an undergraduate research assistant/librarian have been provided by Northwestern's Center for Urban Affairs; a small grant in 1973 from Citizens for a Better Environment, a Chicago environmental group, has helped underwrite the cost of maintaining subscriptions for the project library.

EIS Review Activities. For the purpose of maintaining the project library, Professor Friesema follows the Federal Register and writes various federal agencies, requesting a copy of each EIS they release for public distribution.<sup>1</sup> When EIS's are received by the project, they are briefly examined to determine if project members might be interested in commenting on the statement.

Project members select EIS's for comment based on the relationship of the EIS to other research activities, and on personal competences and predilections. The selection criteria include;

-- Geographic location; EIS's from geographic areas in which project members have conducted research or are personally familiar with for other reasons. For example, a number of the proposals commented on by the project have been located in northcentral New Mexico, a field research site of two of the members of the project staff, and the home of a third.

-- Functional specialization; Professor Friesema tends to specialize in water resources development EIS's (i.e., EIS's prepared by the Corps) and energy EIS's, while Mr. Culhane tends to specialize in public lands agencies (e.g., the Forest Service and B.L.M.).

-- Substantive specialization; The project has, for example, special interests in EIS's related to energy development (particularly in the Northern Great Plains), issues involving special impacts on Native Americans and other cultural minorities, and Forest Service recreation developments (primarily ski area leases.)

The project has, however, prepared comments on almost all types of governmental actions for which EIS's have been written (roads, dams, channelization, mineral exploitation, recreation development, airports, forestry, pesticides and herbicides, power plants, weather modification, etc.); these comments have been directed at some 20 lead agencies; and the proposed actions were located in 30 states as well as nationwide. The project has commented on EIS's of major national interest (e.g., Cochiti Dam in New Mexico, the Alaska Public Lands, or ANSCA, proposals, and the Mineral King development) as well as some rather more obscure proposals (e.g., Pocket Gopher Control on the Angelina National Forest in Texas).

In commenting on EIS's, the project has tended to focus on social, economic and political impacts of agency programs. The project tends to ignore physical environmental impacts as not particularly within the competences of the staff.

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1. There is variation in requesting EIS's. The project does not seek to acquire many of the myriad Federal Highway Administration statements. The project has, however, sought to maintain a complete collection of EIS's released by the following agencies: Forest Service, Corps of Engineers, Bureau of Land Management, National Park Service, Atomic Energy Commission (now, the Nuclear Regulatory Commission), Bureau of Reclamation, Fish & Wildlife Service, Soil Conservation Service, Tennessee Valley Authority, and the Environmental Protection Agency.

Lastly, the activities of the staff have not been restricted to solely commenting on EIS documents. Investigative and follow-up contacts with lead agency decision makers and other interested parties are often absolutely necessary for effective use of the EIS process. It is still, however, necessary in preparing written comments to write detailed yet concise comments which address issues central to an EIS, to organize comments so that the logic of the comment is clear and inescapable, and to write with decision makers' constraints in mind (while not capitulating to those constraints.)

Findings about the EIS Process. The project's use of the EIS tool has been, over the years, fairly efficacious. A substantial proportion of projects which the project deemed unsatisfactory have been significantly altered or halted as a result of EIS processes in which the project was a participant. Several of the ways in which the EIS process can be quite efficacious have been discussed at greater length than is possible here by Friesema & Culhane (1974) and Friesema & Culhane (forthcoming).

While the decisional outcomes of many EIS processes may be fairly encouraging, Friesema & Culhane (1974) and Friesema & Culhane (forthcoming) are rather pessimistic about the quality or scientific rigor of the social impact analysis found in the typical environmental statement. The primary "social impact assessment" found in an EIS is an unelaborated, or at least unsubstantiated assertion that the proposed program will be economically beneficial. Other social impacts, especially differential impacts among social groups, are almost always either not discussed, poorly discussed, or misdiscussed. Among the factors which appear to lead to inadequate discussion of social impacts in EIS's are: methodological and/or epistemological deficiencies, lack of background in the social sciences on the part of decision makers and EIS writers (and often, a distinct lack of appreciation for social science), a common understanding that the EIS process does/should focus on physiographic impacts, the project-justification stance of lead agency EIS writers, and basic administrative taboos against recognizing the differential social impacts of agency actions.

Evaluation of the Public Lands Project's Experience. There are two aspects of the activities of the project which appear salient in determining whether the project's experience is a generalizable model for social scientist who wish to affect the social impacts of governmental policy. The first is the project's structure as a nonmembership "research group." The second is the project's choice of the EIS process as a vehicle for social assessment advocacy.

As an advocate and adversary, the project's activities are roughly analogous to the role of the professional staffer of an environmental (or any other) interest group. This approach may be more efficacious than, for example, a consulting role, because the project as a commentator can act independently, uncoopted and uncompromised.

The limitation of this adversarial approach of an ad hoc academic group is that such an organization is unfundable for general operating expenses, particularly staff salaries. Academics who carry out socioenvironmental advocacy must do so as an "extracurricular" activity or justify the activity as a part of their normal research responsibilities. However, it is no more difficult for academics to conduct this activity than it is to carry out other research or community service activities without direct remuneration.

The advantage of relying on the EIS process as a vehicle is that the EIS creates a fairly discrete occasion for a decision, and legitimate entry into the decision making process irrespective of the legal standing of the social scientist, whether or not the social scientist was a part of the agency's organization set before the release of the EIS, or the geographic distance of the decisional locus from the social scientist.

The disadvantage of the EIS process is that, of course, not all policy decisions are made by administrative agencies, nor made by agencies following an EIS. The courts have been an important forum for environmental decision making, but the project has never litigated. Legislation (NEPA, the Clean Air Act, Federal Water Pollution Control Act Amendments of 1972, etc.) has been important in environmental policy making, but the project has never lobbied. However, agencies are also important loci of decisions, environmental groups can be effective working primarily with administrative agencies (see, for example, Culhane, 1974), and the EIS process has become an important feature of agency environmental decision making (Culhane, 1974).

Paul J. Culhane

Selected Public Lands Project Publications

H. Paul Friesema. "The Forest Service in Crisis in Northern New Mexico."

Paper read at the Meeting of the Midwest Political Science Association, Chicago, September 1971.

H. Paul Friesema and Paul J. Culhane. "The Environmental Impact Statement Process: Technical Assessment or Political Advocacy?" Paper read at the Meeting of the Society for the Study of Social Problems, Montreal, August 1974.

Sam Carnes and H. Paul Friesema. Urbanization and the Northern Great Plains. Evanston: Northwestern University, Center for Urban Affairs, Report to the Northern Great Plains Resources Program, October 1974.

Paul J. Culhane. The Lake Michigan Federation: Evaluation of an Environmental Interest Group. Evanston: Northwestern University, Center for Urban Affairs Report, November 1974.

Paul J. Culhane. "Federal Agency Organizational Change in Response to Environmentalism." Humbolt Journal of Social Relations. December 1974.

Richard A. Liroff. "Environmental Administration: NEPA and Federal Agencies." in Stuart S. Nagel (ed.), Environmental Politics, New York: Praeger, 1974, pp. 291-305.

H. Paul Friesema. "Environmental Group Fragmentation and Administrative Decision Making." Paper Read at the Meeting of the American Society of Public Administration, Chicago, April 1975.

H. Paul Friesema and Paul J. Culhane. "Social Impacts, Politics, and the Environmental Impact Statement Process," Natural Resources Journal, forthcoming.

## NORTHWESTERN UNIVERSITY

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November 3, 1973

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PUBLIC LANDS PROJECT

Mr. Wayne E. Stephens  
Director, Planning Support Group  
Bureau of Indian Affairs  
Billings, MontanaIn re: Crow Ceded Area  
Coal Lease - Westmoreland  
Resources Mining Proposal:  
Draft Environmental  
Statement.

Dear Mr. Stephens:

We feel that there are some serious deficiencies in the draft environmental impact statement and also in the mining proposal itself. We feel that these deficiencies are so serious that the BIA should either cancel this proposal entirely, or substantially revise the proposal and then submit an entirely new draft environmental impact statement.

In the first place, we believe that the BIA has, once again, found itself with a conflict of interest. On the one hand, as the introductory paragraph illustrates, the BIA, as an agency within the Department of Interior is strongly interested in solving the so-called energy crisis by rapid development of Fort Union coal. But you also owe a trust obligation to the Crow Indian Tribe. In this case, when the interests of the Crow clash with the interest in developing the coal, the Crows lose. That is in the great and well known BIA tradition, of course. Fortunately for the Crows, and the non-Indians in the area, the so-called coal leases of June, 1972 seem to be illegal and void, and so any coal mining on Tract III will have to be renegotiated. The belated appearance of this environmental impact statement amounts to an acknowledgement that these developments are in fact likely to have a major environmental impact, requiring the NEPA procedures. But NEPA and the CEQ guidelines make it unambiguously clear that the impact procedure must be complied with prior to any major action on the project such as these illegal leases. Therefore, the contract should and must be renegotiated. It ought to be renegotiated on terms which are far more favorable to the Crow. These more favorable terms should include substantially more money, and serious contractually imposed requirements upon Westmoreland to ameliorate the social, cultural, and environmental disruptions this development will create.

(1) Social and Cultural Impacts - Our first concern, in particular, has to do with the social and cultural disruptions this development will create, for Indians and non-Indians alike. We think that the evaluation concerning such disruptions is entirely inadequate. It is generally recognized that urbanization and industrialization in a rural society impose special problems. They need to be anticipated and considered, not only for the Indian community but for the possibly impacted communities of Hardin, Hysham, Lodgegrass, Sanders, and

Crow Agency. Although the proposal does not project a vast population increase for these towns, any increase at all will have serious social and cultural repercussions. We suggest that the final EIS consider that the development will affect family stability, life style choices, crime and social disorder, rates of alcoholism, and the levels of happiness and aspirations for both the Crows and the non-Indian inhabitants of the small towns in the area. It can be anticipated that increased levels of employment would lead to greater mobility and more social choice, which, in turn, would lead to a departure from traditional social and cultural life styles. If this is the case, do those people involved wish for this to happen? Also, the development would probably lead to increased social pluralism, so that traditional forms of family life and authority would be seriously threatened. Some of these things may be occurring anyway, as communities in Montana become integrated into the urban control structures of American society. But the changes precipitated by even the low level of industrialization and urban growth predicted in the EIS for this first stage will sharply increase and magnify these changes, as the communities lose control of critical decisions to corporations and government agencies far away, and as the communities come to be places of strangers.

Moreover, we think that the hiring and operating plans of Westmoreland et al are in their interests, and not in the interest of the Indians. The proposal calls for the hiring and training of some Indians. That whole thrust is misplaced. The clear assumption is that the Indians should alter their ways to become the types of workers that the mining contractor would like. Your EIS reports (page 94), "The training program includes continuing education and training to develop a sense of responsibility among the Indian work force." On page 95 you say, "Later, as the Indian training program develops a responsible work force, the Indians will move into openings created by workforce turn-over and by future expansion of the mining operation." Rather than attempting to remake the Indians in the mold of a European-stock urban work force, we strongly urge that the industrial enterprise should be shaped around the Crow's value system. You do not provide nearly enough information on Crow values to fully know what might be appropriate, but you do quote a Crow that "personal gain and the accumulation of private wealth has little prestige value in Crow communities." You say, on page 36, that this is an accurate description. That implies, to us, that the Crow workers may prefer an occupation in which they work until they feel that they have made enough for awhile, and then prefer to do other things. For any number of reasons which might seem inexplicable to those geared to American industrial management, the Indian workers may prefer a working arrangement rather than becoming part of a "responsible workforce." For example, Indians ought not to be subject to disciplinary action for taking time off when they need to for tribal, familial or other cultural reasons. Being familiar with other training programs for native Americans, principally BIA's SIPI in Albuquerque, New Mexico, we recommend that both PINTO and future employment by Westmoreland be more sensitive to the various needs of the workers. Surely, Westmoreland and PINTO could accommodate their requirements to the labor force's cultural obligations, interests and values. At best, such efforts can only partially reduce the impacts of bringing a complex technical process to these people. For the industrially induced division of labor which will occur will inevitably mean among other things, that present authority patterns and community cultural obligations will be increasingly overlain with a different and conflicting set of norms and obligations of the urban, industrial world. This will probably lead to increased social disorganization among the present

population in the area. Every effort should be expended, by the BIA, acting in its fiduciary capacity for the Indians, to mitigate and reduce the disruptive effects of this enterprise. There is nothing in the impact statement to suggest that this duty is being fulfilled.

There is nothing in this impact statement to indicate that the BIA is doing anything to anticipate or ameliorate the social problems which this type of development will inevitably create. Your "concern" over social consequences is well illustrated by your discussion of "Unavoidable Adverse Environmental Effects" (Chapter 5) when you discuss "social impacts." You write, (p. 155) "The adverse social effects of any endeavor or development can be measured only in terms of the inhibiting characteristics of social change on reaching social goals" (sic). That totally defies interpretation. You continue, "With a planning process designed to effectively use tribal income, adverse effects can be quantitatively predicted and their significance evaluated." We can interpret this sentence. It suggests that the tribe ought to use some of its royalty payments to assess the adverse social impacts, which, you assert, can be quantitatively predicted and evaluated. We suggest that you are required by law to assess the adverse effects as part of the impact statement. The responsibility cannot be shucked off onto the tribe, for sometime after the proposal has become operative.

There are other problems with the proposed hiring policies of Morrison-Knudsen. You write "In view of the Morrison-Knudsen record of successful training and employment of Indians and Crow and other reservations, it is safe to estimate that substantially over 50 percent of the positions at the mine will be filled by Crow Indians." It is absurd to leave that as a "safe estimate." The just released U.S. Civil Rights Commission staff report on the Navajo reservation clearly and unmistakably indicates what little value the promises about Indian employment on strip mining and energy projects can become. If, indeed, it is a "safe estimate" that better than 50 percent of the employees will be Crow, then Morrison-Knudsen ought to be under no difficulty in guaranteeing, as a term of the contract, that better than 50% of the workers will be Crow Indians. We would expect it to be necessary to impose some severe penalty upon the company (whether Morrison-Knudsen or Westmoreland, we care not), for non-compliance with this term of the contractual arrangements to be entered. We understand that there may be initial problems for the company in achieving this rate, so suggest that it not become effective until the second year of the contract. By the third year we believe the contract also ought to mandate that at least 50% of the supervisory and management positions be filled by Crow Indians. We even suggest the desirability that the Crow supervisory and managerial appointees should be selected by the Tribe, rather than the company, using tribally determined criteria.

We understand that there may be some difficulty in getting Westmoreland, et al. to agree to such conditions. But as much should be extracted from the companies as possible. The companies appear to be at some disadvantage in any renegotiation of these leasing and mining agreements, de novo, as they have fairly heavy sunk investments in Ceded Area Tracts II and III, as well as contractual obligations to deliver coal. As a fiduciary, acting on behalf of the Crow, it is your duty to press this negotiating advantage as far as it goes. If, because Department of Interior policies concerning coal development, solving the "energy crisis," etc. interfere with the BIA's ability to act in the interest

of the Crows, then it seems to us that the BIA ought to withdraw from any role in determining this matter, and have the Crow represented by others who can genuinely act on behalf of the tribe.

(2) Impact on Race Relations.- It seems almost certain that one of the byproducts of the development as outlined in the draft environmental statement, will be increased racial hostility and friction. Whatever the present accommodations as between the Indians and whites in this area, they will become unstuck as many new white workers move into the area, and come into work and other contact with the Indians. The respective ways of white urban workers and the present local population (both Indian and non-Indian) will almost certainly be mutually incomprehensible, to some degree. That condition breeds fear and distrust. But when you add to that the fact that the white newcomers will have higher education, more skilled and responsible work, and more money than either the Indian, or much of the present non-Indian population, you add up the conditions for volatile racial relations. It is abundantly clear that much of the current tumultuous state of Indian-white relations, as illustrated by Wounded Knee, can be attributed to the impositions of an urban American industrial state upon people whose values are different. With stripmining and its ancillary developments, that urban industrial state is going to be right there in Crow Agency and Hardin, Montana.

(3) Fiscal and Political Impacts - We think you greatly understate and misstate the consequences of the development upon the adjoining communities where people associated with the development will live such as Hardin. You assert, on page 18, that "the increased tax base would permit expansion of necessary community facilities." But it appears that the industrial developments may not be located in some of the taxing jurisdictions where people will live. If so, it is probable that the increased public expenditures for schooling the newcomers, policing them, etc. will not be paid through any adequate increase in the tax base of the responsible jurisdictions. If the Westmoreland developments are going to have the asserted impacts on adjoining communities, then Westmoreland ought to be required to make some payments in lieu of taxes to these jurisdictions for the costs of public service that the development creates. For, apart from a very small number of merchants, all the accumulated evidence is that the present residents of these towns will receive absolutely no monetary benefits from these developments whatsoever. The jobs and wealth will go to newcomers. The old residents will simply bear a large part of the costs.

Incidentally, we think that your analysis of the demographic data is inadequate. Your essential comparison of income, poverty, etc. was between Crow Indians and all residents of Big Horn and Treasure counties. It would be more appropriate to present a comparison of Indian and non-Indian incomes, poverty, etc. If you did so (not counting the Indians twice), we think this would graphically illustrate why few of the new jobs would go to present non-Indian residents of the area.

It is probable that, in addition to social and cultural pluralism, the mining operation will lead indirectly to political pluralism. Rather than the consequent style of decision-making usually present in a small town, political conflicts will increase in number and intensity. Traditional sources of authority,

whether it be the tribal council or a socio-economic elite in a small town, will break down, and power will be diffused. The repercussions of this diffusion of power needs to be considered, we believe, in the final EIS. Another probable political impact of the mining operation will be a loss of local control over the political process. Traditional loyalties, whether to the tribe or the town, will break down, and other loyalties will take their place. It would be expected that as these transitions are made, the local people would tend to become increasingly alienated from their local governments and would feel, justifiably or not, less efficacious in their control over local governmental affairs.

(4) Responsibility for Enforcement - In general it appears that the various industrial interests, especially Westmoreland and Burlington Northern, are responsible for complying with the various requirements set forth in this proposal, with no provision made for external supervision. We do not believe this to be reasonable.

For instance, would it not be better to have an independent agency, rather than Burlington Northern, enforce the provisions of the railroad construction contract relevant to the minimization of environmental impact? (p. 135) With respect to the future discovery of significant historic and prehistoric sites during the mining operation, we do not believe that Westmoreland should be responsible for notifying the State Archeologist, because it is not in their interest to do so; perhaps Westmoreland could hire an independent archeologist to oversee this part of the operation. (p. 136) With respect to assessing the effects of coal strip mining on wildlife species and their habitats, we do not believe that Westmoreland will do the kind of job necessary in gathering appropriate information and in monitoring the effects of their mining. They are in the mining business, not wildlife management. It seems possible that Westmoreland could appropriate monies to the state or federal government to pay for expert analysis of coal strip mining effects. In general, we do not believe that vested private interests should be expected to enforce impartially the regulations under which they operate. We have a number of shorter points.

(5) Future Developments - We believe you are legally bound to consider (1) the interactive effect of this development along with the other coal related developments in the region and (2) the effect of the reasonably anticipatable future development associated with this project. You do neither. You assert, on page 3, that future environmental statements will need to study the cumulative effects. To the extent that it is possible to do so, we believe you must do that in this document.

(6) Impact on Workers - We think there was an entirely inadequate discussion of the noise problem. Some of the decible levels you talk about seem damaging to employees and anything else nearby. The availability of precautionary measures is not sufficient.

(7) Impact on Hydraulic System - We think that there was insufficient attention in the draft impact statement to the prospect of damage to the coal bed aquifers - and particularly the depletion of ground water outside of the tracts under lease, with full coal development. It may be true (dubious), that "Regionally (outside of Tract III) the effect of the strip mining operation on ground water conditions in this aquifer will probably be moderate, unless the proposed mining area is expanded considerably." But every reasonable person knows that Westmoreland plans to expand the mining area "considerably."

(8) Mining Impact on the Topography - We do not believe you are correct in asserting (p. 158) "Only through an unreasonable expense and amount of effort could the land be put back into its original contours and conditions." Could you clarify what is considered to be an unreasonable expense for the total reclamation of the land? (p. 158). What would the expense be, and would Westmoreland be willing to consider whatever additional expenses necessary to accomplish the job? We do not necessarily believe that it is desirable to decrease the land surface gradient from the original, in that the land should have esthetic purpose as well as agricultural purpose.

(9) Crow Response to the Proposal. - It seems vitally important that in the final EIS the Crow Indian leaders (p.199) consulted during the preparation of the statement be identified and their opinions stated. Also, we suggest that Crows opposed to the mining proposal be solicited for their opinions and their reasons for opposition. This might be considered an incursion into the authority of the Crow Tribal Council, but given the controversy of this proposal and the probable applications for similar leasing arrangements elsewhere on Indian lands in the future, and given the increasing interest in this topic to all Indians, we feel that it would be appropriate to set such a precedent.

(10) Now that the National Academy of Science report on strip mining in the west is available, we believe this proposal ought to be strictly evaluated in terms of those criteria in a revised draft environmental impact statement.

(11) In view of the fact that the U.S. Senate has passed an amendment to the strip mine control act, which forbids any strip mining on land where the surface is owned by private citizens, but the mineral rights are in federal ownership, we believe you should do nothing, and allow nothing, which would thwart that intent, pending House action and final passage of that federal legislation.

Finally, we have one question. You simply add the expected tribal royalties to present tribal income, to arrive at the expected economic benefits for the Crow. But will not the increased tribal income from coal leases (and salaries) reduce some of the other present income from the Crow, so that their net gain will be less than you assert? If so how much?

Thank you for your attention to our concerns. Should these comments arrive in time, would you please read them into the record at the public hearing, as well as including them and responding to them in the final EIS. We would be delighted, of course, if this proposal does not go to a final EIS in this form. You should, in honor, completely renegotiate and redo this effort.

Sincerely,

H. Paul Friesera  
 Sam Carnes  
 On behalf of the  
 Great Plains Communities Study Group

## ENVIRONMENTAL MEDIATION: A FIRST DISPUTE

Flood Control, Recreation and Development in the  
Snoqualmie River Valley

Gerald W. Cormick and Jane E. McCarthy

The Snoqualmie River Valley forms a green bracket around the Seattle, Washington metropolitan area. The valley can be divided into three distinct sectors: (1) the upper valleys of the North, South and Middle Forks of the Snoqualmie which flow through steep alpine valleys; (2) the middle valley which includes the confluence of the three forks of the river and has two towns of about 12,000 population; and (3) below a 168' falls, the lower valley where the river meanders through rich, green farmlands.

The dispute over flood control in the valley is a classic environmental conflict. Following a serious flood in 1959, the local county sponsored a Corps of Engineers study which resulted in the proposal of a flood control dam on the Middle Fork. The residents of the middle valley supported the proposed dam as it would prevent damage to their homes and businesses. The farmers in the lower valley supported it because it would control the crop-damaging spring floods which occur about every second year. A coalition of environmental and citizen groups opposed the dam on the grounds it would open the flood plain to urban sprawl, interrupt a free-flowing river and was unjustified on a cost-benefit basis.

In 1970 and again in 1973 the Governor said "no" to the dam, as proposed, on the grounds that it would be "environmentally disruptive," but noted that he continued to be concerned about the flood problem. Following a lengthy series of divisive public hearings, the Environmental Mediation Project (EMP) first became involved in the dispute in late 1973. Preliminary discussions were held with the State and the Corps, the primary decision-making bodies, to determine whether or not they would be interested in exploring the possible mediation of the dispute. Based on a first assessment of the issues and initial contacts with the various "parties" (environmentalists, farmers, residents and public officials), it was determined that mediation could be a useful tool in resolving the impasse.

The EMP then discussed with the Governor the possibility of his formally appointing the Project Director and Assistant Director (Gerald W. Cormick and Jane E. McCarthy) as mediators. After the mediators ensured that both they and the mediation process would be acceptable to those involved, the Governor formally appointed Cormick and McCarthy on May 7, 1974, requesting a report on their progress by June 30, 1974.

An immediate task was to identify the parties to the dispute. Public hearing records indicated those who had been leading spokesmen for various positions. The mediators conferred with these persons and many others, describing the process, discussing the dispute and asking, "Who are the ten or twelve persons who, if they could agree on something, have the kind of influence and stature that the various groups--farmers, environmentalists, etc.--would support them and anything they might agree to?" About ten names of persons who represented all important positions and shades of opinion in the conflict emerged from this lengthy process. Those ten became the "core group" for the mediation sessions.

Members of this core group were not formal representatives of any organizations. Their responsibility was to "bring along" their constituents as the discussions progressed. In a sense, they were also mediators.

Cormick and McCarthy worked with this group in joint and separate sessions and also provided a link to the key parties not "at the table"--the Governor, the Corps and county officials, all of whom were carefully kept current on the progress of the dispute in order to ensure their support for emerging recommendations.

Several initial points were established which were an important impetus to the discussions. The environmentalists discovered the farmers really didn't want to sell their land to subdividers and would support stringent controls to prevent such development. The residents of the middle valley began to understand the development concerns of the environmentalists and recognized that such development would make the valley less desirable to them as well. The environmentalists discovered that sprawl was occurring legally and illegally in the middle and upper valleys despite the flooding. And, the environmentalists began to see that their "win" was temporary and a future serious flood could not only lead to a dam being built but to the environmentalists being blamed for damages and injuries. The focus became, "How do we provide some level of flood control, insure the continued economic viability of the farmers and the towns and build the kind of land-use plans and controls that maintain the valley as a greenbelt with broad recreational value?"

It is difficult in a brief description such as this to relate the kinds and depth of effort performed by citizens when they feel they have an opportunity to influence decisions: The spokesman for the farmers who would arrive at 10 p.m., straight from haying all day, work in joint session until 2 a.m. and then head home for a nap before 5 a.m. milking. The Project Engineer at the Corps who would carefully research even the most peripheral questions, meet with any of the participants, and work all weekend and who established a level of credibility with all of the parties which proved invaluable. And, the environmentalists who assumed personal risk and abuse as they began to support flood control measures.

When the mediators reported to the Governor on their progress shortly after June 30, he asked that they continue their efforts and report back by September 30.

In late August the mediation appeared to have reached a stalemate. The environmentalists in the core group had been unable to formulate any common position in response to alternate approaches proposed by those primarily interested in flood control. At this point the mediators refused to call any further joint sessions until the environmental group spokesmen had gotten a position together and communicated that position to their constituents. This action, along with the return of a key environmental spokesman from a six week kayak trip in Alaska, led to a breaking of the deadlock. By the end of September a tentative agreement had begun to take shape.

On December 6th, after two months of painstaking effort to formalize specific provisions and final language, all of the participants in the mediation effort signed a set of joint recommendations to be forwarded to the Governor.

Generally, the agreement provides for a multi-purpose flood control, hydro-electric, recreational and water supply dam on the North Fork (rather than the Middle Fork) of the Snoqualmie, a system of setback levees in the middle valley which provide 100 year flood protection to developed areas, maintaining a large portion of the middle valley in natural flood storage and recreational use, controlling patterns of development through the purchase of floodway easements and development rights and the establishment of a basin planning council to coordinate planning for the entire river basin. The agreement also provides for appointment by the Governor of an interim committee, composed of participants in the mediation along with a few other citizens, to direct the implementation of the agreement. The interim committee will be provided with technical assistance from an advisory group representing various federal, state and local agencies.

The Corps of Engineers and county and local officials have indicated support for the package. (Preliminary studies indicate the basic engineering and cost-benefit feasibility of the proposal.) The Washington Environmental Council, a state-wide umbrella organization of environmental groups, has voted unanimously to support the proposal and they, along with a number of other citizen groups such as the League of Women Voters, the Alpine Lakes Protection Society and the Valley Greenbelt Association (the farmers' organization) have written letters to the Governor indicating formal support.

In a press conference held to announce the agreement, Governor Evans stated that he "thoroughly endorse(d)" the recommendations and announced the formation of the proposed interim committee as the first step in their implementation.

The EMP has carefully documented and recorded this first attempt to apply mediation to an environmental dispute. Our tentative conclusions from this and other environmental disputes in which we have been involved address such concerns as (1) which environmental disputes are most likely to be "mediable"; (2) the problems of identifying and conferring "recognition" on groups and individuals; (3) the proper relationship between such "unequals" as concerned citizens and public officials responsible for making decisions; (4) the length of time required to resolve complex environmental problems of broad interest; (5) how to deal with the lack of implicit or explicit deadlines imposed by the situation; and (6) how to translate agreements into implementation.

December 20, 1974.

ADDENDUM: Flood Control, Recreation and Development  
in the Snoqualmie River Valley

It is now some six months since Governor Evans announced a comprehensive plan for flood control, land use and recreation in the Snoqualmie-Snohomish drainage system arrived at through the mediation process. Since that time the implementation process provided for in the agreed upon recommendations to the Governor have been going forward. The mediators no longer have formal involvement in the situation.

The Governor appointed an Interim Committee, as proposed in the unanimous recommendations, whose members represent both those involved in the mediation effort and a number of other constituencies whose support is necessary in ensuring the effective implementation of both the letter and spirit of the agreement. Members of that Committee, with the assistance of a liaison person appointed by the Governor to provide a variety of staff and other services, have spent long hours working with federal, state and local officials to develop the program necessary to implement the proposals.

As a part of this implementation and planning effort, the Chairman of the Interim Committee and the mediators were invited by Senator Warren G. Magnuson and Representative Lloyd Meads to testify before the Subcommittees on Public Works of the Committees on Appropriations of the United States Senate and House of Representatives. That testimony was on behalf of a Corps of Engineers request for funds to undertake the technical studies necessary to ensure the feasibility of the proposed flood control and other works as outlined in the agreement.

An important consideration for the mediators was to determine the point at which their formal responsibility should be terminated. There was an assumption on the part of some observers and participants that the mediators should assist the Interim Committee throughout the implementation process. However, one reason that a process for implementing the agreement was developed was to create a mechanism whereby diverse but concerned citizen and public groups could continue to interact. Accordingly, the mediators ensured that all parties were aware that with the signing and announcement of the agreed upon recommendations, their formal participation would end. This step not only clearly transfers the responsibility for implementation to the Interim Committee and relevant public officials but highlights a critical difference between the quite separate processes of reaching an agreement for future activity and the actual carrying out of that activity. Further, a continuing problem in the mediation of many other social disputes has been the difficulty experienced by some intervenors in severing a continuing obligation for facilitating the implementation of agreements reached. This not only could prevent the maturing of newly defined relationships between the parties themselves, but places a very real limit on the number of involvements possible for any intervenor.

With the beginning of June, 1975, the Environmental Mediation Project was re-funded by the Ford and Rockefeller Foundations as the "Office of Environmental Mediation" in the Institute of Environmental Studies at the University of Washington in Seattle, Washington. The goals of the Office over the next two years will be both to broaden the scope and variety of disputes in which it is involved and to work toward institutionalizing dispute resolution systems for the broad range of environmental problems which continue to confront us.

# FAIRBANKS NORTH STAR BOROUGH

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IMPACT INFORMATION CENTER, A COMMUNITY-DIRECTED RESEARCH MODEL

Mim Dixon, Ph.D.,  
Director,  
Impact Information Center

## Abstract

Vast oil and natural gas resources in the American arctic are being developed to meet the nation's demand for domestic energy sources. The trans Alaska oil pipeline is a landmark in both resource development and construction. At its inception, it was the largest private construction project in history. Prior to federal approval of the trans Alaska oil pipeline, extensive environmental impact studies were made as required by the National Environmental Policy Act of 1969. Although aspects of impact upon the "socioeconomic" environment were included in the environmental impact statement which was submitted to the U.S. Department of the Interior, little research was undertaken on the social impact of the pipeline construction prior to the actual event.

The Impact Information Center is studying the effects of construction of the trans Alaska oil pipeline on the community of Fairbanks, which is a principal administrative, supply, and transportation center for construction activities. By documenting certain social, cultural, economic, population, and other changes in Fairbanks resulting directly and indirectly from the pipeline project, this study may enhance the accuracy of social aspects of environmental impact statements for future resource development projects. It may also provide information which would help affected communities plan for impact and cope with its effects in a rational, systematic manner. And, the Impact Information Center provides a new model for community-directed research. This article describes the history and functions of the Impact Information Center and the role of the social scientist in this research setting.

## INTRODUCTION

Current and past administrations of the federal government have given high priority to making the United States more independent with respect to its sources of energy. Domestic production of oil has been encouraged to meet national energy needs. Thus, a sense of urgency surrounds the development of Alaska's oil and gas resources. Passage of the federal Trans Alaska Pipeline Authorization Act of 1974 paved the way for constructing a pipeline to carry oil from the oil fields of Prudhoe Bay on Alaska's northern coast to the port of Valdez on Alaska's southern coast.

Construction of the trans Alaska pipeline system was officially begun in April, 1974, although preliminary work began as early as 1968. Initial phases of construction required building a 361 mile gravel road from the Yukon River to Prudhoe Bay, which includes bridges over 20 major streams and rivers and a 2,300 foot bridge over the Yukon River. Other preliminary construction includes three permanent airfields, eight temporary airfields, fifteen permanent access roads, numerous temporary access roads, and nineteen construction camps. The second phase of the project, scheduled for completion in mid-1977, includes construction of a 798 mile long, 48 inch diameter steel pipeline from Prudhoe Bay to Valdez, eight pump stations along the route, and oil storage and tanker loading facilities at Valdez. The final stage of the project includes construction of four additional pipeline pump stations and more oil storage and tanker docking facilities at Valdez. Estimated completion date for the construction project is 1977.

The cost of the project is now estimated in excess of \$6 billion. Alyeska Pipeline Service Company, the firm hired by a consortium of seven oil companies to build and operate the trans Alaska oil pipeline has hired two construction management contractors, Bechtel, Inc., and Fluor Alaska, Inc. Twelve execution contractors have also been hired. An estimated 9,000 persons were to be employed directly on pipeline jobs by the end of 1974, with 22,000 jobs in 1975. Many management personnel and skilled tradesmen are being brought to Alaska to do the work. Most unions have negotiated contracts which provide a working period of nine to 13 weeks, with 10 hours of work for seven days per week, and a rest and recreation period of one to two weeks. This yields paychecks of \$1,000 to \$1,500 per week for laborers and skilled craftsmen. Management persons usually work schedules of eight weeks of work and two weeks of rest and recreation, with salaries in the range of \$30,000 to \$70,000 per year.

The Impact Information Center was conceived by the community, and its ultimate rationale is to serve the community by providing information about the community. Thus, the fundamental approach is to gather information on a broad range of activities within the community and to disseminate that information in the most expedient manner. The accumulated information also provides a basis for analytical interpretation within a theoretical framework.

Data collected by the Impact Information Center is reported to the public in monthly reports. In July, 1975, the eighteenth regular report was produced. The regular reports range in length from 20 to 30 pages, and cover a broad variety of topics, including housing, food prices, traffic community services, and other areas. In addition to the regular reports, two special reports have been produced, one on minority and Alaska hire on the pipeline, and the other on the effects of the pipeline on Senior Citizens in Fairbanks.

Impact Information Center Reports are distributed to the news media; local, state, and federal agencies; and, persons who have requested that their names be placed on the mailing list. Currently there are approximately 500 persons on the mailing list. The Impact Advisory Committee meets with the Impact Information Center staff in monthly public meetings to review the reports and to suggest directions for additional research. Thus, the data regularly undergo the tests of public scrutiny.

In January, 1975, after the Impact Information Center had been in operation for six months, persons on the mailing list received an evaluation questionnaire. There was a 52.7% rate of return on the questionnaires. The results indicated that on the average, 3.3 persons read each copy. More than 77% of the respondents stated that they had actually used information contained in Impact Information Center reports. Some of the uses specified by the respondents included using the information for planning and decision-making; for reference in hearings, reports, or research; in news reporting; in agency reports; to support proposals or budget requests; to help people who are new to the community; and as part of speeches or programs. Every person responding to the questionnaire indicated a desire to remain on the Impact Information Center mailing list.

In addition to providing written reports, the Impact Information Center acts as a communications and referral center. Located in a storefront office in the heart of Fairbanks, the Impact Center serves as a walk-in center for local citizens and newcomers to Fairbanks. Traveling journalists, bureaucrats, and businessmen considering locating their businesses in Fairbanks, frequent the Center. Many persons telephone the Impact Information Center with questions, complaints, rumors, or information. And, the staff of the Impact Information Center is often asked to speak to local and visiting groups.

METHODS

A variety of methods have been used to collect community data. These include the following:

1. A reporting system has been established in which local and state agencies send copies of their regular reports to the Impact Information Center.
2. The local newspaper and other major newspapers within the state, are reviewed daily and a file of newspaper clippings relating to the community, the impacts of the pipeline, and energy, resource development, is maintained.
3. Regular market basket surveys, heating-oil cost surveys, and surveys of rental prices advertised in the local newspaper are conducted to establish economic indices. In addition, information obtained by the Bureau of Labor Statistics in its Anchorage Consumer Price Index is utilized. A major activity of the Impact Center and its Advisory Committee has been to encourage the reestablishment of a consumer price index in Fairbanks.
4. Utilizing the dockets from the State Superior Court, filed divorce complaints are recorded monthly, and information from previous years is being collected in order that a time series analysis may be possible.
5. Interviews are conducted with local persons to obtain information on a variety of subjects, and local institutions are visited and observed.
6. Public meetings and hearings are attended to obtain both information and public expressions of sentiments.
7. Formal questionnaires are used occasionally to obtain information on specific problems, (e.g., a survey of high school students to determine their roles within the workforce, a survey of Senior Citizens to ascertain their pipeline-related problems, and a survey of local pipeline-related workers to determine their child care needs and solutions).
8. Local university students are encouraged to study impact phenomena or to do mini-ethnographies in areas which relate to pipeline construction and/or impact phenomenon. Their work is supervised and coordinated through the Impact Center, and the Center acquires copies of completed papers.

9. Impact Center staff participate in local groups, give speeches at meetings of various organizations, are interviewed on radio and television talk shows, and participate in community activities in other ways which help to create a positive image and a sense of trust which facilitates an informal communications network.
10. As the Impact Information Center has become recognized as a community resource, persons in the community or elsewhere with questions, problems, or information contact the Impact Center either by telephone or going directly to the Center. Persons in the community provide information not only in terms of data, but also by alerting the staff to community concerns.

Research methods are flexible and strive for the integration of qualitative and quantitative data. The financial and political constraints on the Impact Center prohibit a large research team which could provide greater depth of information. However, the relatively small size of the community, and the unique vantage point provided by the research setting, enables the applied anthropologist to view the community in a holistic manner not often afforded urban anthropologists.

#### ROLE OF THE SOCIAL SCIENTIST

The Impact Information Center offers a unique research setting which provides the social scientist with validity, access to information, and a sense of purpose. This type of applied anthropology requires certain skills not often taught in graduate school. To function effectively in this type of nonacademic setting, a minimal level of proficiency is required in practical politics, which often runs counter to academic training.

In the interest of stimulating dialogue between applied social scientists, this paper offers suggestions based upon the author's experiences as an applied anthropologist working for local government in a relatively small, conservative community.

Fundamental to these recommendations is the fact of life that the position, (i.e. funding), for the applied anthropologist is subject to local control; and, therefore, local politics. Another fundamental premise is that the anthropologist's effectiveness is dependent upon his/her credibility and ability to communicate findings.

1. Consider every group and individual in the community as part of a "special interest group," whether or not it appears that they have the community interest at heart; rather than personal interests. To avoid community politics and gain general acceptance, it is important not to be identified with any single "special interest." This may be accomplished by balancing activities with some types of special interest groups with attentions to opposite types of interests. Types of special interest groups in the community might include business/economic; church/social activist; conservationists; academic/university; labor/union; and ethnic groups.

2. An advisory committee or board of directors composed of representatives of broadly-based segments of the community is vitally important. This gives the organization more credibility and distributes the responsibility for activities to people who are known and respected in the community. In order for an advisory board to be effective, it must include representatives of potentially critical organizations.

3. To maintain credibility, it is imperative to limit activities to disseminating documented information, to minimize interpretations, and to avoid projections. Based upon accurate information, others can draw conclusions, make predictions, suggest policy, and recommend planning. If the applied social scientist is asked to become involved in planning processes, it is best to offer several alternatives, explaining the positive and negative aspects of each. In other words, the social scientist does not become a political threat if he/she lets somebody else take responsibility for decision-making.

4. If the information is to be used, it must be presented in a clear and understandable manner. Information is more likely to be used when written narratives are kept to a minimum, and charts and graphs are employed whenever appropriate. Statistical analysis is difficult for many people to interpret and conceptualize. It is far more effective to present quantitative information using numbers and percentages. Social scientists who find this threatening to their sense of academic competence may prepare two reports: a detailed report for personal use and for people with specialized interest, and a more general and brief report for the public.

5. Vocabulary is exceedingly important. Words with neutral or positive connotations in academia can have negative connotations in other contexts. Try to understand community attitudes and political sensitivities, and select words which will not evoke hostilities. For example, I found that the words "research" and "study" send up red flags in this anti-intellectual community; whereas, the term "investigation" was acceptable. Similarly, I achieved greater acceptance by using the title "Information Officer" rather than "Research Associate."

In most cases the business/economic interests dominate politically. Explanations including concepts which are understood by the economic interests and which incorporate their values are more likely to be accepted. "Taxpayer's dollar" is a phrase which is used commonly by politicians, and can also be used effectively by social scientists.

6. You don't always have to be right. Try to avoid inaccuracies and mistakes; but, if somebody in the community accuses you of being wrong, don't become defensive. Remember:

- a. That person is becoming involved in the project--encourage his/her participation.
- b. That person is a source of information--seek the additional information he/she has to offer.
- c. Criticism from your advisory board gives them a raison d'etre - if you are always right, that means they are powerless.

- d. Your credibility is as much a function of process, as content--concentrate on developing strong relationships rather than strong arguments.
  - e. Don't worry about being embarrassed by mistakes--it makes you human.
7. There are both academic and nonacademic approaches to accomplishing similar goals. For example, academic proposal-writing and grantsmanship is quite different from the means by which one obtains funds for nonacademic institutions.
8. Applied social scientists must become more media conscious. News media seek sensational stories and quotations, so it is necessary to learn how to use the news media without letting them abuse you.
9. Be aware of the hierarchy within your system. Keep administrative persons posted on your activities and consult with them on decision-making matters. Do not consider your project to be outside the system. It is possible to do this and still maintain a fair amount of autonomy.

Perhaps other applied social scientists can draw upon their own experiences to add to this list of suggestions.

#### SUMMARY

Forging a role for an applied anthropologist in a community-directed research setting is incredibly challenging. The Impact Information Center provides an exciting opportunity for research with continual sharing and evaluation on the part of the research population. Monitoring the effects of pipeline construction through the Impact Information Center may be considered the data-gathering stage of this research. Since the community prefers to utilize the data with a minimum of analysis and interpretation, the next phase of the research effort will probably take place in a different setting. The data-gathering stage is probably most useful to the local community; whereas, the synthesis, analysis, and interpretation will be more beneficial to the academic community, planners, and persons involved in social impact assessment.

Although this researcher is anxious to move into an analysis of the data, one or two years of data gathering is not unusual in social science research. What may be unusual is that the process of data gathering is as personally gratifying as it is in the Impact Information Center.

#### REFERENCES

- Dixon, Mim H. "Minority hire and Alaska hire on the pipeline." Impact Information Center Special Report No. 1. Fairbanks: Fairbanks North Star Borough, 1975.
- Dixon, Mim H. "Senior citizens: the effects of pipeline construction on older persons in Fairbanks." Impact Information Center Special Report No. 2. Fairbanks: Fairbanks North Star Borough, 1975.
- Parr, Charles H. "Impact Information Center Schematic." Paper presented to the Borough Assembly, Fairbanks North Star Borough, 1974.

## SOCIAL IMPACT ASSESSMENT IN CROSS-CULTURAL PERSPECTIVE\*

C. P. Wolf

1. Mohenjo-Daro: A Case Study of Environmental Management

One hundred sixty-seven miles north of Karachi lies the ruin of an ancient Indus civilization, Mohenjo-Daro. But that's ancient history, isn't it, at most of antiquarian interest. I have taught about it, in courses on the comparative sociology of civilizations, but that morning three days ago I was thinking of Mohenjo-Daro as a case in environmental management. Was it a failed case, of environmental mismanagement? We are at liberty to inspect the ruin. It has the appearance of a disorderly brickyard. What's interesting about that? Those bricks once sheltered life. Regard the bricks: they are hardened by firing, though not enough to resist seepage of river water. How were they fired? By deforestation. What was the effect of that? Erosion, silting and salinity.

That is one theory of the civilization's demise; there are others (see Wheeler 1968). The foreign invasion hypothesis places superior weapons of iron in the conquerors' hands. Mohenjo-Daro, a floodplain settlement, had none. But what made it an inviting conquest? Again, being situated on the floodplain, it must have endured severe flooding. Yet endure it did, for 2000 years of continuous occupation. An elaboration on the flooding theory has geological uplifting downstream forming temporary dams that impounded immense pools of backwater. Or climatic change, perhaps? But what would Mohenjo-Daro have been without the Indus? It would not have been at all, much less perhaps the first and foremost of ancient civilizations. This points to the ambivalence of natural landscapes, where to exploit natural advantage is to risk natural hazards (see White 1974).

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\*Revision of a paper presented to the International Conference on Management of the Environment, Karachi, Pakistan, 19 February 1975.

What, after all, is the moral of Mohenjo-Daro? Is it found in the irony of Shelly's lines:

I met a traveller from an antique land  
Who said: Two vast and trunkless legs of  
Stone  
Stand in the desert . . .

And on the pedestal these words appear:  
"My name is Ozymandias, king of kings:  
Look on my works, ye Mighty, and  
despair!"  
Nothing beside remains. Round the decay  
Of that colossal wreck, boundless and  
bare  
The lone and level sands stretch far  
away.

I will think upon it two days hence, beside Tarbela Dam.

## 2. Introduction

As you know, the United States has many qualified environmental scientists. So the composition of our delegation--both sociologists--may strike you as a bit odd. It wasn't planned that way, exactly, but it turned out that way. Professor Bean has already demonstrated the wisdom of his selection. I too shall try to suggest why social scientists are good people to have around on matters of environmental concern. My message is very simple. There is a newly emerging body of knowledge called "environmental sociology" that seems important to questions of environmental management because, fundamentally, problems of environment are human problems. Within that field, one distinct emphasis--"social impact assessment"--seems especially pertinent.

I am speaking then as an unofficial "Ambassador from Sociology," and social science more generally--an all-too-hidden continent of thought when considering the world environment and its management. It was John Ruskin, I believe, who greeted news of a transoceanic cable linking Britain and India with the aston-

ished reply: "But what have we to say to India?" We social scientists have perhaps more to learn than to say on environmental subjects. Yet the globalization of sociology in recent decades marks a turning point in world intellectual history, and it is only fitting that some of these intellectual resources be applied to global problems of environmental management.

I am speaking too as a citizen of the world. Two facts about "environment" are so obvious they bear repeating: (1) environment is international in scope, and (2) environmental studies are interdisciplinary in character. No parochialisms of discipline or nation can be allowed to obscure these facts.\*

### 3. The Idea of "Environmental Management"

What social scientists can suggest is a reciprocity of human environment and human experience. It is the social environment which is our experience and expression. Environment is the carrier of human value; it is shaped to human purpose. The idea of "environmental management" symbolizes that environment is not something outside of humankind and its experience but rather the arena in which human aspirations are molded and human potentiality is realized. "Environmental quality" must therefore resolve to "quality of the human environment." Correspondingly, the aim and achievement of environmental management must be to enlarge and enhance the quality of life.

A good deal of the intellectual work required of social scientists at this point is to effectively formulate these "quality of life" criteria and to accurately gauge their indicators. Both are needed, to deepen conceptual meaning and refine operational measurement. There are questions of collective decision and

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\*Tarbela Dam, which Shami (n.d.: 20-22) would elevate as a symbol of national self-reliance, arose from the "engineering solution" former TVA Chairman David E. Lillenthal proposed to settle the dispute over Indus water division between

action that must be resolved in order to prevent recurrent "tragedies of the commons" (Hardin); this time on a global scale. (Indeed, it would appear that the devastating effects of Sahelian drought are as much due to overgrazing as to climatic variation.)

#### 4. Environmental Sociology

These seeming commonplaces of environmental perception and evaluation are given new meaning by a growing body of interdisciplinary social science knowledge variously labeled "environment and behavior" or "man-environment relations." Within that broad domain is a newly emergent specialty, "environmental sociology," which addresses the intricate and inextricable relationship between human --that is, social--activity and its physical setting. Increasingly, the human environment is a "built environment," a social construction. What is "natural," to humans or environments, is a hoary question. (Negry 1962) and perhaps a pointless one. What seem essential are cultural perceptions, definitions, and values. "Environmental degradation" refers to a physical state of air, land and water quality, for example, but it is a social judgment of those "natural" conditions.

The corollary is that environmental quality has its human causes and consequences, and further, that by a process of mutual adjustment societies' environmental problems are reflections of their own natures. And because they co-exist in mutual adjustment, if not outright harmony, it is difficult to change one without changing the other. Hardest of all is to change both simultaneously. This "socialization" of environment does not imply or betray the anthropocentric notion--Niebuhr (1960) calls it "henotheism"--that because environment is avail-

India and Pakistan Its construction has been financed largely through the World Bank and multi- and bilateral grants and loans from half a dozen nations. Besides 15,000 Pakistanis, 500 workers from 24 countries are employed on the project. Technical expertise has been drawn from several major international consulting firms (Baker 1973: 8).

The range of these concerns is indicated in the draft "Statement of Purpose for an Environmental Sociology Section," appended.

able it is thereby disposable. As Catton (1975) recognizes, to think otherwise is both fallacious and fatal. The domination of nature (Leiss 1972) must extend to human nature as well (Skinner 1966).

The evolution of human society is a process of change from nature to culture as the basis of human activity. In effecting this change, technology has been the chief instrument of cultural intervention and control. One early example of cultural achievement is glimpsed in Lévi-Strauss' (1969) study, The Raw and the Cooked, which explores the mythology surrounding use of fire in food preparation. Through cooking, far wider niches of human adaptation were opened up, yielding to our species an evolutionary advantage it has never relinquished.

In the process of this great transformation, environment has been the recipient of the most advanced technological applications. There is a social component to this process, in the invention and diffusion of technological innovations and the social forms through which they are organized and applied. There is also a distinctive "social technology," of which one particular form -- "social impact assessment" (SIA) -- is assuming some importance for development planning in the industrially advanced societies. Countries less developed stand to benefit significantly by a transfer of this social technology.\*

##### 5. Social Impact Assessment

SIA is a quite recent development in the United States, and we are in the very early stages of thinking about how to do it, let alone putting it into widespread practice. The best way to explain the idea of SIA is by analogy with the more familiar practice of "environmental impact assessment" as

\*On problems of the transfer of intellectual technology see however Streeten (1974).

required under the National Environmental Policy Act of 1969 (NEPA), whose purpose is to "encourage productive and enjoyable harmony between man and his environment and stimulate the health and welfare of man. . . ." NEPA further recognizes "the profound impact of man's activity on the inter-relations of all components of the natural environments" and prescribes the use of "all practicable means and measures . . . to create and maintain conditions under which man and nature can exist in productive harmony and fulfill the social, economic and other requirements of present and future generations of Americans." The means and measures cited, including those "which will insure that presently unquantified environmental amenities and values may be given appropriate consideration," entail an interdisciplinary approach "to insure the integrated use of natural and social sciences . . . in decision-making which may have an impact on man's environment." While distinctively "social" impacts have tended to be implicit, indirect and qualitative under these provisions, recent administrative regulations and legal interpretations have broadened and deepened the social content admissible and required (Savatsky 1974; Francis 1974).

An example closer to hand is found in the statement (Nasim, Mirza and Ahmed 1975: 2) that "The development and application of nuclear energy is one of the first major examples of determining environmental and public health issues well in advance of industrial application. . . ." Indeed, "anticipatory research" is the key to this analysis, not merely "evaluative research" after the fact of technological damage. We seek to learn what will happen to people in communities over the next 50 or 100 years with and without a planned intervention--a dam, a highway, a housing development, a sewerage treatment plant, a factory location, a nuclear reactor, and so on and on. Nor are "nonstructural" policies, programs and projects, such as a social security or a family

planning scheme, to be excluded from such analysis. These are surely among the most complex--and most important--questions of environmental management.

The methodology for conducting these studies is undergoing rapid development at present; doubtless it will draw on numerous established techniques of social research, such as demographic analysis, survey research and social network analysis, to name but a few. Also it will draw on less familiar techniques of futures research, such as societal trend analysis and cross-impact matrix methodologies and those of technology assessment as well. The general logic of the approach follows a series of assessment steps:

1. Social profiling--establishing base conditions from which to measure future change;
2. Profile projection over the expected life of the project--presently the weakest methodological point, except for population projections on a highly aggregate level;
3. "Assessment," or estimating the profile parameters under alternative plans; and
4. Impact evaluation, the assignment of positive or negative values to the various anticipated outcomes. One question here is: who benefits from and who pays for the plans under study.

After working through this procedure, we should arrive at a sounder basis for decision making and for mitigating those adverse impacts that cannot be avoided. While SIA is now very much more of an art than a science (Wolf 1974), with increased experience it should provide a valuable planning tool. The rewards of effective planning should far outweigh the difficulties of analysis.

Why is analysis on this order of complexity required when unserved human needs, of health and housing, employment and education, appear so obvious? In the case of Pakistan, for instance, isn't anything done along these lines to be accounted as sheer gain? One answer is that while there are undoubted benefits there are also inescapable costs, and these must be optimized across the entire

range of development planning. Moreover, the incidence of benefits and disbenefits will not fall equally and equitably to all parties involved and persons affected. The criterion of social justice must not be ignored in the dissociation of costs and benefits, especially where redistributive effects are themselves planning objectives. Lastly, we know of many projects in which unanticipated consequences have vitiated or seriously compromised the value of well-intended plans. For all these reasons it seems both necessary and desirable for SIA to be consistently and conscientiously applied.

#### b. . . . in Cross-Cultural Perspective

Very well, but why the cross-cultural emphasis? Isn't this aspect of advanced planning more properly consigned to advanced industrial societies? I have tried to argue the universal validity of SIA. We have then, to demonstrate that validity, and to point out the utility of SIA for all who employ it. First, as to validity, we can simply indicate that advanced industrial societies themselves contain striking cultural differences which must be appreciated and respected in the planning process. I very well remember the almost frantic call I received from the Canadian Ministry of Transportation. It seems their building in Ottawa was besieged by Indians demanding fairer treatment; and wasn't there something I could send them about the special role of cultural minorities in planning for the public good? Again, our own American Indians are sitting on top of vast mineral and energy reserves they are not at all sure they want to see exploited at their expense.

These examples provide a kind of "internal validity" check on public programs that cut across many divisions of class, race and ethnicity. Much of our knowledge of these groups and their differences comes from anthropologists. In turn, much of their understanding derives from the study of non-Western peoples.

A large fraction of previous research, in applied anthropology, community development and cultural ecology, bears on this interest. To consolidate and expand this knowledge base, a sizeable number of American anthropologists have recently banded together to form a "Group on Social Impact of Environmental Modification."

There is another issue to be raised in consideration, however. A great deal of the technical assistance rendered throughout the world bears heavy social responsibility for the human consequences implied. For one example, the Energy Research and Development Administration (formerly a part of the U. S. Atomic Energy Commission) through its Office for International Programs is now implementing the agreement between President Ford and President Sadat to install a nuclear reactor in the United Arab Republic. Surely a responsible negotiation of this agreement demands attention to the social impacts of such an installation. Past results of foreign aid in that part of the world are hardly reassuring, in terms of environmental quality (Wade 1974) and political stability as well (Holden 1974). Assessments of the Aswan Dam remain incomplete, although Geiser's (1973) study of an earlier structure clearly indicates the symbolic dimension and the cohesive force of myth and ritual in societies experiencing rapid change. A respectable body of literature has been accumulating on water resource development elsewhere in Africa (FAO 1969; Rubin and Warren 1968; Brokensha 1963-64; Scudder 1968) and Southeastern Asia (Hannan 1968; Ingersoll 1972). Increasing research effort is now required for purposes of codification and systematic generalization of their findings, and for placing them in an operational context such as SIA provides.

#### 7. Tarbela Dam Project: A Further Case in Point

It is within the borders of Pakistan itself that the largest of such undertakings is nearing completion. Tarbela Dam, in the Himalaya foothills some 40

miles northwest of Rawalpindi, is the largest rock and earth-fill dam in the world. A great many of Pakistan's hopes for future development are tied to its success; what power and water mean to a largely agricultural society can scarcely be exaggerated. What it means in human terms is no less impressive. Its reservoir will displace 80,000 people from about 100 villages (Baker 1973: 11). A massive resettlement program had succeeded in displacing only 10,000 by 1973, a year before scheduled filling to planned capacity. Tarbela Project Director Aman Ullah Kahn acknowledges,

This is the human problem we are facing. Whereas we are building this project for the benefit of humanity, for the development of the country, for the uplift of the economy, 80,000 human beings are being displaced. That is the sacrifice these people are making so that others can derive benefits.

Those people's attitude is: "Why us?" Even a generous compensation scheme will not restore the lost sense of place and disrupted way of life; some of those resettled have actually returned to former homes now threatened with inundation. The Project affords scant provision for unskilled employment, and while there is talk of building new townships around Tarbela reservoir there is a noticeable lack of social planning, e.g. possible recreational development with at least seasonal employment opportunities.

Other questions intrude on the level of physical planning; water storage capacity is predicted to decline by 80% over the next sixty years, due to silting, though power production would continue unaffected. The next major project

Current figures place the number resettled at 71,720. Whatever the loss to agricultural productivity, delays in dam completion caused by partial collapse of two tunnels may have actually facilitated the human adjustment process.

Two hamlets have already been built at Ghazi on the left bank and at Pehur on the right bank where 4,000 people have been resettled. Khalabat Township near Haripur is completed. It will ultimately accommodate 30,000 affected persons. The townships will be equipped with all the basic amenities and facilities.

will be Kalabagh, 120 miles downstream. "Is there any way to prevent Tarbela from becoming obsolete in the next 60 years? Ask this question and you see a gleam come in the eyes of the engineers building Tarbela" (Baker 1973: 11).

"Of course," one of them said. "Tarbela can store 20 percent of the water in the river. The other 80 percent flows through. If we could somehow build four more Tarbelas, some of those upstream, we could control the river completely and offset the silt problem."

Upstream watershed management, reforestation and other measures could very well reduce siltation; on the demand side, USAID (1974) estimates that over 75% of irrigation water available now is lost through seepage, spills and inefficient management, resulting in further loss of acreage due to waterlogging. "But no end of "engineering solutions" will adequately resolve the "human problems" of Tarbela Dam Project and its successors. What is required is assessment of their social impacts.\*

### 8. Environmental Perception and Cultural Variation

~~It is to expose--~~not to suppress--cultural differences that we are attempting to view social impact assessment in cross-cultural perspective. If environment is global in its proportions, environmental perceptions and evaluations are culturally diverse. While the global environment should be assessed in global terms, applying universal standards of environmental quality, environmental and cultural differences are appreciable between and within world regions. Differences, even contradictions, may occur within a society as well. Japan presents the cultural paradox of high esthetic appreciation coupled with unprecedented environmental pollution.

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The Government is also planning to set up some large industrial units at Khalabat . . . to provide sufficient means of employment to the affected people." I owe this and other information on Tarbela Dam Project to K. M. Parvez, Water and Power Development Authority (WAPDA) Public Relations Officer.

\*Anthropological field studies at the site are presently being conducted under the direction of Hugh S. Plunkett.

The major division appears to fall between more and less industrially developed nations, the former's problem of environmental management being defined as pollution control and the latter's as housing provision, sanitation, nutrition and the like.\* One illustrative case is the recent dispute over the UN's Earthwatch operations, the United States stressing environmental monitoring, e.g. via remote sensing, while other countries, especially African, urged priority for increasing stocks of urban housing. What "environment" means from these contrasting viewpoints is partly a matter of cultural experience and definition. In either case however the very perception of environmental problems is an encouraging sign, taking seriously Melko's (1972) suggestion that the course of civilizational advance is marked not by problem solution but by problem creation.

Main attitudes toward environment--exploitation, conservation and preservation--roughly correspond to stages of industrial development: early, mature and, most recently, postindustrialism. The attitude of early industrializers appears to be the total subjugation of nature at whatever cost, a mode of exploitation that now seems increasingly unviable. Mature industrialism has tempered that view by giving emphasis to environmental conservation. Postindustrialism underscores the need for preservation as well, recognizing that long-term human survival depends as much on environmental maintenance and enhancement as on resource exploitation.

Now if this is so, it seems evident for example that Pakistan's environmental management problems are not those of an advanced industrial society.\*\* Of

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\*No sharp distinction is supported by these Conference proceedings; despite widely-shared concern for housing, health and sustenance, pollution has been a major preoccupation for all participants.

\*\*Perversely enough, however, Pakistan has incurred some environmental problems of advanced societies, e.g. vehicular air and noise pollution, without having acquired the institutional and physical infrastructure to successfully engage them.

far greater concern are what Berry (1973) terms "the human consequences of urbanization." While it is true that since the industrial revolution, urbanization and industrialization in the West have proceeded more or less in parallel, perhaps it is a eurocentric bias to regard the former unaccompanied by the latter as "over-urbanization." The concept of "people pollution" or "superfluous people" rests on a single-valued logic of economic utility; there are more generous ways of conceiving human worth and richer criteria for its valuation. Nevertheless, it does seem necessary to attain some reasonable balance of people and resources, whatever the natural and cultural setting.

Attaining that balance poses something of a "developer's dilemma," of social equity and distributive justice--both supposed goals of the modernization process. As a development strategy, it may be preferable to maintain depressed levels of living for great masses of people while accumulating sufficient investment capital to eventually raise them--all the while having mobilized the mass support and social discipline to permit such development when "the long run" appears a luxury good of future-oriented, affluent societies. As Tiryakian (1967: 77) puts it:

It may be suggested that a fundamental dilemma of total societies in the modern setting is whether to opt for rapid economic development or rapid political development, the former being a centrifugal force, the latter a centripetal one. We would argue that they cannot be maximized simultaneously; the price of economic development is the erosion of social cohesion.

Another version of the "modernizer's dilemma" is bound up in the contradiction between national pride and cultural inferiority (Dore 1969: 433):

. . . the modernizer of a late-developing nation suffers from certain psychological disabilities. . . . In a world of competitive nation-states his modernizing zeal is likely to be highly correlated with--he himself is likely to claim that it is a function of--patriotism. And patriotism requires pride in country. So the admission that his country is backward which justifies his modernizing efforts has to be reconciled somehow with the defiant assertion that in some respects his country is superior. And the more wholesale the modernizing reforms his intelligence commends to him, the more difficult the reconciliation can become.

### 9. Environmental Management and World Politics

Can less developed countries learn the lessons of a modernization process that threatens global ecocatastrophy? In my view, it is greatly to be doubted.\* In their search for wealth and power, we should rather expect a pattern of the repetition of Western errors and excesses. Indeed they will insist on it, as if it were their due. For the unpalatable alternative, in their view, would be a perpetuation of the manifestly unjust system of international stratification. The point of course is that environmental management and world politics do not easily mix. Just as population control is regarded by some ultranationalists as "genocide," pollution control may be denounced as "ecocide."

Environmental concerns of advanced industrial nations, such as ozone depletion by release of freon into the atmosphere, must appear esoteric, even frivolous, set beside hungry mouths. Moreover, what predominantly agricultural country is going to ban the use of DDT and other potent insecticides, as the United States has done, at the risk of widespread epidemics and famines? Any system of production, even the most primitive form of slash-and-burn agriculture, has environmental consequences. But there is some truth to the argument that the most insidious dangers, say toxic metals or radioactive contamination, come from the applications of high technology.

Rappoport (1971: 132) argues that ecological dominance on a global scale degrades local, more complexly adapted ecosystems, and "As man forces the ecosystems he dominates to be increasingly simple . . . their already limited autonomy is further diminished . . . the system's normal self-corrective capacity is diminished and eventually destroyed." Global "development" then becomes a

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\*In light of the Conference proceedings, I must retract this statement to the extent of doubting my doubts.

species of "ecological imperialism," undermining our biological viability and ultimately the global ecosystem as a whole.

It may not be improper to characterize as ecological imperialism the elaboration of a world organization that is centered in industrial societies and degrades the ecosystems of the agrarian societies it absorbs. Ecological imperialism is in some ways similar to economic imperialism. In both there is a flow of energy and material from the less organized system to the more organized one, and both may simply be different aspects of the same relation. Both may also be masked by the same euphemisms, among which "progress" and "development" are prominent.

Similarly, Robert Theobald has speculated that less developed countries are now better adapted to a world future of resource scarcity than are the industrially advanced ones, and that extinction of these cultural patterns and social practices would lead to a general impoverishment of the world's human resources and social capital.

As before, cultural differences in the world are present and real; differential environments have conditioned differential experiences, adaptations and histories. This social environment too deserves protection and preservation. Even "tolerated variability" will not suffice; beyond that we require the positive appreciation of difference--cultural diversity as well as cultural unity. Pressures for seizing development opportunity should not eradicate these differences of cultural heritage and natural habitat. In turn this implies that the system of international stratification should be transformed into one of international differentiation, with equal cultural prestige and economic reward allotted to all segments and sectors.

#### 10 The Program

All of this talk is merely pious until translated into an active program of research.\* The framework for such an effort already exists in the Unesco.

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\*Professor Bean would observe that even an "active program of research" is pious talk until translated into environmental policy and action.

Man and the Biosphere Programme, whose central focus is the investigation of ecosystem functioning and natural resource management under a variety of environmental conditions. While this program, at least in the United States,\* has been deficient in respect to social science--in which it should be among the strongest --positive steps are being taken to remedy this condition. Project 10, "The Human Consequences of Large-Scale Engineering Works," presently occupies a low priority which I would like to see raised, for this is directly the concern of social impact assessment. To achieve this we are seeking international colleagues and inviting their initiative in framing cooperative research proposals for funding under PL-480 and other auspices. The UN's conference on Human Settlements, to be held in May/June 1976 in Vancouver, Canada, affords an early occasion on which to come together in the common interest. Plans are being formulated to hold a workshop on the topic of this paper under sponsorship of the Environmental Design Research Association, meeting in conjunction with the UN conference. It would be most appropriate for this event to attract strong international representation.

## 11. Conclusion

Remarks at the "ambassadorial" level are very like what Dr. Johnson complained of as "attitudinizing"; those at the programmatic level are scarcely any better. My American colleague, Professor Bean, has balanced them with some more substantive. Although there remain serious value questions to explore--of "material versus moral" in development ideology--for which we scarcely possess the vocabulary, there are also value commitments demanding immediate action. I hope to have offered one promising approach to engaging those concerns. While SIA is not yet an effective tool for environmental management, it has strong poten-

\*A general survey is contained in Programme on Man and the Biosphere (MAB) Task Force on the Contribution of the Social Sciences to the MAB Programme (1974).

tial realizeable in the near term. And, like "environment," it is both interdisciplinary and international in character and scope. At least as much attention should be paid to the ends of human activity as to their means.

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## References

- Baker, James W. "Men, Machines--and Money--Move a Mountain," Panorama (Karachi), 25, 2 (1973), 4-11.
- Berry, Brian J. L. The Human Consequences of Urbanization: Divergent Paths in the Urban Experience of the Twentieth Century. New York: St. Martin's Press, 1973.
- Brokensha, David. "Volta Resettlement and Anthropological Research," Human Organization, 22, 4 (Winter 1963-64), 286-90.
- Catton, William R., Jr. "NEPA, Sociologists and Succession: A Position Paper," Environmental Sociology 5 (January 1975), 8-21.
- Dore, Ronald P. "The Modernizer as a Special Case: Japanese Factory Legislation, 1882-1911," Comparative Studies in Society and History, 11, 4 (October 1969), 433-50.
- FAO. Man Made-Lakes: Planning and Development. Rome: Food and Agriculture Organization, 1969.
- Francis, Mark. "The Environmental Policy Act and the Urban Environment: Toward Socially Oriented Impact Statements," pp. 49-58 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, WI: Environmental Design Research Association, 1974.
- Geiser, Peter. "The Myth of the Dam," American Anthropologist, 75, 1 (February 1973), 184-94.
- Hannan, Willard A. "The Mekong Project," American Universities Field Staff, Southeast Asia Series, Vol. 16, Nos. 10-14, 16-17 (1968).
- Holden, Constance. "Ethiopia: Did Aid Speed an Inevitable Upheaval?" Science, 186, 4170 (27 December 1974), 1225-26.
- Ingersoll, J. "Including Social Factors in Planning Pioneer Projects," Memorandum to the International Bank for Reconstruction and Development. 5 January 1972. 46 p.
- Leiss, William. The Domination of Nature. New York: George Braziller, 1972.
- Lévi-Strauss, Claude. The Raw and the Cooked: Introduction to a Science of Mythology. Tr. by John and Doreen Weightman. New York: Harper and Row, 1969.
- Melko, Matthew. "Problem Creation: The Central Dynamic of the Civilizational System." Paper presented at the 1st Annual Meeting of the Northeast Division, Society for General Systems Research, Geneseo, NY, 29 September 1972. 8 p.
- Nasim, M., K. F. Mirza and Manoor Ahmad. "Impact of Radioactive Releases on the Environment." Paper presented at the International Conference on Management of the Environment, Karachi, Pakistan, 17 February 1975. 8 p.
- Negri, Numa Clive. "Art Contra Science: An Inquiry into the Sociological Aspects of the Schism between Science and the Creative Arts," Impact of Science on Society, 12, 1 (1962), 61-80.

- Niebuhr, H. Richard. Radical Monotheism and Western Culture. New York: Harper and Brothers, 1960.
- Programme on Man and the Biosphere (MAB) Task Force on the Contribution of the Social Sciences to the MAB Programme. Final Report. MAB Report Series No. 17. Paris: Unesco, 1974.
- Rappaport, Roy A. "The Flow of Energy in an Agricultural Society," Scientific American, 224, 3 (September 1971), 116-22, 127-32.
- Rubin, Neville and William M. Warren (eds.). Dams in Africa. New York: Augustus M. Kelley, 1968.
- Savatsky, Pamela Dee. "A Legal Rationale for the Sociologist's Role in Researching Social Impacts," pp. 45-47 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, WI: Environmental Design Research Association, 1974.
- Scudder, Thayer. "Social Anthropology, Man-Made Lakes and Population Relocation in Africa," Anthropological Quarterly, 41, 3 (July 1968), 168-76.
- Shami, Muhandis. An Engineer in Search of an Image & Self-Reliance. Lahore, Pakistan: Engineering Herald Press, n.d. (1973?)
- Skinner, B. F. "Contingencies of Reinforcement in the Design of a Culture," Behavioral Science, 11, 3 (May 1966), 159-66.
- Streeten, Paul R. "Social Science Research on Development: Some Problems in the Use and Transfer of an Intellectual Technology," Journal of Economic Literature, 12, 4 (December 1974), 1290-1300.
- Tiryakian, Edward A. "A Model of Societal Change and Its Lead Indicators," pp. 69-97 in Samuel Z. Klausner (ed.), The Study of Total Societies. Garden City, NY: Doubleday, 1967.
- USAID. Pakistan Economic Development Data (Based on Information Available August 1, 1974). Islamabad, Pakistan: USAID, 1974.
- Wade, Nicholas. "Sahelian Drought: No Victory for Western Aid," Science, 185, 4147 (19 July 1974), 234-37.
- Wheeler, Mortimer. The Indus Civilization. 3rd ed. Cambridge: Cambridge University Press, 1968.
- White, Gilbert F. (ed.). Natural Hazards: Local, National, Global. New York: Oxford University Press, 1974.
- Wolf, C. P. "Social Impact Assessment: The State of the Art," pp. 1-44 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, WI: Environmental Design Research Association, 1974.

ENVIRONMENT: A BIBLIOGRAPHY OF SOCIAL SCIENCE AND RELATED LITERATURE, Socio-economic Environmental Studies Series EPA-600/5-74-011, Office of Research and Development, U.S. Environmental Protection Agency, Washington, D.C.: U.S. Government Printing Office, February, 1974. Pp. 860 \$7.45 (Also available from the National Technical Information Service, Springfield, Virginia).

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#### ABSTRACT

This comprehensive, unannotated bibliography contains nearly 5,000 items covering literature in and related to the fields of anthropology, communications, economics, education, design, geography, history, human ecology, landscape architecture, management, planning, politics and government, population, psychology, public administration, recreation, social psychology and sociology. The emphasis is on literature that is substantively, methodologically or theoretically relevant to man and his activities in relationship to natural environments. The bibliography is listed alphabetically by author, with an extensive, crosslisted subject-by-title index under the following categories: Aesthetic, Humanistic, Literary, Religious, Philosophic/Agriculture, Food, Ranching, Rural/Air/Anthropology/Attitudes, Behavior, Opinions, Motives Values, Perceptions, Cognitions, Knowledge, Psychology, Social Psychology/Built Environment-Natural Environment Interface, Including Urban Environment-Natural Environment Relations/Climate/Communications, Media/Conflicts, Controversy, Competition, Issues/Conservation, Conservation Movement/Economics, Business, Industry, Economic Growth and Development, Work, Occupations/Education/Energy, Minerals/Forests/General Ecology, General Environment, Social Ecology, Human Ecology, Eco-Systems/Geography, Regional Studies/Government, Public Agencies/History/International, Interstate, Intergovernmental, Interagency/Land/Law, Property Rights/Management, Policy, Decision Making, Planning, Development/Medicine, Health/Methodology, Evaluation, Measurement, Indicators, Systems Analysis, Cost-Benefit Techniques, Projections, Monitoring, Control, Standards, Performance Criteria, Theory, Concepts/Natural Disasters, Natural Hazards/Natural Resources, General/Noise/Place Names in Title/Politics/Pollution/Population, Demography, Migration, Crowding/Quality of Life, Affluence, Living Standards, General Environmental Quality/Readers, Conference Proceedings, Special Issues, Textbooks/Recreation, Leisure, Parks, Wilderness, Wildlife, Nature/Reference: Bibliographies, Data Sets, Catalogs, Directories, Literature Surveys and Reviews/Science, Technology/Sociology, Social Organization, Institutions, Culture, Society/Space, Spatial Behavior, Territoriality/Transportation/Voluntary Action, Voluntary Organizations, Citizen Participation, Social Movements/Waste/Water.

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# NOTICE OF RESEARCH PROJECT

SUPPORTING AGENCY

AGENCY'S NUMBER(S)

U.S. DEPT. OF AGRICULTURE  
COOPERATIVE STATE RES. SERVICE  
MONTANA

0027044

MONB00452

TITLE OF PROJECT

SOCIAL CHANGE IN WATER RESOURCE DEVELOPMENT AREA: SOCIAL ASPECTS OF  
CONSTRUCTION PHASE OF LIBBY DAM

PRINCIPAL INVESTIGATOR, INSTITUTE AND DEPARTMENT SPECIALLY

HT TURBECK SOCIOLOGY

PERFORMING ORGANIZATION

PERIOD FOR THIS NRP

MONTANA STATE UNIVERSITY  
AGRICULTURAL EXPERIMENT STA.  
BOZEMAN, MONTANA 59715

7/73 TO 6/74 MULT. SUPPORT  
FY74 FUNDS UNKNOWN

OBJECTIVE

OBJECTIVE: Investigate social relationship, recreational habits, pressures on community services, attitudes, organized opposition, occupational roles, physical characteristics and displaced persons in the Libby Dam area prior to, during, and after construction of the dam.

APPROACH

APPROACH: A sampling procedure will be used to obtain 200 old time residents and 200 newcomers to be interviewed each year. Subsamples will be taken for a case study approach. An intensive study will be made of service organizations during the period of rapid change. Measures of both tangible and intangible factors will be obtained for this area of rapid social change. Analysis of these data will provide information for future decisions on location of development projects, planning during early stage of such projects and will add to knowledge of rapid social changes and community development during such changes.

PROGRESS

PROGRESS: Analysis is taking place on leadership in the three communities. Of critical importance is the perception of leadership by the larger community, the impact of the dam on leadership, the perception of the community problems in terms of how one perceives leadership and the control that absentee landlords such as the federal government and absentee corporations have over the area. The impact of absentee control becomes critical in understanding the role of leadership as well as the general idea of decision making in local communities of the county at large. The world of work, mobility, satisfaction with the area and life style are being analyzed to grasp a better understanding of what the resident of Lincoln County sees as the basis for satisfaction with the area and the implication of the area for his own life stage. Such analysis becomes relevant when community development is an issue or future community growth becomes a focus for the community. Other analysis as mentioned in the first publication will take place with the completion of the above.



H.R. 3510: THE LAND USE AND RESOURCE CONSERVATION  
ACT OF 1975

An important, indeed critical--piece of legislation is again before the Congress. Among the many compelling reasons for enacting a comprehensive land use planning bill is the realization that "decisions concerning key public facilities, large scale or regionally significant developments, and other land uses which have significant economic, social, and environmental implications are often made without regard to the long-term economic, environmental and social consequences or impact beyond the immediate jurisdiction," and that "significant land-use decisions are being made without adequate opportunity for members of the public to be informed about the impact of or the alternatives for such decisions, or to become involved in such decisions in meaningful ways."

H.R. 3510 seeks "to encourage and support the establishment by the States and Indian tribes of effective land use planning and management programs that assure adequate consideration of the environmental, social, and economic implications of major decisions as to the use of the Nation's land. . . ." From the standpoint of social impact assessment, the key provisions are:

Sec. 304(a): The State program shall include policies and procedures to consider the location of, and the environmental, social, and economic impacts of, large scale subdivision or development projects. . . .

Sec. 306: The State program shall include policies and procedures to consider the environmental, social, and economic impact of developments of regional impact.

Sec. 310(a): (The State program shall include) development of an adequate data base including methods for collecting, revising, exchanging and using geophysical, biological, demographic, economic, social, and environmental data.

Sec. 404(b): (In the development of land use plans, each agency head shall) (1) use a systematic interdisciplinary approach to achieve integrated consideration of physical, biological, economic, and social sciences.

Sec. 505: The Secretary (of the Interior) shall report biennially to the President and the Congress on land resources, uses of land, and current and emerging problems of land use. Such report shall include the Secretary's evaluation of the effectiveness of each State program for carrying out the policies of this Act, and shall include an assessment of the economic, social, and environmental costs imposed in each State by inappropriate use and development in areas of critical State concern, and the effects of land use controls on the rights of property owners:

## AGENCY GUIDELINES FOR THE PREPARATION OF ENVIRONMENTAL IMPACT STATEMENTS

### 1. Department of Agriculture.

Environmental impacts. This requires analyses and descriptions of both the anticipated favorable and adverse impacts of the proposed action as it affects the environment.

The environment in this case includes both the natural environment and the social and economic environment. (Federal Register, 38, 222 (19 November 1973), 31937)

Identify, analyze, and discuss the full range of social, physical, and biological factors which change as a result of direct or indirect effects of the proposal. Examples of areas of environmental impact are: Air quality, weather modification, water quality, fish and wildlife, noise, radiation, hazardous substances, energy supply, land use, soil, plants, outdoor recreation, historic, architectural and archeological preservation, impacts on low-income populations, and employment.

Both primary and secondary consequences should be considered in the analysis. For example, the implications, if any, of the action on population distribution or concentration should be objectively estimated and an assessment made of the probable effects of such changes in population patterns upon the resource bases, including land use, and public services in the area in question. Include also, economic impacts on employment, unemployment, changes in local culture, social and other economic factors. (Federal Register, 38, 222 (19 November 1973), 31926)

### 2. Soil Conservation Service.

Both long- and short-range implications of a proposed action to man, his physical and social surroundings, and to nature are to be evaluated. (Federal Register, 38, 222 (19 November 1973), 31910)

. . . the degree of public interest, potential controversy, urban or rural setting, and economic and social impacts should be assessed. (p. 31912)

Secondary impacts such as socioeconomic effects as well as cumulative effects of other SCS and relevant actions in the area to be influenced are to be considered. (p. 31913)

### 3. Department of Transportation

The environmental impact statement process should be used to explore alternative actions that will avoid or minimize adverse impacts and to evaluate both the long and short term implications to man, his physical and social surroundings and to nature. (Federal Register, 38, 210 (1 November 1973), 30216)

Section 16(d) of the Airport Act establishes a requirement for the opportunity for a public hearing for consideration of economic, social, and environmental effects of airport projects. . . . (p. 30217)

Planning stage criteria for citizen involvement and identification of social, economic, and environmental impacts in Department planning programs are set forth in DOT 1130.2 Annual Unified Work Programs for Intermodal Planning, of 3-16-73. (p. 30218)

The interdisciplinary approach should not be limited to the preparation of the environmental impact statement, but should also be used in the early planning stages of the proposed action. Early application of such an approach should help assure a systematic evaluation of reasonable alternative courses of action and their potential social, economic, and environmental consequences. (p. 30219)

Impacts of the proposed action on the human environment involving community disruption and relocation. (1) The statement should include a description of probable impact sufficient to enable an understanding of the extent of the environmental and social impact of the project alternatives and to consider whether relocation problems can be properly handled. This would include the following information obtainable by visual inspection of the proposed affected area and from secondary sources and community sources when available.

(a) An estimate of the households to be displaced including the family characteristics (e.g., minorities, and income levels, tenure, the elderly, large families).

(b) Impact on the human environment of an action which divides or disrupts an established community, including, where pertinent, the effect of displacement on types of families and individuals affected, effect of streets cut off, separation of residences from community facilities, separation of residential areas.

(c) Impact on the neighborhood and housing to which relocation is likely to take place (e.g., lack of sufficient housing for large families, doubling up).

(d) An estimate of the businesses to be displaced, and the general effect of business dislocation on the economy of the community.

(e) A definition of relocation housing in the area and the ability to provide adequate relocation housing for the types of families to be displaced. (pp. 30224-25)

Other social impacts. The general social groups specially benefited or harmed by the proposed action should be identified in the statement, including the following:

(1) Particular effects of a proposal on the elderly, handicapped, non-drivers, transit dependent, or minorities should be described to the extent reasonably practicable.

(2) How the proposal will facilitate or inhibit their access to jobs, educational facilities, religious institutions, health and welfare services, recreational facilities, social and cultural facilities, pedestrian movement facilities, and public transit services. (p. 30225)

#### 4. Department of Housing and Urban Development.

Environment is not defined in NEPA or in the CEQ Guidelines. However, it is clear from section 102 of the Act and elsewhere that the term is meant to be interpreted broadly to include physical, social, cultural, and aesthetic dimensions. Examples of environmental considerations are: air and water quality, erosion control, natural hazards, land use planning, site selection and design, subdivision development, conservation of flora and fauna, urban congestion, overcrowding, displacement and relocation resulting from public or private action or natural disaster, noise pollution, urban blight, code violations and building abandonment, urban sprawl, urban growth policy, preservation of cultural resources, including properties on the National Register of Historic Places, urban design and the quality of the built environment, the impact of the environment on people and their activities. (Federal Register, 38, 127 (18 July 1973), 19183.

Existing social environment (positive and negative aspects)

- a. Community facilities and services. Description (general description, location, responsible body, relation of capacity to existing demand) of school, park, recreational and cultural, police and fire and health facilities servicing the site and area.
- b. Employment centers and commercial facilities servicing the site and area.
- c. Character of community. Socioeconomic and racial characteristics.
- d. Other. Not included in above categories.

## 5. Environmental Protection Agency.

Primary impacts are those that can be attributed directly to the proposed action. If the action is a field experiment, materials introduced into the environment which might damage certain plant communities or wildlife species would be a primary impact. If the action involves construction of a facility, such as a sewage treatment works, an office building or a laboratory, the primary impacts of the action would include the environmental impacts related to construction and operation of the facility and land use changes at the facility site.

Secondary impacts are indirect or induced changes. If the action involves construction of a facility, the secondary impacts would include the environmental impacts related to:

(i) induced changes in the pattern of land use, population density and related effects on air and water quality or other natural resources;

(ii) increased growth at a faster rate than planned for or above the total level planned by the existing community.

A discussion of how socioeconomic activities and land use changes related to the proposed action conform or conflict with the goals and objectives of approved or proposed Federal, regional, State and local land use plans, policies and controls for the project area should be included in the EIS. If a conflict appears to be unresolved in the EIS, EPA should explain why it has decided to proceed without full reconciliation. (Environment Reporter, Supplement 250, 9 May 1975, p. 27)

## 6. Council on Environmental Quality.

Secondary or indirect, as well as primary or direct, consequences for the environment should be included in the analysis. Many major Federal actions, in particular those that involve the construction or licensing of infrastructure investments (e.g., highways, airports, sewer systems, water resource projects, etc.), stimulate or induce secondary effects in the form of associated investments and changed patterns of social and economic activities, or through changes in natural conditions, may often be even more substantial than the primary effects of the original action itself. For example, the effects of the proposed action on population and growth may be among the more significant secondary effects. Such population and growth impacts should be estimated if expected to be significant . . . and an assessment made of the effect of any possible change in population patterns or growth upon the resource base, including land use, water, and public services, of the area in question.

Agencies should also take care to identify, as appropriate, population and growth characteristics of the affected area and any population and growth assumptions used to justify the project or program or to determine secondary population and growth impacts resulting from the proposed action and its alternatives. . . . (Environment Reporter, Supplement 250, 9 May 1975, 12)

## LOCKS AND DAM 26

In the case of Atchison, Topeka and Santa Fe Railway Company et al. v. Howard H. Callaway et al. (Civil Action Nos. 74-1190, 74-1191), District Judge Charles R. Richey in a Memorandum Opinion filed 6 September 1974, ". . . since the requirements of Section 122 and 209 are similar to those of NEPA, it is unnecessary at this stage in the proceedings to examine in depth the Plaintiff's allegations in this respect as this Court has found NEPA to have been violated." (p. 5) "In this respect" refers to allegations that the Corps had "violated Section 122 of the Rivers and Harbors Act of 1970 by not examining possible adverse economic, environmental, and social effects of the project." This is the first case in which Section 122 has been at issue, directly or indirectly. It is a weak precedent, however, because Section 122 "analytic requirements" have been subsumed or assimilated to those of NEPA (in which the mandate for conducting social impact assessment is only implied). Moreover, in citing Section 122 the Plaintiffs specified their charge only on items pertaining to economic and environmental impacts; community well-being was faintly referred to at one point in passing, but then only as a secondary effect of economic deprivation. Now it is true that Section 122 has been held by the Corps to be consistent with NEPA and to extend it in desirable (social) respects, and also that NEPA furnishes an extremely broad base for establishing the legal standing of social impact assessment. Nevertheless, it cannot be said in this case that the "analytic requirements" of social impact assessment have been strongly asserted or contested.

## STEPS of the PROCESS

Alan V. Galdis

I Introduction: Tell what's going to happen, why, what alternative strategies there are. Tell any factors which will constrain the report. Tell of any meetings, formal or informal, at which information was gathered, given, or exchanged.

II Profile \* : Tell the pertinent geographical, economic, social and environmental aspects of the project area.

III First Enumeration  
& Elimination:

Go thru the 17 stated categories \*\* to see which do and which do not apply. In this enumeration, the 17 stated categories are considered strictly according to the three headings of Social, Economic or Environmental. In later enumerations, inter-related categories will be considered if and where they exist.

IV Explication of  
Alternatives:

List and explain the alternative project schemes.

V Second Enumeration:

Apply the remaining categories in terms of effects that these categories could have on alternatives (based on data & judgment). Include the "without project" (no action) condition here, and the initial "with project" conditions.

VI Addition of

Categories: Show any effect categories which are not specifically mentioned in guidelines and which could have effects (based on data & judgement).

VII Third Enumeration:

Apply all categories in terms of possible effects on alternatives (in terms of data & judgment).

VIII Addition and Elimination of Categories and/or alternatives on advice & consent of local interests (and C of E) 1/:

through formal contacts, delete agreed-upon categories and/or alternatives.

IX Final Enumeration 1/

Apply remaining categories to remaining alternatives (in terms of data & judgment).

This is the final "with project" step of the report.

X Consideration of Project Modification 1/:

In view of final enumeration, consider feasible project changes.

XI Recommendations 1/: On basis of final enumeration and consideration of modifications, make recommendations.

XII Statement of Findings 1/: In a concise and precise document, sum up pertinent points for preparation of EIS.

\* Subheadings: Geography, Population, Education, Income, Employment, Housing, Zoning, Industry & Commerce, Environment.

\*\* In some cases, the opposite condition may be of major concern.

1/ These steps hinge on the assumption that the project is accepted by and commented on by local interests. Without assurances of local support, and without statements of local preference, the last logical step in the ESE assessment process is Step VII.

Anthony Downs cites twenty-one specific types of losses that are imposed upon residential households, other than those losses resulting from paying the costs of construction itself. These twenty-two specific types of losses will be presented below (Downs, p. 192ff).

The Kinds of Losses Imposed Upon Residential Households  
by Urban Highway and Urban Renewal Projects  
(Other than Construction Costs)

- A. Losses imposed upon residential households by displacement itself:
1. Disruption of established personal and other relationships
  2. Losses due to the taking of real property
  3. Losses due to home financing arrangements, especially contract buying
  4. Costs of seeking alternative housing elsewhere
  5. Costs of paying for alternative housing elsewhere
  6. Moving costs
  7. Higher operating costs of residing elsewhere
- B. Losses imposed upon residential households by uncertainties and delays:
8. Deterioration in the quality of life during waiting periods
  9. Inability of property owners to sell property at reasonable prices during waiting periods
  10. Declines in the value of properties during waiting periods because of neighborhood and individual property deterioration
  11. Losses of income suffered by owners of rental property because of the departure of tenants before actual taking occurs
  12. Costs of maintaining property after its fair market value has been established for purposes of litigation
- C. Losses imposed upon residential households not directly displaced but located in surrounding areas:
13. Higher taxes paid because of increased city costs of counteract vandalism and other deterioration in the area
  14. Disruption of local communications through the blocking of streets
  15. Reduction in the quantity and quality of commercial and other services available in the area because they have left or been displaced
  16. Reduction in employment opportunities and increased costs of travelling to work because firms have been compelled to move elsewhere or have gone out of business
  17. Spillover effects of deterioration in the clearance areas during the waiting periods
  18. Higher rents or housing prices because of increased competition for housing among low-income households resulting from displacement
  19. Reduction in the efficiency of community facilities through:
    - a. Loss of patronage if displacement has removed customers
    - b. Overcrowding if displacement has removed alternative source of supply (such as a local school, parks, playgrounds, etc.)
  20. Losses in property values due to changes in the accessibility of various parts of the metropolitan area
  21. Losses resulting from congestion, vibration, noise, street blockage, dust, and other negative factors involved in the process of constructing the new highway or urban renewal project
  22. Losses in property values due to increased ugliness, noise, air pollution, or other adverse effects of the completed highway or urban renewal project

## I. Losses resulting directly from displacement.

1. Disruption of established relationships. Earlier in this paper we recognized the importance of the neighborhood itself where many hours of established relationships with other persons, places, and businesses are very important for the people. Beyond the family ties and friendships with others living nearby, credit relationships with stores and banks and habitual patterns of social and commercial intercourse are also important. Valuable social interactions which can be lost when relocated. Much time and energy has been invested in these relationships and must be destroyed in most cases, after relocation, to establish new ones. The establishment of credit is not insignificant for most low income persons. A difficulty like this is seldom considered in relocation.

2. Real Property Removal. The owners of parcels of land in an area that is being considered for construction of public projects, are compensated by what is called a fair market value. Many times the residents lose greatly by this fair market value because they cannot replace the value of their property that they are selling. The fair market value is defined as what a willing buyer would pay a willing seller under current market conditions, if neither was under any compulsion to complete a transaction. Most often the seller cannot purchase equitable property with the fair market price.

3. Losses due to Home Financing Arrangements. Many low income neighborhoods have households which have been purchased through contract financing. Under this method the occupant normally purchases a property at a contract price. This price, usually far above fair market value, has been inflated as a compensation to the seller for accepting a very low down payment and for dealing with a buyer whose credit standing is inadequate for obtaining a normal mortgage loan. Many complications and losses can occur to the residents, because of these types of arrangements and lack of compensation from the government for these.

4. Costs of Seeking Other Home. Just the task of looking for another place to live involves a great investment of time and money. (This is especially true if one is forced to look during working hours.) Purchase of the new home is one of the largest costs to those who must relocate. Because in reality it is almost impossible for residents from low income neighborhoods to find alternative housing at the same low sum they received from the government. Nor can they usually pay the same rent they formerly paid. We are reminded that these costs are of a greater burden to those who are Black, those who are of old age, those who are on fixed incomes, those who are disabled in any way, and those who live in low income neighborhoods where the fair market value does not bring an equal compensation of value per place in a different neighborhood. This is particularly difficult in a time of inflation when construction costs and housing costs in general have been rising very rapidly. It should also be noted that a growing area, such as Lexington, also makes for scarcity of housing, which inflates the price of houses. Lexington not only has a shortage of low income housing but of most housing ranges. The recent report from Spindletop Research indicates the lack of low income housing in the Lexington area, and pinpoints the Georgetown area as one of the specific areas of scarcity. Both home owners and renters, after relocation, generally pay much more of their income for housing. A study of over 2100 relocated households conducted by the Census Bureau showed that a majority of rent paying households paid higher rents after displacement than before. Moreover the fraction of their incomes devoted to rents rose, with the median shifting from 25.1% to 27.7%. The proportion of rented households paying over 20% of their incomes for rent rose from 67% to 76% (Downs, p. 198).

6. **Moving Costs.** A public works committee report showed that less than 50% of all households and individuals displaced per year by all federally related programs received payments for moving costs. Although all people actually incurred moving costs, less than 50% received any government compensation for such costs. Also the average size of payment when made to displaced families or individuals, often times does not meet the actual costs of moving.

7. **Higher Operating Costs of Another Home.** Living expenses many times are greater in the new neighborhoods where the residences have moved than in their old neighborhoods. This includes things like increased commuting costs to work, greater heating bills, higher property taxes, and general operating costs for the home itself.

## II. Losses Due to Related Uncertainty and Delays

Since there is always a time lapse between the initiation of a project and the completion, this means that there will be time delays in relocating the people and constructing the highway and people finding their new neighborhoods. During the entire lapse of time from initial discussion to the actual construction of the project, the area and the people in it are strongly affected by both the possibility and the actuality of future clearance.

8. **Deterioration of the Quality of Neighborhood Life.** Once a project has been announced, many owners of both residences and businesses are reluctant to make any improvements in their property; therefore, dilapidation occurs. Vacancies also result from people moving out before actual relocation procedures are begun. Such departures create not only vacancies, but also encourage vandalism and crime. Colburn noted that in a Boston location from the West End, truancy increased and teenage hangouts developed. A greater occurrence of vandalism and crime was also detected in this area.

9. **Inability of Owners to Sell at Reasonable Prices.** During the interim period before construction actually begins or during construction before relocation has begun, anyone wishing to move often cannot receive fair market value for his property. If one is forced to move because of work, he usually receives a lower compensation and does not become eligible for compensation that would be due to him had he remained until the government had begun compensation.

10. **Interim Declines in Property Value.** For reasons discussed above, property values may actually decline in an area before the court takes action to actually purchase the property. The date at which the court takes action is the date of the fair market value of the house. If there has been an interim decline in property values these people are not compensated for the depressed value that has occurred since the announcement of the proposed project. Although some owners look forward to the government buying their dilapidated and deteriorating property, these are usually absentee landlords, who are reasonably well off economically, and see the government as relieving them of property of which they are glad to be rid.

11. **Losses of Rental Income.** After the announcement of the project, many renters find other property immediately and leave the owners of the rental property without tenants, since some people are unwilling to move into an area where construction of a highway is being considered. It should also be noted that maintenance costs are higher due to vandalism, crime, and general deteriorating of surrounding properties.

12. **Costs of Maintaining the Property after Appraisal.** In some cases several months may elapse between the actual appraisal and the legal action which finally takes the property. During this interim, owners may sometimes make certain vital repairs which then do not appear in appraised value and for which there will be no adequate compensation.

III. **Indirect Losses Imposed Upon Households and Surrounding Areas.** The highway not only affects those persons which are relocated and displaced, but it has many effects upon those persons living or owning their own property, in the nearby neighborhood. Below are some of those losses which can be incurred by these people.

13. **Higher Taxes Because of Greater Local Government Cost.** If greater government costs are incurred in the area because of dilapidation, vandalism, increased police protection, greater sanitation costs, etc., these costs might possibly be passed on to those left in the neighborhood. One possibility is an increase in property taxes.

14. **Disruption of Local Communications and Traffic.** Construction of almost any highway normally blocks movement on a large number of local streets and causes general disruption of the neighborhood. These consequences decrease convenience in movement for local residents and others passing through. It will probably be of greater inconvenience to the people in the local neighborhood than it will be to the people who will actually use the highway, after it is constructed.

15. **Reduction in Quantity and Quality of Local Services.** The construction of the highway might present such adverse conditions during its construction that many establishments will move out of the area and others refuse to move in, which possibly will cause a further deterioration in the quality of the neighborhood. The reduction of such establishments decreases the choice available to the remaining residents. The quality of the neighborhood is further reduced by the elimination of such facilities as parks, especially where the community uses the parks for recreation, for leisure activities, or just a place to get away from it all. For many of these areas the only green space left is in a park. These are some of the kinds of losses for which no compensation can be made. By eliminating a great part of Douglas Park, the Georgetown citizens, particularly the elderly and the teenagers, would incur great losses for which there is no compensation.

16. **Reduction in Employment Opportunities and Increased Commuting Costs.** Whenever commercial, government, industrial, or other employment providing installations are displaced, persons who formerly worked in such places are compelled to become unemployed or to travel farther to available jobs. Although most displaced establishments providing much employment locate elsewhere, many small retail establishments, once moved out of an area like this, are never reopened elsewhere. Studies indicate that this percentage can run as high as 40% and usually exceeds 20% (Hartman, p. 329).

17. **Impact on the Areas Outside the Clearance Area.** This is especially significant when a highway is being constructed. It can bring with it deterioration of the surrounding neighborhood and all the ramifications of deterioration. We should also draw special attention to the fact that the highway as proposed would be constructed very near the new school in Douglas Park. This will bring additional danger to students. School children must walk near the highway to and from school. Also the school is in such close proximity that the highway probably presents danger to students in the area or at school, itself.

18. Increased Competition for Low Cost Housing. As noted earlier, when low cost dwelling units are eliminated this increases the competition for the remaining low cost dwelling units, which can mean an increase in price for those who are already unable to pay higher cost for housing. It can also increase density in already densely settled urban areas. As noted earlier this affects the Black population even greater than the population generally, because they do not have as open a housing market as the general population. An elimination of some housing units for Blacks create an even tighter housing market than before. It seems that the housing situation of low income households has become worse rather than better in the past few years: (1) because fewer low income housing units are being built; (2) but also because fewer housing units as a whole have been built, which results in fewer houses filtering down to low income peoples. The general inflation of construction costs, and the higher rates of interest have contributed to the lack of new housing being built, although there is a greater demand because of the new prosperity.

19. Reduced Efficiency of Community Facilities Serving Surrounding Areas. Stores, churches, schools, parks and other facilities near the clearance areas can sometimes be forced into a less efficient operation by the demolition of residences and creation of new projects. If we include the parks as facilities, we can see that the demise of part of Douglas Park would reduce its utility to the people in the neighborhood, but it also could provide over-crowding to other parks in the areas that are serving Black populations.

20. Changes in Relative Accessibility. The purpose of a major highway is to improve the mobility of a large number of persons within the metropolitan area. Any alteration of the relative accessibility of different parts of the metropolitan area have a concomitant change in property values. Where interchanges make accessibility greater, values tend to rise. But on the opposite side, other sights can fall just as sharply in property value when accessibility is closed off from the highways. These losses occur in all areas where the highway is not accessible. By re-routing traffic away from areas which normally have had traffic, losses can occur in places not even near the neighborhoods to which the highway now runs.

21. Losses Resulting from a Process of Construction. During the construction of a highway, local traffic is impeded both by added congestion and the blocking of movement due to this construction. The local government has to pay increased costs for traffic control and for the creation of alternate access paths. Businesses on surrounding streets often times lose sales, because access to the property is diminished and traffic congestion discourages patronage. Also, noise and vibration associated with construction may disrupt productive processes and generally lower the quality of the environment. No compensation is generally made for these losses, even when they are substantial.

22. Losses Resulting from Adverse Environmental Changes. During the construction of the highway, and after the highway is constructed, the neighborhood has additional highway noise, more air pollution from exhaust fumes, the glare of lights at night, increased congestion in the neighborhood, and a greater possibility of danger to children and other pedestrians, because of the increased traffic congestion on the highway. These are additional costs for which there are no compensation to those people who must remain in the area once the highway is constructed.

## SOCIAL IMPACT REPORT EVALUATION GUIDELINE

Ed Bryan

This guideline is designed to assist city planners and other agencies who are interested in assessing how changes in the urban environment will effect the lives of the citizens in that environment. It is intended to help the analyst determine how any environment change will alter the patterns of social movements, activities and interactions of the community's residents.

This guideline has been put in outline form so that the various social aspects of the community can more readily be recognized and assessed. Each aspect should be considered as a dependent variable that can be effected, to one degree or another, by any environmental change.

The outline is divided into two parts. The first is designed to describe the effected area as it presently exists. The second part is intended to describe the proposed change and to assess the effect of same.

## Description of the Existing Community

## I. Population distribution within the community

(This is essentially demographic data, some of which may be obtained from the bureau of the census. Its purpose is to give the analyst a picture of the various types of people living within the community.)

## A. Age Distribution

## 1. Age range and ratios:

The analyst should try to determine the range of ages appearing in the community and the percentage of residents which appear in each age group.

## 2. Residence Distribution:

Ignoring the effect of the wide age ranges present in family groups, the analyst should determine if housing patterns are homogeneous or heterogeneous as to age.

## B. Ethnic Distribution

## 1. Demographic analysis:

The analyst should determine the variety of ethnic groups who reside within the effected area and the proportion of each ethnic group to the community as a whole.

2. Residence Distribution:

The analyst should discover whether housing areas tend to be ethnically defined and whether ethnically homogeneous areas are voluntarily created by the residents or are the result of outside social pressures.

3. Ethnic Friction Analysis:

Previous ethnic conflicts should be analyzed and the possibility of future ethnic conflicts should be taken into account by the analyst.

C. Socio-Economic Analysis

1. Income and education range and ratio analysis:

The community should be analyzed to determine the various educational and income levels present within the community.

2. Socio-economic residency patterns:

Residency patterns should be analyzed to determine how housing is stratified along status and/or income lines.

D. Family Composition Analysis

1. Demographic analysis:

The analyst should try to determine the percentage of his community made up by family groups: the number of adults living within family groups as opposed to the number of children: the age range of the children within the community: the number of one parent households and the number of households where both parents work.

2. Residency Patterns:

The analyst should determine both the homogeneity of heterogeneity of family group housing, as well as the primary type of housing, whether single or multiple family dwellings.

E. Population Density Analysis

1. The degree of population density within the area should be determined. This should include residential use density, recreational and service use density, and commercial use density.

2. The amount of undeveloped land within the community should be assessed.

F. Population Stability Analysis

1. The degree of population mobility in the community should be determined. In and out migration patterns will be analyzed.

## II. Occupational Profile Analysis

- A. The Structure and Character of the Work Force
  - 1. Skills Profile: Skills, occupations and educational levels of community members will be noted.
- B. Geographic Distribution of the Work Force
  - 1. Patterns of occupational mobility and the ratio of inter-community job holders to extra community job holders will be examined.
- C. Occupational Need-Assessment
  - 1. Unemployment and underemployment data will be correlated to population data already acquired. The ratio of employed to non-employed within the community will be determined.

## III Transportation Pattern Analyses

- A. Private Transportation Use Analysis
  - 1. Number of cars per household.
  - 2. Estimate of degree and type of private use, eg., employment, household.
- B. Public Transportation Use Analysis
  - 1. Percentage of community members who use public transportation
  - 2. Demographic and area analysis of public transportation use.
- C. Traffic Patterns
  - 1. Investigate the factors of congestion, parking availability that affect the community in private and public transportation.

## IV. Community Service Analysis

(The variety, capacity, availability of services and the ratio of facilities to the population in the impacted area will be determined)

- 1. Public Services
  - a. Variety, capacity of agencies (police, medical, fire departments, park and recreational, public social services--welfare, senior citizens)
- 2. The Private Sector
  - a. Variety and capacity of commercial services.
- 3. Social Function Need Assessment
  - a. Need and duplication of service analysis

## THE PROPOSAL AND ITS EFFECTS ON THE EXISTING COMMUNITY

### I The Project Under Consideration:

The proposal should be described in detail. Of particular interest is an analysis of fiscal ramifications (eg. tax revenues realized or expended) Note Short Term and Long Term Effects.

### II Population Distribution Factors:

- A. Will displacement result?
- B. Will distribution ratios be altered? (age, ethnic, socio-economic, family composition)
- C. Will ethnic solidarity be influenced?
- D. Will population density and migration patterns be altered?

### III Economic and Occupational Impact

- A. Will patterns of occupational mobility be altered? Increase or decrease in persons commuting to work?
- B. Will the structure and character of the work force be altered? Will jobs created by the proposal meet the needs and skills of community members?
- C. Will underemployment and unemployment rates be altered?
- D. Will the distribution of real income be altered?
- E. Tax Structure analysis: Will the tax system (federal, state, county, local) be altered? Will the project increase or decrease tax expenditures?

### IV Transportation Pattern Analysis

#### A. Private transportation

1. Will transportation use patterns of private vehicles be altered?
2. Will there be an increase or decrease of private vehicles?

#### B. Public transportation

1. Will the variety of public transportation be increased, decreased, or alleviated?
2. Will the distribution of community members who use public transportation be altered?
3. What is the effect of increase in public transportation in traffic congestion and use?

C. Traffic patterns

Will the alteration of transportation effect congestion, parking availability and physical apparatus in the community?

V. Community Services Import Analysis

- A. Will the project increase or decrease demand for public and private services?
- B. Public Services - can public services absorb increased demand within present budget structure? Will new tax support be necessary? (police, fire, medical, park and recreation)
- C. Private Sector - Does the proposal duplicate social and economic services existing in community? Are present commercial resources sufficient to meet increased need?

VI. Long Term Detrimental Effects

- A. Describe long term effects of the proposal that are detrimental to the health and viability of the community.
- B. Describe alternatives in the proposal to mitigate long term detrimental effects.

PUBLIC OPINION FEEDBACK

- I. Sampling - representative public opinion
- II. Identification and interviewing of interested parties and groups who will gain or lose by the project
- III. Mass-media information system.

# Key Social Indicators

Deshaies, Kopper and Siker (1971)

## Socioeconomic Status

### 1. Education

- a. *Median educational attainment of household head.*
- b. *Grammar school education or less* – Percent of population over 18 years of age with 8th grade or less of school attendance.
- c. *Less than high school education* – Percent of population over 21 years of age with less than a high school education.
- d. *College education* – Percent of population over 25 years of age with a baccalaureate degree and/or advanced degrees.
- e. *Professional education* – Percent of population over 29 years of age with a masters, doctorate, or other advanced degrees.

### 2. Income

- a. *Median family income.*
- b. *Relief income* – Percent of families receiving some relief income.
- c. *Income level less than \$1,000* – Percent of families with income less than \$1,000.
- d. *Income level less than \$2,000* – Percent of families with income less than \$2,000.
- e. *Income level less than \$3,000* – Percent of families with income less than \$3,000.
- f. *Income level less than \$4,000* – Percent of families with income less than \$4,000.

g. *Income level less than \$5,000* – Percent of families with income less than \$5,000.

h. *Income level between \$5,000-\$10,000* – Percent of families with income \$5,000 to \$10,000.

i. *Income level greater than \$10,000* – Percent of families with income greater than \$10,000.

### 3. Housing

- a. *Overcrowding index* – Percent of occupied housing units having 1.01 or more persons per room.
- b. *Substandard housing index* – Percent of housing units that either lack a complete bathroom for exclusive use or that have a combination of two of the following: Low value or rent, inadequate heating, no complete kitchen for exclusive use.
- c. *Low rent index* – Percent of renter-occupied housing units with a contract monthly rent of less than \$80. (no cash rent included in the less than \$80 group).
- d. *Low owner-occupied housing value* – Percent of owner-occupied housing units in one-family structure with a value of less than \$12,500.
- e. *Older housing* – Percent of population residing in houses built before 1950.

### 4. Social Organization

- a. *Normal family life index* – Percent of children under 18 years of age living with both parents. This indicator is a measure of stable family organization.

- b. *Marital unrest index* – Ratio of divorced and separated persons to now married persons – measure of family disorganization.
  - c. *Matriarchy index* – Percent of household heads that are female heads with own children – measure of family disorganization.
5. Occupation and Employment
- a. *Low status occupation* – Percent of employed males in unskilled, semiskilled, or service occupations.
  - b. *Under-employment* – Percent of employed males working less than 30 hours per week.
  - c. *Unemployment, male* – Ratio of unemployed males over employed males  $\times 1,000$ .
  - d. *Married female employment* – Percent of married women employed and working more than 30 hours per week.
  - e. *High-status occupation* – Percent of employed males with professional or managerial positions.

Socioeconomic Status Composite Indicator (incorporates 1 through 5 above)

#### 6. Material Indicators

- a. *Automobile ownership – negative* – Percent of household who do not own an automobile.
- b. *Multiple automobile ownership* – Percent of households with more than two people, having two or more automobiles.
- c. *T.V. ownership – negative* – Percent of households not owning a television.

#### Maternal and Child Health Data

##### 1. Fertility

- a. *High fecundity* – Percent of women with three or more own children.
- b. *Childless women* – Percent of women married more than 2 years who have no own children.

- c. *General fertility rate* – Births per 1,000 females in age interval 15 to 44.
- d. *Nuptial birth rate* – Legitimate births per 1,000 married females.
- e. *Gross reproduction rate* – Female births to mothers of ages 15 to 44 per 1,000 females of ages 15 to 44. (Replacement formula.)
- f. *Nonwhite fertility* – Number of births to non-white females.
- g. *White fertility rate* – Number of births occurring to white females.
- h. *High birth order* – Percent of births representing a birth order of four or more children.
- i. *Births at Yale-New Haven Hospital* – Percent of total live births occurring at Yale-New Haven Hospital.
- j. *Births at Hospital of St. Raphael* – Percent of total live births occurring at Hospital of St. Raphael.

##### 2. Family Planning

- a. *Childbearing expectations* – Percent of married females between the ages of 14 to 44 who expect one or more additional children.
- b. *No childbearing expectation – high fertility areas* – Percent of married females between the ages of 14 to 34 not expecting any additional children.
- c. *No childbearing expectation – general* – Percent of married females between the ages of 14 to 44 not expecting additional children.

##### 3. Pregnancy Outcome

- a. *Low birth weight* – Percent of live births with birth weight  $5\frac{1}{2}$  pounds or less.
- b. *Optimum birth weight* – Percent of live births with baby weight 6 pounds 10 ounces to 9 pounds 14 ounces.
- c. *Successful pregnancy* – Percent of total pregnancies resulting in live births.

- d. *Poor gestation* – Percent of live births with a gestation period of 35 weeks or less
- e. *Infant mortality* – Percent of live born babies who died within 1 year.
- f. *Perinatal* – Percent of total live and stillborn births which were either stillborn or the infant died within 28 days after birth.
- g. *Toxemia or pregnancy disorders* – Percent of mothers in Yale-New Haven Hospital who had toxemia or other pregnancy disorders.
- h. *Pregnancy complications* – Percent of mothers in Yale-New Haven Hospital who experienced pregnancy complications.
- i. *Infant diseases* – Percent of babies born who experienced postnatal diseases.
- j. *Type of delivery* – Percent of deliveries spontaneous, operative, and neonatal, premature, immature, abortive, and/or died undelivered.

#### 4. Prenatal Care

- a. *Prenatal visits - negative* – Percent of mothers in Yale-New Haven Hospital who did not visit a doctor prior to entering the hospital
- b. *Prenatal visits - positive* – Percent of mothers in Yale-New Haven Hospital who had made seven or more prenatal visits
- c. *Pregnancy trimester of prenatal visits* – Related to number of visits
- d. *Service status while in hospital* – Percent of maternity cases in wards and/or private rooms.

#### 5. Characteristics of Mother

- a. *Parity* – Mean number of previous live births.
- b. *Age of mother at birth* – Mean age of mother at birth.
- c. *Catholic mothers* – Percent of mothers in Yale New Haven Hospital who reported being Catholic

- d. *Jewish mothers* – Percent of mothers in Yale-New Haven Hospital who reported being Jewish.
- e. *Protestant mothers* – Percent of mothers in Yale-New Haven Hospital who reported being Protestant.
- f. *Nonwhite* – Percent of mothers in Yale-New Haven Hospital who were nonwhite.
- g. *Under-age mothers* – Percent of live births occurring to mothers under 18 years of age.
- h. *High-risk pregnancy ages* – Percent of live births occurring to mothers under 20 and over 34 years of age.

#### 6. Child Day Care and Life Cycles

- a. *Working mothers - preschool children* – Percent of working mothers with children less than 6 years of age.
- b. *Working mothers - school children* – Percent of working mothers who have own children ages 6 to 17.
- c. *Child care index* – Percent of mothers with children under 13 years of age who take care of their own children and who do not work.
- d. *Child rearing index* – Percent of household heads with own children under 14 years of age.
- e. *Preschool index* – Percent of household heads with own children under 6 years of age.
- f. *Minor population* – Percent of population under 21 years of age.
- g. *Children indicator* – Percent of population under 18 years of age.

#### 7. Illegitimacy

- a. *Illegitimate birth rate* – Illegitimate births per 1,000 unmarried females in age interval 15 to 44.

- b. *Unmarried mothers* — Percent of mothers in Yale-New Haven Hospital who were unmarried.
- c. *Age of mother bearing illegitimate child.*

## Health Data

### 1. Health Resources Utilization

- a. *Lack of health insurance coverage* — Percent of population not covered by health insurance.
- b. *Head of household not covered by health insurance* — Percent of household heads not covered by health insurance.
- c. *Routine physical examination — positive* — Percent of population receiving a routine physical examination by a doctor within the last 12 months.
- d. *Routine physical examination — negative* — Percent of population not receiving a routine physical examination by a doctor within the last 12 months.
- e. *Routine physical examination of children — positive* — Percent of children under 18 years of age receiving routine physical examination by a doctor within the last 12 months.
- f. *Routine physical examination of children — negative* — Percent of children under 18 not receiving routine physical examination within the last 12 months.
- g. *Dental examination—population* — Percent of population over 7 years of age visiting the dentist for routine dental care.
- h. *Dental examination — school children* — Percent of children between 7 and 17 years of age visiting the dentist for routine dental care.
- i. *Hospital visits* — Percent of population visiting hospital emergency rooms or clinics as a result of an immediate health problem.
- j. *Hospital visits — Yale-New Haven Hospital* — Percent of population visiting the Yale-New

Haven Hospital emergency room or outpatient clinic.

- k. *Hospital visits — Hospital of St. Raphael* — Percent of population visiting Hospital of St. Raphael emergency room or outpatient clinic.

### 2. Health Status

- a. *Morbidity index* — Percent of population reporting a chronic acute health problem.
- b. *Activity restrictions* — Percent of population reporting frequent or complete limitation of normal activity because of a health problem or disability?
- c. *Activity Restrictions — head of household or wife* — Percent of households where the head and/or wife reported frequent or complete limitation of normal activity because of a health problem or disability.
- d. *Elderly population restricted* — Percent of population 65 years of age or over reporting frequent or complete limitation of normal activity because of a health problem or disability.

### Migration

- a. *Nonmigrant index* — Percent of population over 5 years of age living in the same house for 5 or more years.
- b. *Interstate migrants* — Percent of population born outside Connecticut.
- c. *Ethnicity* — Percent of population with one or both parents foreign-born.

### Descriptive Indicators

- a. *Racial composition, Negro and other minority races* — Proportion of the population that is Negro or other minority race.
- b. *Child rearing completed (or no child rearing)* — Percent of married couples with husband over 45 years of age with no own children under 18 years of age.

*Elderly population* – Percent of population 65 years or older.

*Median age of household head.*

*Average household size* – Mean number of persons in household.

*Dependency rate* – The number of persons

under 18 years of age or over 64 years of age per 1,000 persons.

g. *Age distribution of population* (17 groupings).

h. *Age distribution of female population* (13 groupings).

i. *Age distribution of female population married* (13 groupings).

## EVALUATION

Evaluation of urban water resources plans will be accomplished by comparing the impacts of the alternative plans with the water resource planning objectives and the regional problems, concerns, and issues that the planning effort was directed to achieve. (Planning Division 1973: 3-9&10)

Whereas impact assessment involves identifying and measuring the changes associated with each of the alternative plans, evaluation is the process through which values are ascribed to these changes. Evaluation is accomplished by interpreting whether the consequences of the alternatives are beneficial or adverse. (Planning Division 1973: 3-10)

## IMPACT ASSESSMENT

The purpose of impact, or effect, assessment is to identify and measure the changes expected to result from different alternative plans. Impacts are identified by comparing all the components of an alternative plan to the base condition of the region to determine the economic, social, and environmental changes from the condition that are expected to occur with the plan. Impact assessment involves the following activities:

- (1) Categorize the source of impacts, such as inputs, outputs or facilities.
- (2) Identify and trace impacts.
- (3) Specify incidence of impacts, including spatial distribution, and when they will occur.
- (4) Measure impacts.

(Corps of Engineers, Department of the Army. "Urban Studies Program: Proposed Policies and Procedures," Federal Register, 39, 130, Part III (5 July 1974), 24757-58)

Impact assessment is the process through which the changes associated with alternative plans are identified and measured.

An impact is any potentially significant change brought about by an alternative. Impacts are identified by comparing the inputs, outputs, and facility requirements of an alternative to the base condition of the region to determine if a change from that condition is expected to occur.

Because the alternative plans involve actions which may take place in the future, identification of impacts will require forecasting whether significant changes from the base condition can be expected. (Planning Division 1973: 3-8)

## "SOCIAL IMPACTS"

Thiel's definition of social effects is concise: they are regarded as those influences which ". . . change the relationship between people and social institutions such as the family, community, government, schools, churches, etc." (Kanwit 1967: 18)

## ANNOTATED BIBLIOGRAPHY

References below are annotated in the following format:

Title  
 Author(s)  
 Place of publication and other identifying information  
 Descriptors/Identifiers  
 Locators  
 Abstract  
 Findings  
 Comments  
 See also:

"Descriptors/Identifiers" are key words describing the broad subject areas (descriptors) and specific contents (identifiers) of each source. Since the same terms can be used interchangeably, as either descriptors or identifiers according to the author's emphasis, both sets are combined in a single list or index in Appendix 2. Here, identifiers are subordinated by use of a colon, e.g., Attitudes: Flooding and Flood Protection. The former term is the descriptor; the latter, the identifier.

"Locators" simply indicate the physical setting of the studies reported. In certain cases these are highly localized; in others they are area-wide (e.g. river basins).

Abstracts used are those supplied by the author wherever possible. "Findings" are selected to highlight the reviewer's particular interests, however. Comments are his own except where otherwise stated.

"See also" refers to cognate sources a reader may wish to consult.

A Preliminary Model of the Hydrologic-Sociologic Flow System of an Urban Area

Wade Andrews and others.

Logan, Utah: Institute for Social Science Research on Natural Resources and Utah Water Research Laboratory, Utah State University, 1973 (April).

DESCRIPTORS/IDENTIFIERS

Attitudes; Flooding and Flood Protection; Flood Plain Management; Hydrologic System; Interviewing; Methodology; Modeling; Regression Analysis; Social Well-Being; Watershed Management

LOCATORS

Salt Lake Valley, Utah

ABSTRACT

This report describes the first phase of a larger project directed toward developing a general technique for analyzing and solving urban metropolitan hydrologic problems through joint consideration of both the physical and social system dimensions. This particular report is limited to the preliminary work of identifying social variables, the first step of assigning mathematical values and developing a mathematical format for them. In addition, the physical-hydrologic system is identified for purposes of clarifying the element in that system. The ultimate objective of the entire project is to lay out a theoretical and generally applicable mathematical model of both the physical and social dimensions involved in metropolitan flooding problems.

This report is divided into five parts. Chapter I introduces the problem and sets out the scope of the study. Chapter II is concerned with the development of the hydrologic dimension of the model. The methodology and rationale used in developing the conceptual model of the sociological component of the system are presented in Chapter III. A conceptual model of the hydrologic-sociologic system together with generalized mathematical relationships for specific sociological processes are included in Chapter IV. Chapter V sets out the conclusions of the first phase of the project. Specific data, computer programs, and other relevant information are included as appendices.

Both survey data and data collected by agencies and groups in the study area (Salt Lake Valley) are used and modeled by application of multiple regression analysis.

## FINDINGS

1. The variable, "perceived likelihood of flooding at present residence," is a central motivating variable for members of the public and is also related to other types of behavior, such as membership in groups or organizations concerned with flood control projects which are instrumental in influencing flood agency behavior.
2. An agency is alerted to a flooding problem by either the hydrologic component (physical systems and their condition) or by public perception of the flood probabilities through the variable "perceived likelihood of flooding at present residence."
3. Emergency and non-emergency action selection processes on the part of agencies emphasize different factors. The selection of emergency actions emphasizes "flood control potential of action" and "cost and other economic factors." Non-emergency action selection emphasizes factors such as aesthetics and recreation as well as opinions of publics and other agencies.
4. There are many more specific findings contained within each section of the report and referring to each part of the model. These are mainly found in Chapter 4, pp. 37-59. Here the sociologic part of the hydrologic-sociologic model is divided into six stages:
  1. State of public opinion information and perception of flooding problems.
  2. Planning agencies or social structure for planning activities and the preliminary proposal process.
  3. Decision agencies or structure for analysis and adoption of proposed plan.
  4. Public reaction process (acceptance, rejection, or adjustment).
  5. Alternative actions subcycle.
  6. Implementation of actions.

For each stage, regression analyses of the most strategic variables are conducted and the results are "plugged-into" the model.

## COMMENTS

1. This is an ambitious modeling effort which effectively demonstrates the possibilities of a systemic path model approach to laying the conceptual foundation for impact assessment. It is particularly pertinent to area profiling issues.

Social Costs and Benefits of Water Resource Construction

Rabel J. Burdge and K. Sue Johnson

Research Report No. 64, Lexington: Water Resources Research Institute, University of Kentucky, 1973 (November).

DESCRIPTORS/IDENTIFIERS

Adjustment; Army Corps of Engineers; Attitudes; Relocation; Reservoirs; Benefit-Cost Analysis; Community Cohesion; Evaluation; Interviewing; Methodology; Migration: Forced; Reservoirs; Social Values

LOCATORS

Carr Fork and Cave Run Reservoirs, Kentucky

ABSTRACT

This report analyzes the process of relocating people who must move due to reservoir construction in Kentucky. Using a variety of data obtained in previous studies psychological, social, economic and other material costs and benefits of forced relocation are described and the role of the relocating agency (the Army Corps of Engineers) is examined. Generally, the younger, more affluent and better-educated migrants fare better in the relocation process than the older, poorer and less-educated. Particular attention is paid to those people who found relocation difficult and suggestions are offered for easing their burden. The framework for this report is longitudinal, tracing the relocation process from pre-migration to post-relocation.

FINDINGS

1. Relocation tends to affect people who are poor, often subsistence farmers, with little formal education, and who hold values such as traditionalism, familism, person-centeredness, and fatalism. Many hold negative attitudes toward reservoir construction and the federal government in general.
2. It is not true that knowledge about a project is necessarily a factor in reducing negative attitudes. The tendency toward negativity is greater among those who must be relocated.

3. Positive attitudes are likely when people can see real benefits for them personally or for the whole community (Burdge and Ludtke 1973). Negative attitudes probably arise from the feeling that they are losing something personally.

4. "The mean age of those having to move for the Cave Run Reservoir was 58, and for Carr Fork Reservoir 56 for males and 53 for females. This is considerably older than the U. S. average. Their modal education in both populations was eighth grade; their mean incomes were \$4,000 at Cave Run and \$5,000 at Carr Fork, so they hardly form a well-to-do class. Rural dwellers tend to be very attached to their homes and land. . . . These people lead a life based on personal, individualistic, and familistic relationships--all of which, plus ways and pace of doing things, is disrupted when they have to move. For some people this loss of focus of identification can have catastrophic results."

5. "These data show that a substantial number of people were mistreated by the Corps. They were not helped enough, or were not paid enough for the difficulty and inconvenience of finding a new home. About half the respondents experienced some difficulty in dealing with the Corps, and the major issue was financial cost."

6. "About one-third of the persons whose financial situations worsened (20 of 67) cited relocation as a cause. Frequently cited reasons included the lack of a garden and higher rents and for those with a new business location the necessity for more rent and a decrease in business volume. On the other hand, only a very small number (2 out of 43) whose financial situation had improved cited reservoir-related causes. These two respondents listed a garden and increased business volume as the reason for an improved financial situation."

7. "When asked what social activities had changed the most upon relocation, the majority replied, 'visiting friends.'"

SEE ALSO: Burdge and Ludtke (1973); Ludtke and Burdge (1970); Johnson and Burdge (1974).

"Social Separation among Displaced Rural Families: The Case of Flood Control Reservoirs"

Rabel J. Burdge and Richard L. Ludtke

In: W. R. Burch and others (eds.) Social Behavior, Natural Resources and the Environment. New York: Harper and Row, 1973, pp. 85-108.

DESCRIPTORS/IDENTIFIERS

Adjustment; Attitudes: Relocation/Reservoirs; Benefit-Cost Analysis; Causal Inference; Community Cohesion; Interviewing; Methodology; Migration: Forced; Modeling; Quasi-Experimental Design; Reservoirs.

LOCATORS

Kentucky; Southeast Ohio

ABSTRACT

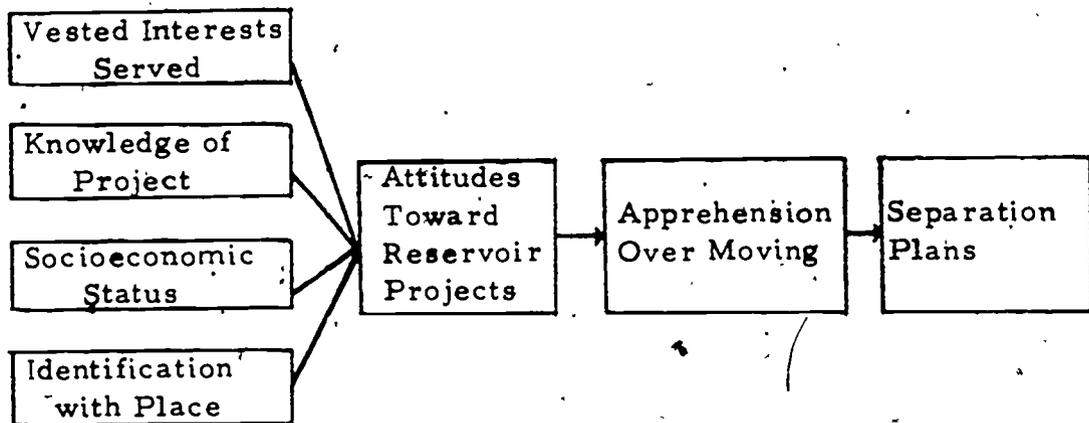
The focus of this paper is on how rural people anticipated forced migration due to reservoir construction. Data were obtained from personal interviews with people about to be flooded by multipurpose reservoirs in southeastern Ohio and central Kentucky. A model is tested in which the variables "vested interests," knowledge of reservoir project, socio-economic status, and the degree of "identification with place" are seen as producing differential attitudes toward the projects. Different attitudes, it is hypothesized, will produce differential apprehension over moving, which in turn will influence individual migration plans. Support for the model is uneven, but the variables "vested interests" and degree of "identification with place" are correlated strongly with attitudes of respondents toward reservoir projects. A most surprising finding is that socio-economic status is not related to attitudes toward projects with sufficient strength to be considered important.

FINDINGS

1. This is a study of how rural people anticipate forced moves. The unique aspect of the phenomenon under study is that return migration is precluded. The main dependent variable is anticipation of migration under this condition.

2. Previous literature on migration is reviewed. None of this research rejects the notion that migration is a stress-producing activity.

3. The model tested is the following:



The design is one which makes causal inferences from non-experimental data. In this design only the concluding variable is seen strictly as a dependent variable. The two intervening variables may be considered as independent or dependent. The initial variables are assumed to be caused by (exogenous) variables outside the system, but are viewed as independent variables in the model. Reciprocal causation (feedback) is ruled out.

4. Results of the test:

1. Apprehension over moving relates inversely with people's willingness to separate themselves from their current friends and homes.
2. People with more favorable attitudes toward the project are less apprehensive over moving and consequently are more willing to engage in moves that require a greater degree of separation from current friends and residence.
3. Vested interests is an exceptionally powerful variable in support of the hypothesis that attitudes affect social migration. Vested interests were found to relate to apprehension indirectly

as predicted, supporting the idea that those persons with vested interests served by a project are more willing to engage in moves that require a greater degree of separation from current friends and residence.

4. Knowledge about the project had a negligible effect on people's attitudes toward the reservoir projects and did not contribute to the explanation of social migration.
5. The level of identification with place was found to relate strongly and consistently with apprehension and consequently produced indirect effects on social separation. Uniformly, the more intense identification with place, the less inclined people were to move.

5. This study, then, suggests a portrait of a person with favorable attitudes toward reservoirs as one who is younger, unresistant to change, has high vested interests in the project, and has an extremely low identification with place of residence. This person is less likely to be apprehensive about moving.

SEE ALSO: Ludtke and Burdge (1970); Burdge and Johnson (1973).

"A Systemic Approach to Social Impact Assessment"

C. Mark Dunning

In: C. P. Wolf (ed.) Social Impact Assessment. Milwaukee, Wisc: Environmental Design Research Association, 1974, pp. 59-64.

DESCRIPTORS/IDENTIFIERS:

Evaluation; Groups: Impacted; Planning; Profiling; Publics: Identification of; Systems Approach.

LOCATORS

Pruitt-Igoe (St. Louis, Missouri)

ABSTRACT.

In order to gain understanding of potential impacts, a project area may be viewed as a system and the major components and issues identified. By obtaining baseline data on the project area social system, a comparison of this information with the perceptions of this system embodied in plans and planning inputs can be made. Impact assessment, by this method, is a two-part process. In the first part, the project area is disaggregated into major interest groups and publics. Major community issues are also identified so that the character of interrelationships among these groups is more apparent. Utilizing this understanding as a framework, plans are then compared on the basis of the manner in which costs and benefits are distributed over the area. By forecasting future social conditions, given the assumptions of plans or perceptions guiding planning, an understanding of the social trade-offs that alternative plans entail can be developed. This understanding, in turn, can be reapplied to the planning process to add another dimension to choices that must be made in developing project plans. Impact assessment as comparative evaluation can thus aid in the development of plans that may be sensitive to a wider range of political, social and economic groups and issues.

FINDINGS

1. What is the method of systematic analysis?

1. Disaggregate project area into publics and interest groups; specify their goals, their perceptions of important issues.
  2. Compare and evaluate plans on basis of benefit-cost distribution over groups (differential impact analysis).
  3. Choose best alternative in terms of optimum systems advantage.
2. Why do systemic approach?
1. To avoid extreme selective focus or bias toward one group to the exclusion of others.
  2. Need to know whole project area and how it fits together.
  3. Sensitizes one to complexities of project area structure and to salient community issues.
  4. Shows that impacts have different beneficial or adverse impacts on different groups.
  5. Best guide to good planning because it includes important, but easily overlooked, factors.

#### COMMENTS

1. Girard Krebs ("A Systemic Approach to Social Impact Assessment: A Response to Dunning;" pp. 65-66 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wisc.: Environmental Design Research Association, 1974) warns against the political use of a systems approach in rationalizing planner bias.

2. Krebs further argues that adopting a holistic viewpoint implied in the systems approach forces the question of where to draw boundaries around the impact area and what is the adequacy of social models for handling such complexity. In any case, a systems viewpoint is only the beginning of wisdom, and it cannot substitute for interior as well as exterior viewing of the area under study.

Man and Water--The Relationship Between Social Psychological Systems and Water Resources Development

S. J. Fitzsimmons and O. A. Salama

Cambridge, Mass: Abt. Associates, Inc., 1973 (November).

DESCRIPTORS/IDENTIFIERS

Bureau of Reclamation; Data Sources; Four Accounts Framework; Indicators; Matrix Logic; Methodology; Multiple-Objective Planning; Profiling; Social Needs; Social-Psychological Concepts; Water: Functions/Policy

ABSTRACT

This report is divided into two major sections. The first examines man's social-psychological needs and his water resource development activities and the relationships between the two. The second part develops a set of measurements for determining the nature and extent of these relationships for use in planning for actual water resources development projects.

Part One, "Social Psychological Systems as They Relate to Water Resources Development," begins as a brief "primer" on the content of the various social sciences, followed by a more extensive treatment of sociology and social psychology. Next, a description of the qualities of water and its reclamation is presented. Based on this review, a variety of water functions are identified. Following this is a chapter which attempts to integrate the concepts of the social sciences and the water development functions through a discussion of human social and psychological needs and water development activities. The first part closes with a chapter which explores the relationships between human and water systems and then generates a systematic basis for deriving a set of social data which may be used in water resources planning.

Part Two, "Methods and Procedures for Measuring Relationships," begins with a discussion of the policy context of water resource development. It then explores the program context of water resource development by examining the multiple-objective planning framework within which social assessment must coexist with economic, environmental, technological and budgetary assessments of projects. Following

this is a chapter-length treatment of measures of social psychological variables relevant to water development planning. These measures are construed in a deductive manner, progressing from the earlier analysis of the interface between human and water needs, through policy and program contexts, to data selection. In addition to data specifications, the aspects of data acquisition, validity and reliability, and synthesis and aggregation are discussed and recommendations made. C

### SUMMARY

Chapter 1. Based upon their review of the literature the writers come to four conclusions:

1. Until recently there has been a lack of public concern for the social needs of man for water and the impact of water policy on man.
2. There is a gap in the social sciences on the theoretical level with respect to understanding man's relationship to his environment, and certainly with respect to water development aspects.
3. There is also a corresponding lack of research.
4. There is a lack of knowledge at the program level about how to measure the relationships between man and water.

The purpose of this report is to fill in these gaps by proposing strategies for addressing the four problems listed above.

Chapter 2. This chapter discusses concept selection and organization, based on a review of social science literature. From a larger sample of concepts, the writers select a subset to be included in a matrix relating social-psychological concepts to water development functions. Each concept is tied to one (or more) of seven levels of behavioral organization. These are: Individual, Groups, Organizations, Social Processes, Social Maintenance and Change, Society, and Population.

Chapter 3. Water serves a variety of functions for man. Based on the literature, a range of functions was identified which were considered representative of the many types of objectives embodied in reclamation activities. A total of fourteen functions was selected, including ecology

maintenance and control, life support, security, available and predictable supply, quality and distribution, recreation, community, industrial-agricultural and other functions. A given water development activity (e.g., a dam, reservoir, power plant, etc.) usually fulfills a variety of functions simultaneously. Conversely, a given function can be supported by a variety of activities. Activities and functions are arrayed against each other in a matrix.

Chapter 4. This chapter: (1) presents a matrix arraying social-psychological systems concepts against water development functions; (2) indicates ways in which the matrix will be used for analysis; (3) relates the matrix to upcoming chapters on program and policy considerations; and (4) discusses some of the implications and limitations of matrix logic for generating variables.

Chapter 5. This chapter identifies a series of concepts, magnitudes or concerns generically referred to as "parameters" which establish a bridge between the fourteen water development project functions and the seven levels of behavioral organization. Each of the linkages between behavioral categories and water development functions is examined according to its implications for man's needs for water and water's impact on man.

Chapter 6. The political juncture between water resource development and social goals is discussed in this chapter, primarily in terms of the Water Resources Council's "Principles and Standards." A systematic accounting framework is presented at the end.

Chapter 7. The focus here is on multiple-objective planning in the context of water development programs. Certain principles of multiple-objective planning distinguish it from other types. Some of its central features include: implicit criteria to accept or reject a plan, the concept of optimization of choice among project possibilities, long-range planning for change and an interactive or "systems" approach. A section of this chapter is specifically addressed to various ways of looking at and solving the problem of optimization.

Chapter 8. This, the concluding chapter, fills in the cells of the matrix using a large number of indicators presumably relevant at each level of connection between function and behavioral organizations.

COMMENTS

1. The reader who may be interested in this report but who does not wish to struggle through its 400-plus pages is advised to read the excerpts from the report appearing in Wade H. Andrews and others (1973), pp. 117-158.

2. This report disappoints and aggravates in so many ways and at so many points that it is hard to decide where to begin criticism or what is the most strategic critical orientation. In my view the report, in its present form, should not have been written and certainly should not have been published, though its patent deficiencies may prove instructive. Ironically, the service best rendered by Man and Water is a negative one--what not to do--and it unwittingly speaks to the advisability of case-study approaches to the social impacts of water resources development. It is not tenable to argue for the report even on the grounds that it was intended for non-professional audiences because its bulkiness, disorganization, lack of conceptual clarity and methodological looseness altogether convey what may mildly be termed an "unimpressive" picture of the capability of social science to say anything illuminating about the relationship between water and society. If the report is not entirely an incompetent one (and this may be doubted), it is assuredly an inconsequential one. This is a real pity since the need for sound, cogent analysis in the water resources area is manifest. The central problem of the report and that from which most of its substantive shortcomings derive is that the scope and objectives of the study were ill-conceived. These were, in essence, to produce a definitive statement (a "treatise") on the relationship between social-psychological systems and water resources development. The major problem with this is the prematurity of a deductive strategy toward mapping that relationship. The writers apparently thought it to be the most effective strategy although it is difficult to know why since they note at the outset the weakness of the knowledge base from which they work. This strategic error demonstrates in high relief how critical problem formulation is to effective research. Now for some specifics.

3. Three relationships between man and water are postulated:

- a. MAN—needs—→WATER  
(+)
- b. WATER—impacts—→MAN (functional)  
(§)
- c. WATER—impacts—→MAN (dysfunctional)

These are incomplete, overly simple, and uninformative. For one thing, they omit what I think is a more obvious and important man-water relationship:

d. MAN  $\xrightarrow{(\pm)}$  IMPACTS  $\rightarrow$  WATER (functional and/or dysfunctional)

Although itself overly simple, d. better expresses the focus of social impact assessment than a., b. and c. That these relationships are uninformative is best revealed by the writers' own statement, which is repeated a number of times throughout the report (the reason for which eludes me):

It is abundantly clear that the relationship between man and water is not symmetric; that man's need for water is not the same as the social impact of water on man. Stated another way, people do not influence environmental infrastructure in the same way as it influences them. It is apparent that the relationship between man and water is asymmetric--that is, man's need for water is not the same as water's impact upon man. (p. 187)

4. The criteria for concept selection are unclear. In fact, "selection" may be too generous a term. The concepts of the social sciences look like a grab bag listing from the indexes of introductory texts. The problem is that there is no clear theoretical rationale underlying or giving meaning to the concepts used. To be sure, the report does state some criteria but they seem irrelevant to the selection process. The major criterion should have been parsimony. Instead, it appears to have been "the more the better."

Besides engendering a certain indifference ("So what?") in the reader, the non-systematic selection and use of concepts also creates real problems of measurement. The writers state that fewer measures (indicators) than parameters (relationships) were identified because a given measure might be used for more than one parameter. If so, this suggests that some kind of factor analysis should have been used to reduce the number of parameters so that a one-to-one relationship between parameter and measure could have been obtained. We need good operational measures of concepts, but the effect of this report's attempts in that direction is to further conceptual and methodological carelessness.

5. In addition to poor concept selection, the report does a shabby job of organizing the concepts selected. It opts for seven levels of behavioral activity. These levels are confusing although they seem systematic. The language of the report confuses even more, referring to these activities variously as "referents," "social concerns" or "levels of analysis." One senses that the writers have not thought out the meaning of their distinctions nor the terms by which they are best expressed. In regard to the levels, they are poorly distinguished descriptively and probably do not all fall within the same logical plane (e.g., lumping together processes and structures seems unwise). Besides, when one finds out what these levels are supposed to encompass it becomes evident that their conceptual connections overlap considerably so that the whole object of distinguishing them is lost. In short, this taxonomy of categories and concepts is worse than useless because it does little to inform and much to obscure. It does not seem difficult to come up with a better one with just a bit more effort and some stricter criteria of inclusion and exclusion. The problem these writers had, I would argue, is that they lacked a guiding theoretical framework so they ended up with the worst kind of eclecticism.

6. The major output of the report is contained in the matrices arraying social-psychological concepts against water development functions and the indicators which are supposed to operationalize these relationships. Looking over these matrices it is apparent that they are quite ineffective because they suffer from all the problems which precede them: poor organization, duplication, proliferation, dubious measures as well as a lack of meaningful policy relevance (an avowed aim of the report). Moreover it is clear that many of the measures do not aptly fit at a given level of analysis (e.g., using population measures to characterize individuals). The strategy the writers should have opted for was to take a very delimited subset of parameters, select the best measures available and suggest how the resulting data connect to the policy-making context.

More could be said about the report on a chapter-by-chapter basis, but the problems addressed above are the most significant and irksome. The scope and objectives of the report, to repeat, were ill-conceived and, not surprisingly, the product reflects this. It may be worth noting that the text is replete with typing and grammatical errors, which suggests that the report received as little editorial attention as its substantive shortcomings received little critical attention. One recommendation is called for: back to the drawing boards and start all over again.

"The National Environmental Policy Act and the Urban Environment:  
Toward Socially-Oriented Impact Statements"

Mark Francis

In: C. P. Wolf (ed.), Social Impact Assessment. Milwaukee,  
Wisc: Environmental Design Research Association, 1974. pp. 49-58.

DESCRIPTORS/IDENTIFIERS

Dimensioning Impacts; Environmentalism; Goose Hollow Foothills vs. Romney (1971); Legal Aspects; Natural Environmental Policy Act: Legal History/Social Impact Assessment; Nucleus of Chicago Homeowners' Association vs. Chicago Housing Authority (1973); Planning; Social Goals

ABSTRACT

The intent and scope of this paper is to discuss the impact of the National Environmental Policy Act on urban programs and projects and to schematically propose a framework within which social information can be utilized in environmental impact statement formulation and review. The paper is presented in four sections. The first deals with the common law, constitutional, and statutory rights of the environment, with the major discussion being on the provisions of the National Environmental Policy Act (NEPA). Secondly, recent judicial interpretations of the application of NEPA to the urban environment are discussed. Next, possible future extensions of these court rulings are proposed in relationship to policies and programs administered under federal agencies (HUD, HEW, etc.). And finally, a framework for formulating socially-oriented impact statements within the professions of urban planning and design is presented.

FINDINGS

1. Recently (case of Goose Hollow Foothill League v. Romney, 1971) court interpretations of NEPA have turned to the human urban environment and dealt with impact of the environment on man rather than only impact of man on environment.
2. NEPA has potential of being used against social goals (e.g., Nucleus of Chicago Homeowners' Association v. Chicago Housing Authority, 1973).

3. The applicability of impact statements to urban projects is moving toward making impact statements a standard requirement on "major Federal actions" which "significantly affect" the quality of the human environment.

4. The requirement to prepare an impact statement is currently being legislated by some states--Washington, Delaware, Wisconsin, Hawaii, North Carolina, and especially California.

5. Court actions brought by environmental groups under NEPA have primarily utilized the act as a negative tool intended to stop or delay major federal projects.

6. There is now a need to view environmental impact statements as a positive mechanism whereby Federal agencies can implement and guarantee such social factors as community involvement, user needs, and adequate community services in urban-related programs and projects.

7. Social information requirements for realizing this goal encompass (1) the environmental setting, (2) the offsite macro socio-economic setting, (3) macro onsite socio-economic impacts, and (4) micro onsite user impact. Subcategories are enumerated under each of these major headings.

SEE ALSO: Savatsky (1974).

"Social Impacts of Strip Mining and Other Industrializations of Coal Resources"

Raymond L. Gold

In: C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wisc: Environmental Design Research Association, 1974. pp. 123-46.

DESCRIPTORS/IDENTIFIERS

Anomie; Attitudes: Coal Industrialization; Coal Mining Impacts; Community Cohesion; Differential Impacts; Economic Impacts; Future Shock; Groups: Impacted; Interviewing; Methodology; Montana Power Company; Participant Observation; Ranchers; Strip Mining

LOCATORS

Colstrip and Gillette, Montana

ABSTRACT

This paper reports findings from five months of ethnographic study in southeastern Montana which focus on the social impact of coal industrialization on groups in the area's two principal towns. Changes noted include shifts in the selection of friends, strains in communicating with friends and neighbors of long standing, a shift in the established power structure from ranchers to new mining industrialists, the need to live with constant and increasing uncertainties for which planning is virtually impossible, a keen interest on the part of some merchants and businessmen in immediate monetary gain, the need to accommodate to the invasion and requirements of newcomers who subscribe to foreign life-styles and value systems, and the loss of a sense of community. Suggestions are offered concerning the meaning of industrialization and rural life to area residents and the theoretical and research implications of these findings.

FINDINGS

1. This report focuses on landowners because, aside from the schools, the biggest social impact to date has been on them.
2. The impacts on merchants are much more economic (and positive) than social.

3. Many life changes have taken hold because of the mining situation:

- a. Shifts in friendship networks and new strains among old friends.
- b. Intensification of class alignments and awareness.
- c. Shift in power structure from ranchers to new mining industrialists.
- d. Constant and growing uncertainties.
- e. Merchant interest in quick money.
- f. Entry of newcomers with different values and life-styles.
- g. Loss of sense of community.

4. Newcomers affect law enforcement, health care, churches, and especially schools. PEOPLE POLLUTION IS THE GREATEST FEAR AND UNCERTAINTY.

5. Locals are fearful of new taxes to pay for increased services demand.

6. There is a decline in neighborliness because there is less need for dependence on fellow-townspeople since new goods and services are available.

7. Future shock and anomie are resulting from disruptions of an industrial technology superimposed on a stable rural environment.

8. Old coalitions are breaking down while new ones emerge:

- a. White and Indian children, formerly at odds, are now coalescing against newcomers.
- b. Businessmen and merchants, formerly dependent on the ranchers, are now trying to share power with the mining companies.
- c. Ranchers who view land as intrinsic value and inalienable home vs. those who see it as an economic tool, business item for profit.

9. One positive result of the mining operations has been the excitement generated by opposition to coal development and the shared purpose gained thereby.

COMMENTS

1. Need to display impacts in tabular form (cf. Mack). Complex group alignments and diverse (differential) impacts need to be partialled out in non-narrative form.
2. Approach is adaptable to both e-model frame and comparative diachronic analysis.
3. The ranchers, we are told, are being exploited; yet they were on top before the mining people came in. How did the mining people break through this rancher dominance in the first place? Do (did) the non-ranchers in the area feel exploited by the ranchers? by the power companies? by the strip miners? What the paper lacks but needs is a more detailed and systematic "before" profile so that better comparisons can be made.
4. Taking the ranchers' point of view lends a very effective and intimate touch to the sociological portrait, but tends to stereotype and/or ignore the views of the other groups.

SEE ALSO: John R. Kelly, "Site-Specific Research: Comments on 'Social Impacts of Strip Mining and Other Industrializations of Coal Resources,'" pp. 147-50 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wis.: Environmental Design Research Association, 1974.

Socio-Cultural Impacts of Water Resource Development in the Santiam River Basin

Thomas C. Hogg and Courtland L. Smith

Corvallis: Water Resources Research Institute, Oregon State University, 1970 (October).

DESCRIPTORS/IDENTIFIERS

Attitudes; Dams; Benefactors vs. Beneficiaries; Community Cohesion; Dams; Economic Impacts; Interviewing; Life History Technique; Methodology; Participant Observation; Social Impacts; Staging of; Social Values; Technological Lag

LOCATORS

Albany - Lebanon and Sweet Home, Foster and Green Peter Dams, Santiam River Basin, Oregon

ABSTRACT

This study assesses the impacts of two dams on the behavioral and attitudinal patterns of Santiam River Basin residents in Oregon. The research is structured by viewing the dams through a developmental cycle of preconstruction, construction and postconstruction, thereby highlighting the differential "staging" of impacts. The Santiam River Basin area is treated as a socio-cultural system undergoing important technical and environmental change. The research goal of describing and explaining these changes was accomplished through a combination of methods and techniques, including general survey questionnaires, more detailed open-ended interviewing of selected informants, and biographical data gained through a sociological reconstruction of the life histories of a number of individuals. A major focus is on the varying modes and degrees of integration experienced by the area towns prior to and during the impact stages.

The study finds that socio-cultural impacts of significant magnitude are clearly demonstrable throughout the development cycle. Central emphasis is placed on conceptualizing the project area as part of a larger system whose operation has notable consequences for the more local system. The dams, it is found, caused increased social "non-articulation" in the area's cultural system and stimulated quests for

new bases of social integration by urban escapees. However, lack of articulation and planning between elements of the larger socio-cultural system are restricting full developmental benefits.

Throughout, the writers argue that people's values and actions should be continually sought as inputs into the total water resources development process if full benefits are to accrue to the area. People must be prepared to assume the dual roles of beneficiaries and benefactors if project impacts are to be realistically assessed.

### FINDINGS

1. There would appear little problem in stimulating local support and acceptance of water resource development projects, based on the research reported here. This is largely because of the tendency to define economic growth and development as good.
2. In rural communities such as Sweet Home (Oregon), where most of the projects are constructed, the construction phase of the project brings significant short-term expansion and, then, in late stages of construction and early operation, a significant decline. This includes overburdening of local services--schools, municipal works, and commercial facilities.
3. Dissatisfaction with the quality of life in California led to the influx of migrants from there to the project area on speculation that work would be available on the dams. This fact points to the difficulty of establishing boundaries within which the assessment of impacts is conducted.
4. From the point of view of Sweet Home residents, the planning phase of the project stimulated them to think differently about their community.
5. Several kinds of different social and economic impacts are associated with the different phases of pre-construction, construction and post-construction.
6. The most direct impact on the schools was an increase of several hundred students during the construction phase.
7. Most of the added school tax burden was paid for by the local people through increased property taxes. For the most part, the

income taxes paid by the construction personnel went directly to the state government, thereby reducing direct support of the local system.

8. Municipal expenses like those for the schools rose after completion of the dams. City services were improved during construction, but associated with the improvements were increased taxes for the locals. What seems important is that the local people expected the dams to result in long-term growth for which expanded services would be required. The services were expanded but the expected growth did not occur.

9. Only a very small proportion of the total benefits accrued to the local residents and these were mainly recreational. The problem is that the projects were justified primarily on the grounds that they would develop the region. This had the effect of neglecting consideration of local development. Thus, the local community incurred most of the costs but received few of the benefits.

10. In the political area, the influx of urban-suburban migrants resulted in increased legalism and formalism in administrative matters. Formerly, the community had been used to conducting its affairs on a more informal and personal basis. Influence and moral persuasion, rather than the threat of formal sanction, were previously the major means of social control.

11. Economically, problems were created by the underlying faith in and assumption that the dams would bring economic growth and development to the community. Sweet Home is an example of a community which embraced economic growth, but did not realize its expectations. The interesting thing is that the residents seem not to have lost their faith in the ideology of growth.

12. In contrast to most of the residents, people seem to believe that merchants and businessmen did well, especially during the construction phase. Those engaged in recreation-related business will probably continue to benefit, although this will probably not contribute to sustained economic development.

13. The attitudes toward economic development and the influence of more formal and legalistic procedures have contributed to a changed image of the community which has necessitated social and attitudinal adjustments on the part of residents. Sweet Home has become a

more non-articulated community than before construction. What has occurred is the maintenance of specific patterns of roles but less integration and more segmentation between them.

14. The major question which an impact study should address is who benefits and who pays and how. The emphasis should be on groups as beneficiaries and benefactors as well as on impacts, as costs and benefits.

### COMMENTS

1. The authors make an interesting remark about the relation between technological change and social organizational patterns. They write:

[E]xogenous impetus for cultural change may come in terms of ideas and behaviors appropriate to a given technology, even before the technology arrives. Thus, communities may be restructured and reoriented to a particular new way of life well in advance of developing that new subsistence system. This implies that technological change, even in situations of exogenous impetus, is not necessarily causally related to changes of organization and ideology. Furthermore, it implies that settings may, through unique historical circumstances, endogenously develop the ideological and organizational bases for a new technology well in advance of that technology's development. (p. 127)

This inverts the culture-technology relationship from one of "cultural lag" to one of "technological lag." It also suggests that over the long term in situations of technological lag, after the appropriate technology has been grafted onto the social system, there will result an imperfect, possibly sub-optimal fit, thereby producing some new disjunction between technology and culture. At that point the problem then becomes one of technology calling forth a cultural adaptation of ideas, attitudes and values.

"Demographic Effects of Water Development"

John Hollis and James McEvoy III \*

In: Charles R. Goldman, James McEvoy III and Peter J. Richerson (eds.), Environmental Quality and Water Development. San Francisco: W. H. Freeman, 1973, pp. 216-232.

DESCRIPTORS/IDENTIFIERS

Demographic Impacts; Recreation; Self-Fulfilling Prophecy; Population Projections; Urbanization; Water; Policy

LOCATORS

Los Angeles, California

ABSTRACT

From a demographic point of view, the crux of the water problem in the United States lies in the discrepancy between the natural distribution of the water supply and the distribution of consumers. In addition, water users "consume" more per capita each year as incomes, spending and leisure time increase. This makes population projections difficult and often risky, a major problem being that the projections often become self-fulfilling prophecies. Population and water demand projections are taken as immutable fact and the "threat" of future water famine prompts water managers to search always farther afield to serve a hypothetical population which might not appear if more water were not made available. The attempt to supply an area with unlimited quantities of water has serious environmental and social effects at both ends of the distribution system, and the magnitude of these effects will increase as our population continues to concentrate disproportionately in urbanized, semi-arid regions. The historical development of this population-water demand relationship is traced in terms of phases of policy objectives and outcomes, with special reference to the case of Los Angeles. To encourage growth for its own sake is a questionable philosophy in view of the decreasing quality of life it portends. As a start toward better water planning, a national policy should be established to assess all long-term demographic predictions used to justify large-scale water development projects.

## FINDINGS

1. From a demographic viewpoint, the crux of the water problem in the United States lies in the discrepancy between the natural distribution of water supply and the distribution of consumers.
2. The demographic history of the United States has been dominated by three major phenomena, all of which are particularly salient in the twentieth century: (1) absolute growth of the population; (2) the movement of population to the West; and (3) increasing urbanization.
3. Recreational use, as opposed to physiological needs for other major uses of water, is an increasingly significant aspect of the value of water, including major impacts on income from recreation and recreational equipment, leisure time and aesthetic beauty.
4. A major problem with population projections as they affect water development is their tendency to become self-fulfilling prophecies. In Los Angeles, for example, population projections were used to justify water resource expansion which, in turn, generated more population growth and attracted industry.
5. Recommendation: The Federal Government should establish a policy of carefully evaluating all population projections used as background to water project proposals. Specifically, efforts should be directed toward determining to what extent a project would create, and not merely serve, a projected population.

SEE ALSO: Smith and Hogg (1971a). Together, these two articles provide a good introductory statement about the relationships between water development and population change.

"The Impact of Open Urban Land on Community Well-Being"

L. Douglas James and Donna R. Brogan

In: C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wis.: Environmental Design Research Association; 1974, pp. 151-67.

DESCRIPTORS/IDENTIFIERS

Community Cohesion; Environment; Factor Analysis; Flood Plain Management; Index Construction; Land Use Planning; Methodology; Planning; Quality of Life; Regression Analysis; Social Well-Being; Urban Areas.

LOCATORS

Atlanta, Georgia

ABSTRACT

Many now advocate that flood plains and other open urban space be preserved for recreational activities and visual enjoyment. One important consideration in evaluating this policy is the effect of open land within an urban community on the lives of those who live nearby. This study uses Atlanta data to examine the hypothesis that the well-being of urban residents is associated with their physical environment. The hypothesis is tested by using stepwise multiple regression analysis of 22 well-being indices on selected indices of the physical and social environment. The results substantiate the hypothesis by showing that the association of the indices of the physical environment with the well-being indices is statistically significant and that the indices of the physical environment are approximately equal to the indices of the social environment in their ability to predict well-being. The collective results imply that the most important influence of urban land is its role in attracting or deterring the entry of outsiders into residential neighborhoods. Urban open space can make a definite contribution to urban well-being through development as a barrier separating the residential communities from intense-use areas or through development to contribute to the recreational or aesthetic resources of the community.

FINDINGS

1. Exterior physical characteristics (factors) are statistically significant and as important as socioeconomic factors in explaining

such social problems as arrests, poor mental health, absence from school, fires, etc. In fact, the results indicate that the physical environment is much more important than the socioeconomic factors in associations involving juvenile and drug problems.

2. The findings also illustrate distinct differences in the characteristics of the exterior physical environment associated with different well-being indices: e.g. juvenile arrests are highest among those young people living near recreational opportunities attracting other youth into the neighborhood; narcotics arrests occur most often among people living near gardens, parks and woodlands, etc.

3. The dominant pattern in the regression analyses was that land use patterns that cause large numbers of non-residents to frequent residential neighborhoods are regularly associated with problems for the neighborhood residents.

4. A major policy implication is that urban well-being would be enhanced if areas of intense commercial, industrial or recreational activity were separated from residential areas. This involves two distinct kinds of open space use. One is as vegetative barriers separating residential areas from areas devoted to other uses and subdividing residential areas into communities with which people can identify, and within which they can know one another. The other is to provide within each such community the natural or aesthetic environment and the recreational opportunities that satisfy the needs of its people.

#### COMMENTS

1. The findings appear overgeneralized for purposes of firm policy guidance. Comparative studies of different cities and neighborhoods is a prerequisite to generalization of the findings.

2. The socio-economic indices are not all good ones--in fact, it is hard to tell the socio-economic indices from the physical environment ones at times. The conceptual distinction informing this operational classification seems fuzzy, or at least overly simple; theoretical coherence may have been sacrificed to measurement methodology.

3. Do the non-subjective (non-individual) grouped data used really "get at the concepts tested"? Don't we really need some attitudinal

data at least as supplementary data? The validation of objective measures by subjective perceptions would be instructive.

4. Assuming the finding that "land use patterns which cause large numbers of non-residents to frequent residential neighborhoods are regularly associated with problems for the neighborhood residents" is true, the question of a "causal" model providing some explanatory framework for the measured associations becomes acute.

5. Alternative linkage patterns are mentioned at the outset and not developed in subsequent analysis or interpretation of findings. Theoretical development might explore these models more fully.

SEE ALSO: C. P. Wolf, "Comment on 'The Impact of Open Urban Land on Community Well-Being,'" pp. 169-70 in Wolf (ed.), Social Impact Assessment, Milwaukee, Wisc: Environmental Design Research Association, 1974, and rejoinder by the authors, pp. 171-74.

"Social Impact Statements: A Tentative Approach"

Sue Johnson and Rabel J. Burdge

In: C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wisc: Environmental Design Research Association, 1974, pp. 69-84.

DESCRIPTORS/IDENTIFIERS

Case-Matching; Comparative Diachronic Analysis; Data Sources; Dimensioning Impacts; Methodology; Quasi-Experimental Design; Reservoirs; Survey Research

LOCATORS

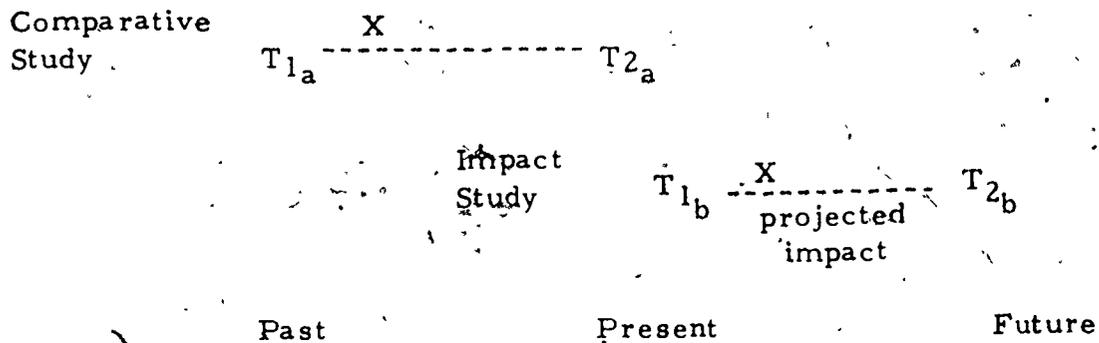
Kentucky (Reservoirs)

ABSTRACT

The general methodology presented here involves using post-construction analysis of a project similar in as many respects as possible to one being proposed to make social impact predictions (comparative diachronic analysis). Consideration is given to the kinds of similarities needed to "match" projects; e.g., geographical location, size and scope of project, and the social and economic characteristics of the affected community. Further attention focuses on the degree of validity associated with primary and secondary data to make the necessary predictions for social impact statements. The examples here deal with reservoir construction projects, but the general methodology with important adaptations can be used for other large-scale projects such as highway construction, urban renewal, waste disposal, and watershed management, among others. Social impact is here divided into two categories: the impact on persons who must be relocated and the project impact on the local community and adjacent counties.

FINDINGS

1. This paper proposes a quasi-experimental design under the name of "comparative diachronic methodology" as one practical approach to social impact prediction:

Schematic Diagram of Comparative Diachronic Methodology

X = Reservoir Construction

2. Data supporting social impact statements occur on various levels. A methodological proposition is advanced that as one moves from level I (census data) to level VII (survey data), validity will increase since the data will better reflect the character of the local area.

3. A substantive point is that relocatees are among the first to be affected by a project and in major ways, starting with the "news" that a project is being planned.

4. The closer the matching on basic community characteristics, the greater the accuracy of impact prediction.

COMMENTS

1. A criterion problem arises as to which characteristics of areas and groups are most important for obtaining a good match. This problem is even more difficult if the method is applied to cities.

2. Besides the problem of matching, the methodology is probably limited when applied to urban situations. The unit of urban analysis is probably not a county, but something like the SMSA and, at a disaggregate level, groups within the city.

3. How does cost-benefit get worked into the methodology? The method needs to be supplemented by a way to measure and weigh impacts.

4. While Johnson and Burdge take the county as their unit of analysis, it is clear that their analytical units are really territorial entities within a defined cultural area. Actually, cultural homogeneity is the most important matching criterion, although what "cultural" means in this context is not clear.

5. There are no political variables among the matching criteria, except that implied by the "purpose" of a proposed project.

SEE ALSO: C. P. Wolf, "Comment on 'Social Impact Statements: A Tentative Approach,'" pp. 85-86 in Wolf (ed.), Social Impact Assessment. Milwaukee, Wis: Environmental Design Research Association, 1974, and reply by the authors, pp. 87-88.

"The Social Impact of Urban Highways"

Lynn G. Llewellyn

In: C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wis.: Environmental Design Research Association, 1974, pp. 89-108.

DESCRIPTORS/IDENTIFIERS

Attitude Surveys; Attitudes: Highways; Community Cohesion; Differential Impacts; Environment: Highway Impacts; Interviewing; Methodology; Migration: Forced; Noise: Highway Impacts; Public Participation

LOCATORS

Baltimore, Maryland

ABSTRACT

Recent interest in the social effects of highways was prompted by urban disorders and the growth of environmentalism. For years the benefits accruing from highway construction had been extolled while little attention was devoted to social costs. This paper examines data on social impact derived primarily from surveys with individuals living in proximity to completed freeways or proposed freeway locations. Included in the presentation are attitudinal data on transportation preferences, perceived highway impacts, and freeway disputes. Special emphasis is also given to the effects of displacement and relocation and to the extreme variability of response to highway traffic noise. The findings suggest that the social costs of freeways are generally borne by the urban poor, minority groups, and the aged.

FINDINGS

1. Perhaps the most unequivocal statement that can be made about highways is that they affect people differentially and they are in turn reacted to in much the same way.
2. The urban poor, minority groups, and the aged are often the victims of short-sighted freeway planning.

3. (The general public, for the most part, favors highway construction. Furthermore, once highways are completed, the majority of those living nearby see more advantages than disadvantages in their presence. On the other hand, opposition to certain types of highways, particularly freeways, is increasing in various localities. Opinion surveys and case studies of freeway controversies suggest that some groups are more likely than others to resist freeways, but for quite different reasons. Senior citizens, as they become increasingly dependent on public transportation, avoid freeways, possibly because they fear high speeds. Anxiety may also contribute to lower tolerance for freeway noise among the elderly. Low-income, non-white, inner-city residents oppose freeways on the grounds of community disruption and the high probability that, if anyone is to be displaced (with inadequate compensation and inferior replacement housing), they will be the victims. Those with higher incomes and more education, especially professionals, frequently combat freeways on environmental and aesthetic grounds (e. g., increased noise and air pollution are common complaints). Concern about the safety of children and the physical deterioration of neighborhoods is typically mentioned by several population groups.

4. The consequences of displacement are often most severe in low-income areas, or those communities heavily populated by minority groups and elderly, long-term residents. But all too often highway route selection has followed the path of least political resistance--precisely the localities just described.

5. The data suggest that actual sound levels do not correlate highly with reported disturbance; other factors such as age, length of residence, socio-economic status, and attitudes toward one's immediate environment (and toward highways in general) appear to account for more of the variance. There is also evidence indicating that the type of noise, and the difference between ambient noise levels and that produced by freeway traffic, are sometimes more important than absolute noise levels. Perhaps the most disturbing findings are those reported by Glass *et al.* (1973) relating the intensity and duration of freeway noise to impaired learning. If nothing else, it underscores the fact that many questions about the impact of noise remain unanswered.

6. In order of frequency of neglect, the problem areas identified as most in need of research in the area of highway impact are:

- mass transit alternatives
- impact on taxes and tax base
- increased urbanization
- nearby property values
- disposition of public comments
- community disruption
- "no-build" alternatives
- noise pollution
- air pollution

### COMMENTS

1. Michael A. Perfater ("Comment on 'The Social Impact of Urban Highways,'" pp. 109-10 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wisc: Environmental Design Research Association 1974) complains that Llewellyn has uncritically accepted the dated and biased assertions of highway critics.

2. Perfater contends that where abuses existed they have since been rectified by recent legislation such as the Relocation Act of 1972 and the requirement that state highway departments submit "Action Plans" detailing planning procedures and provisions for public involvement.

SEE ALSO: Llewellyn's "Reply to Perfater's Comments on 'The Social Impact of Urban Highways,'" pp. 111-12 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wisc: Environmental Design Research Association, 1974.

Evaluation of the Social Impact of Reservoir Construction on the Residential Plans of Displaced Persons in Kentucky and Ohio

Richard L. Ludtke and Rabel J. Burdge

Research Report No. 26, Lexington: Water Resources Research Institute, University of Kentucky, 1970.

DESCRIPTORS/IDENTIFIERS

Adjustment; Attitudes: Reservoirs; Benefit-Cost Analysis; Community Cohesion; Interviewing; Methodology; Migration: Forced; Modeling; Quasi-Experimental Design; Reservoirs

LOCATORS

Caesar Creek Reservoir, Ohio; Taylorsville Reservoir, Kentucky

ABSTRACT

This research was initiated to develop and test a model for explaining migration under conditions of forced displacement and relocation. Data for the study come from investigation of questionnaire responses by populations in Ohio and Kentucky who were affected by the planning and construction of reservoir projects. The model includes a consideration of people's potential for transferring existing statuses to new residences, the extent to which people's interests are served by the reservoir, people's knowledge of the reservoir, the social class backgrounds of those displaced, and the extent to which people identify with their places of residence. These factors are viewed as affecting people's levels of apprehension and consequently their willingness to separate from their current membership systems.

The testing of the model indicated that apprehensions over moving are greatest for those who identify strongly with their present residences; that apprehension over migration is less for those whose vested interests are served by the reservoir; and that knowledge of the reservoir project did not reduce apprehensions over moving as predicted by the model. The writers suggest that the deleterious impacts of reservoir projects could be reduced if agencies planning the projects would develop and use more effective mechanisms for including affected people's views in the planning process.

FINDINGS

1. Apprehension over moving relates inversely to people's willingness to separate themselves from their current friends and homes.
2. People with more favorable attitudes toward projects were less apprehensive over moving and as a consequence were more willing to engage in moves that require greater degrees of separation from their current friends and types of residence.
3. One of the main independent variables, "type of status transfer," was predicted to vary inversely with apprehension. The findings showed little support for this relationship. The status transfer variables did, however, relate to the measure of separation. The extent of transfer of primary relationships was strongly related, in a negative direction, with people's willingness to separate from their current friends.
4. The presence of commuting did not relate to apprehension, but commuters did appear less willing to separate themselves from either their friendship groups or type of community than non-commuters. People with a history of mobility, on the other hand, did seem less apprehensive over moving in general and more willing to separate from both friendship groups and their current community types.
5. Vested interests proved to be an exceptionally powerful variable. Those with interests enhanced by a reservoir project expect to engage in moves requiring the greatest amount of separation.
6. Knowledge had a negligible effect on people's attitudes toward the reservoir project and did not contribute to the explanation of social migration.
7. Socio-economic status also failed to relate to people's attitudes toward reservoir projects. However, separation from place was found to be directly facilitated by socio-economic status.
8. Identification with place related consistently and strongly with apprehension and consequently produced indirect effects on social separation. Uniformly, the more intense identification with place, the less inclined people were to engage in social separation.

SEE ALSO: Burdge and Ludtke (1973); Burdge and Johnson (1973).

"Criteria for Evaluation of Social Impacts of Flood Management Alternatives"

Ruth P. Mack

In: C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wisc: Environmental Design Research Association, 1974, pp. 175-95.

DESCRIPTORS/IDENTIFIERS

Army Corps of Engineers; Attitudes: Dams; Community Cohesion; Dams; Differential Impacts; E-Model; Economic Impacts; Evaluation; Flood Plain Management; Groups: Impacted; Interviewing; Methodology; Modeling; Optimization; Participant Observation; Social Values; Social Well-Being; Trade-Offs.

LOCATORS

North Springfield, Vermont

ABSTRACT

This is a descriptive and analytical study of two cases of water resource management--the flood in Westfield, Massachusetts and the construction of a dam in North Springfield and Weathersfield, Vermont. The report covers the period from 1955 to 1971 for both cases, thereby allowing developmental comparisons over time. The major intent of the report is to develop a method for systematically assessing and evaluating differential impacts and their relationships to various community groups. This task is carried out in terms of an explorative ("e-") model which is grounded in economic utility theory and which aims to measure household utility optimization as it is affected by project impacts. The specific impacts in both cases are identified, analyzed, and displayed in terms of the e-model frame. A central conclusion is that social impacts are substantial relative to economic ones--proportions of 40 to 60 for the flood and 45 to 55 for the dam. Moreover, impacts of different kinds fell on different groups: economic impacts, (largely positive, were most associated with business and industry; social impacts, largely negative, were most associated with residents and townspeople. The report concludes with a discussion of criteria for designing and selecting alternatives in flood management protection programs and endorses approaches which attempt to maximize planning flexibility and management means which are sensitively designed at all phases of program development.

FINDINGS

1. Social impacts are substantial relative to economic ones.
2. Both social and economic impacts fall on different groups with different effects. A major theme of paper is differential impacts.
3. As between what might be called the service and source areas of flood control benefits, it is abundantly clear that the service area, primarily businessmen in Springfield, uniformly benefit and the large majority of such benefits are economic. The source area, on the other hand (Weathersfield and Perkinsville), made large sacrifices, the majority of which were social.
4. The tabular display of impacts and impacted groups gives a detailed analysis of impact magnitudes and directions (i. e., whether "positive" or "negative" and to what degree). Some examples may give an idea of these concrete impacts:

Planning and Purchase of Basin Property: People whose property may be taken or who may be cleared out of areas and forced to find new homes uniformly suffered negative impacts including litigation costs, uncertainty about the future, reduction of income from capital in property, the tension of controversy, etc..

Clearing of Basin, Dam Construction, and Aftermath: People who were relocated suffered significant losses including loss of income, difficulties of forming new community and personal relationships, loss of leisure time due to relocation, etc. In contrast, business interests tended to benefit substantially from dam construction because of additional income accruing from enhanced value of flood plain property and potential expansion of business in the protected area.

COMMENTS

Shields (1974) first raises questions about Mack's "imputational method":

1. Where do the numbers come from? How were weights assigned to the various impacts? Are they "objective" measures or "subjective" judgments? A methodological note on this matter should be appended to the Report.

2. The utility categories are too vaguely distinguished, especially for purposes of concrete case analysis. They all make sense in their own terms, but tying them to the specific impacts is somewhat arbitrary in the sense that different observers using the same model and looking at the same concrete impacts could differ widely in their assignments of utility categories. Maybe what is needed is a set of operational measures for each category.

3. This is related to point 2. Why are some of the utility categories economic, others social, and still others environmental? Also, what is involved in the term "environmental?" As used in the Report, it seems to include typically cultural things--ideas, beliefs, aesthetics, etc. This use confuses the meaning of "social." The idea of designating utilities as economic, environmental, or social is, I take it, to connect the individualistic utility categories to more macro-scale units or concepts. This should be done more systematically: the underlying theoretical rationale and principles of classification should be explained.

4. Again, this bears on the impact types--economic, environmental, and social: why are there three types identified in the text, but only two are used in the display tables? There is a disjunction here between the conceptual discussion and the actual impact analysis.

5. While many impact groups are identified, it is not clear to what extent their memberships overlap. Overlapping group memberships should result in more intense impacts (1 or -) on those members. This raises the possibility of "impact inconsistency."

6. Evaluative activity is central to the e-model, but is virtually ignored in the impact analysis and display. Evaluative activity is completely absent in the display table for the dam.

7. Whereas the Report is a study of two different cases of flood management, there is very little in it by way of explicit, detailed paired-comparison. It would be useful if the comparative possibilities were more fully exploited.

Economic and Social Impact of Recreation at Reclamation Reservoirs:  
An Exploratory Study of Selected Colorado Reservoir Areas

J. Gordon Milliken and H. E. Mew Jr.

Denver, Colorado: Denver Research Institute, University of Denver,  
1969.

DESCRIPTORS/IDENTIFIERS

Attitudes: Reservoirs; Economic Impacts; Interviewing; Land Use  
Planning; Methodology; Recreation; Reservoirs; Tourism

LOCATORS

Shadow Mountain/Granby and Horseshoe Reservoirs, Colorado

ABSTRACT

Three reclamation reservoirs in Colorado were studied twenty years after construction to determine the economic and social impact of recreation. Two were remote scenic mountain reservoirs (studied as a single area) while the third was a foothills reservoir near a city of 40,000 population. The methodology included questionnaires and interviews with recreationists and businessmen and analysis of land value changes.

Substantial direct economic impacts were found in both areas. These included: (1) increases in the value of land, improvements, and recreation facilities; (2) increases in tax revenue; (3) increases in retail sales of goods and services to recreationists; (4) increases in boat sales; (5) increases in expenditures for operation and maintenance of recreation facilities; and (6) the creation of more jobs.

Socio-cultural impact was also studied and significant differences were found between typical groups of recreationists using the two areas. These included differences in socioeconomic characteristics, place of residence, preferred recreation activities, frequency and duration of visits, and expenditures and investments in recreation equipment. The study forecasts future socioeconomic impact in both reservoir locations and hypothesizes general types of impacts that can occur at other water-oriented recreation areas.

FINDINGS

1. Primary economic impacts of both reservoir areas were salient and positive. These included: (1) increases in land and property values; (2) tax revenue increases; (3) increases in retail business sales; (4) increases in employment. Secondary economic impacts were not discussed in the article.
2. Shadow Mountain/Branby Reservoir users are typically families with 2-3 children, parents of between 30 and 49 years of age, out-of-state vacationers, with above average occupational status and incomes above or about \$10,000 per year.
3. Horsetooth Reservoir users are typically area (Denver SMSA) residents, families, with above average occupational status and incomes, between \$10,000 and \$14,000 per year. They are likely to go to the area for weekends and engage in fishing or water skiing.
4. Recreationist demand for the areas is expected to continue increasing, thus promoting further major economic impact.
5. Regarding social impacts, the reservoirs created substantial new recreational opportunities, although it is hypothesized that even without the reservoirs the area would have experienced a growth in recreational use and opportunities.
6. In their literature review, the authors found age, income, and occupational status the primary factors influencing participation in, and discrimination among, recreation activities.

- The greatest demand for all types of outdoor recreation is concentrated in metropolitan areas and preference is for weekend use.

- Both of the above trends are expected to continue into the future.

COMMENTS

1. One positive note is their attention to "history." It should be said, however, that such attention is almost inevitable by the nature of the

study and the cases selected since it discusses the impact of reservoirs built twenty years prior to the study. History here involves accounting for impacts (mainly economic) prior to the time of the study and since the building of the reservoirs.

2. This paper pays scant attention to social impacts. In fact, the impacts noted are as much economic as social despite the label "social." Generally, the social impact part is concerned with characteristics of users of the reservoirs, not with such things as impacts on community and area residents (except for businessmen, where the impacts cited are economic). One section does imply positive impacts on Denver area residents who are the largest users of the Horsetooth Reservoir and there is some discussion of population growth (though no indication is made as to how population growth was or was not independently affected by the reservoirs). Even where the impact "improved recreational opportunities" is discussed, it is noted that recreational opportunities and use of the areas would probably have increased regardless of the reservoirs. This may tell us that a study which specifically focuses on economic impacts will find little in the way of social impact to report, even when such impacts may be strong. Of course, the alternative interpretation is that while social impacts beyond those briefly noted may have been in evidence, they were fairly insignificant compared to major economic impacts.

3. One highly noteworthy point about this study is that almost no one seems to have been adversely affected by the reservoirs. This goes for both social and economic impacts. In fact, the reservoirs appear to have been a real plus to the area as well as to the Denver Metropolitan area. This constitutes the first "bona fide" example of an impact study which describes nearly universally good results for the impacted area and groups. The reservoirs even improved the aesthetic quality of the area. (Can it really be that the projects were nearly universally beneficial or is the analysis deficient?)

4. The report does not deal with or estimate the extent of secondary impacts, both social and economic. It may be that focusing on some secondary impacts would have revealed certain adverse impacts.

"Social-Psychological Response to Forced Relocation Due to Watershed Development"

Ted L. Napier

Water Resources Bulletin, 8, 4 (August 1973), 784-795.

DESCRIPTORS/IDENTIFIERS

Adjustment; Alienation; Attitudes: Watershed Development; Benefit-Cost Analysis; Community Cohesion; Interviewing; Methodology; Migration: Forced; Quasi-Experimental Design; Watershed Management

LOCATORS

Ohio, West Virginia (Watersheds)

ABSTRACT

This paper analyzes the social-psychological response of rural community residents to the impacts of forced relocation due to externally imposed water resource development. The study was conducted within two communities in West Virginia and two in Ohio, all of which had been recently involved in watershed development. Two other communities were selected as controls. Groups within each affected community were divided into non-relocated/relocated and initial and post-shock groups. Three hypotheses were tested: (1) community groups directly affected by forced relocation will become alienated from the changing community situation; (2) relocated people in the affected community groups will exhibit greater alienation than the non-relocated community groups; and (3) alienation will decrease as the affected groups adjust to the changed situation. None of the hypotheses is supported. Affected groups' attitudes about their community situation appear to be a function of variables other than the stimulus of forced relocation. Negative attitudes were present in the affected groups, but they were mainly directed toward the change agent and toward the inconvenience of physical relocation rather than toward social relationships within the community.

FINDINGS

1. This is a quasi-experimental design study which attempts to evaluate the social-psychological response of local residents to forced displacement and relocation due to watershed development. The dependent variable is community alienation.

2. Three hypotheses are tested:

1. Community groups which are directly affected by forced relocation of population due to water resource development will become alienated from the changing community situation.

2. Relocated people in the affected community groups will exhibit greater alienation than those in the non-relocated groups.

3. Alienation resulting from the disruptive effects of externally imposed change will decrease as affected groups adjust to the changed community situation.

3. None of the hypotheses is accepted. Forced relocation of people due to watershed development did not consistently result in alienated subject groups in the manner predicted. Affected groups' attitudes about their community situation seem to be affected by variables other than the stimulus of forced migration. Negative attitudes were present among the groups, but they were directed toward the external change agent and the inconvenience of physical relocation rather than toward social relationships within the community.

4. A partial explanation for the apparent lack of community alienation may be attributed to the relocation pattern of the displaced people. The relocated groups moved or intended to move within the non-inundated portions of the affected communities. They were able, therefore, to maintain group memberships or believed that they would be able to maintain group memberships. Apparently the maintenance of group memberships prevented the fragmentation of established interaction patterns and therefore counteracted tendencies toward alienation.

#### COMMENTS

1. Valid conceptualization and measurement of "alienation" are exceedingly difficult. But ignoring this problem, the interesting point about this study is that it tested the less obvious hypotheses about alienation and found the more obvious one to hold. That is, it would appear that relocated people would more plausibly be "alienated" from the agency responsible for their forced move than the community in which the move occurred. And this is precisely what was found. "Apprehension" over the move and the necessity to form new social relationships is probably the more appropriate variable when it comes to assessing reactions to a changed community situation (Burdge and Ludtke 1973). Or it may be that alienation, as the absence of solidary ties, may be avoided in impact situations like this one if there is an available out-group (the change agency) to scapegoat.

"Social Effects of Nuclear Power Plants"

Elizabeth Peelle

In: C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wisc: Environmental Design Research Association, 1974, pp. 113-20.

DESCRIPTORS/IDENTIFIERS

Differential Impacts; Dimensioning Impacts; Environment; Groups; Impacted; Methodology; Nuclear Power Plants: Social Impacts; Radiation: Perceived Danger; Trade-Offs.

LOCATORS

Mendocino Nuclear Power Plant, California

ABSTRACT

Social effects of building and operating nuclear power plants result from impacts upon (1) socially-valued aspects of the physical environment and (2) the social structure itself. Sudden, temporary population growth during construction may strain financial and organizational resources of rural areas. Large increases in tax base result from operation of privately-owned power plants, affecting tax structures and land use balances in site-specific fashion.

Assessment of impacts involves dimensioning with fourteen descriptors, and analysis of impact recipient groups. Dissociation of social costs and benefits may occur (1) through time lag between costs and benefits, (2) when different groups are beneficiaries and payees, and (3) through vagaries of institutional structure. Assessment of social costs and benefits usually involves non-equivalent currencies of exchange, and raises serious analytical and methodological problems for a final cost-benefit balance. Social impact alternatives are listed as are requirements for adequate social impact analysis.

FINDINGS

1. There is usually a striking dissociation between costs and benefits of nuclear power plants through: (1) time lag between costs and benefits, (2) different groups being beneficiaries and payees, and (3) vagaries of

institutional structure--in short, through the pervasiveness of differential impacts.

2. Population growth and the resulting demand upon local services and community structures are the major construction impacts upon the affected area.

3. A major impact of large installations such as privately-owned power plants is their effect upon tax structures and thus upon the balance of land uses.

4. Impacts may be dimensioned by at least fourteen descriptors:

- |                            |                                       |
|----------------------------|---------------------------------------|
| (1) time                   | (8) quantifiability                   |
| (2) location               | (9) synergistic effects               |
| (3) directness             | (10) magnitude                        |
| (4) singularity            | (11) cumulativeness                   |
| (5) perceived desirability | (12) certainty                        |
| (6) importance             | (13) differential impact on people    |
| (7) reversibility          | (14) differential impact on resources |

5. Three major categories of social impacts emerge from the building and operation of a nuclear power plant: (1) impacts upon socially-valued aspects of the physical environment; (2) impacts upon the social structure itself; and (3) perceived danger of radiation.

6. An enumeration of the items which a social impact statement should address includes:

1. Systematic identification of social costs and benefits.
2. Analysis of social costs and benefits (dimensioning, etc.).
3. Quantification of social costs and benefits.
4. Identification and analysis of impact recipients.
  - a. Mixed impact groups.
  - b. Multiple impact groups.
  - c. Separation of beneficial and adverse impact recipients.
5. Reducing problem to sets of identical beneficiary-payee groups.
6. Quantification of costs and benefits in terms of impact recipients.
  - a. Number of recipients of each impact.
  - b. Intensity of impacts

7. Limiting/reducing unquantifiables.
8. Determining acceptable cost-risk levels.
9. Establishing equivalence among values.
10. Choosing an appropriate social discount rate.
11. Producing a final social cost-benefit balance.

### COMMENTS

1. William T. White ("Comments on 'Social Effects of Nuclear Power Plants,'" pp. 121-22 in C. P. Wolf (ed.), Social Impact Assessment, Milwaukee, Wisc: Environmental Design Research Association 1974) notes that as well as construction and operation, emphasis should also be placed on the social impacts of site selection. Moreover, there is a synergism present in the clustering of site locations that site-specific studies ignore.

2. White further believes that "life-style" as a social impact category has not been properly addressed and that theoretical development of such conceptualization is a pressing need that no amount of quantitative measurement will serve.

"A Legal Rationale for the Sociologist's Role in Researching Social Impacts"

Pamela Dee Savatsky

In: C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wisc: Environmental Design Research Association, 1974, pp. 45-47.

#### DESCRIPTORS/IDENTIFIERS

Legal Aspects; National Environmental Policy Act: Social Impact Assessment.

#### ABSTRACT

In order to justify a mandate for social impact analyses where no explicit legal document exists, it is necessary to explore recent federal acts concerning environmental impact analyses. The most pertinent for this purpose is the National Environmental Policy Act of 1969. This act declares a policy of encouraging productive and enjoyable harmony between man and his environment through impact of man's activity on the interrelations of all components of the natural environment. The argument of this paper is that such a policy implicitly, but obviously, demands social impact analyses as well as environmental ones.

#### FINDINGS

1. Through implicit communication, NEPA (National Environmental Policy Act) has declared the necessity for human and therefore social impact assessments.

#### COMMENTS

1. The argument presented is sound. The real task now is how to best organize social science inputs into developing more formal and explicit guidelines and also how to most strategically follow the legal route. There are hazards to avoid (Wolf 1974: 34) and they are greater than those associated with environmental impact legislation because of the multiplicity of values and interests at stake.

SEE ALSO: Francis (1974).

"Cultural Aspects of Water Resource Development Past, Present, and Future."

Courtland L. Smith and Thomas C. Hogg

Water Resources Bulletin, 7, 4 (August 1971), 652-660.

#### DESCRIPTORS/IDENTIFIERS

Bureau of Reclamation; Demographic Impacts; Economic Growth; Social Values; Water: Policy.

#### LOCATORS

Western United States

#### ABSTRACT

Attitudes toward the development of the American West have undergone significant changes over the past century as the nature of water resources as factors in development have changed. Viewing these changes processually, stages for water resources definition and use can be identified in the total process of western cultural development. The first involves the value of water resource development as a stimulus to population and economic growth. The second stage, still in progress, adopts a dominant cultural norm which sees water development as inevitable if not necessary to keep up with growth. The third stage is incipient. Future cultural values with respect to water resource development will be to look at it as a means for controlling or managing both the location and quantity of population and economic growth. To this end planners will have to become concerned with the questions of human adaptation. Concern will have to be given to the problems of getting a living which enables individuals to meet the subsistence needs of self and family, to establishing community which provides for cooperation among individuals and the management of conflict, to establishing improved communication which promotes interpersonal interaction, and for fostering innovation which provides the new ideas necessary to adapt to new environmental situations.

#### FINDINGS

1. There have been three stages in the development of water policy in the United States:

1. 1862-Pre-World War II: Early water resource development was undertaken in the American West in order to stimulate population migration into the frontier.
  2. Post-World War II to 1970 (Earth Day): During this period the goals of planning seem to have shifted from a population settlement and growth ethic to a concern for using water resource planning to keep up with population growth.
  3. Post-1970: Unregulated population growth is being questioned and many are suggesting that population size be seen as a dependent variable to be managed either up or down by careful planning, of which water resource planning is only a part.
2. The cultural functions which are most important to water resource planning are adaptation to the environment, the gaining of subsistence, the establishment of a meaningful community, the enhancement of communication and the stimulation of innovation.
  3. The present water resource planning culture has too often dealt solely with demographic variables of births, deaths and migration to project population growth rates. There is consequently a need for planners of this culture to take account of prevailing cultural dimensions which influence variations in demographic variables.

#### COMMENTS

1. This article serves nicely as a companion piece to Hollis and McEvoy (1973). Together, they are a good historical and theoretical framework for understanding the relationships between water development and population change.

Quality of Life in Kickapoo Valley Communities

E. A. Wilkening and others.

Report No. 11. Madison: Institute for Environmental Studies, University of Wisconsin.

DESCRIPTORS/IDENTIFIERS

Attitudes; Community Leaders/Dams; Community Cohesion; Community Leaders; Dams; Interviewing; Methodology; Participant Observation; Profiling; Quality of Life; Reputational Method

LOCATORS

Kickapoo Valley and LaFarge Dam, Wisconsin

ABSTRACT

This report is the second in a series dealing with the economic and social impact of the LaFarge Dam on the Kickapoo River in southwestern Wisconsin. It is the intent of the study to establish social and economic baseline information on communities to be affected by a reservoir project before that project is completed. It illustrates a method for measuring the impact of the dam on people and institutions, using secondary sources and data collected by personal interviews with community leaders who were selected by a reputational method. Future studies of the same region will assess changes occurring as a result of the project, thereby building a continuous record of socio-economic changes in a flood control project.

The report briefly presents the economic history of the region and its population changes since 1890. Most of the report consists of a display and discussion of the responses of community leaders in the twelve communities in answer to questions concerning their opinions of services, facilities, leadership and the overall "quality of life" in their communities. The study also gives some indication of reservoir impacts anticipated by area residents. It was timed to take place before the LaFarge Reservoir was constructed but after most of the land had been purchased. A later report of the series will focus on changes in land ownership, values and use.

## FINDINGS

1. This study, part of a larger long-range effort, establishes baseline data about the social and economic characteristics of the communities which will be affected by the LaFarge Dam before it is completed. Future studies will assess changes occurring as a result of the completed project, thereby compiling a continuous record of socioeconomic changes in the area.

2. The reservoir to be created by the dam is expected to attract new recreationists and business to the communities to counteract the business and population decline in the area. But these changes will have impacts on life-styles and institutions. The purpose of this study is to provide a basis for assessing these changes so that citizens and policymakers can take account of them in future decisions about projects of this kind.

3. Some tentative recommendations are offered:

1. The total impact of a study of a project of this kind should include information about the social and economic consequences for individuals, institutions and services.

2. Impact studies need to be made early and by disinterested parties rather than by the agency having an interest in the promotion of the project.

3. Information about the decision to build major structures such as the LaFarge Dam should be disseminated as widely and as early as possible. Lack of information contributes to the problems of those who are forced to sell their land and make adjustments.

4. The LaFarge Dam will affect several communities above and below the dam. Some will benefit more than others. Maximizing benefits will require the cooperation of all people living in the watershed above the dam and immediately below it.

5. Measures of the impact of water management upon personal well-being and quality of life requires gathering a wide range

of both objective and subjective data. In combination, the two types of data complement each other in validating the measure of quality of life in an area before and after a project is built.

6. The subjective evaluations of leaders in the community may provide a substitute for a more comprehensive survey of a random sample of people:
4. Of the 127 questions on the interview schedule, only two deal directly with perception of impacts.
  5. The majority of the leaders saw no effect of the dam on property taxes in their communities. Less than ten percent of those in the valley thought there would be an increase because of the need for more public services and a few thought the decrease in land taken off the property tax rolls would increase taxes.
  6. In response to the question, "How much influence do you think the LaFarge Dam will have on the community?" most of the leaders in Ontario and LaFarge thought it would be "quite a lot." The responses of the leaders in the other communities varied considerably. The majority in all communities, except Muscoda and Richland Center, felt there would be "some" or "quite a lot" of effect, but many were uncertain as to the effect. The major advantages of the dam were perceived as economic benefits from tourists and recreation and from industry new to the area. Only one in eight saw the major benefit as flood control. A few see the reservoir as attracting "undesirable" people and as producing problems of drugs, drinking and the need for added police protection. The change in lifestyle and business patterns with out-of-town summer tourist trade is viewed as a disadvantage by some and as an advantage by others.

### COMMENTS

1. Dual use of reputational interviewing and more objective secondary census data sometimes has effect of making sensible interpretation of findings impossible because of the discrepancies between the leaders' ratings and the other indicators. On the other hand, this combination makes for increasing interpretation precisely because of the discrepancies.

2. To ask leaders to rate themselves and use that as the only measure of leadership effectiveness is dubious. It is useful to find out what leaders think of themselves, but that hardly constitutes a valid measure of leadership effectiveness.
3. This is mainly a descriptive study. What it lacks is some explanatory scheme which attempts to fit together all the pieces of data about the area studied. Also, it doesn't always do a good job of weighting the differences between communities on a given indicator. We end up with a jumble of evidence in need of interpretation.
4. The reputational technique has another disadvantage: it tends to undercut the role of conflict between groups in a community. If there is dissatisfaction or disagreement between leadership and public, these are not likely to get a fair airing through interview of leaders alone. For this reason it is doubtful that "the subjective evaluations of leaders in the community may provide a substitute for a more comprehensive survey of a random sample of people."
5. As the authors suggest, the value of this report may not be apparent until follow-up studies are done so that an evolutionary picture of the area is obtained.
6. Some salient cleavages identified in the study are: "insiders" vs. "outsiders," farmers vs. non-farmers, in-valley vs. out-of-valley, and state vs. region. These are of course pertinent to the question of differential perception of impacts.

Sociological Factors in Watershed Development

Kenneth P. Wilkinson and Lucy W. Cole

State College: Water Resources Research Institute, Mississippi State University, 1967 (July).

DESCRIPTORS/IDENTIFIERS

Attitudes: Watershed Development; Field Theory; Interviewing; Planning; Public Participation; River Basin Development; Watershed Management

LOCATORS

Mississippi (Watershed Projects)

ABSTRACT

This paper (1) develops a strategy and frame of reference (the interactional or field theory approach) for sociological investigation of the community and related social influences on watershed development; (2) reviews the literature of the social science which bears on this problem; and (3) compiles preliminary information on watershed development programs in Mississippi. These tasks are carried out as part of a long-range research program to assess the influence of sociological factors in water resources management, particularly at the local level.

The strategy proposed in connection with (1) integrating certain aspects of the work of social scientists and water management professionals has been carried out in only a preliminary, fragmentary fashion. Partly as a result of this, the proposed theoretical frame of reference has yet to be employed in research on the most salient and critical water resources problems. Findings of the review of literature reported in connection with (2) point to the need for a systematic classification and evaluation of the theoretical and methodological assumptions underlying social science research in this area. A start is made toward identifying social factors which influence watershed development, but the concepts and methods employed for this purpose are useful mainly in case studies of specific localities. Sophisticated studies using a large sample of communities must await development of more precise operations for measuring social-organizational aspects

of communities. The information reported in connection with (3) is intended to expand the base for generalizing from the earlier case studies through analysis of selected data on all small watersheds in Mississippi.

### SUMMARY

Chapter 1. The "interactional" or field theory approach to studies of water resources is proposed. Little theoretical convergence has been accomplished in the body of studies conducted thus far. This suggests that a systematic theory is needed to focus concentrated programs of research.

Chapter 2. On the basis of a review of literature in the water resources area, it is concluded that "human behavioral problems pervade many aspects of water management programs." Much of the literature focuses on the problem of public participation. Also, an economic benefit-cost analytical procedure seems to predominate. The writers argue that what is needed "is a concerted effort to apply the theories and methods of basic research" to the sociological study of water problems.

Chapter 3. This chapter reviews the more specific studies on watershed development programs in Mississippi. In concluding the writers note that the theoretical frame of reference outlined in Chapter 1 has yet to be applied.

### COMMENTS

1. This paper, perhaps because it was written at a time when the social science input into water resources management was so weak and pessimistic, reveals excessive concern for the role of the sociologist in the planning process. In fact, the substantive contributions discussed are more related to this question than to substantive questions themselves. Sociologists get hung up about this too much; we'll only be taken seriously when we begin to offer good problem-solving research.

2. It is hard to see how the "interactional approach" is superior to the systems approach. A problem in taking Parsons' scheme as the model is that scant connections will be found. Also, characterization of social systems approach is one-sided--i. e., on its failure to deal with change. Potential application of interactional approach appears dubious.

3. As a literature review and guide, this paper is still useful. It is very sketchy, however, and would have been more potent if it had selected a smaller set of problems and developed them more intensively. Its primary value is as a "scanning" device for literature review.

"The Effects of Urban Renewal upon a Black Community: Evaluation and Recommendations"

J. Allen Williams, Jr.

Social Science Quarterly, 50, 3 (December 1969), 703-712.

DESCRIPTORS/IDENTIFIERS

Attitudes: Urban Renewal; Community Cohesion; Evaluation; Housing: Replacement; Interviewing; Methodology; Migration: Forced; Minorities: Urban Renewal; Quality of Life: Urban Renewal: Housing.

LOCATORS

Austin, Texas

ABSTRACT

Although the dysfunctional consequences of urban renewal projects have been well documented, some proponents appear to believe that recent changes in policy and administration have solved the previous problems. The purpose of this paper is to present findings from a study conducted in a recently completed urban renewal project in a black area in Austin, Texas and to make several recommendations based on the findings. It is an evaluative study in that it attempts to assess the impacts of the project in terms of the goals of urban renewal. In general, few if any positive impacts are found and most of the impacts are clearly negative. For example, decent housing was not obtained by over one-third of the respondents, higher housing costs were incurred in the change, many complained of having been placed in an unsuitable living environment, and segregation was not diminished. Moreover, respondents complained that the move and the new area contributed to a sense of loss of community, including separation from friends and long-time neighbors. Recommendations for change include greater compensation for displaced families, better timing on the part of the relocating agency in displacing people from their old residences, and increased use of public service personnel to assist relocated families with a range of problems.

FINDINGS

1. About one-third of the relocated households did not obtain "decent" housing; 70.5% of all households in the sample took on an increased financial burden after relocation.
2. The majority stated that there had been no change for the better in physical characteristics of their living environment.
3. The majority indicated little or no change in convenience to facilities and the number stating they are less conveniently located was twice that of those who felt more conveniently located.
4. Many feel the change has improved their lives regarding the honesty of the people and as a place to raise children, but many also expressed the view that safety after dark and police protection had declined.
5. There has been an overall improvement in tax revenue and commerce.
6. The project in no way contributed to ethnic desegregation through relocation.
7. Loss of community was highly salient for some (26.3%) but not uppermost in most people's minds.
8. Few households have received assistance through contact with service agencies.
9. The most salient need is to provide ways of minimizing harm to relocatees, including more funds to displaced households. Execution of renewal plans should be carefully staged so that housing becomes available prior to displacement. The aims of urban renewal may be incompatible; if so, priorities among the objectives should be established on the basis of need.

COMMENTS

1. This kind of evaluation research needs to be expanded: larger samples, different projects, different areas. Site-specificity limits the generalizability of results and the applicability of recommendations.

## DESCRIPTORS AND IDENTIFIERS

- Adjustment (social-psychological)  
 Burdge and Johnson (1973)  
 Burdge and Ludtke (1973)  
 Ludtke and Burdge (1970)  
 Napier (1972)
- Alienation  
 Napier (1972)
- Anomie  
 Gold (1974)
- Army Corps of Engineers  
 Burdge and Johnson (1973)  
 Mack (1974)  
 Wolf (1974)
- Attitudes  
 Coal industrialization  
 Gold (1974)  
 Community leaders  
 Wilkening and others (1973)  
 Dams  
 Hogg and Smith (1970)  
 Mack (1974)  
 Wilkening and others (1973)  
 Flooding and flood protection  
 Andrews and others (1973)  
 Highways  
 Llewellyn (1974)  
 Relocation  
 Burdge and Johnson (1973)  
 Burdge and Ludtke (1973)  
 Reservoirs  
 Burdge and Johnson (1973)  
 Burdge and Ludtke (1973)  
 Ludtke and Burdge (1970)  
 Milliken and Mew (1969)
- Urban renewal  
 Williams Jr. (1969)  
 Watershed development  
 Napier (1972)  
 Wilkinson and Cole (1967)
- Attitude Surveys  
 Llewellyn (1974)
- Benefactors vs. Beneficiaries  
 Hogg and Smith (1970)
- Benefit-Cost Analysis  
 Burdge and Johnson (1973)  
 Gold (1974)  
 Llewellyn (1974)  
 Mack (1974)  
 Peelle (1974)
- Bureau of Reclamation  
 Fitzsimmons and Salama (1973)  
 Smith and Hogg (1971a)
- Case-Matching  
 Johnson and Burdge (1974)
- Causal Inference  
 Burdge and Ludtke (1973)
- Coal Mining Impacts  
 Gold (1974)
- Community Cohesion  
 Burdge and Johnson (1973)  
 Burdge and Ludtke (1973)  
 Gold (1974)  
 Hogg and Smith (1970)  
 James and Brogan (1974)

**Community Cohesion (cont'd)**

Llewellyn (1974)  
 Ludtke and Burdge (1970)  
 Mack (1974)  
 Napier (1972)  
 Wilkening and others (1973)  
 Williams Jr. (1969)

**Community Leaders**

Wilkening and others (1973)

**Comparative Diachronic Analysis**

Johnson and Burdge (1974)

**Dams**

Hogg and Smith (1970)  
 Mack (1974)  
 Wilkening and others (1973)

**Data Sources**

Fitzsimmons and Salama (1973)  
 Johnson and Burdge (1974)

**Demographic Impacts**

Hollis and McEvoy (1973)  
 Smith and Hogg (1971a)

**Differential Impacts**

Gold (1974)  
 Llewellyn (1974)  
 Mack (1974)  
 Peelle (1974)

**Dimensioning Impacts**

Francis (1974)  
 Johnson and Burdge (1974)  
 Peelle (1974)

**E-Model**

Mack (1974)

**Economic Growth**

Smith and Hogg (1971a)

**Economic Impacts**

Gold (1974)  
 Hogg and Smith (1970)  
 Mack (1974)  
 Milliken and Mew (1969)

**Environment (physical)**

James and Brogan (1974)  
 Llewellyn (1974)  
 Peelle (1974)

**Environmentalism**

Francis (1974)

**Evaluation**

Burdge and Johnson (1973)  
 Dunning (1974)  
 Mack (1974)  
 Williams Jr. (1969)

**Factor Analysis**

James and Brogan (1974)

**Field Theory**

Wilkinson and Cole (1967)

**Flood Plain Management**

Andrews and others (1973)  
 James and Brogan (1974)  
 Mack (1974)

**Four Accounts Framework**

Fitzsimmons and Salama (1973)

**Future Shock**

Gold (1974)

**Goose Hollow Foothills vs. Romney (1971)**

Francis (1974)

## Groups

## Impacted

Dunning (1974)  
Gold (1974)  
Mack (1974)  
Peelle (1974)

## Highway Impacts

Llewellyn (1974)

## Housing

Replacement (urban renewal)  
Williams Jr. (1969)

## Hydrologic System

Andrews and others (1973)

## Index Construction

James and Brogan (1974)

## Indicators

Fitzsimmons and Salama (1973)

## Interviewing

Andrews and others (1973)  
Burdge and Johnson (1973)  
Burdge and Ludtke (1973)  
Gold (1974)  
Hogg and Smith (1970)  
Llewellyn (1974)  
Ludtke and Burdge (1970)  
Mack (1974)  
Milliken and Mew (1969)  
Napier (1972)  
Wilkening and others (1973)  
Wilkinson and Cole (1967)  
Williams Jr. (1969)

## Land Use Planning

James and Brogan (1974)  
Milliken and Mew (1969)

## Legal Aspects

Francis (1974)  
Savatsky (1974)

## Life History Technique

Hogg and Smith (1970)

## Matrix Logic

Fitzsimmons and Salama (1973)

## Methodology

Andrews and others (1973)  
Burdge and Johnson (1973)  
Burdge and Ludtke (1973)  
Fitzsimmons and Salama (1973)  
Gold (1974)  
Hogg and Smith (1970)  
James and Brogan (1974)  
Johnson and Burdge (1974)  
Llewellyn (1974)  
Ludtke and Burdge (1970)  
Mack (1974)  
Milliken and Mew (1969)  
Napier (1972)  
Peelle (1974)  
Wilkening and others (1973)  
Williams Jr. (1969)

## Migration

## Forced

Burdge and Johnson (1973)  
Burdge and Ludtke (1973)  
Llewellyn (1974)  
Ludtke and Burdge (1970)  
Napier (1972)  
Williams Jr. (1969)

## Minorities

Urban Renewal  
Williams Jr. (1969)

## Modeling

Andrews and others (1973)  
Burdge and Ludtke (1973)  
Ludtke and Burdge (1970)  
Mack (1974)

## Montana Power Company

Gold (1974)

Multiple-Objective Planning  
Fitzsimmons and Salama (1973)

National Environmental Policy Act  
(NEPA)

Legal history

Francis (1974)

Social impact assessment

Francis (1974)

Savatsky (1974)

Noise

Highway impacts

Llewellyn (1974)

Nuclear Power Plants

Social impacts

Peelle (1974)

Nucleus of Chicago Homeowners'  
Association vs. Chicago Housing  
Authority, (1973)

Francis (1974)

Optimization

Mack (1974)

Participant Observation

Gold (1974)

Hogg and Smith (1970)

Mack (1974)

Wilkening and others (1973)

Planning

Dunning (1974)

Francis (1974)

James and Brogan (1974)

Wilkinson and Cole (1967)

Profiling

Dunning (1974)

Fitzsimmons and Salama (1973)

Wilkening and others (1973)

Public Participation

Llewellyn (1974)

Wilkinson and Cole (1967)

Publics

Identification of

Dunning (1974)

Quality of Life

James and Brogan (1974)

Wilkening and others (1973)

Williams Jr. (1969)

Quasi-Experimental Design

Burdge and Ludtke (1973)

Johnson and Burdge (1974)

Ludtke and Burdge (1970)

Napier (1972)

Radiation

Perceived danger

Peelle (1974)

Ranchers

Gold (1974)

Recreation

Hollis and McEvoy (1973)

Milliken and Mew (1969)

Regression Analysis

Andrews and others (1973)

James and Brogan (1974)

Relocation (see Migration: Forced)

Reputational Method

Wilkening and others (1973)

Reservoirs

Burdge and Johnson (1973)

Burdge and Ludtke (1973)

Johnson and Burdge (1974)

Ludtke and Burdge (1970)

Milliken and Mew (1969)

- River Basin Development  
Wilkinson and Cole (1967)
- Self-Fulfilling Prophecy  
Population Projections  
Hollis and McEvoy (1973)
- Social Goals  
Francis (1974)
- Social Impacts  
Staging of  
Hogg and Smith (1970)
- Social Needs  
Fitzsimmons and Salama (1973)
- Social-Psychological Concepts  
Fitzsimmons and Salama (1973)
- Social Values  
Burdge and Johnson (1973)  
Hogg and Smith (1970)  
Mack (1974)  
Smith and Hogg (1971a)
- Social Well-Being  
Andrews and others (1973a)  
James and Brogan (1974)  
Mack (1974)
- Strip Mining  
Gold (1974)
- Survey Research  
Johnson and Burdge (1974)
- Systems Approach  
Dunning (1974)
- Technological Lag  
Hogg and Smith (1970)
- Tourism  
Mjlliken and Mew (1969)
- Trade-Offs  
Mack (1974)  
Peelle (1974)
- Urban Areas  
James and Brogan (1974)
- Urbanization  
Hollis and McEvoy (1973)
- Urban Renewal  
Housing  
Williams Jr. (1969)
- Values (see Social Values)
- Water  
Functions  
Fitzsimmons and Salama (1973)  
Policy  
Fitzsimmons and Salama (1973)  
Hollis and McEvoy (1973)  
Smith and Hogg (1971a)
- Watershed Management  
Andrews and others (1973)  
Napier (1972)  
Wilkinson and Cole (1967)
- Well-Being (see Social Well-Being)

## LOCATORS

Albany-Lebanon, Oregon  
Hogg and Smith (1970)

Atlanta, Georgia  
James and Brogan (1974)

Austin, Texas  
Williams Jr. (1969)

Baltimore, Maryland  
Llewellyn (1974)

Caesar Creek Reservoir, Ohio  
Ludtke and Burdge (1970)

Carr Fork Reservoir, Kentucky  
Burdge and Johnson (1973)

Cave Run Reservoir, Kentucky  
Burdge and Johnson (1973)

Colstrip, Montana  
Gold (1974)

Foster Dam, Oregon  
Hogg and Smith (1970)

Gillette, Montana  
Gold (1974)

Green Peter Dam, Oregon  
Hogg and Smith (1970)

Horsetooth Reservoir, Colorado  
Milliken and Mew (1969)

Kentucky (reservoirs)  
Burdge and Johnson (1973)  
Burdge and Ludtke (1973)  
Johnson and Burdge (1974)  
Ludtke and Burdge (1970)

Kickapoo Valley, Wisconsin  
Wilkening and others (1973)

LaFarge Dam, Wisconsin  
Wilkening and others (1973)

Los Angeles, California  
Hollis and McEvoy (1973)

Mendocino Nuclear Power Plant,  
California  
Peelle (1974)

Mississippi Watershed Projects  
Wilkinson and Cole (1967)

North Springfield Dam, Vermont  
Mack (1974)

Ohio  
Southeastern reservoirs  
Burdge and Ludtke (1973)  
Watersheds  
Napier (1972)

Pruitt-Igoe (St. Louis, Missouri)  
Dunning (1974)

Salt Lake Valley, Utah  
Andrews and others (1973)

Santiam River Basin, Oregon  
Hogg and Smith (1970)

Shadow Mountain/Granby Reservoirs,  
Colorado  
Milliken and Mew (1969)

Sweet Home, Oregon  
Hogg and Smith (1970)

Taylorville Reservoir, Kentucky  
Ludtke and Burdge (1970)

Western U. S. Water Development  
History  
Smith and Hogg (1973)

West Virginia Watersheds  
Napier (1972)

## REFERENCES

- \* Andrews, Wade H. and others (1973) A Preliminary Model of the Hydrologic-Sociologic Flow System of an Urban Area. Logan, Utah: Institute for Social Science Research on Natural Resources and Utah Water Research Laboratory, Utah State University (April).
- Andrews, Wade H. and others, eds. (1973a) The Social Well-Being and Quality of Life Dimension in Water Resources Planning and Development. Logan: [same as above].
- Bishop, A. Bruce (1972) "An Approach to Evaluating Environmental, Social and Economic Factors in Water Resources Planning," Water Resources Bulletin, 8, 4 (August), 724-34.
- Booth, Alan and Henry Camp (1974) "Housing Relocation and Family Social Integration Patterns," Journal of the American Institute of Planners, 40, 2 (March), 124-28.
- Breese, Gerald and others (1965) The Impact of Large Installations on Nearby Areas. Beverly Hills, Calif: Sage Publications, Inc.
- \* Burdge, Rabel J. and K. Sue Johnson (1973) Social Costs and Benefits of Water Resource Construction. Research Report No. 64. Lexington: Water Resources Institute, University of Kentucky.
- \* Burdge, Rabel J. and Richard L. Ludtke (1973) "Social Separation among Displaced Rural Families: The Case of Flood Control Reservoirs," pp. 85-108 in W. R. Burch and others (eds.), Social Behavior, Natural Resources and the Environment. New York: Harper and Row.
- Chicago District, Corps of Engineers (1973) Wastewater Management Study for Chicago South End of Lake Michigan--Appendix E: Social-Environmental Evaluation. Chicago: Chicago District, Corps of Engineers (July).

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\* Included in Appendix 1: Annotated Bibliography

REFERENCES (cont'd)

- Cook, Thomas J. and Frank P. Scioli, Jr. (1972) "A Research Strategy for Analyzing the Impacts of Public Policy," Administrative Science Quarterly, 17, 3 (September), 328-39.
- \* Dunning, C. Mark (1974) "A Systemic Approach to Social Impact Assessment," pp. 59-64 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee: Environmental Design Research Association.
- \* Fitzsimmons, Stephen J. and Ovadia A. Salama (1973) Man and Water--A Social Report. Cambridge, Mass: Abt. Associates, Inc.
- \* Francis, Mark (1974) "The Environmental Policy Act and the Urban Environment: Toward Socially-Oriented Impact Statements," pp. 49-58 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee: Environmental Design Research Association.
- Füllerton, Avery (1972) "Environmental, Economic and Social Aspects of the Cross Florida Barge Canal," pp. 121-25 in Leonard B. Dworsky and others (eds.), Social and Economic Aspects of Water Resources Development. Urbana, Ill: American Water Resources Association.
- Gardner, Robert W. (1973) "Social Impact Study of the Proposed Willow Creek Flood Control Project." Walla Walla, Wash.: U. S. Army Engineer District, Walla Walla (June), 34 p. mimeo.
- \* Gold, Raymond L. (1974) "Social Impacts of Strip Mining and Other Industrializations of Coal Resources," pp. 123-46 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee: Environmental Design Research Association.
- \* Hogg, Thomas C. and Courtland L. Smith (1970) Socio-Cultural Impacts of Water Resource Development in the Santiam River Basin. Corvallis: Water Resources Research Institute, Oregon State University (October).
- Highway Impact Research Staff (1962) Blairsville: A Bypass Study. University Park: Pennsylvania State University.
- \* Hollis, John and James McEvoy III (1973) "Demographic Effects of Water Development," pp. 216-32 in Charles R. Goldman and others (eds.), Environmental Quality and Water Development. San Francisco: W. H. Freeman and Co.

REFERENCES (Cont'd)

- \* James, L. Douglas and Donna R. Brogan (1974) "The Impact of Open Urban Land on Community Well-Being," pp. 150-167 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee: Environmental Design Research Association.
- \* Johnson, Sue and Rabel J. Burdge (1974) "Social Impact Statements: A Tentative Approach," pp. 69-84 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee: Environmental Design Research Association.
- Kraenzel, Carl F. (1957) "The Social Consequences of River Basin Development," Law and Contemporary Social Problems, 22 (Spring), 221-36.
- \* Llewellyn, Lynn G. (1974) "The Social Impact of Urban Highways," pp. 89-108 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee: Environmental Design Research Association.
- \* Ludtke, Richard L. and Rabel J. Burdge (1970) Evaluation of the Social Impact of Reservoir Construction on the Residential Plans of Displaced Persons in Kentucky and Ohio. Research Report No. 26. Lexington: Water Resources Institute, University of Kentucky.
- \* Mack, Ruth P. (1974) "Criteria for Evaluation of Social Impacts of Flood Management Alternatives," pp. 175-95 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee: Environmental Design Research Association.
- \* Milliken, J. Gordon and H. E. Mew, Jr. (1969) Economic and Social Impact of Recreation at Reclamation Reservoirs: An Exploratory Study of Selected Colorado Reservoir Areas. Denver: Denver Research Institute, University of Denver (March).
- \* Napier, Ted I. (1972) "Social-Psychological Response to Forced Relocation Due to Watershed Development," Water Resources Bulletin, 8, 2 (August), 784-95.
- Office of the Chief of Engineers (1972) "Guidelines for Assessment of Economic, Social, and Environmental Effects of Civil Works Projects." ER 1105-2-105. Washington, D. C.: U. S. Army Corps of Engineers (15 December).

REFERENCES (Cont' d)

- Office of the Chief of Engineers (1973) "Information Supplement No. 1 to Section 122 Guidelines (ER 1105-2-105, 15 December 1972)." Washington, D. C: U. S. Army Corps of Engineers (September).
- \* Peelle, Elizabeth (1974) "Social Effects of Nuclear Power Plants," pp. 113-20 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee: Environmental Design Research Association.
- Perfater, Michael A. (1972) The Social and Economic Effects of Relocation Due to Highway Takings. Charlottesville: Virginia Highway Research Council (October).
- Riordan, Courtney (1970) A Study of the Probable Economic and Social Effects of Constructing and Operating the Bell Nuclear Power Station in Tompkins County. Ithaca, N. Y.: Office of Regional Resources and Development, Cornell University (September).
- \* Savatsky, Pamela Dee (1974) "A Legal Rationale for the Sociologist's Role in Researching Social Impacts," pp. 45-7 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee: Environmental Design Research Association.
- Shields, Mark (1974) "Comment on 'Criteria for Evaluation of Social Impacts of Flood Management Alternatives,'" pp. 197-98 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee: Environmental Design Research Association.
- Smith, Courtland L. and Thomas C. Hogg (1971) "Benefits and Beneficiaries: Contrasting Economic and Cultural Distinctions," Water Resources Research, 7, 2 (April), 254-62.
- \* Smith, Courtland L. and Thomas C. Hogg (1971a) "Cultural Aspects of Water Resources Development Past, Present, and Future," Water Resources Bulletin, 7, 4 (August), 652-60.
- Sorokin, Pitirim A. (1936) "Is Accurate Social Planning Possible?" American Sociological Review, 1, 1 (February), 12-28.
- \* Wilkening, E. A. and others (1973) Quality of Life in Kickapoo Valley Communities. Report No. 11. Madison: Institute for Environmental Studies, University of Wisconsin (September).

REFERENCES (Cont'd)

- \* Wilkinson, Kenneth P. and Lucy W. Cole (1967) Sociological Factors in Watershed Development. State College: Water Resources Research Institute, Mississippi State University (July).
  - \* Williams, J. Allen, Jr. (1969) "The Effects of Urban Renewal upon a Black Community: Evaluation and Recommendations," Social Science Quarterly, 50, 3 (December), 703-712.
- Wolf, C. P. (1974) "Social Impact Assessment: The State of the Art," pp. 1-44 in C. P. Wolf (ed.), Social Impact Assessment. Milwaukee, Wisc: Environmental Design Research Association.

## BIBLIOGRAPHY

- Aron, Henry J. *Shelter and Subsidies: Who Benefits from Federal Housing Policies?* Washington, DC: Brookings Institution, 1972.
- Abell, Peter. *Model Building in Sociology*. New York: Schocken, 1971.
- Abrahamson, Mark. "The social dimensions of urbanism," *Social Forces*, 52, 3 (March 1974), 376-83.
- Abram, R. E. and George Roesinger. "Behavioral science applications in environmental quality," in C. Schoenfeld (ed.), *Interpreting Environmental Issues: Research and Development in Conservation Communications*. Dembar Educational Research Services, 1972.
- Abt, Clark C. "Forecasting future social needs," *The Futurist*, 5, 1 (February 1971), 20-21.
- Abt, Clark C., Richard N. Foster and Robert H. Rea. "A scenario generating methodology," pp. 191-214 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Abt Associates, Inc. *The Corderus Creek Wastewater Management Study: Appendix B-- Impact Studies*. Baltimore, MD: Baltimore District, Corps of Engineers, August 1972.
- Abt Associates, Inc. *Socio-Economic Impact Analysis of Alternative Wastewater Management Systems in the Massachusetts Merrimack River Basin*. AAI Report No. 74-62. Cambridge, MA: Abt Associates, Inc., May 1974.
- Ackerman, Bruce A. and others. *The Uncertain Search for Environmental Quality*. New York: Free Press, 1974.
- Agricultural Experiment Station. "Reducing adverse effects of reservoirs." Circular 293. Manhattan: Kansas State College of Agriculture and Applied Science, October, 1952.
- Agelasto, Michael A., III. "Non-growth and the poor: equity considerations in controlled growth policies," *Planning Comment*, Spring 1973, 2-11.
- Ahlund, Owe. "Budget games--a method of measuring the user's wishes as to the design of the environment," *Man-Environment Systems*, 5, 3 (May 1975), 177-78.
- Airan, Damodar S. "The need for a comprehensive approach in the management of environmental resources," *Water Resources Bulletin*, 9, 3 (June 1973), 421-32.
- Alan M. Voorhees and Associates, Inc. "Computation of highway impacts." Exchange Bibliography No. 67. Monticello, IL: Council of Planning Librarians, February 1969. 28 p.
- Albrecht, Stan L. "Sociological implications of power plant development," in *Proceedings of the Associated Intermountain Universities Conference on Policy Formulation in the Development of Energy Resources*, May 1972.

- Albrow, Martin. "The role of the sociologist as a professional: the case of planning," pp. 1-19 in Paul Halmos (ed.), *The Sociology of Sociology: The Sociological Review Monograph 16*. September 1970.
- Aldrich, Robert. "Economic impact of environmental legislation," *Industrial Water Engineering*, 10, 4 (July-August 1973), 12-20.
- Alexander, Tom. "The social engineers retreat under fire," *Fortune*, 86, 4 (October, 1972), 132-36, 140, 142, 146, 148.
- Alford, Robert R. "Quantitative indicators of the quality of life: a critique," *Comparative Urban Research*, 3, 1 (Summer 1973), 5-8.
- Allen, Irving L. "Community size, population composition and cultural activity," *Rural Sociology*, September 1968.
- Allen, Irving Lewis. "The sociology of new towns and new cities." Exchange Bibliography No. 518. Monticello, IL: Council of Planning Librarians, 1973.
- Allen, Ruth Hamilton. *Approaches to Environmental Quality: The National Environmental Policy Act and the Evolution of Biosocial Criteria for Environmental Impact Analysis*. New Haven, CT: Institution for Social and Policy Studies, Yale University, 1973.
- Allen, W. *Noise: The Social Impact*. (Cited in Stratford 1974: 153)
- Alonso, William. "Beyond the inter-disciplinary approach to planning," pp. 67-77 in J. B. Cullingworth (ed.), *Problems of an Urban Society: Vol. 3 Planning for Change*. London: George Allen and Unwin, 1973.
- Alonso, William. "Predicting best with imperfect data," *Journal of the American Institute of Planners*, 34, 4 (July 1968), 248-55.
- Alston, Robert. "Socio-economic considerations in environmental decision-making," *Humboldt Journal of Social Relations*, 2, 1 (Fall-Winter 1974), 58-66.
- Altshuler, Alan. "The potential of 'trickle down,'" *The Public Interest*, 15 (Spring 1969), 46-56.
- American Geophysical Union (ed.). *Man-Made Lakes: Their Problems and Environmental Effects*. Geophysical Monograph 17. Washington, DC: American Geophysical Union, 1974.
- American Institute of Certified Public Accountants. *Social Measurement*. New York: American Institute of Certified Public Accountants, 1972.
- American Rivers Conservation Council and Environmental Policy Center. "95 theses." Cincinnati, OH: Rivers Unlimited, 3 May 1974. 12 p.
- American Society of Planning Officials. *Impact of Large Industries on Small Communities*. Information Report No. 31. Chicago: American Society of Planning Officials, October 1951.
- Amir, Shaul. "Highway location and public opposition," *Environment and Behavior*, December 1972.

- Anderia, Georges. Information in 1985: A Forecasting Study of Information Needs and Resources. Paris: Organization for Economic Cooperation and Development, 1973.
- Anderson, Frederick R. NEPA in the Courts: A Legal Analysis of the National Environmental Policy Act. Baltimore, MD: The Johns Hopkins Press, 1973.
- Anderson, Martin. The Federal Bulldozer: A Critical Analysis of Urban Renewal, 1949-1962. Cambridge, MA: M.I.T. Press, 1964.
- Anderson, Theodore and L. Bean. "The Shevky-Bell social areas: confirmation of results and a reinterpretation," *Social Forces*, 40 (December 1961).
- Andrews, Frank M. "Social indicators of perceived life quality." Paper presented to the Eighth World Congress of Sociology, Toronto, ON, 20 August 1974.
- Andrews, Frank M. and Stephen B. Withey. "Assessing the quality of life as people experience it." Paper presented to the Annual Meeting of the American Sociological Association, Montreal, P.Q., August 1974. 24 p. mimeo.
- Andrews, Richard N. L. "Comparison of techniques for impact assessment." Unpublished manuscript. n.d. 14 p. mimeo.
- Andrews, Richard N. L. Environmental Policy and Administrative Change: The National Environmental Policy Act of 1969 (1970-71). Unpublished doctoral dissertation. Chapel Hill: University of North Carolina, 1972.
- Andrews, Richard N. L. "A philosophy of environmental impact assessment," *Journal of Soil and Water Conservation*, 28, 5 (September-October 1973), 197-203.
- Andrews, Wade H. "Social values in irrigation and water development." Logan: Institute for Social Science Research on Natural Resources, 1974.
- Andrews, Wade H. and others. Identification and Measurement of Quality of Life Elements in Planning for Water Resources Development: An Exploratory Study. Logan: Utah State University, 1972.
- Andrews, Wade H., William C. Dunaway and Dennis C. Geertsen. Social Aspects of Flooding in the Urbanized East Salt Lake County Area. Research Circular No. 1. Logan: Institute for Social Science Research on Natural Resources, July 1972.
- Andrews, Wade H. and Dennis C. Geertsen. The Function of Social Behavior in Water Resource Development. Research Report No. 1. Logan: Institute for Social Science Research on Natural Resources, Utah State University, December 1970.
- Andrews, Wade H. and Dennis C. Geertsen. Social Dimensions of Urban Flood Control Decisions. Research Monograph No. 3. Logan: Institute for Social Science Research on Natural Resources, Utah State University, January 1974.
- Andrews, Wade H. and Gary E. Madsen. "Social impacts and methodological perspectives from a post audit analysis of water resource development," pp. 61-74 in Wade H. Andrews and others (eds.), *The Social Well-Being and Quality of Life Dimension in Water Resources Planning and Development*. Logan: Institute for Social Science Research on Natural Resources, Utah State University, 1973.

- Andrews, Wade H. and others. Identification and Measurement of Quality of Life Elements in Planning for Water Resources Development: An Exploratory Study. Research Report No. 2. Logan: Institute for Social Science Research on Natural Resources, Utah State University, April 1972.
- Andrews, Wade H. and others. A Preliminary Model of the Hydrologic-Sociologic Flow System of an Urban Area. PRWG 109-1. Logan: Institute for Social Science Research on Natural Resources, Utah State University, April 1973.
- Andrews, Wade H. and others. Proceedings of the Workshop for Sociological Aspects of Water Resources Research. Report No. 1. Logan: Institute for Social Science Research on Natural Resources, Utah State University, 1968.
- Andrews, Wade H. and others (eds.). The Social Well-Being and Quality of Life Dimension in Water Resources Planning and Development. Logan: Institute for Social Science Research on Natural Resources, Utah State University, 1973.
- Angell, Robert Cooley. "The moral integration of American Cities: II," American Journal of Sociology, 80, 3 (November 1974), 607-29.
- Annals of the American Academy of Political and Social Science. Society and Its Physical Environment" (May 1970).
- Anthony, Robert. "Closing the loop between planning and performance," Public Administration Review, 31, 3 (May-June 1971), 388-98.
- Antoniou, Jim. Environmental Management: Planning for Traffic. New York: McGraw-Hill.
- Arensberg, Conrad M. and Solon T. Kimball. Culture and Community. New York: Harcourt, Brace and World, 1965.
- Argonne National Institute. The Relationship between Land Use and Environmental Protection. Argonne, IL: Argonne National Institute, 1972.
- Argonne National Laboratory. Social Costs for Alternative Means of Electrical Power Generation for 1980 and 1990. ANL-8093-V3. Argonne, IL: Argonne National Laboratory, March 1973.
- Arnhoff, Franklyn N. "Social consequences of policy toward mental illness," Science, 188, 4195 (27 June 1975), 1277-81.
- Arnstein, Sherry R. "A ladder of citizen participation," Journal of the American Institute of Planners, July 1969.
- Arnstein, Sherry R. and Alexander N. Christakis and others. Perspectives on Technology Assessment. Jerusalem, Israel: Science and Technology Publishers, 1975.
- Arrow, Kenneth J. and Anthony C. Fisher. "Environmental preservation, uncertainty, and irreversibility," Quarterly Journal of Economics, 88, 2 (May 1974), 312-19.
- Artle, Roland and Pravin P. Varaiya. "Economic theories and empirical models of location choice and land use: a survey," Proceedings of the IEEE, 63, 3 (March 1975), 421-30.

- Arvanitidis, N. V., Y. M. Ioannides and L. T. Brekka. Socio-Economic Impact of Flooding on Community Development in North Richmond. Menlo Park, CA: INTASA, Inc., June 1971.
- Atkin, William Wilson and others. "What are our esthetic values?" *Landscape Architecture*, 61, 6 (June 1971), 35-66.
- Atkinson, Arthur A. and Ira M. Robinson. "Amenity resources for urban living," in Harvey S. Perloff (ed.), *The Quality of the Urban Environment*. Washington, DC: Resources for the Future, 1969.
- Austin, C. M. "The evaluation of urban public facility location: an alternative to benefit-cost analysis," *Geographical Analysis*, 6, 2 (April 1974).
- Bagley, Marilyn and others. *Aesthetics in Environmental Planning*. Washington, DC: Washington Environmental Research Center, U. S. Environmental Protection Agency, November 1973.
- Bahr, Howard M., Bruce A. Chadwick and Darwin L. Thomas (eds.). *Population, Resources, and the Future: Non-Malthusian Perspectives*. Provo, UT: Brigham Young University Press, 1972.
- Bailey, Robert H. "Some considerations related to environmental influence assessment," *Canadian Public Administration*, Fall 1973.
- Baker, Janet K. "Social elements in environmental planning," *Battelle Research Outlook*, 4, 2 (1972), 8-11.
- Baker, Janet K., Norbert Dee and James R. Finley. "Measuring impacts of water resource developments on the human environment," *Water Resources Bulletin*, 10, 1 (February 1974), 10-21.
- Baldwin, Malcolm F. "Report on Project progress and future plans." Washington, DC: Environmental Impact Assessment Project, The Institute of Ecology, 1974. 10 p. mimeo.
- Baldwin, Marynard M. (ed.). *Portraits of Complexity: Applications of Systems Methodologies to Societal Problems*. Columbus, OH: Battelle Memorial Institute, 1975.
- Baldwin, Pamela L. and Malcolm F. Baldwin. *Onshore Planning for Offshore Oil: Lessons from Scotland*. Washington, DC: Conservation Foundation, 1975.
- Bales, Robert F. and Arthur S. Couch. "The value profile: a factor analytic study of value statements," *Sociological Inquiry*, Winter 1968.
- Ball, Ian Tranquair. "Institutional interaction in metropolitan water resources planning," *Water Resources Bulletin*, 9, 3 (June 1973), 529-37.
- Ballweg, John A. *Measuring Attitudes toward Water Use Priorities*. VPI-WRRC-BULL 50. Blacksburg: Water Resources Research Center, Virginia Polytechnic Institute and State University, April 1972.
- Baram, Michael S. "Technology assessment and social control--a conceptual framework proposed," *Science*, 4 May 1973.

- Barker, Roger G. *Ecological Psychology: Concepts and Methods for Studying the Environment of Human Behavior*. Stanford, CA: Stanford University Press, 1968.
- Barker, Roger G. and Phil Schoggen. *Qualities of Community Life*. San Francisco: Jossey-Bass, 1973.
- Bernard, Jerald R. "A social accounting system for regional development planning," *Journal of Regional Science*, April 1969.
- Barnes, J. A. "Social networks." Module 26. Redding, MA: Addison-Wesley, 1972.
- Barnett, Jonathan. *Urban Design as Public Policy: Practical Methods of Improving Cities*. New York: McGraw-Hill, 1974.
- Bartee, Edwin M. "A holistic view of problem solving," *Management Science*, 20, 4 (1973), 439-48.
- Battelle Columbus Laboratories. "Environmental assessment for effective water utility management planning." Washington, DC: U. S. Environmental Protection Agency, April 1972.
- Battelle Pacific Northwest Laboratories. *Columbia River and Tributaries: Environmental Assessment Manual*. Richland, WA: Battelle Pacific Northwest Laboratories, May 1974.
- Batty, Michael. "Social power in plan-generation," *Town Planning Review*, 45, 3 (July 1974), 291-310.
- Bauer, Raymond A. "Detection and anticipation of impact: the nature of the task," pp. 1-67 in Raymond A. Bauer (ed.), *Social Indicators*. Cambridge, MA: M.I.T. Press, 1967.
- Bauer, Raymond A. and Dan H. Fenn, Jr. *The Corporate Social Audit*. New York: Russell Sage Foundation, 1972.
- Bauer, Raymond A. and Kenneth J. Gergen (eds.). *The Study of Policy Formation*. New York: Free Press, 1968.
- Bauer, Raymond A., Richard S. Rosenbloom and Laure Sharp. *Second-Order Consequences: A Methodological Essay on the Impact of Technology*. Cambridge, MA: M.I.T. Press, 1969.
- Baur, E. Jackson. "Assessing the social effects of public works projects." Research Paper No. 3. Fort Belvoir, VA: Board of Engineers for Rivers and Harbors, U. S. Army Corps of Engineers, July 1973. 35 p. mimeo.
- Bauman, Richard D. and Arn Henderson. "User oriented approach to housing design for Indians," *Journal of the Urban Planning and Development Division, ASCE*, 100, UPI (March 1974), 29-42.
- Beardsley, Philip L., David M. Kovenock and William C. Reynolds. *Measuring Public Opinion on National Priorities: A Report on a Pilot Study*. Beverly Hills, CA: Sage, 1974.

- Bechdolt, Burley V., Jr. "Vector representation and analysis of areally distributed variables," *Annals of Regional Science*, 8, 3 (October 1974), 99-110.
- Becker, Harold S. and Raul de Brigard. *A Framework for Community Development Action Planning: I. An Approach to the Planning Process*. Report R-18. Middletown, CT: Institute for the Future, February 1971.
- Becker, Harold S. and Raul de Brigard. *A Framework for Community Development Action Planning: II. Study Procedure, Conclusions, and Recommendations for Future Research*. Report R-19. Middletown, CT: Institute for the Future, February 1971.
- Becker, Harold S. and Herbert Gerjuoy. "Management of risk using Trend Impact Analysis: an application of computer techniques for corporate planning and decisionmaking." Glastonbury, CT: The Futures Group, 1973.
- Beckman, Norman. "The planner as a bureaucrat," *Journal of the American Institute of Planners*, 30, 4 (November 1964), 323-27.
- Beckman, Richard L. and W. Kip Viscusi. *Damming the West; Ralph Nader's Study Group Report on the Bureau of Reclamation*. New York: Grossman, 1973.
- Beers, Howard W. "Applications of sociology in development programs," *Community Development Review*, 8, 1 (March 1963).
- Behrend, Herbert. "Mobile homes and new communities," *Journal of the Urban Planning and Development Division*, 100, UP2 (November 1973), 181-89.
- Bell, Colin. "Replication and reality or, the future of sociology," *Futures*, 6, 3 (June 1974), 253-60.
- Bell, Colin and Howard Newby. *Community Studies*. New York: Praeger, 1972.
- Bell, Daniel. "The idea of a social report," *The Public Interest*, 15 (Spring 1969), 72-84.
- Bell, Daniel. *The Coming of Post-Industrial Society: A Venture in Social Forecasting*. New York: Basic Books, 1973.
- Bell, Daniel. "The public household--on 'fiscal sociology' and the liberal society," *The Public Interest*, 37 (Fall 1974), 29-68.
- Bell, Daniel. "Twelve modes of prediction--a preliminary sorting of approaches in the social sciences," *Daedalus*, 93, 3 (Summer 1964), 845-80.
- Bell, Gwen and Jaqueline Trywhitt (eds.). *Human Identity in the Urban Environment*. Baltimore, MD: Penguin, 1972.
- Bell, Gwen, Edwina Randall and Judith E. R. Roeder. *Urban Environments and Human Behavior: An Annotated Bibliography*. Stroudsburg, PA: Dowden, Hutchinson and Ross, 1973.
- Belzung, L. D. and M. H. Sonstegaard. *Regional Response through Port Development: An Economic Case Study on the McClellan-Kerr Arkansas River Project*. Fayetteville: Bureau of Business and Economic Research, University of Arkansas, January 1973.

- Bennett, John W. "Anthropological contributions to the cultural ecology and management of water resources," pp. 34-81 in L. Douglas James (ed.), *Man and Water: The Social Sciences in Management of Water Resources*. Lexington: University Press of Kentucky, 1974.
- Bennett, John W. "Social adaptation in a Northern Plains region: a Saskatchewan study," pp. 180-90 in Carle C. Zimmerman and Seth Russell (eds.), *Symposium on the Great Plains of North America*. Fargo: North Dakota Institute for Regional Studies, 1967.
- Benveniste, Guy. *The Politics of Expertise*. Berkeley, CA: Glendessary, 1972.
- Bereano, Philio L. "The normative aspects of environmental planning," pp. 216-19 in Leonard B. Dworsky, David J. Allee and Sandor C. Csallany (eds.), *Social and Economic Aspects of Water Resources Development*. Urbana, IL: American Water Resources Association, 1972.
- Berliner, Joseph S. *Economy, Society and Welfare: A Study in Social Economics*. New York: Praeger, 1972.
- Bernstein, Samuel J., W. Giles Mellon and Sigmund Handelman. "Regional stabilization: a model for policy decision," *Policy Sciences*, 4, 3 (September 1973), 309-25.
- Berry, Brian J. L. *The Human Consequences of Urbanization: Divergent Paths in the Urban Experience of the Twentieth Century*. New York: St. Martin's, 1973.
- Berry, David and Gene Steiker. "The concept of justice in regional planning: justice as fairness," *Journal of the American Institute of Planners*, 40, 6 (November 1974), 414-21.
- Berry, David and Gene Steiker. "The concept of justice in regional planning: some policy implications." Philadelphia: Regional Science Research Institute, November 1973. 33 p.
- Berry, Marvin P. "The importance of perceptions in the determination of Indian water rights," *Water Resources Bulletin*, 10, 1 (February 1974), 137-43.
- Beshers, James. "The construction of 'social area' indices: an evaluation of procedures," pp. 65-70 in *Proceedings of the Social Statistics Section, American Statistical Association*, 1959.
- Betak, J. F. "Information theory as a basis for studying environmental complexity: some limitations," *Environment and Planning*, 6, 3 (May-June 1974).
- Bettersworth, Thomas A. "Aesthetic design of electric distribution lines," *Journal of the Urban Planning and Development Division, ASCE*, 91, UP1 (July 1965), 31-45.
- Biderman, Albert D. "Kinostatistics for social indicators," *Educational Broadcasting Review*, 5, 5 (October 1971), 13-19.
- Bigger, Charles P. *Participation: A Platonic Inquiry*. Baton Rouge: Louisiana State University Press, 1968.

- Billington, David P. "Public works--higher esthetic standards needed," *Civil Engineering--ASCE*, 43, 10 (October 1973), 36-40.
- Bird, Helen Privett. "Environmental and economic impact of rapid growth on a rural area: Palm Coast," *Environmental Affairs*, 2, 1 (Spring 1972), 154-71.
- Bish, R. L. "An economic approach to land and water resource management: a report on the Puget Sound Study." Seattle: Institute for Economic Research, University of Washington, April 1972. 20 p.
- Bishop, A. Bruce. "An approach to evaluating environmental, social, and economic factors in water resources planning," *Water Resources Bulletin*, 8, 4 (August 1972), 724-34.
- Bishop, A. Bruce. Structuring Communications Programs for Public Participation in Water Resources Planning. Fort Belvoir, VA: Institute for Water Resources, U. S. Army Corps of Engineers, May 1975.
- Biswas, Asit K. "Socio-economic considerations in water resources planning," *Water Resources Bulletin*, 9, 4 (August 1973), 746-54.
- Biswas, Asit K. and Robert W. Durie. "Sociological aspects of water development," *Water Resources Bulletin*, 7, 6 (December 1971), 1137-43.
- Bjergo, Allen C. and Maureen Fleming Ullrich. "Land subdivision: subsequent use and costs in western Montana." Paper presented at the Annual Meeting of the Rural Sociological Society, San Francisco, CA, 23 August 1975.
- Black, Guy. "Externalities and structure in PPB," *Public Administration Review*, 31, 6 (November-December 1971), 637-43.
- Blackman, A. Wade, Jr. "Forecasting through dynamic modeling," pp. 257-75 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Blackman, A. Wade, Jr. "The use of dynamic modeling for conditional forecasts of resource allocation policies," *Technological Forecasting and Social Change*, 6, 2 (1974), 191-208.
- Blalock, H. M., Jr. (ed.). *Causal Models in the Social Sciences*. Chicago: Aldine, 1971.
- Blalock, H. M., Jr. (ed.). *Measurement in the Social Sciences: Theories and Strategies*. Chicago: Aldine, 1974.
- Blyau, Peter M. "Structural effects," *American Sociological Review*, 25, 2 (April 1960), 178-93.
- Blevins, Audie L., Jr., James G. Thompson and Carl Ellis. *Social Impact Analysis of Campbell County, Wyoming*. Prepared for the Wyoming Environmental Institute under contract with Atlantic Richfield Company. Larimer: University of Wyoming, December 1974.
- Boffey, Philip M. "Systems analysis: no panacea for nation's domestic problems," *Science*, 158 (24 November 1967), 1028-30.

- Bohm, Peter. "An approach to the problem of establishing the demand for public goods," Swedish Journal of Economics, 73, 1 (March 1971).
- Bolan, Richard S. "The social relations of the planner," Journal of the American Institute of Planners, 37, 6. (November 1971), 386-96.
- Bollinger, W. LaMar. "The economic and social impact of depopulation process upon four selected counties in Idaho," pp. 561-96 in Sara Mills Mazie (ed.), The Commission on Population Growth and the American Future: Vol. 5. Population, Distribution, and Policy. Washington, DC: U. S. Government Printing Office, 1972.
- Bolt Beranck & Newman, Inc. "HUD noise assessment guidelines." Cambridge, MA: Bolt Beranck & Newman, Inc., 1971. 36 p.
- Bonine, John E. "The evolution of 'technology-forcing' in the Clear Air Act," Environment Reporter Monograph No. 21, 6, 13 (25 July 1975), 1-30.
- Bonnen, James T. "The absence of knowledge of distributional impacts: an obstacle to effective policy analysis and decisions," pp. 246-70 in Robert H. Haveman and Julius Margolis (eds.), Public Expenditures and Policy Analysis. Chicago: Markham, 1970.
- Booth, Alan and Henry Camp. "Housing relocation and family social integration patterns," Journal of the American Institute of Planners, 40, 2 (March 1974), 124-28.
- Bordman, Sanford L. "Improving the accuracy of benefit-cost analysis," IEEE Spectrum, September 1973, 72-76.
- Borton, Thomas E. and Katherine P. Warner. "Involving citizens in water resources planning," in James A. Swan and William B. Stapp (eds.), Environmental Education: Strategies toward a More Liveable Future. New York: Halsted Press, 1974?
- Botka, D. "A descriptive model of social contacts within a community," Ekistics, 30, 177 (August 1970), 110-16.
- Boulder Area Growth Study Commission. Exploring Options for the Future: A Study of Growth in Boulder County. Vol. VIII: Social and Humanistic Aspects. Boulder, CO: Boulder Area Growth Study Commission, November 1973.
- Boudeville, Jacques R. "Planning methods for integrated regional development," Ekistics, November 1971.
- Boulding, Kenneth E. "The social system and the energy crisis," Science, 19 April 1974.
- Boyd, Keith A. and Frank A. Bell, Jr. "A rationale for the regionalization of public water systems," Water Resources Bulletin, 9, 1 (February 1973), 73-80.
- Bracken, Darcia Daines. "Social goals and evaluation of resource commitments," Water Resources Bulletin, 9, 3 (June 1973), 485-93.

- Bradshaw, Jonathan. "The concept of social need," *Ekistics*, 37, 220 (March 1974), 184-87.
- Brail, Richard K. and F. Stuart Chapin, Jr. "Activity patterns of urban residents," *Environment and Behavior*, 5, 2 (June 1973), 163-90.
- Brand, Daniel, Brian Barber and Michael Jacobs. "Technique for relating transportation improvements and urban development patterns," pp. 69-89 in David Sweet (ed.), *Models of Urban Structure*. Lexington, MA: D. C. Heath, 1972.
- Brauer, Mary A. and John S. Adams. "Useful goal-achievement measures: Zelder's segregation indices," *Journal of the American Institute of Planners*, 40, 6 (November 1974), 430-38.
- Brecher, Charles. *The Impact of Federal Antipoverty Policies*. New York: Praeger, 1973.
- Breese, Gerald and others. *The Impact of Large Installations on Nearby Areas*. Beverly Hills, CA: Sage, 1965.
- Brewer, Garry D. *Politicians, Bureaucrats and the Consultant: A Critique of Urban Problem Solving*. New York: Basic Books, 1973.
- Bright, James R. "Forecasting by monitoring signals of technological change," pp. 238-56 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Bright, James R. "The process of technological innovation--an aid to understanding technological forecasting," pp. 3-12 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Bright, James R. (ed.). *Technological Forecasting for Industry and Government: Methods and Applications*. Englewood Cliffs, NJ: Prentice-Hall, 1968.
- Bright, James R. and Milton E. F. Schoeman (eds.). *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Brody, A. and A. P. Carter (eds.). *Input-Output Techniques*. New York: American Elsevier, 1972.
- Brokensha, David and Thayer Scudder. "Resettlement," pp. 20-62 in Neville Rubin and William M. Warren (eds.), *Dams in Africa: An Interdisciplinary Study of Man-Made Lakes in Africa*. London: Frank Cass, 1968.
- Brokensha, David. "Volta resettlement and anthropological research," *Human Organization*, 22, 4 (Winter 1963-64), 286-90.
- Brolin, Brent C. and John Zeisel. "Social research and design: applications to mass housing," pp. 239-46 in Gary T. Moore (ed.), *Emerging Methods in Environmental Design and Planning*. Cambridge, MA: M.I.T. Press, 1970.
- Bromley, Daniel W. "Social goals, water resource development and the Water Resources Council: a critical assessment," in *Proceedings of the Western Agricultural Economics Association, 44th Annual Meeting, Squaw Valley, CA, 27 July 1971*.

- Bromley, Daniel W. and Richard L. Barrows. "The changing nature of water resource investments: implications for community development," pp. 81-105 in Donald R. Field, James C. Barron and Burl F. Long (eds.), *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Bromley, Daniel W., A. Allan Schmid and William B. Lord. *Public Water Resource Project Planning and Evaluation: Impacts, Incidence and Institution*. Working Paper #1. Madison: Center for Resource Policy Studies and Programs, School of Natural Resources, University of Wisconsin, September 1971.
- Bromley, David G. and Joel Smith. "The historical significance of annexation as a social process," *Land Economics*, August 1973.
- Bronwell, Arthur B. "Engineering and public policy," *The Futurist*, 7, 5 (December 1973), 272-73.
- Brooks, Harvey. "Can science be planned?" Reprint No. 3. Cambridge, MA: Program on Technology and Society, Harvard University, n.d. (1967). 20 p.
- Brooks, Harvey. "Models for science planning," *Public Administration Review*, 31, 3 (May-June 1971), 364-74.
- Brooks, Ralph M. "Toward the measurement of social indicators: conceptual and methodological implications," *Proceedings of the American Statistical Association*, 1971.
- Brown, Lance Jay and Dorothy E. Whiteman. *Planning and Design Workbook for Community Participation: An Evaluation Report*. Princeton, NJ: Research Center for Urban and Environmental Planning, Princeton University, 1973.
- Brown, Lawrence A. and John Holmes. "The delimitation of functional regions, nodal regions, and hierarchies by functional distance approaches," *Ekistics*, November 1971.
- Brown, Lawrence A. and Kevin R. Cox. "Empirical regularities in the diffusion of innovation," *Annals of the Association of American Geographers*, September 1971.
- Brown, M. Ray. *Technology, Energy, and Society: A Study of the Sociological Impact of Thermonuclear Fusion Reactors*. Unpublished masters thesis. Texas Technical University, August 1971.
- Brown, Perry J. (ed.). *Toward a Technique for Quantifying Aesthetic Quality of Water Resources*. IWR Contract Report 74-8. Fort. Belvoir, VA: Institute for Water Resources, U. S. Army Corps of Engineers, October 1974.
- Brown, R. "Linking local planning with structure planning," *The Planner*, 60, 1 (January 1974).
- Bruhn, John G. "Human ecology: a unifying science?" *Human Ecology*, 2, 2 (April 1974), 105-25.
- Brunner, Ronald D. and Garry D. Brewer. "Policy and the study of the future: given complexity, trends or processes?" in Garry D. Brewer and Ronald D. Brunner (eds.), *Political Development and Change*. New York: Free Press, 1975.

- Bruvold, William H. "Belief and behavior as determinants of environmental attitudes," *Environment and Behavior*, 5, 2 (June 1973), 202-18.
- Bryant, Coralie and Louise G. White. "Planning, participation, and social change," *Growth and Change*, 6, 1 (January 1975), 38-43.
- Buchanan, James M. and W. Craig Stubblebine. "Externality," *Economica*, 29 (November 1962), 371-84.
- Buck, Roy C. and Robert A. Rath. "Planning as institutional innovation in the smaller city," *Journal of the American Institute of Planners*, 36, 1 (January 1970), 59-64.
- Buckley, W., T. Burns and L. D. Meeker. "Structural resolutions of collective action problems," *Behavioral Science*, 19, 5 (September 1974), 277-97.
- Buffington, Larry. "Professionalization: a strategy for improving environmental quality," *Humboldt Journal of Social Relations*, 2, 1 (Fall-Winter 1974), 18-21.
- Bultena, Gordon L. "Dynamics of agency-public relations in water resource planning," pp. 125-49 in Donald R. Field, James C. Barron and Burl F. Long (eds.), *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Burby, Raymond J., III. *Politics and Planning: Toward a Model of Planning-Related Policy Outputs in American Local Government*. Chapel Hill, NC: Evergreen House, 1968.
- Burch, William R., Jr. "Resources and social structures," *Annals of the American Academy of Political and Social Science*, May 1970.
- Burch, William R., Jr. and Neil H. Cheek, Jr. "Social meanings of water: patterns of variation," pp. 41-53 in Donald R. Field, James C. Barron and Burl F. Long (eds.), *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Burch, William R., Jr., Neil H. Cheek, Jr. and Lee Taylor (eds.). *Social Behavior, Natural Resources, and the Environment*. New York: Harper and Row, 1972.
- Burchard, J. E. "The limitations of utilitarianism as a basis for determining urban joy," in *Man and the Modern City*. Pittsburgh: University of Pittsburgh Press, 1963.
- Burchell, Robert W., with James W. Hughes. *Planned Unit Development: New Communities American Style*. New Brunswick, NJ: Center for Urban Policy Research, Rutgers University.
- Burchell, Robert W. and David Listokin. *The Environmental Impact Handbook*. New Brunswick, NJ: Center for Urban Policy Research, Rutgers University, 1974.
- Burchell, Robert W. and David Listokin (eds.). *Future Land Use: Energy, Environmental, and Legal Constraints*. New Brunswick, NJ: Center for Urban Policy Research, Rutgers University, 1975.

- Burdge, Rabel J. "The Protestant ethic and leisure-orientation." Paper presented at the Ohio Valley Sociological Society, Cleveland; OH, 21 April 1961.
- Burdekin, R. and S. A. Marshall. "The use of Forrester's systems dynamics approach in urban modeling," *Environment and Planning*, 4, 4.
- Burdge, Rabel J. and K. Sue Johnson. "Social costs and benefits of water resource construction." Research Report No. 64. Lexington: Water Resources Research Institute, University of Kentucky, November 1973.
- Bureau of Reclamation. *Guidelines for Implementing Principles and Standards for Multiobjective Planning of Water Resources*. Denver, CO: Bureau of Reclamation, December 1972.
- Burke, Edmund M. "Citizen participation strategies," *Journal of the American Institute of Planners*, 34, 5 (September 1968), 287-94.
- Burke, Roy, III, James P. Heaney and Edwin E. Pyatt. "Water resources and social choices," *Water Resources Bulletin*, 9, 3 (June 1973), 433-47.
- Burkhardt, Jon. "Community reactions to anticipated highways: fears and actual effects," *Citizen Participation and Social Indicators*. Highway Research Record, No. 470. Washington, DC: Highway Research Board, 1973.
- Burkhardt, Jon. "Impact of highways in urban neighborhoods: a model of social change," in *Social, Economic and Environmental Factors of Transportation*. Highway Research Record, No. 356. Washington, DC: Highway Research Board, 1971.
- Burkhardt, Jon E. "The impact of highways on urban neighborhoods: a model of social change." Paper prepared for the 50th Annual Meeting of the Highway Research Board, 21 January 1971. 28 p.
- Burkhardt, Jon. "Neighborhood social interaction: measurement and prediction of change." Paper presented at the Federal Highway Administration Course on Social and Economic Effects of Highways, Washington, DC, December 1973.
- Burkhardt, Jon and C. Eby. "'Need' as a criterion in transportation planning," *Transportation Systems Planning and Analysis*, Highway Research Record, No. 435. Washington, DC: Highway Research Board, 1973.
- Burkhardt, Jon, A. M. Lago and J. Rothenberg. *Highway Improvement as a Factor in Neighborhood Change: Vol. II. Changes in Neighborhood Social Interaction*. RMC Report UR-128. Washington, DC: Bureau of Public Roads, March 1971.
- Burkhardt, Jon E. and Margaret T. Shaffer. "Social and psychological impacts of transportation improvements," *Transportation*, 1, 2 (June 1973), 207-26.
- Burnham, John B., Stan M. Nealey and William S. Maynard. "A method for combining societal and technical judgments in environmental decision making," *Transactions of the American Nuclear Society Conference on Nuclear Power Plant Siting*, Portland, OR, 28 August 1974, pp. 48-49.
- Burns, . "Computational techniques for analysis of system dynamics models of social systems," *Socio-Economic Planning Sciences*, 8 (1974), 215-23.

- Burns, Leland S. and Alvin J. Harman. *The Complex Metropolis. Part 6 of Profile of the Los Angeles Metropolis: Its People and Its Homes. Research Report #9. Los Angeles: Housing, Real Estate, and Urban Land Studies Program, University of California, Los Angeles, 1968.*
- Burt, DeVere E. "The geography of extinct and endangered species in the United States," *The Explorer*, 15, 3 (Fall 1973), 4-10.
- Butcher, Walter R. "The role of water resources in community development," pp. 59-79 in Donald R. Field, James C. Barron and Burl F. Long (eds.), *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Butler, Edgar W., Georges Sabagh and Maurice D. Van Arsdol, Jr. "Demographic and social psychological factors in residential mobility," *Sociology and Social Research*, 48, 2 (), 139-54.
- Butler, William; Robert Kavesh and Robert Platt (eds.). *Methods and Techniques of Business Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1974.
- Buttimer, Anne. "Social space in interdisciplinary perspective," *Geographical Review*, 59, 3 (July 1969), 417-26.
- Byler, P. M. "Functional and psychological integration in a rural community." University Park: Department of Agricultural Economics and Rural Sociology, Pennsylvania State University, March 1973.
- Bylund, H. B. "The human factor and changes in water usage patterns," *Water Resources Research*, 2 (1966), 365-69.
- Cahill, Edward E. "Sociologists as planners." Paper presented at the 66th Annual Meeting of the American Sociological Association, Denver, CO, 30 August 1971. 20 p. mimeo.
- Caldwell, Lynton K. "The ecosystem as a criterion for public land policy," *Natural Resources Journal*, 10 (April 1970), 203-21.
- Caldwell, Lynton K. "Environment: a short course in semantics," *Public Administration Review*, 31, 6 (November-December 1971), 671-78.
- Caldwell, Lynton K. *Man and His Environment: Policy and Administration*. New York: Harper and Row, 1975.
- Caldwell, Lynton K. (comp.). *Science, Technology, and Public Policy*. Washington, DC: Planning and Policy Analysis Office, National Science Foundation, 1968-1973 (3 vols.).
- Calvin, James A. and others. "An attempt at assessing preferences for natural landscape," *Environment and Behavior*, December 1972.
- Campbell, D. T. and J. C. Stanley. *Experimental and Quasi-Experimental Designs for Research*. Chicago: Rand McNally, 1963.
- Campbell, Rex and Jerry L. Wade (eds.). *Society and Environment: The Coming Collision*. Boston: Allyn and Bacon, 1972.

- Campbell, Rex R. and Mary Zielinski. "Influence of manmade lakes on population change and characteristics: 1960-1979." Paper to be published in a forthcoming issue of the NC-97 Committee publication.
- Cameron, Juan. "Growth is a fighting word in Colorado's mountain wonderland," *Fortune*, 88, 4 (October 1973), 148-59, 212, 214, 216, 218.
- Camina, Margaret M. "Plan-design models: a review," *Town Planning Review*, 40, 2 (July 1969), 119-30.
- Campbell, Angus and Philip E. Converse (eds.). *The Human Meaning of Social Change*. New York: Russell Sage Foundation, 1972.
- Cancro, Robert. "Some psychosocial implications of rapid technological change." Unpublished manuscript, n.d. 15 p.
- Caporaso, James A. and Leslie L. Roos, Jr. (eds.). *Quasi-Experimental Approaches: Testing Theory and Evaluating Policy*. Evanston, IL: Northwestern University Press, 1973.
- Cappon, Daniel. "Priorities in environmental health," *Ekistics*, 37, 220 (March 1974), 160-68.
- Cappon, Daniel with David Lawrence. "Psychosocial indicators," *Ekistics*, 37, 220 (March 1974), 188-93.
- Carey, George W. and others. *Urbanization, Water Pollution, and Public Policy*. New Brunswick, NJ: Center for Urban Policy Research, Rutgers University, 1974.
- Carey, William D. "Muddling through: government and technology," *Science*, 188, 4183 (4 April 1975), 13.
- Carlson, Jack W. "The status and next steps for planning, programing, and budgeting," pp. 367-412 in Robert H. Haveman and Julius Margolis (eds.), *Public Expenditures and Policy Analysis*. Chicago: Markham, 1970.
- Carnes, Sam with Paul Friesema. "Urbanization and the northern Great Plains." Report to the Northern Great Plains Resources Program. Evanston, IL: Center for Urban Affairs, Northwestern University, October 1974.
- Caro, Francis G. "Approaches to evaluative research: a review," pp. 403-21 in Louis A. Zurcher, Jr. and Charles M. Bonjean (eds.), *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler, 1970.
- Carr, Donald E. *Death of the Sweet Waters*. New York: W. W. Norton, 1971.
- Carroll, James D. "Participatory technology," *Science*, 171 (19 February 1971), 647-53.
- Carr, Lowell Julliard and James Edson Stermer. *Willow Run: A Study of Industrialization and Cultural Inadequacy*. New York: Harper and Brothers, 1952.
- Carson, John M., Goldie W. Rivkin and Malcolm D. Rivkin. *Community Growth and Water Resources Policy*. New York: Praeger, 1973.

- Carter, Everett C., Lonnie E. Haefner and Jerome W. Hall. "Literature references on techniques for the evaluation of actors relevant to decision-making on highway locations." Washington, DC: Federal Highway Administration, U. S. Department of Transportation, January 1972.
- Carter, Luther J. The Florida Experience: Land and Water Policy in a Growth State. Baltimore, MD: Johns Hopkins Press, 1975.
- Carter, Luther J. "Water projects: how to erase the 'pork barrel' image?" Science, 182, 4109 (19 October 1973), 266, 268-69, 316.
- Cartwright, T. J. "Problems, solutions and strategies: a contribution to the theory and practice of planning," Journal of the American Institute of Planners, 39, 3 (May 1973), 179-87.
- Castle, E. N. "Economics and the quality of life," American Journal of Agricultural Economics, 54, 5 (December 1972), 723-35.
- Catalano, Ralph, Stephen J. Simmons and Daniel Stokols. "Adding social science knowledge to environmental decision making," Natural Resources Lawyer, 8, 1 (1975), 41-59.
- Catanese, Anthony James. "Frustrations of national planning: reality and theory in Columbia," Journal of the American Institute of Planners, 39, 2 (March 1973), 93-105.
- Catanese, Anthony J. Scientific Methods of Urban Analysis. Urbana: University of Illinois Press, 1972.
- Catanese, Anthony J. and Alan W. Steiss. "The search for a systems approach to the planning of complex urban systems," Plan: Journal of the Town Planning Institute of Canada, April 1969.
- Catanese, Anthony J. and Alan W. Steiss. Systemic Planning: Theory and Application. Lexington, MA: D. C. Heath.
- Catton, William R., Jr. "NEPA, sociologists and succession: a position paper," Environmental Sociology, 5 (January 1975), 8-21.
- Cauley, Jon and Todd Sandler. "Public goods theory: another paradigm for futures research," Futures, 6, 5 (October 1974), 423-28.
- Caulfield, Henry P., Jr. "The politics of multiple objective planning." Paper presented at the Conference on Multiple Objective Planning and Decision-Making, Boise, Idaho, 15 January 1975. 28 p. mimeo.
- Caulfield, Henry P., Jr., Harry A. Steele and Sam H. Johnson, III (eds.). Manual for Training in the Application of the Principles and Standards of the Water Resources Council. Fort Collins: Environmental Resources Center, Colorado State University, December 1974.
- Census Use Study. Social and Health Indicators System: Part II. Rural: Mound Bayou, Mississippi. Washington, DC: U. S. Government Printing Office, 1973.
- Center for Economic Projections. Economic and Demographic Projections for Two Hundred and Twenty-Four Metropolitan Areas. 3 vols. Report No. 67-R-1. Washington, DC: National Planning Association, May 1967.

- Center for Urban Studies, Wayne State University. Social Reporting in Michigan: Problems and Issues. Lansing, MI: Office of Planning Coordination, State of Michigan, January 1970.
- Cetron, M. J. "Editorial comment," *Technology Assessment*, 2, 4 (October 1974), 211-14.
- Century Research Corporation. Social Aspects of Urban Water Conservation. Arlington, VA: Century Research Corporation, August 1972.
- Chadwick, George. A Systems View of Planning: Towards a Theory of the Urban and Regional Planning Process. New York: Pergamon, 1971.
- Chaiklin, Harris. "The relationship between social system theory and community organization theory." Paper presented at the 14th Annual Meeting of the Council on Social Work Education, New York City, 25-27 January 1966. 17 p.
- Chalk, Rosemary. "Technology assessment: an interdisciplinary, integrative approach," *Technology Assessment*, 2, 4 (October 1974), 217-21.
- Challoner, David R. "A policy for investment in biomedical research," *Science*, 186, 4158 (4 October 1974), 27-30.
- Chamberlain, Neil W. "Private and public planning," *Public Administration Review*, 31, 3 (May-June 1971), 382-88.
- Changnon, Stanley A., Jr. "Inadvertent weather and precipitation modification by urbanization," *Journal of the Irrigation and Drainage Division, ASCE*, 99, IRI (March 1973).
- Chapin, F. Stuart, Jr. "Activity systems and urban structure: a working schema," *Journal of the American Institute of Planners*, 34, 1 (January 1968), 11-18.
- Chapin, F. Stuart, Jr. "Free time activities and quality of urban life," *Journal of the American Institute of Planners*, 37, 6 (November 1971), 411-17.
- Chapin, F. Stuart, Jr. *Human Activity Patterns in the City: Things People Do in Time and Space*. New York: John Wiley, 1974.
- Chapin, F. Stuart, Jr. "Selected theories of urban growth and structure," *Journal of the American Institute of Planners*, 30, 1 (February 1964), 51-58.
- Chen, Kan (ed.). *Technology and Social Institutions*. New York: Institute of Electrical and Electronics Engineers, 1974.
- Chen, Kan, Karl F. Lagler and others. *Growth Policy: Population, Environment, and Beyond*. Ann Arbor: University of Michigan Press, 1974.
- Chevalier, M. *Social Science and Water Management: A Planning Strategy*. Ottawa: Department of Energy, Mines and Resources, 1969.
- Chicago District. *Wastewater Management Study for Chicago-South End of Lake Michigan: Appendix E. Social-Environmental Evaluation*. Chicago: Chicago District, Corps of Engineers, July 1973.

- Christakis, Alexander N. "Limits of systems analysis of economic and social development planning," *Ekistics*, 200 (July 1972), 37-42.
- Christakis, Alexander N. and David W. Malone. *A Systematic Approach to Human Settlement Planning. Progress Report I of the Science-Based Planning Project.* Columbus, OH: Academy for Contemporary Problems and Battelle Columbus Laboratories, n.d.
- Churchill, Henry S. "New tendencies in planning," pp. 134-36 in C. E. Elias, Jr., James Gillies and Syend Riemer (eds.), *Metropolis: Values in Conflict.* Belmont, CA: Wadsworth, 1964.
- Cicchetti, Charles J. and V. Kerry Smith. "Congestion, quality deterioration, and optimal use: wilderness recreation in the Spanish Peaks Primitive Area," *Social Science Research*, 2, 1.
- Cicchetti, Charles J. *Forecasting Recreation in the United States.* Lexington, MA: D. C. Heath, 1973.
- Cicchetti, Charles J. and others. "Evaluating federal water projects: a critique of proposed standards," *Science*, 181, 4101 (24 August 1973), 723-28.
- Claffey, Paul J. "User criteria for rapid transit planning," *Journal of the Urban Planning and Development Division, ASCE*, 90, UPI (September 1964), 5-14.
- Claire, William H. "Esthetic considerations in urban general planning," *Journal of the Urban Planning and Development Division, ASCE*, 98, UPI (July 1972), 63-69.
- Clark, David B. "The concept of community--a re-examination," *Sociological Review*, August 1973.
- Clark, Felicia and Todd Lee. "A broad concept of 'community' is what's new about new towns," *Architectural Record*, December 1973.
- Clark, Terry Nichols. "Community social indicators--from analytical models to policy applications," *Urban Affairs Quarterly*, 9, 1 (September 1973), 3-36.
- Clavel, Pierre. "Planners and citizen boards: some applications of social theory to the problem of plan implementation," *Journal of the American Institute of Planners*, 34, 3 (May 1968), 130-39.
- Clough, Donald J. "A multiagency decision model framework for benefit-cost analysis," *Canadian Operations Research Society Journal*, 7, 3 (November 1969), 193-203.
- Clymer, A. Ben. "Next-generation models in ecology," pp. 553-69 in Bernard C. Patten (ed.), *Systems Analysis and Simulation in Ecology: Vol. II.* New York: Academic Press, 1972.
- Coady, Susan K., George P. Johnson and Jean M. Johnson. "Effectively conveying results: a key to the usefulness of technology assessment." Paper presented at the First International Congress on Technology Assessment, The Hague, 31 May 1973. 20 p.

- Coase, R. H. "The problem of social cost," *Journal of Law and Economics*, 3 (October 1960), 1-44.
- Coates, Joseph F. "Coates' corner," *Technology Assessment*, 2, 1 (November 1973), 69-71.
- Coates, Joseph F. "Technology assessment: the benefits . . . the costs . . . the consequences," *The Futurist*, 5, 6 (December 1971), 225-31.
- Coates, Joseph F. "Technology assessment and public wisdom," *Journal of the Washington Academy of Science*, 65, 1 (1975), 3-12.
- Coates, Vary T. "Technology and public policy: the process of technology assessment in the federal government." Summary Report. Washington, DC: Program of Policy Studies in Science and Technology, The George Washington University, July 1972.
- Coates, V. T. and J. E. Mock. *The Southern Regional Conference on Techno-Assessment: Summary*. Washington, DC: George Washington University, October 1974.
- Cochrane, James L. and Milan Zeleny (eds.). *Multiple Criteria Decision Making*. Columbia: University of South Carolina Press, 1973.
- Cohn, Victor. "The hospital as a utility," *Technology Review*, 76, 3 (January 1974), 6-7.
- Cohon, Jared L. and David H. Marks. "Multiobjective screening models and water resource investment," *Water Resources Research*, 9, 4 (August 1973), 826-36.
- Cohon, Jared L. and David H. Marks. "A review and evaluation of multiobjective programming techniques," *Water Resources Research*, 11, 2 (April 1975), 208-20.
- Cole, Sam. "Limitations of large scale models in forecasting," *Journal of the Royal Town Planning Institute*, April 1974, 646-49.
- Colm, Gerhard and Luther H. Gulick. "Program planning for national goals." *Planning Pamphlet No. 125*. Washington, DC: National Planning Association, November 1968.
- Colman, Arthur D. "Irrational aspects of design," *Man-Environment Systems*, 3, 3 (May 1973), 161-76.
- Coleman, James S. *The Mathematics of Collective Action*. Chicago: Aldine, 1973.
- Coleman, James S. "Policy research in the social sciences." Morristown, NJ: General Learning Press, 1972.
- Coleman, James S. "The possibility of a social welfare function," *American Economic Review*, 56, 5 (December 1966), 1105-22.
- Committee on Interior and Insular Affairs, United States Senate. "A definition of the scope of environmental management." Washington, DC: U. S. Government Printing Office, 1970.
- Commoner, Barry. "Alternative approaches to the environmental crisis," *Journal of the American Institute of Planners*, 39, 3 (May 1973), 147-62.

- Connecticut River Basin Program. "Plan formulation guidelines." Hanover, NH: New England River Basins Commission, 1 July 1974. 84 p. mimeo.
- Conway, Donald (ed.). Social Science and Design: A Process Model for Architect and Social Scientist Collaboration. Washington, DC: American Institute of Architects, 1973.
- Cook, Earl. "Canyon Dam and Reservoir and their impacts on their surroundings," pp. 1.1-1.65 in Earl Cook and others, Reservoir Impact Study. College Station: Texas A&M University, November 1974.
- Cook, Earl and others. Reservoir Impact Study. College Station: Texas A&M University, November, 1974.
- Cook, Thomas J. and Frank P. Scioli, Jr. "A research strategy for analyzing the impacts of public policy," Administrative Science Quarterly, 17, 3 (September 1972), 328-39.
- Coomber, Nicholas and Asit K. Biswas. Evaluation of Environmental Intangibles. Bronxville, NY: Genera Press, 1973.
- Cooper, Clare C. Easter Hill Village: Some Social Implications of Design. Riverside, NJ: Free Press, 1975.
- Corning, Peter A. "An index for the quality of life." Paper presented at the 138th Annual Meeting of the American Association for the Advancement of Science, Washington, DC, December 1971.
- Correa, Hector. A Systems Approach to Socio-Economic Planning. Pittsburgh, PA: University Center for International Studies, University of Pittsburgh, March 1971.
- Costonis, John J. Space Adrift: Landmark Preservation and the Marketplace. Urbana: University of Illinois Press, 1974.
- Cottle, Richard and Jacob Krarup (eds.). Optimization Methods for Resource Allocation. New York: Crane, Russak, 1974.
- Cottrell, W. F. "Death by dieselization: a case study in the reaction to technological change," American Sociological Review, 16, 3 (June 1951), 358-65.
- Council on Environmental Quality. "Guidelines on preparation of environmental impact statements," Environment Reporter, Supplement 250, 9 May 1975, 9-21.
- Cowan, Peter (ed.). The Future of Planning. Beverly Hills, CA: Sage, 1973.
- Cox, P. Thomas. "Success of watershed development in local communities," Natural Resources Journal, 9, 1 (January 1969), 23-34.
- Crane, Diana. Social Aspects of the Prolongation of Life. New York: Russell Sage Foundation, 1969.
- Crawford, A. B. "A method of multiple criteria evaluation." Center Paper 72-2. Alexandria, VA: Center for Advanced Planning, Institute for Water Resources, U. S. Army Corps of Engineers, June 1972.

- Crawford, A. Berry and A. Bruce Bishop. "A preliminary analysis of the environmental and community impacts of four alternatives for improving highway access to Ogden Valley." A report submitted to the Utah Department of Highways. Logan: Utah State University Foundation, n.d. (1973?) 40 p.
- Cripps, E. L. and D. H. S. Foot. "The urbanization effects of a third London airport," *Environment and Planning*, April 1970.
- Criss, Robert R. "Socio-economic accounting applied to water resources planning," *Water Resources Bulletin*, 7, 4 (August 1971), 639-43.
- Crocker, Thomas D. "Water and the economics of implementing environmental objectives," pp. 261-77 in Donald R. Field, James C. Barron and Burl F. Long (eds.), *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Crothers, R. J. "Factors related to the community index of satisfactoriness," *Ekistics*, 30, 177 (August 1970), 107-9.
- Cross, Nigel (ed.). *Design Participation: Proceedings of the Design Society's Conference, Manchester, 1971*. London: Academy Editions, 1972.
- Crossland, Janice. "The new city commons," *Environment*, 17, 3 (April-May 1975), 26-28.
- Crowe, Beryl L. "The tragedy of the common revisited," *Science*, 166, 3909 (28 November 1969), 1103-7.
- Culhane, Paul J. "Federal agency organizational change in response to environmentalism," *Humboldt Journal of Social Relations*, 2, 1 (Fall-Winter 1974), 31-44.
- Culhane, Paul J. *The Lake Michigan Federation: Evaluation of an Environmental Interest Group*. Evanston, IL: Public Lands Project, Center for Urban Affairs, Northwestern University, November 1974.
- Cullingworth, J. B. *Problems of an Urban Society: I. The Social Framework of Planning*. London: George Allen and Unwin, 1973.
- Cullingworth, J. B. (ed.). *Problems of an Urban Society: III. Planning for Change*. London: George Allen and Unwin, 1973.
- Culyer, A. J. *The Economics of Social Policy*. London: Martin Robertson, 1973.
- Cumberland, John H. and Bruce N. Stram. *Effects of Economic Development upon Water Resources: An Interindustry Approach to Modeling Economic-Environmental Systems*. College Park: Bureau of Business and Economic Research, University of Maryland, 1974.
- Curtis, Virginia (ed.). *Land Use and the Environment: An Anthology of Readings*. Washington, DC: Office of Research and Monitoring, Environmental Studies Division, U. S. Environmental Protection Agency, 1973.
- Cypra, Kenneth J. "Homeowner decision making in public water supply," *Journal of the Urban Planning and Development Division, ASCE*, 99, UPI (March 1973), 97-103.

- Daetz, Douglas and Richard Harris Pantell (eds.). *Environmental Modeling: Analysis and Management*. Stroudsburg, PA: Dowden, Hutchinson and Ross, 1974.
- Dahl, Robert A. "The analysis of influence in local communities," pp. 227-41 in Bernard J. Frieden and Robert Morris (eds.), *Urban Planning and Social Policy*. New York: Basic Books, 1968.
- Dakley, Norman C. (ed.). *Studies in the Quality of Life: Delphi and Decision Making*. Lexington, MA: D. C. Heath, 1972.
- Darling, Frank Fraser and Raymond F. Dasmann. "The ecosystem view of human society," *Impact of Science on Society*, 19, 2 (April-June 1969), 109-21.
- Dasgupta, Ajit K. and D. W. Pearce. *Cost-Benefit Analysis: Theory and Practice*. New York: Barnes and Noble, 1972.
- Dasmann, Raymond F., John P. Milton and Peter H. Freeman. *Ecological Principles for Economic Development*. New York: John Wiley, 1973.
- Davenport, Sally (ed.). *Planning and Evaluation of Multiple Purpose Water Resource Projects in a Multiobjective Environment: An Overview and Post-Audit Analysis*. Menlo Park, CA: INTASA, Inc., December 1972.
- David, Henry. "Assumptions about man and society and historical constructs in futures research," *Futures*, 2, 3 (September 1970), 222-30.
- David, Paul T. "Party platforms as national plans," *Public Administration Review*, 31, 3 (May-June 1971), 303-15.
- Davis, John C. and Michael J. McCullagh (eds.). *Display and Analysis of Spatial Data*. New York: John Wiley, 1974.
- Davis, Otto A. and Morton J. Kamien. "Externalities, information and alternative collective action," pp. 74-95 in Robert H. Haveman and Julius Margolis (eds.), *Public Expenditures and Policy Analysis*. Chicago: Markham, 1970.
- Davis, Robert K. and Steve H. Hanke. "Conventional and unconventional alternatives for water supply management," *Water Resources Research*, 9, 4 (August 1973), 861-70.
- Davis, Ruth M. "Preventive technology: a cure for scientific ills," *Science*, 188, 4185 (18 April 1975), 213.
- Davis, Ruth M. "Technology as a deterrent to dehumanization," *Science*, 185, 4158 (30 August 1974), 737.
- Day, Lawrence H. "The corporate role in technology assessment: a case example," *Technology Assessment*, 2, 1 (November 1973), 29-45.
- de Alessi, Louis. "Toward an analysis of postdisaster cooperation," *American Economic Review*, 65, 1 (March 1975), 127-38.
- de Jouvenel, Bertrand. *The Art of Conjecture*. Tr. by Nikita Lary. New York: Basic Books, 1967.

- de Jouvenel, Bertrand and others. Human Futures. Guildford, Surrey: IPC Science and Technology Press, 1974.
- Dean, Joe H. and C. S. Shih. "Subjective decision-making for urban water resources development," Water Resources Bulletin, 9, 5 (October 1973), 942-49.
- Dean, R. Gary and Joel C. Snell. Socio-Economic Impact on Changing Life Styles to the Year 2020. Working Paper #2. Blair; NB: Dana College, 1 July 1973.
- Dearlinger, John A. and others. Measuring the Intangible Values of Natural Streams: Part I. Lexington: Water Resources Research Institute, University of Kentucky, 1971.
- Dearlinger, John A. and others. Measuring the Intangible Values of Natural Streams: Part II. Lexington: Water Resources Research Institute, University of Kentucky, 1973.
- Decoufle, Andre-Clement and Nicole Schwartz. "The concept of needs: a survey of illusions," Futures, 6, 1 (February 1974), 16-25.
- DeCoursey, Donn G. "Application of discriminant analysis in design review," Water Resources Research, 9, 1 (February 1973), 93-102.
- Dee, Norbert and others. "An environmental evaluation system for water resources planning," Water Resources Research, 9, 3 (June 1973), 523-35.
- Dee, Norbert and Howard Reiquam. "Comprehensive environmental analysis," Battelle Research Outlook, 4, 2 (1972), 25-29.
- Dehem, Roger. "Concepts of regional planning," Canadian Public Administration, 9, 2 (June 1966), 158-63.
- Delbecq, Andre L. and Andy Van de Ven. "A group process model for problem identification and program planning," Journal of Applied Behavioral Science, 1971.
- Delorme, Charles D., Jr. and Norman J. Wood. "Savannah River improvement and environmental preservation," Land Economics, 50, 3 (August 1974), 284-88.
- Denton, Trevor. Social Relations and Physical Environment: A Critical Bibliographic Review. St. Catharines, ON: Department of Sociology and Urban Studies Institute, Brock University, August 1973.
- Department of Agriculture. "Environmental statements: proposed guidelines for preparation" (Forest Service), Federal Register, 38, 222 (19 November 1973), 31922-38.
- Department of Housing and Urban Development. The New Community of Cedar-Riverside Minneapolis, Minnesota. Washington, DC: Department of Housing and Urban Development, 10 February 1975.
- Department of Housing and Urban Development. "Protection and enhancement of environmental quality: procedures," Federal Register, 38, 137 (18 July 1973), 19182-94.

- Department of Transportation. "Procedures for considering environmental impacts," Federal Register, 38, 210 (1 November 1973), 30215-30.
- DeSalvo, Joseph S. "Neighborhood upgrading effects of middle-income housing projects in New York City," Journal of Urban Economics, July 1974.
- Deshales, John, Samuel Korper and Estelle Siker. Health Information System--II. Census Use Study Report No. 12. Washington, DC: Bureau of the Census, March 1971.
- Design-Science International, Inc. Recreational, Aesthetic, and Cultural Impact Analysis of Alternative Wastewater Management Systems in the Massachusetts Merrimack River Basin. Cambridge, MA: Design-Science International, Inc., April 1974.
- Detweyler, T. R. (ed.). Man's Impact on Environment. New York: McGraw-Hill, 1971.
- Devine, Richard P. and Laurence L. Falk. "Social surveys: a research strategy for social scientists and students." Morristown, NJ: General Learning Press, 1972.
- Dickerman, A. R. "A value-oriented approach to water policy objectives," Land Economics, 48, 4 (November 1972), 398-403.
- Dickert, Thomas G. and Katherine R. Domeny (eds.). Environmental Impact Assessment: Guidelines and Commentary. Berkeley: University Extension, University of California, 1974.
- Dickey, John W., David M. Glancy and Ernest M. Jennelle. Technology Assessment: Its Application to the Solid Waste Management Programs of Urban Governments. Lexington, MA: Lexington Books, 1973.
- Dickson, David. Alternative Technology and the Politics of Technical Change. London: Fontana/Collins, 1974.
- ~~Dierkes~~, Meinolf and Raymond Bauer (eds.). Corporate Social Accounting. New York: Praeger, 1973.
- Dilley, Steven C. "Case of the nebulous numbers," Harvard Business Review, 52, 6 (November-December 1974), 42-44, 46, 48, 50, 166, 168, 170.
- Dillon, Robert J. "Judgment mapping: a graphic technique for policymaking applied to developing alternative energy technologies." Paper presented to the Second General Assembly of the World Future Society, Washington, DC, June 1975. 16 p.
- Dimock, Marshall E. "Urban observatories and management strategy," Urban Affairs Quarterly, 8, 1 (September 1972), 41-48.
- Directorate of Regulatory Standards. Nuclear Power Facility Performance Characteristics for Making Environmental Impact Assessment. Washington, DC: Atomic Energy Commission, December 1974.
- Ditton, Robert B. and Thomas L. Goodale (eds.). Environmental Impact Analysis: Philosophy and Methods. Proceedings of the Conference on Environmental Impact Analysis, Green Bay, WI, 4-5 January 1972. Springfield, VA: National Technical Information Service, 1972.

- Divine, E. J. "The treatment of incommensurables in cost benefit analysis," *Land Economics*, 42 (1966), 383-86.
- Djerassi, Carl, Christina Shih-Coleman and John Diekman. "Insect control of the future: operational and policy aspects," *Science*, 186, 4164 (15 November 1974), 596-607.
- Dodge, B. H. "Achieving public involvement in the Corps of Engineers' water resources planning," *Water Resources Bulletin*, 9, 3 (June 1973), 448-54.
- Dohrenwend, Barbara Snell and Bruce P. Dohrenwend (eds.). *Stressful Life Events: The Nature and Effects*. New York: John Wiley, 1974.
- Doilney, James A. "Two capitalistic rationales for conservation," *Review of Regional Studies*, 2, 3 (December 1972), 87-102.
- Doktor, Robert. "On the creation of demand for technological innovation," *Technological Forecasting and Social Change*, 6, 2 (1974), 219-20.
- Dolgin, Erica and Thomas Guilbert (eds.). *Federal Environmental Law*. St. Paul, MN: West Publishers, 1974.
- Donahue, Charles L., Jr. "The need for communication in the planning and implementation of social change," *Cornell Journal of Social Relations*, Spring 1971.
- Donaldson, David. "Rural water supply in developing countries," *Water Resources Bulletin*, 8, 2 (1972), 391-98.
- Donnison, David V. "Agenda for housing," pp. 233-40 in Michael Wheeler (ed.), *The Right to Housing*. Montreal: Harvest House, 1969.
- Donnison, David. "Planning and government," pp. 93-112 in Peter Cowan (ed.), *The Future of Planning*. Beverly Hills, CA: Sage, 1973.
- Dorman, Albert A. "Environmental values and the freeway planning process," *Public Works*, September 1969.
- Dorn, Harold. "Pitfalls in population forecasts and projections," *Journal of the American Statistical Association*, 45, 311-34.
- Downs, Anthony. "Up and down with ecology--the issue-attention cycle," *The Public Interest*, 28 (Summer 1972), 38-50.
- Doxiadis Associates. "The IDEA method for regional planning," pp. 467-82 in Gwen Bell and Jacqueline Tyrwhitt (eds.), *Human Identity in the Urban Environment*. Baltimore, MD: Penguin, 1972.
- Drew, Elizabeth B. "Dam outrage: the story of the Army Engineers," *Atlantic Monthly*, 225, 4 (April 1970), 51-62.
- Drew, Elizabeth B. "HEW grapples with PPBS," *The Public Interest*, 8 (Summer 1967), 9-29.
- Drewnowski, Jan. "Valuation systems implied in planning decisions--shall we try to reveal them?" *Co-Existence*: January 1969.

Drexler, John A., Jr. "Technological sophistication and organizational practices." Ann Arbor: Institute of Social Research, University of Michigan, June 1973.

Drobny, Neil L. "Social accounting in environmental planning." Paper presented at the Seminar on Corporate Social Accounts, Battelle Seattle Research Center, 10-11 November 1972. 13 p. mimeo.

Drucker, Philip, Jerry Eugene Clark and Lesker Dianne Smith. Sociocultural Impact of Reservoirs on Local Government Institutions: Anthropological Analysis of Social and Cultural Benefits and Costs from Stream Control Measures--Phase 4. Research Report No. 65. Lexington: Water Resources Research Institute, University of Kentucky, 1973.

Daun, Ake. "Some environmental studies in the field of European ethnology," *Man-Environment Systems*, 5, 3 (May 1975), 191-92.

Dubin, Robert. "Causality and social systems analysis." Paper presented at the 66th Annual Meeting of the American Sociological Association, Denver, CO, 31 August 1971.

Duhl, Leonard J. "Planning and predicting: or what to do when you don't know the names of the variables," *Daedalus*, 96, 3 (Summer 1967), 779-88.

Duke, Richard D. and others. Regional Planning for Monterey Bay: A Trilogy of Issue-Oriented Games for Citizen Use. Ann Arbor: Environmental Simulation Laboratory, University of Michigan, December 1973.

Duncan, Otis Dudley. "Social forecasting: the state of the art," *The Public Interest*, 17 (Fall 1969), 88-118.

Duncan, Otis Dudley. "Social organization and the ecosystem," pp. 36-82 in Robert E. L. Faris (ed.), *Handbook of Modern Sociology*. Chicago: Rand McNally, 1964.

Dunn, Edgar S., Jr. *Economic and Social Development: A Process of Social Learning*. Baltimore, MD: The John Hopkins Press, 1971.

Dunn, Edgar S., Jr. *Social Information Processing and Statistical Systems--Change and Reform*. New York: John Wiley, 1974.

Dupnick, Edwin Gene. *Collective Utility in the Management of Natural Resources: A Systems Approach*. Report No. 5. Tucson: Natural Resources Systems Laboratory, University of Arizona, June 1971.

Durandberger, Robert (comp.). *Environment and Man*. Palo Alto, CA: National Press Books, 1970.

Duval, A., E. Fontela and A. Gabus. *Cross-Impact: A Handbook on Concepts and Applications*. DEMATEL Report No. 1. Geneva: Battelle Geneva Research Center, 1974.

Dyckman, John. "New normative styles in urban studies," *Public Administration Review*, 31, 3 (May-June 1971), 327-34.

- Dyckman, John W. "Societal goals and planned societies," pp. 248-67 in H. Wentworth Eldredge (ed.), *Taming Megalopolis: Vol. 1. What Is and What Could Be*. Garden City, NY: Doubleday, 1967.
- Dynes, Russell R. *Organized Behavior in Disaster*. Lexington, MA: D. C. Heath, 1970.
- Dynes, Russell R. and Dennis Wenger. "Factors in the community perception of water resource problems," *Water Resources Bulletin*, 7, 4 (August 1971), 644-51.
- Dynes, Russell R. and Dennis E. Wenger. "A model of community problem solving and selected empirical applications." Columbus: Water Resources Center, Ohio State University, December 1971.
- Dysart, Benjamin C., III and Andy H. Barnett. "Determination of public environmental preference in water resources planning and development." Paper presented at the Annual Meeting of the American Society of Civil Engineers, 18-22 October 1971, St. Louis, MO.
- Earwicker, John. "The future of planning: an exploration using futures techniques," *The Planner: Journal of the Royal Town Planning Institute*, 60, 4 (April 1974), 650-52.
- East-West Gateway Coordinating Council. "Environmental quality planning: goals, policies and objectives." Staff Technical Report. St. Louis, MO: St. Louis Area Council of Governments, June 1973.
- Eastman, Clyde, Alan Randall and Peggy L. Hoffer. "How much to abate pollution?" *Public Opinion Quarterly*, 38, 4 (Winter 1974-75), 574-83.
- Economic Research Service. "Planning natural resource development: an introductory guide." *Agricultural Handbook No. 431*. Washington, DC: U. S. Department of Agriculture, May 1972.
- Educational Policy Research Center. *Toward Master Social Indicators*. Research Memorandum EPRC 6747-2. Menlo Park, CA: Stanford Research Institute, February 1969.
- Edwards, David V. "Political forecasting," pp. 471-78 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Ehler, Charles N. "Urban systems design: toward an ecological rethink," *American Behavioral Scientist*, 14, 6 (July-August 1971), 791-801.
- Ehrenfeld, John F. "The environment, a growing constraint on technological change," pp. 461-70 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Eigerman, Maria. "Social and economic impacts of waste water management in the Merrimack Basin." Paper presented at the National Meeting of the American Society of Civil Engineers, 30 January 1973. 6 p.

- Eldredge, H. Wentworth. "Toward a national policy for planning the environment," pp. 3-27 in E. Erber (ed.), *Urban Planning in Transition*. Washington, DC: American Institute of Planners, 1970.
- Elgin, Duane and others. *City Size and the Quality of Life: An Analysis of the Policy Implications of Continued Population Concentration*. Menlo Park, CA: Stanford Research Institute, November 1974.
- Ellis, Jack. "The use of social research in architectural planning." Paper presented at the 65th Annual Meeting of the American Sociological Association, Washington, DC, 31 August 1970.
- Ellis, R. E. "Towards measurement of the community consequences of urban free-ways," *Highway Research Record*, 229 (1968), 38-52.
- Emery, F. E. and E. L. Trist. *Towards a Social Ecology: Contextual Appreciation of the Future in the Present*. New York: Plenum, 1973.
- England, J. Lynn. *Social and Cultural Factors to be Examined in Land Use Planning*. Ogden, UT: United States Forest Service, 1974.
- England, Roger and Gordon Best. "Indeterminate, non-optimal strategies for urban planning." Discussion paper prepared for the International Bank for Reconstruction and Development. London: Llewellyn-Davies Weeks Forester-Walker & Bor, February 1973 (draft). 51 p. mimeo.
- Enk, Gordon A. *Beyond NEPA: Criteria for Environmental Impact Review*. Rensselaerville, NY: Institute on Man and Science, May 1973.
- Enk, Gordon A. and others. *Assessing the Social Impacts of Oil Spills: Proceedings of an Invitational Symposium Co-Sponsored by The Institute on Man and Science and the U. S. Environmental Protection Agency, 25-28 September 1973*. Rensselaerville, NY: Institute on Man and Science, February 1974.
- Environmental Impact Center, Inc. *A Methodology for Assessing Environmental Impact of Water Resources Development*. Cambridge, MA: Environmental Impact Center, Inc., November 1973.
- Environmental Impact Center, Inc. *Secondary Effects of Public Investments in Highways and Sewers*. Newton, MA: Environmental Impact Center, Inc., 26 February 1975.
- Environmental Impact Center, Inc. *Secondary Impacts of Infrastructure Investments in the Denver Region*. Newton, MA: Environmental Impact Center, Inc., December 1974.
- Environmental Protection Agency. "Environmental Protection Agency regulations on preparation of environmental impact statements," *Environment Reporter*, Supplement 250, 9 May 1975, 23-35.
- Environmental Services Division. *Evaluation Methodology for Metropolitan Atlanta Water Resources Study*. Unpublished manuscript. Atlanta, GA: Atlanta Regional Commission, 31 July 1974.

- Environmental Systems Department, Westinghouse Electric Corporation. Socioeconomic Effects of Construction and Operations of WNP-3 and WNP-5 and Alternatives to Alleviate Adverse Effects. Prepared for Washington Public Power Supply System. Pittsburgh, PA: Westinghouse Electric Corporation, December 1974.
- Enzer, Selwyn. "Assessing a problem-oriented social technology: a general conduct," *Futures*, 6, 6 (December 1974), 486-98.
- Enzer, Selwyn. "A case study using forecasting as a decision-making aid," *Futures*, December 1970, 341-60.
- Enzer, Selwyn. "Cross-impact techniques in technology assessment." Paper P-15. Middletown, CT: Institute for the Future.
- Enzer, Selwyn. "Delphi and cross-impact techniques: an effective combination for systematic futures analysis," *Futures*, 3, 1 (March 1971), 48-61.
- Enzer, Selwyn, Wayne I. Boucher and Frederick D. Lazar. *Futures Research as an Aid to Government Planning in Canada: Four Workshop Demonstrations*. Report R-22. Middletown, CT: Institute for the Future, August 1971.
- Epstein, David G. *Brasilia: Plan and Reality*. Berkeley: University of California Press, 1973.
- Espinosa, Humberto Jose. *Implications of the Folsom Dam on the Future Development of the Adjacent Area*. Unpublished masters thesis. Berkeley: Department of City Planning, University of California, 1953.
- Etzioni, Amitai and Richard Bemp. *Technological Shortcuts to Social Change*. New York: Russell Sage Foundation, 1972.
- Euston, Andrew F. "Social issues of built environment." Paper prepared for the First National Congress on Optimum Population and Environment, Chicago, IL, 8-11 June 1970. 11 p.
- Expert Panel on Project 5. "Impact of human activities on the value and resources of lakes, marshes, rivers, deltas, estuaries and coastal zones." London: Unesco Programme on Man and the Biosphere, 19-22 September 1972.
- Expert Panel on Project 13. "Perception of environmental quality." Paris: Unesco Programme on Man and the Biosphere, 26-29 March 1973.
- Evans, A. W. "Measuring the total impact of a new factory in Furness: a Markovian approach," *Regional Studies*, 7, 4 (December 1973).
- Evans, John W. "Evaluating social action programs," pp. 239-52 in Louis A. Zurcher, Jr. and Charles M. Bonjean (eds.), *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler, 1970.
- Evans, R. G. "'Behavioral' cost functions for hospitals," *Canadian Journal of Economics*, May 1971.
- Everett, Michael. "LAND/Landscape Analysis and Natural Design," *Bulletin of the Rhode Island School of Design, Alumni Edition*, 60, 3 (December 1973), 7-12.

- Fabos, Julius Gy. "Putting numbers on qualities: the rising landscape assessors," *Landscape Architecture*, 64, 3 (April 1974), 164-65.
- Fagin, Henry. "Social foresight and the use of urban space," pp. 231-49 in Lowden Wingo, Jr. (ed.), *Cities and Space: The Future Use of Urban Land*. Baltimore, MD: Johns Hopkins Press, 1963.
- Fainstein, Susan S. and Norman J. Fainstein. "City planning and political values," *Urban Affairs Quarterly*, 6, 3 (March 1971), 341-62.
- Fairchild, Warren D. "2 objectives, 4 accounts," *Water Spectrum*, 5, 4 (1973), 22-27.
- Falk, Laurence L. "The sociologist's role in environmental impact studies." Unpublished manuscript.
- Falkson, Louis Michael. "Report on social accounting and optimization models," pp. 132-33 in Leonard R. Dworsky, David J. Allee and Sandor C. Csallany (eds.), *Social and Economic Aspects of Water Resources Development*. Urbana, IL: American Water Resources Association, 1972.
- Faludi, Andreas (ed.). *A Reader in Planning Theory*. New York: Pergamon, 1973.
- Faludi, Andreas. *Sociology in Planning Education*. Oxford: Oxford Polytechnic, 1970.
- Farvar, M. Taghi and John P. Milton (eds.). *The Careless Technology: Ecology and International Development*. Garden City, NY: Natural History Press, 1972.
- Federal Highway Administration. "Process guidelines (social, economic, and environmental effects of highway projects)," Policy and Procedure Memorandum 90.4. Washington, DC: U.S. Department of Transportation, 1 June 1973.
- Feinberg, Gerald. "Long-range goals and the environment," *The Futurist*, 5, 6 (December 1971), 241-46.
- Feldman, Arnold S. and Charles Tilly. "The interaction of social and physical space," *American Sociological Review*, 25, 6 (December 1960), 877-84.
- Feldt, Allan G., with David Moses and James Eckroad. *W.A.L.R.U.S. 1: Water and Land Resource Utilization Simulation*. Technical Report No. 28. Ann Arbor: Environmental Simulation Laboratory, University of Michigan, May 1972.
- Fellman, Gordon. "Neighborhood protest of an urban highway," *Journal of the American Institute of Planners*, 35, 2 (March 1969), 118-22.
- Ferejohn, John A. *Pork Barrel Politics: Rivers and Harbors Legislation, 1947-1968*. Stanford, CA: Stanford University Press, 1974.
- Ferrara, Thomas C., Karl M. Romstad and William K. Johnson. "Public participation in urban water planning," *Journal of the Urban Planning and Development Division, ASCE*, 97, UP2 (December 1971), 179-90.
- Fessler, D. R. "The development of a scale for measuring community solidarity," *Rural Sociology*, 17 (1952), 144-52.

- Field, Donald R., James C. Barron and Burl F. Long (eds.). *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Fielding, Gordon J. "Transportation impact research: problems of location decisions at the community level," *Annals of Regional Science*, 4, 2 (December 1970), 117-26.
- Finkler, Earl. "Nongrowth as a planning alternative." *Planning Advisory Service Report No. 283*. Chicago: American Society of Planning Officials.
- Finkler, Earl and David L. Peterson. *Nongrowth Planning Strategies: The Developing Power of Towns, Cities, and Regions*. New York: Praeger, 1974.
- Finley, James R. and Janet K. Baker. "Social elements in environmental planning," *Battelle Research Outlook*, 4, 2 (1972), 8-11.
- Finsterbusch, Kurt. "A policy analysis methodology for social impacts," *Journal of the International Society for Technology Assessment*, 1, 1 (March 1975), 5-15.
- Finsterbusch, Kurt. *A Methodology for the Analysis of Social Impacts*. Vienna, VA: BDM Corporation, 1975.
- Firey, Walter. *Man, Method, and Land: A Theory of Resource Use*. Glencoe, IL: Free Press, 1960.
- Fischer, and Davies. "An approach to assessing environmental impacts," *Journal of Environmental Management*, 1 (1973), 207-27.
- Fishburn, Peter C. "Subset choice conditions and the computation of social choice sets," *Quarterly Journal of Economics*, 88, 2 (May 1974), 320-29.
- Fisher, Joseph L. "Reflections on the formulation of regional policy," *Regional Science Association Papers*, 18 (1966), 67-74.
- Fitzsimmons, Stephen J. and Ovadia A. Salama. *Man and Water: The Relationship between Social Psychological Systems and Water Resources Development*. Cambridge, MA: Abt Associates, November 1973.
- Flax, Michael J. "Indicators of urban conditions: generating more useful community profiles." Working Paper 1206-14. Washington, DC: The Urban Institute, 30 June 1973. 18 p. mimeo.
- Flax, Michael J. *A Study in Comparative Urban Indicators: Conditions in 18 Large Metropolitan Areas*. Washington, DC: The Urban Institute, April 1972.
- Flax, Michael J. and Heremy B. Taylor. "Urban indicators: aids to a better understanding of the urban environment," in *Proceedings of the Urban and Regional Systems Association*, 1972.
- Fleagle, Robert G. and others. *Weather Modification in the Public Interest*. Seattle: University of Washington Press, 1974.
- Foin, Theodore C., Jr. "Systems ecology and the future of human society," pp. 475-531 in Bernard C. Patten (ed.), *Systems Analysis and Simulation in Ecology*: Vol. II. New York: Academic Press, 1972.

- Fontane, Patrick E. "Improving program evaluation with reciprocal indicators." Paper presented to the Annual Meeting of the Eastern Sociological Society, 5-7 April 1974. Philadelphia, PA. 12 p. mimeo.
- Foote, Nelson N. "Putting sociologists to work," *The American Sociologist*, 9, 3 (August 1974), 125-34.
- Forbes, Jean (ed.). *Studies in Social Science and Planning*. New York: John Wiley, 1974.
- Ford, E. J., Jr. "Estimating consumer's surplus losses of relocatees from an urban renewal project," *Land Economics*, 50, 2 (May 1974), 168-71.
- Ford, Larry R. "Historic preservation and the sense of place," *Growth and Change*, 5, 2 (April 1974), 33-37.
- Forestell, William L. "Should water utilities control growth?" *American City*, 89, 6 (June 1974), 57-58.
- Forester, John. *Social Change: Problems of Technology and Planning: Tracing the Social Consequences of Transport Technologies*. Working Paper No. 230. Berkeley: Institute of Urban and Regional Development, University of California, April 1974.
- Fox, Karl A. *Social Indicators and Social Theory: Elements of an Operational System*. New York: John Wiley, 1974.
- Francis, Mark. "The Environmental Policy Act and the urban environment: toward socially oriented impact statements," pp. 49-58 in C. P. Wolf (ed.), *Social Impact Assessment*. Milwaukee, WI: Environmental Design Research Association, 1974.
- Francis, Mark Owen. *The Kennedy Library Public Space Workshops: A Community Participation Approach for Urban Landscape Assessment and Design*. Unpublished masters thesis. Cambridge, MA: Graduate School of Design, Harvard University, 1975.
- Francis, Walton J. "A report on measurement and the quality of life." Washington, DC: U. S. Department of Health, Education, and Welfare, January 1973.
- Franklin, Herbert M. "Controlling urban growth--but for whom?" Washington, DC: Potomac Institute, 1973. 45 p.
- Frazier, C. Craig (ed.). *Theoretical Models of Human-Environment Relations*. Proceedings of a Workshop held at the 6th Annual Conference of the Environmental Design Research Association, Lawrence, KS, April 1975.
- Frederickson, H. George. "The new public administration: emergence of a social equity ethic," *Connecticut Government*, 24, 3 (Spring 1971), 1-4.
- Freed, J. Arthur (comp.). "Some ethical and social problems of science and technology: a bibliography of the literature from 1955." Arlington, VA: National Technical Information Service, February 1964. 49 p. mimeo.

- Freeman, A. Myrick III. "Project design and evaluation with multiple objectives," pp. 347-63 in Robert H. Haveman and Julius Margolis (eds.), *Public Expenditures and Policy Analysis*. Chicago: Markham, 1970.
- Freeman, C. "Technology assessment and its social context," *Stud. Gen.*, 24 (1971), 1038-50.
- Freeman, David M. *Technology and Society: Issues in Assessment, Conflict, and Choice*. Chicago: Rand McNally, 1974.
- Freeman, Howard E. and Clarence C. Sherwood. *Social Research and Social Policy*. Englewood Cliffs, NJ: Prentice-Hall, 1970.
- French, Robert Mills. "Community change," *Growth and Change*, 5, 2 (April 1974), 59-60.
- Frey, Bruno. "A general model of resource allocation in a democracy," pp. 157-64 in Ludwig von Bertalanffy, Anatol Rapoport and Richard L. Meier (eds.), *General Systems: Yearbook of the Society for General Systems Research*, Vol. 13. Washington, DC: Society for General Systems Research, 1968.
- Frey, John C. and others. "The economic and social impact of highways: a progress summary of the Monroeville case study." Progress Report 219. University Park: Agricultural Experiment Station, Pennsylvania State University, June 1960.
- Fried, Morton. "Grieving for a lost home," in L. J. Duhl (ed.), *The Urban Condition*. New York: Basic Books, 1963.
- Fried, Robert C. and Paul M. Hohenberg (eds.). *The Quality of Life in European Cities: A Collection of Papers Presented at the Conference of June 18-21, 1972*. Pittsburgh, PA: Council for European Studies, 1973.
- Frieden, Bernard J. and Robert Morris (eds.). *Urban Planning and Social Policy*. New York: Basic Books, 1968.
- Friedenberg, H. L. and R. A. Matson. "Regional delineation: designation of a development region for the Mid-South," *Growth and Change*, 5, 3 (July 1974).
- Friedland, William H. "Social sleepwalkers: scientific and technological research in California agriculture." Research Monograph No. 13. Davis: Department of Applied Behavioral Sciences, University of California, Davis, n.d. (1975?).
- Friedland, William H. and Amy Barton. *Destalking the Gilly Tomato: A Case Study in the Social Consequences in California Agricultural Research: Research Monograph No. 15*. Davis: Department of Applied Behavioral Sciences, University of California, Davis, June 1975.
- Friedman, Robert S. "Professionalism: expertise and policy making." New York: General Learning Press, 1971. 22 p.
- Friedman, S. "Koga? or environmental disruption," *Social Science Information*, 9, 4 (August 1970), 9-13.
- Friedmann, John. "The concept of a planning region: the evolution of an idea in the United States." Working Paper No. 12. New York: United Nations Social and Economic Council, June 1958.

- Friedmann, John. "The future of comprehensive urban planning: a critique," *Public Administration Review*, 31, 3 (May-June 1971), 315-26.
- Friedmann, John. "The future of the urban habitat," pp. 57-82 in Donald M. McAlister (ed.), *Environment: A New Focus for Land-Use Planning*. Washington, DC: National Science Foundation, October 1973.
- Friedmann, John. "The implementation of urban-regional development policies," *Eskistics*, November 1971.
- Friedmann, John. "An information model of urbanization," *Urban Affairs Quarterly*, December 1968.
- Friedmann, John. "Introduction to the study and practice of planning," *International Social Science Journal*, 9, 3 (1959), 327-39.
- Friedmann, John. "Regional development in post-industrial society," *Journal of the American Institute of Planners*, 30, 2 (May 1964), 84-90.
- Friedmann, John. *Retracking America: A Theory of Transactive Planning*. Garden City, NY: Doubleday, 1973.
- Friedmann, John and Barclay Hudson. "Knowledge and action: a guide to planning theory," *Journal of the American Institute of Planners*, 40, 1 (January 1974), 2-16.
- Friedrichs, J. and H. Ludtke. *Participant Observation: Theory and Practice*. Lexington, MA: D. C. Heath, 1975.
- Friend, J. K. and W. N. Jesop. *Local Research and Strategic Choice: An Operational Research Approach to the Process of Public Planning*. Beverly Hills, CA: Sage, 1969.
- Friesema, H. Paul. *The Forest Service in crisis in northern New Mexico*. Unpublished manuscript. September 1971. 51 p.
- Friesema, H. Paul and Paul J. Culhane. "The environmental impact statement process: technical assessment or political advocacy." Paper presented at the Annual Meeting of the Society for the Study of Social Problems, Montreal, P.Q., 25 August 1974. 10 p. mimeo.
- Fromm, Gary, William L. Hamilton and Diane E. Hamilton. *Federally Supported Mathematical Models: Survey and Analysis: I. Analysis and Conclusions*. Washington, DC: National Science Foundation, 1974.
- Fromm, Gary, William L. Hamilton and Diane E. Hamilton. *Federally Supported Mathematical Models: Survey and Analysis: II. Model References*. Washington, DC: National Science Foundation, June 1974.
- Fullerton, Avery. "Environmental, economic and social aspects of the Cross Florida Barge Canal," pp. 121-25 in Leonard B. Dworsky, David J. Allee and Sandor C. Csallany (eds.), *Social and Economic Aspects of Water Resources Development*. Unbaná, IL: American Water Resources Association, 1972.
- Fusfeld, Alan R. "The technological progress function: a new technique for forecasting," pp. 92-105 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.

- Gabbay, Michele and Charles Windle. "Demographic data to improve services: a sample of mental health applications." Mental Health Demographic Profile System Working Paper No. 33. Rockville, MD: National Institute of Mental Health, June 1975.
- Gad, Gunter. "'Crowding' and 'pathologies': some critical remarks," The Canadian Geographer, Winter 1973.
- Gaffney, M. Mason. "Welfare economics and the environment," pp. 88-101 in Henry Jarrett (ed.), Environmental Quality in a Growing Economy. Baltimore, MD: Johns Hopkins Press, 1966.
- Galbraith, John Kenneth. Economics and the Public Purpose. Boston: Houghton Mifflin, 1973.
- Gale, Richard P. "Communicating with environmentalists: a look at life on the receiving end," Journal of Forestry, 71, 10 (October 1973), 653-55.
- Gallas, Edward C. "The court as a social force," Public Administration Review, 31, 2 (March-April 1971), 125-33.
- Galtung, Johan. "On the future of human society," Futures, 2, 2 (June 1970), 132-42.
- Gans, Herbert J. "From urbanism to policy-planning," Journal of the American Institute of Planners, 36, 4 (July 1970), 223-25.
- Gans, Herbert. "The human implications of current redevelopment and relocation planning," Journal of the American Institute of Planners, 25, 1 (February 1959).
- Gans, Herbert. People and Plans: Essays on Urban Problems and Solutions. New York: Basic Books, 1968.
- Gans, Herbert. "Planning for people, not buildings," Environment and Planning, 1, 1 (1969); 33-46.
- Gardner, Robert W. "Social impact study of the proposed Willow Creek flood control project." Walla Walla, WA: Walla Walla District, Corps of Engineers, June 1973. 34 p. mimeo.
- Garn, Harvey A. and Michael J. Flax. "Indicators and statistics: issues in the generation and the use of indicators." Working Paper 1206-9. Washington, DC: The Urban Institute, 11 August 1972.
- Gardner, Hugh. "The stormy saga of weather mod," New Times, 27 June 1975; 21-24, 27-31.
- Garnsey, Morris E. and James R. Hibbs (eds.). Social Sciences and the Environment. Boulder: University of Colorado Press, 1967.
- Gartner, Robert H. "An analysis of effect assessments." Unpublished masters paper. College Station: Texas A&M University, August 1974.

- Gass, Saul I. and Robert L. Sisson (eds.). *A Guide to Models in Governmental Planning and Operations*. Potomac, MD: Sauger, 1975.
- Gastil, R. D. "A general framework for social science," *Policy Sciences*, 3 (1972), 385-403.
- Gastil, Raymond D. "Social indicators and quality of life," *Public Administration Review*, November-December 1970, 596-601.
- Gauger, Stephen E. and J. B. Wyckoff. "Aesthetic preference for water resource projects: an application of Q methodology," *Water Resources Bulletin*, 9, 3 (June 1973), 522-28.
- Geiser, Peter. "The myth of the dam," *American Anthropologist*, 75, 1 (February 1973), 184-90.
- Gelfand, Donald E. "The challenge of applied sociology," *The American Sociologist*, 10, 1 (February 1975), 13-18.
- Geradin, Lucien. "Morphological analysis: a method for creativity," pp. 442-57 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Gibbs, Kenneth C. "Evaluation of outdoor recreational resources: a note," *Land Economics*, 50, 3 (October 1974), 309-11.
- Gillette, Robert. "Breeder reactor debate: the sun also rises," *Science*, 184, 4137 (10 May 1974), 650-51.
- Gilley, James E. "Environmental costs of mining," pp. 99-109 in American Institute of Mining, Metallurgical, and Petroleum Engineers (eds.), *Proceedings of the Council of Economics*, 1-4 March 1971, New York.
- Gilliam, Harold. "The fallacy of single-purpose planning," *Daedalus*, 96, 4 (Fall 1967), 1142-57.
- Gillo, Martin W. and Maynard W. Shelly. "Predictive modeling of multivariable and multivariate data," *Journal of the American Statistical Association*, 69, 347 (September 1974), 646-53.
- Gilmore, John S. and others. *Environmental Policy Analysis: Public Policy Intervention in Inter-Industry Flows of Goods and Services to Reduce Pollution*. Denver, CO: Denver Research Institute, August 1971.
- Glass, David C. and Jerome E. Singer. *Urban Stress: Experiments on Noise and Social Stressors*. New York: Academic Press, 1972.
- Goldberg, Michael A. "Environmental decision-making: social indicators, simulation, and public choice," *Annals of Regional Science*, 8, 3 (October 1974), 12-23.
- Goldhamer, Herbert. *The Social Effects of Communication Technology*. Santa Monica, CA: Rand Corporation, 1970.
- Goldman, Charles R., James McEvoy, III and Peter J. Richerson (eds.). *Environmental Quality and Water Development*. San Francisco: W. H. Freeman, 1973.

- Goldman, T. A. (ed.). *Cost-Effectiveness Analysis: New Approaches in Decision-Making*. New York: Frederick A. Praeger, 1967.
- Goldstein, Sidney. "Economic and social impact considerations in highway programs," *Urban Law Annual*, 1970.
- Goldstoh, Eli. *The Quantification of Concern: Some Aspects of Social Accounting*. New York: Columbia University Press, 1972.
- Goodchild, B. "Class differences in environmental perception: an exploratory study," *Urban Studies*, 11, 2 (June 1974).
- Goodland, Robert (ed.). *Power Lines and the Environment*. Millbrook, NY: Cary Arboretum of the New York Botanical Gardens, 1973.
- Goodwin, Leonard. "On making social research relevant to public policy and national problem solving," *American Psychologist*, 26 (May 1971), 431-42.
- Gordon, Herome B. "Socioeconomic status--a re-examination of its dimensions," *Journal of Human Resources*, Summer 1969.
- Gordon, T. J. "Cross impact matrices: an illustration of their use for policy analysis," *Futures*, December 1969, 527-31.
- Gordon, T. J. "Initial experiments with the cross impact matrix method of forecasting," *Futures*, 1968.
- Gordon, Theodore J. and Robert H. Ament. *Forecasts of Some Technological and Scientific Developments and Their Social Consequences*. Report R-6. Middletown, CT: Institute for the Future, September 1969.
- Gordon, Theodore J., Selwyn Enzer and Richard Rochberg. "Experiment in simulation gaming for social policy studies," pp. 550-72 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Gordon, Theodore J., Richard Rochberg and Selwyn Enger. *Research on Cross-Impact Techniques with Applications to Selected Problems in Economics, Political Science, and Technology Assessment*. Report R-12. Middletown, CT: Institute for the Future, August 1970.
- Gore, Peter H., Samuel Wilson and Harold R. Capener. "A sociological approach to the problem of water pollution," *Growth and Change*, 6, 1 (January 1975), 17-22.
- Gottlieb, David. "Regional differences as a variable in sociological research," *Social Problems*, 10, 3 (Winter 1963), 251-56.
- Gottman, Jean. "The rising demand for urban amenities," pp. 163-78 in Sam Bass Warner, Jr. (ed.), *Planning for a Nation of Cities*. Cambridge, MA: M.I.T. Press, 1966.
- Gottman, Jean and others. "The scale of settlements and the quality of life," *Ekistics*, 28, 167 (October 1969), 277-81.

- Grabow, Stephen and Allan Heskin. "Foundations for a radical concept of planning," *Journal of the American Institute of Planners*, 39, 2 (March 1973), 106, 108-14.
- Grad, Frank P. and others. *The Automobile and the Regulation of Its Impact on the Environment*. Norman: University of Oklahoma Press, 1975.
- Graham, Robert E., Jr., Henry L. Degraff and Edward A. Trott, Jr. "State projections of income, employment, and population," *Survey of Current Business*, April 1972, 22-48.
- Greenberg, Michael R. and Robert S. Hordon. "Environmental impact statements: some annoying questions," *Journal of the American Institute of Planners*, 40, 3 (May 1974), 164-75.
- Greenberg, Michael R., Donald A. Krueckeberg and Richard Mautner. *Long-Range Population Projections for Minor Civil Divisions: Computer Programs and User's Manual*. New Brunswick, NJ: Center for Urban Policy Research, Rutgers University, 1973.
- Greenbie, Barrie B. "Social territory, community health and urban planning," *Journal of the American Institute of Planners*, 40, 2 (March 1974), 74-82.
- Greenwood, Ned H. and J. M. B. Edwards. *Human Environments and Natural Systems: A Conflict of Dominion*. North Scituate, MA: Wadsworth, 1973.
- Griesinger, D. W. and C. G. McClintock. "Planning social change," pp. 123-37 in Ludwig von Bertalanffy and Anatol Rapoport (eds.), *General Systems: Yearbook of the Society for General Systems Research*, Vol. XV. Washington, DC: Society for General Systems Research, 1970.
- Grindley, William C. *Uncertainties Associated with Water and Related Land Resources Planning of the South Platte River Basin*. Menlo Park, CA: Stanford Research Institute, April 1975.
- Grose, Vernon L. "Constraints on the application of systems methodology to socio-economic needs," in *Proceedings of the First Western Space Congress*, Santa Maria, CA, 27 October 1970.
- Gross, Bertram M. "Planning in an era of social revolution," *Public Administration Review*, 31, 3 (May-June 1971), 259-97.
- Grosser, Charles F. *New Directions in Community Organization: From Enabling to Advocacy*. New York: Praeger, 1973.
- Grosser, George H., Henry Wechsler and Milton Greenblatt (eds.). *The Threat of Impending Disaster: Contributions to the Psychology of Stress*, Cambridge, MA: M.I.T. Press.
- Guitar, Mary Anne. *Property Power: How to Keep the Bulldozer, the Power Line, and the Highwaymen away from Your Door*. Garden City, NY: Doubleday, 1972.
- Gulf South Research Institute. *Environmental Inventory and Social and Economic Assessment of Alternatives for Harbor Development, Mississippi River Vicinity of Memphis, Tennessee*. Memphis, TN: Memphis District, Corps of Engineers, September 1974.

- Gunn, Clare A. and others. Development of Criteria for Evaluating Urban River Settings for Tourism-Recreation Use. Technical Report No. 56. College Station: Texas Water Resources Institute, Texas A&M University, June 1974.
- Gutman, Robert (ed.). People and Buildings. New York: Basic Books, 1972.
- Guest, A. M. "Neighborhood life cycles and social status," Economic Geography, 50, 3 (July 1974).
- Gutmanis, Ivars. "Input-output models in economic and environmental policy analyses," Proceedings of the IEEE, 63, 3 (March 1975), 431-37.
- Haas, J. Eugene. "Forecasting the consequences of earthquake forecasting." Paper presented at the 140th Annual Meeting of the American Association for the Advancement of Science, San Francisco, CA, 28 February 1974. 14 p.
- Haas, J. Eugene. "Social aspects of weather modification," Bulletin of the American Meteorological Society, 54, 7 (July 1973), 647-57.
- Hadden, Jeffrey K. and Edgar F. Borgatta. American Cities: Their Social Characteristics. Chicago: Rand McNally, 1965.
- Haeefe, Edwin T. (ed.). The Governance of Common Property Resources. Baltimore, MD: Johns Hopkins Press, 1975.
- Haeefe, Edwin T. Representative Government and Environmental Management. Baltimore, MD: The Johns Hopkins Press, 1973.
- Hague, C. and A. McCourt. "Comprehensive planning, public participation and the public interest," Urban Studies, 11, 2 (June 1974).
- Hahn, Alan J. "Planning in rural areas," Journal of the American Institute of Planners, 36, 1 (January 1970), 44-49.
- Haiht, Douglas A. and Daniel P. Loucks. Studies in the Analysis of Metropolitan Water Resource Systems: Vol. III. The Political Evaluation of Alternative Metropolitan Water-Resource Plans. Technical Report No. 31. Ithaca, NY: Water Resources and Marine Sciences Center, Cornell University, July 1971.
- Hall, Dennis R. "A Fortran IV program for calculating and plotting group profiles," Behavioral Science, 14 (1969).
- Halprin, Lawrence and J. Burns. Take-Part: A Workshop Approach to Collective Creativity. Cambridge, MA: M.I.T. Press, 1974.
- Hamill, Louis. "Statistical tests of Leopold's system for quantifying aesthetic factors among rivers," Water Resources Research, 10, 3 (June 1974), 395-401.
- Hamilton, H. R. and others. Bibliography on Socio-Economic Aspects of Water Resources. Washington, DC: Office of Water Resources Research, U. S. Department of the Interior, March 1966.

- Hamilton, H. R. and others. Systems Simulation for Regional Analysis of River-Basin Planning. Cambridge, MA: M.I.T. Press, 1969.
- Hampe, Gary D., Verné E. Smith and James P. Mitchell. Water-Related Aesthetic Preferences of Wyoming Residents. Water Resources Series No. 46. Laramie: Water Resources Research Institute, University of Wyoming, n.d. (1974?)
- Hanke, Steve H. and Richard A. Walker. "Benefit-cost analysis reconsidered: an evaluation of the Mid-State project," Water Resources Research, 10, 5 (October 1974), 898-908.
- Hannon, Bruce M. and Roger H. Bezdek. "The job impact of alternatives to Corps of Engineers projects." Unpublished manuscript. Urbana: Center for Advanced Computation, University of Illinois, n.d. 22 p. mimeo.
- Hansen, Richard W. and Gary M. Munsinger. "A prescriptive model of industrial development," Land Economics, 48, 1 (February 1972), 76-81.
- Hansen, Willard B. "Metropolitan planning and the new comprehensiveness," Journal of the American Institute of Planners, 34, 5 (September 1968), 295-302.
- Haray, Frank and Harold Miller. "On the measure of connectedness in a social group," pp. 67-69 in Ludwig von Bertalanffy and Anatol Rapoport (eds.), General Systems: Yearbook of the Society for General Systems Research, Vol. XV. Washington, DC: Society for General Systems Research, 1970.
- Harberger, Arnold C. Project Evaluation: Collected Papers. Chicago: Markham, 1973.
- Harbridge House, Inc. Key Land Issues Facing EPA. Boston, MA: Harbridge House, Inc., February 1974.
- Harbridge House, Inc. The Social and Economic Impact of a Nuclear Power Plant upon Montague, Massachusetts and the Surrounding Area. Boston, MA: Harbridge House, Inc., November 1974.
- Harfen, Darrel G., J. Ewbank and C. M. Sliepcevic. "The entropy law, energy development and the economic process--a decision aid for policy alternatives." Unpublished manuscript, n.d. 28 p. mimeo.
- Hare, F. Kenneth. "How should we treat environment?" Science, 167, 23 January 1970.
- Harman, Willis W. "Needed research on social and economic consequences of alternative energy strategies." Menlo Park, CA: Stanford Research Institute, September 1973. 14 p.
- Harman, Willis W. "Planning amid forces for institutional change," Man-Environment Systems, 2, 4 (July 1972), 207-20.
- Harp, John and Richard J. Gagan. "Renewal plans--a general systems analysis of rural townships," Rural Sociology, 1968?
- Harris, Clarence J. Aerospace scientist as a local, national, and worldwide community planner. Paper presented at the 4th Annual Meeting of the American Institute of Aeronautics and Astronautics, Anaheim, CA, 23 October 1967.

- Harris, Douglas H. The Social Dimensions of Water-Resources Planning. Technical Report No. 160. Santa Barbara, CA: Anacapa Sciences, March 1974.
- Hart, Henry C. "Crisis, community, and consent in water politics," *Law and Contemporary Problems*, 22, 3 (Summer 1957), 510-37.
- Hart, Henry C. "Toward a political science of water resource decisions," pp. 122-63 in L. Douglas James (ed.), *Man and Water: The Social Sciences in Management of Water Resources*. Lexington: University Press of Kentucky, 1974.
- Hartford, Barbara D. and Laura F. Taxel. "Behavioral mapping in environmental design," *Man-Environment Systems*, 4, 3 (May 1974), 185-86.
- Hartley, Harry J. "PPBS: the emergence of a systemic concept for public governance," pp. 149-55 in Ludwig von Bertalanffy, Anatol Rapoport and Richard L. Meier (eds.), *General Systems: Yearbook of the Society for General Systems Research*, Vol. XIII. Washington, DC: Society for General Systems Research, 1968.
- Hartman, L. M. and D. A. Seaston. "Welfare goals and organization of decision-making for the allocation of water resources," *Land Economics*, 41 (1965), 21-30.
- Harvey, D. "Social processes, spatial form and the redistribution of real income in an urban system," pp. 296-337 in Murray Stewart (ed.), *The City: Problems of Planning*. Baltimore, MD: Penguin, 1972.
- Harvey, Ernest C. A Preliminary Study Plan for Assessing the Long Range Effects of Regional Harbor Development. Menlo Park, CA: Stanford Research Institute, February 1969.
- Haskell, Elizabeth H. *Quality of the Urban Environment: The Federal Role*. Washington, DC: The Urban Institute, September 1969.
- Hatry, Harry P. "Systems analysis for social problems." Washington, DC: Washington Operations Research Council, 1970.
- Hatt, Paul. "The concept of natural areas," *American Sociological Review*, 11, 4 (August 1946), 423-27.
- Hauser, Philip M. "On actionism in the craft of sociology," pp. 20-31 in Louis A. Zurcher, Jr. and Charles M. Bonjean (eds.), *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler, 1970.
- Haveman, Robert H. *The Economic Performance of Public Investments: An Ex Post Evaluation of Water Resource Investments*. Baltimore, MD: The Johns Hopkins Press, 1974.
- Haveman, Robert H. and Julius Margolis (eds.). *Public Expenditures and Policy Analysis*. Chicago: Markham, 1970.
- Havinghurst, Robert J. and H. Gerthorn Morgan. *The Social History of a War-Boom Community*. New York: Longmans, Green, 1951.

- Havlick, Spenser W. "Can citizens invent their future? case study observations of public participation in environmental management," pp. 61-65 in Leonard B. Dworsky, David J. Ailee and Sandor C. Csallany (eds.), *Social and Economic Aspects of Water Resources Development*. Urbana, IL: American Water Resources Association, 1972.
- Havlick, Spenser W. "Obtaining attitudes about water resource problems in a metropolitan region," *Ekistics*, 26, 156 (November 1968), 473-76.
- Haythorn, William W. "A 'needs' by 'sources of satisfaction' analysis of environmental habitability," *Ekistics*, 30, 178 (September 1970), 200-2.
- Heberlein, Thomas A. "The three fixes: technological, cognitive, and structural," pp. 279-96 in Donald R. Field, James C. Barron and Burl F. Long (eds.), *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Hecock, R. D. "The spatial dimension: a new reservoir and recreational behavior," *Growth and Change*, 5, 3 (July 1974).
- Heilbroner, Robert L. "On the limited 'relevance' of economics," *The Public Interest*, 21 (Fall 1970), 80-93.
- Henderson, Hazel. "Ecologists versus economists," *Harvard Business Review*, 51, 4 (July-August 1973), 28-30, 32, 34, 36, 152-57.
- Henize, John. "Toward a better understanding of social systems," *Proceedings of the IEEE*, 63, 3 (March 1975), 380-90.
- Heise, David R. (ed.). *Sociological Methodology*. San Francisco: Jossey-Bass, 1974.
- Held, Virginia. "PPBS comes to Washington," *The Public Interest*, 4 (Summer 1966), 102-15.
- Helmer, Olaf. "Cross-impact gaming," *Futures*, 4, 2 (June 1972), 149-67.
- Helmer, Olaf. "Long-range forecasting--roles and methods." Paper P-7. Middletown, CT: Institute for the Future, May 1970.
- Helmer, Olaf. "Multipurpose planning games." Working Paper WP-17. Middletown, CT: Institute for the Future, December 1971.
- Hencley, Stephen P. and James R. Yates (eds.). *Futurism in Education: Methodologie*. Berkeley, CA: McCutchan, 1974.
- Hendricks, David W. and others (eds.). "Environmental design and public projects: selected sections for distribution at the research symposium on environmental impact analysis," National Meeting of the American Society of Civil Engineers, New York City, 1 November 1973.
- Hendricks, Francis and Malcolm MacNair. "Concepts of environmental quality standards based on life styles," *Ekistics*, 30, 177 (August 1970), 139-44.

- Henning, Daniel H. *Environmental Policy and Administration*. New York: Elsevier, 1974.
- Henning, Daniel H. "Natural resources administration and the public interest," *Public Administration Review*, March-April 1970.
- Henriot, Peter J. "Political aspects of social indicators." Occasional Publication No. 4. New York: Russell Sage Foundation, 1972.
- Henriot, P. J. "Political questions about social indicators," *Western Political Quarterly*, 22, 2 (June 1970).
- Henry, Claude. "Investment decisions under uncertainty: the irreversibility effect," *American Economic Review*, 64, 6 (December 1974), 1006-12.
- Henshel, Richard L. "Sociology and prediction," *American Sociologist*, 6, 3 (August 1971), 213-30.
- Henshel, Richard L. and Lewlie W. Kennedy. "Self-altering prophecies: consequences for the feasibility of social prediction," pp. 119-26 in Anatol Rapoport (ed.), *General Systems: Yearbook of the Society for General Systems Research*, Vol. XVIII. Washington, DC: Society for General Systems Research, 1973.
- Herbert, D. T. "Social area analysis: a British study," *Urban Studies*, 4, February 1967.
- Herfindahl, Orris C. and Allen V. Kneese. "Measuring social and economic change: benefits and costs of environmental pollution," pp. 441-503 in Milton Moss (ed.), *The Measurement of Economic and Social Performance*. New York: Bureau of Economic Research, 1973.
- Hessel, Darryl L., Gary S. Stacey and Richard M. Davis. "Public environmental policy--urgent needs and complex choices," *Battelle Research Outlook*, 4, 2 (1972), 16-20.
- Hétman, François. *Society and the Assessment of Technology: Premises, Concepts, Methodology, Experiments, Areas of Application*, Paris: Organization for Economic Cooperation and Development, 1973.
- Heywood, P. R. "Plangloss: a critique of permissive planning," *Town Planning Review*, 40, 3 (October 1969), 251-62.
- Heywood, Phil. *Planning and Human Need*. New York: Praeger, 1973.
- Higgins, Benjamin. "The concept of regional planning," *Canadian Public Administration*, 9, 2 (June 1966), 164-76.
- Hill, Morris. "A goals-achievement matrix for evaluating alternative plans," *Journal of the American Institute of Planning*, 34, 1 (January 1968), 19-29.
- Hill, Morris. *Planning for Multiple Objectives: An Approach to the Evaluation of Transportation Plans*. Monograph Series No. 5. Philadelphia: Regional Science Research Institute, 1973.

- Hill, William W. "A review of selected materials relevant to environmental impact assessment," pp. 3-1 to 3-69 in Leonard Ortolano (ed.), *Analyzing the Environmental Impacts of Water Projects*. Institute for Water Resources Report 73-3. Springfield, VA: National Technical Information Service, March 1973.
- Hillegass, Thomas J., Charles C. Schimpeler and William L. Grecco. "Community decision structure and urban planning process," *Journal of the Urban Planning and Development Division, ASCE*, 96, UPI (March 1970), 17-22.
- Himmelblau, D. M. (ed.). *Decomposition of Large-Scale Problems*. New York: American Elsevier, 1973.
- Hines, Fred K., David L. Brown and John M. Zimmer. *Social and Economic Characteristics of the Population in Metro and Nonmetro Counties, 1970*. Economic Report No. 272. Washington, DC: Economic Research Service, U. S. Department of Agriculture, March 1975.
- Hirsch, Werner Z. (ed.). *Elements of Regional Accounts*. Baltimore, MD: Johns Hopkins Press, 1964.
- Hirsch, Werner Z. (ed.). *Regional Accounts for Policy Decisions*. Baltimore, MD: Johns Hopkins Press, 1966.
- Hirsch, Travis and Hanan C. Selvin. *Principles of Survey Analysis*. New York: Free Press, 1973.
- Hogg, Thomas C. "Socio-cultural aspects of water development," in *People and Water. Proceedings of the Oregon State University Water Resources Research Institute*, 1968.
- Hogg, Thomas C. "Toward including ethnographic parameters in river basin models," in *Water Resources and Economic Development of the West*, Report No. 15. Conference proceedings of the Committee on the Economics of Water Resources Development of the Western Agricultural Economics Research Council, 1966.
- Hogg, Thomas C. and Courtland L. Smith. *Socio-Cultural Impacts of Water Resource Development in the Santiam River Basin, WRR1-5*. Corvallis: Water Resources Research Institute, Oregon State University, October 1970.
- Hoinville, Garland. "Evaluating community preferences," *Environment and Planning*, 3 (1971), 33-50.
- Holden, Constance. "Futurism: gaining a toehold in public policy," *Science*, 189, 4197 (11 July 1975), 120-24.
- Holden, Constance. "New look for Public Works Committee," *Science*, 186, 4159 (11 October 1974), 124.
- Hole, Vere. "Social effects of planned rehousing," *Town Planning Review*, 30, 2 (July 1959), 161-73.

- Holleb, Doris B. Social and Economic Information for Urban Planning: I. Its Selection and Use. Chicago: University of Chicago Press, 1969.
- Hollis, G. E. "The effect of urbanization on floods of different recurrence intervals," Water Resources Research, 11, 3 (June 1975), 431-35.
- Hollis, John and James McEvoy, III. "Demographic effects of water development," Impact of Water Resources Development, 1, 10 (July 1973), 24-40.
- Holman, Mary and James T. Bennett. "Determinants of use of water-based recreational facilities," Water Resources Research, 9, 5 (October 1973), 1208-18.
- Hood, Donald W. (ed.). Impingement of Man on the Oceans. New York: John Wiley, 1971.
- Hoos, Ida R. "Criteria for 'good' futures research," Technological Forecasting and Social Change, 6, 2 (1974), 113-32.
- Hornback, Kenneth E. and others. Studies in Environment: II. Quality of Life. Washington, DC: Office of Research and Development, U. S. Environmental Protection Agency, November 1973.
- Horowitz, Irving Louis and James Everett Katz. Social Science and Public Policy in the United States. New York: Praeger, 1975.
- Horst, W. J. Rittel and Melvin M. Webber. "Dilemmas in a general theory of planning." Reprint No. 86. Berkeley: Institute of Urban and Regional Development, University of California.
- Horwood, Edgar M., Carl A. Zellner and Richard L. Ludwig. Community Consequences of Highway Improvement. National Cooperative Highway Research Program Report 18. Washington, DC: Highway Research Board, National Academy of Science, 1965.
- House, Peter W. "Large-scale models for policy decisions," Proceedings of the IEEE, 63, 3, (March 1975), 511-18.
- House, Peter. The Urban Environmental System: Modeling for Research Policy-Making and Education. Beverly Hills, CA: Sage, 1973.
- House, Peter W., Robert C. Livingston and Carol D. Swinburn. "Monitoring mankind: the search for quality," Behavioral Science, 20, 1 (January 1975), 57-67.
- Howard, Ronald A. "Social decision analysis," Proceedings of the IEEE, 63, 3 (March 1975), 359-71.
- Huber, G. P. "Development of multi-attribute utility models: a review of Field and Field like studies," Management Science, 1973?
- Huddle, Franklin P. The Evolution and Dynamics of National Goals in the United States. Washington, DC: Congressional Research Service, 1971.
- Huddle, Franklin P. "The social management of technological consequences," The Futurist, 6, 1, (February 1974), 16-18.

- Hudson, Barclay M., Martin Wachs and Joseph L. Schofer. "Local impact evaluation in the design of large-scale urban systems," *Journal of the American Institute of Planners*, 40, 4 (July 1974), 255-65.
- Hughes, J. T. and J. Kozlowski. "Threshold analysis: an economic tool for town and country planning," *Ekistics*, 27, 161 (April 1969), 265-68.
- Hughes, James W. *Urban Indicators, Metropolitan Evolution, and Public Policy*. New Brunswick, NJ: Center for Urban Policy Research, Rutgers University, 1973.
- Hughes, James W. (ed.). *New Dimensions of Urban Planning: Growth Controls*. New Brunswick, NJ: Center for Urban Policy Research, Rutgers University, 1975.
- Huitt, Ralph K. "Rationalizing the policy process," pp. 85-98 in Louis A. Zurcher, Jr. and Charles M. Bonjean (eds.), *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler, 1970.
- Hyman, Herbert H. "Planning with citizens: two styles," *Journal of the American Institute of Planners*, 35, 2 (March 1969), 105-12.
- Hyman, Herbert H. *Secondary Analysis of Sample Surveys: Principles, Procedures, and Potentialities*. New York: John Wiley, 1972.
- Ibsen, C. A. and others. *Public Perception of Water Resource Problems*. Blacksburg, VA: Virginia Polytechnic Institute and State University, 1969.
- Ikle, Fred Charles. "Can social predictions be evaluated?" *Daedalus*, 96, 3 (Summer 1967), 733-58.
- Ikle, Fred Charles. "Social forecasting and the problem of changing values, with special reference to Soviet and East European writings," *Futures*, 3, 2 (June 1971), 142-50.
- Iltis, Hugh H., Orie L. Loucks and Peter Andrews. "Criteria for an optimum human environment," *Ekistics*, 29, 175 (June 1970), 449-52.
- Ingersoll, Jay. "Including social factors in planning pioneer projects," Memorandum to the International Bank for Reconstruction and Development. 5 January 1972: 46 p.
- Ingmire, Thomas J. and Tito Patri. "An early warning system for regional planning," *Journal of the American Institute of Planners*, 37, 6 (November 1971), 403-10.
- Ingram, Helen. "The changing decision rules in the politics of water," *Water Resources Bulletin*, 8, 6 (December 1972), 1177-88.
- Inhaber, H. "Environmental quality: outline for a national index for Canada," *Science*, 186, 4166 (29 November 1974), 798-805.
- Innis, George. "One direction for improving ecosystem modeling," *Behavioral Science*, 20, 1 (January 1975), 68-74.

- Institute for Social Science Research. A Comparative Case Study of the Impact of Coal Development on the Way of Life of People in the Coal Areas of Eastern Montana and Northeastern Wyoming. Final Report. Missoula, MT: Institute for Social Science Research, University of Montana, 30 June 1974.
- Institute for Survey Research. Monitoring the Quality of Life. Ann Arbor: Institute for Survey Research, University of Michigan, 1971.
- INTASA. Multiobjective Planning for Multiple Purpose Water Resource Systems: A Structure for Regional Water Resource Development. Menlo Park, CA: INTASA, 1974.
- INTASA. Planning and Evaluation of Multiple Purpose Water Resource Projects in a Multi-Objective Environment: An Overview and Post Audit Analysis. Springfield, VA: National Technical Information Service, 1972.
- International City Management Association. Improving the Quality of Life: State-Local Responsibilities. Washington, DC: International City Management Association, 1970.
- Ireland, J. V. "Research group in planning impact evaluation studies." London: Department of Social and Environmental Planning, Polytechnic of Central London, n.d. 27 p. mimeo.
- Irwin, William P. "The urban observatories: groping about in a new chemistry," Urban Affairs Quarterly, 8, 1 (September 1972), 21-34.
- Isard, W. "Activity-industrial complex analysis for environmental management," Papers of the Regional Science Association, 33 (1974).
- Isard, Walter and others. Ecologic-Economic Analysis for Regional Development. New York: Free Press, 1972.
- Isard, Walter and others. "On the linkage of socioeconomic and ecologic systems." Ekistics, 28, 164 (July 1969), 28-34.
- Iutovich, Mark, Victor Thiessen and Linda Noelker. "The conceptualization and measurement of normative phenomena." Paper presented to the 66th Annual Meeting of the American Sociological Association, Denver, CO, 31 August 1971. 19 p. mimeo.
- Jack McCormick and Associates, Inc. Salt Lake Creek (Ohio) Environmental Assessment: II. Farm and Home Survey. Philadelphia, PA: Jack McCormick and Associates, Inc., 1973?
- Jackson, John S. and William L. Shade. "Citizen participation, democratic representation, and survey research," Urban Affairs Quarterly, September 1970.
- James, L. Douglas. "The challenge to the social sciences," pp. 1-33 in L. Douglas James (ed.), Man and Water: The Social Sciences in Management of Water Resources. Lexington: University Press of Kentucky, 1974.
- James, L. Douglas. "Incorporating social objectives in systems models," pp. 136-51 in Natural Resource Systems Models in Decision Making. Lafayette, IN: Water Resources Research Center, Purdue University, 1969.

- James, L. Douglas (ed.). *Man and Water: The Social Sciences in Management of Water Resources*. Lexington: University Press of Kentucky, 1974.
- James, L. Douglas. *The Use of Questionnaires in Collecting Information for Urban Flood Control Planning*. ERC-0274. Atlanta: Environmental Resources Center, Georgia Institute of Technology, February 1974.
- James, L. Douglas, Arthur C. Benke and Harvey L. Ragsdale. *Integration of Hydrologic, Economic, Ecologic, Social, and Well-Being Factors in Planning Flood Control Measures for Urban Streams*. ERC-0375. Atlanta: Environmental Resources Center, Georgia Institute of Technology, February 1975.
- James, L. Douglas and others. *Community Well-Being as a Factor in Urban Land Use Planning*. ERC-0174. Atlanta: Environmental Resources Center, Georgia Institute of Technology, January 1974.
- James, L. Douglas, Eugene A. Laurent and Duane W. Hill. *The Flood Plain as a Residential Choice: Resident Attitudes and Perceptions and Their Implications to Flood Plain Management Policy*. Atlanta: Environmental Resources Center, Georgia Institute of Technology, October 1971.
- Janowitz, Morris. *"Sociological models and social policy."* New York: General Learning Press; 1971.
- Jantsch, Erich. "Forecasting and the systems approach: a critical survey," *Policy Sciences*, 3, 4 (December 1972), 475-98.
- Jantsch, Erich. *Technological Planning and Social Futures*. New York: John Wiley, 1972.
- Jefers, J. N. R. "Systems modeling and analysis in resource management," *Journal of Environmental Management*, 1 (1973), 13-28.
- Jenkins, William I. and Irving Velody. "The social sciences and government: do the natural sciences show the prescribed path?" *Social Science Information*, 9, 5 (October 1970), 91-118.
- Jerome, Axel and Josef Nathanson. "Socioeconomic implications of airport planning," *Ekistics*, 33, 194 (January 1972), 30-34.
- Jessen, Peter J. "Value systems in policy analysis: integrating pluralistic value systems into the public policy decision-making process." Paper presented at the 139th Annual Meeting of the American Association for the Advancement of Science, Washington, DC, 28 December 1972.
- Johanson, G. P. and H. M. Steiner. "Evaluating social roads in Mexico," *Journal of Transport Economics and Policy*, 7, 1 (January 1973), 1-4.
- Johnson, Harry G. "The economic approach to social questions," *The Public Interest*, 12 (Summer 1968), 68-79.
- Johnson, Howard E. "Some computational aspects of cross impact matrix forecasting," *Futures*, 2, 2 (June 1970), 123-31.

- Johnson, Per K. "Social aspects of environmental impact," pp. 87-90 in Robert B. Ditton and Thomas L. Doodale (eds.), *Environmental Impact Analysis: Philosophy and Methods*. Springfield, VA: National Technical Information Service, 1972.
- Johnston, R. J. "Possible extensions to the factorial ecology method," *Environment and Planning*, 5, 6 (November-December 1973).
- Johnson, Sue. "Recent sociological contributions to water resources management and development," pp. 164-99 in L. Douglas James (ed.), *Man and Water: The Social Sciences in Management of Water Resources*. Lexington: University Press of Kentucky, 1974.
- Johnson, Sue and Rabel J. Burdge. "An analysis of community and individual reactions to forced migration due to reservoir construction," pp. 169-88 in Donald R. Field, James C. Barron and Burl F. Long (eds.), *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Johnson, Sue and Rabel J. Burdge. "A methodology for using diachronic studies to predict the social impact of resource development." Paper presented to the Annual Meeting of the Rural Sociological Society, Montreal, P. Q., August 1974.
- Johnson, Sue, Rabel J. Burdge and William F. Schweri, II. "Report of household survey--Red River residents due for relocation." Unpublished manuscript. Lexington: Center for Developmental Change, University of Kentucky, n.d. (1974). 22 p. mimeo.
- Johnson, Sue and Alan Randall. "Research needs on social, political and institutional aspects of coal utilization," pp. 137-53 in Glenn E. Stout and others, *Proceedings of the Workshop on Research Needs Related to Water for Energy*. Research Report No. 93. Urbana: Water Resources Center, University of Illinois at Urbana-Champaign, November 1974.
- Jonassen, Christen T. "Toward an operational definition of community welfare," *Social Problems*, 8, 2 (Fall 1960), 112-18.
- Jones, Martin V. *A Comparative State-of-the-Art Review of Selected U. S. Technology Assessment Studies*. Washington, DC: Mitre Corporation, May 1973.
- Jones, Martin V. "Generating social impact scenarios, a key step in making technology assessment studies." Monograph No. 11. Washington, DC: Program of Policy Studies in Science and Technology; The George Washington University, 20 January 1972.
- Jones, Martin V. "The methodology of technology assessment," *The Futurist*, 6, 1 (February 1972), 19-22.
- Jones, Martin V. *Scientific Earthquake Prediction: Some First Thoughts on Possible Societal Impacts*.
- Jones, Martin V. *A Technology Assessment Methodology: I. Some Basic Propositions*. McLean, VA: Mitre Corporation, June 1971.

- Jones, Martin V. and Michael J. Flax. *The Quality of Life in Metropolitan Washington, D.C.: Some Statistical Benchmarks*. Washington, DC: The Urban Institute, March 1970. 82 p.
- Jopling, David G., Stephen J. Gage and Milton E. F. Schoeman. "Forecasting public resistance to technology: the example of nuclear power reactor siting," pp. 53-66 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Jorgensen, Vernon F. "Aesthetic considerations in city construction," *Journal of the Urban Planning and Development Division, ASCE*, 91, UPI (July 1965), 1-6.
- Joun, Young P. "Information requirement for socio-ecological models," *Annals of Regional Science*, 5, 1 (June 1971), 25-32.
- Jusk, Andrzej. "Social systems and the criteria of health as defined by the World Health Organization," *American Journal of Psychiatry*, February 1971.
- Juster, F. Thomas. "Economic and social accounts," in *Innovations in Economic Research*. 52nd Annual Report. New York: National Bureau of Economic Research, 1972.
- Juster, F. Thomas. "A framework for the measurement of economic and social performance," pp. 25-84 in Milton Moss (ed.), *The Measurement of Economic and Social Performance*. New York: National Bureau of Economic Research, 1973.
- Kadanoff, Leo P. "From simulation model to public policy," *American Scientist*, 60, 1 (January-February 1972), 74-79.
- Kahn, A. J. *Theory and Practice of Social Planning*. New York: Russell Sage Foundation, 1969.
- Kahn, E. J., Jr. *The American People: The Findings of the 1970 Census*. New York: Weybright and Talley, 1974.
- Kahn, Herman and Anthony J. Wiener (eds.). *American Values: Past and Future*. HI-2182-D. 3 vols. Croton-on-Hudson, NY: Hudson Institute, 31 December 1974.
- Kahne, Stephen K. "A contribution to decision making in environmental design," *Proceedings of the IEEE*, 63, 3 (March 1975), 518-20.
- Kain, John F. and John M. Quigley. *Evaluation of the Quality of the Residential Environment*. Program on Regional and Urban Economics #56. Cambridge, MA: Harvard University, 1975?
- Kaiser, Edward J. "Decision agent models: an alternative modeling approach for urban residential growth," pp. 109-23 in David Sweet (ed.), *Models of Urban Structure*. Lexington, MA: D. C. Heath, 1972.
- Kaiser, Edward J. and others. *Promoting Environmental Quality through Urban Planning and Controls*. Washington, DC: Office of Research and Development, U. S. Environmental Protection Agency, February 1974.

- Kaitz, Edward M. and Herbert Harvey Hyman. Urban Planning for Social Welfare: A Model Cities Approach. New York: Praeger, 1970.
- Kamrany, N. M. "Economic growth and environmental impact: evaluating alternatives," Socio-Economic Planning Science, 7, 1 (February 1973), 37-53.
- Kamrany, N. K. and Alexander Christakis. "Social indicators in perspective," Ekistics, 28, 167 (October 1969), 256-59.
- Kane, Julius. "A primer for a new cross-impact language--KSIM," Technological Forecasting and Social Change, 4, 2 (1972), 129-42.
- Kane, Julius, Ilan Vertinsky and William Thomson. "KSIM: a methodology for interactive resource policy simulation," Water Resources Research, 9, 1 (February 1973), 65-80.
- Kanwit, Edmond L. "Some aspects of the social impact of urban transportation." Paper presented at the Sesquicentennial Forum on Transportation Engineering, New York City, 29 August 1967. 52 p. mimeo.
- Kaplan, A., A. L. Skogstad and M. A. Firshick. "The prediction of social and technological events," Public Opinion Quarterly, 14, 1 (Spring 1950), 93-110.
- Kaplan, Marshall. Urban Planning in the 1960s: A Design for Irrelevancy. New York: Praeger, 1973.
- Kapp, K. William. "Environmental disruption: general issues and methodological problems," Social Science Information, 9, 4 (August 1970), 15-32.
- Kasper, Raphael G. (ed.). Technology Assessment: Understanding the Social Consequences of Technological Applications. New York: Praeger, 1972.
- Kaynor, Edward R. Historical, Political, and Social Factors Affecting Public Policy on River Diversion: Out-of-Basin Diversion of Connecticut River Flood Waters to the Boston Metropolitan Area. Report No. 25. Amherst: Water Resources Research Center, University of Massachusetts, 1973.
- Kaynor, Edward R. and Irving Howards. Attitudes, Values, and Perceptions in Water Resource Decision-Making within a Metropolitan Area. Publication No. 29. Amherst: Water Resources Research Center, University of Massachusetts, June 1973.
- Kaynor, Edward R. and Irving Howards. "Limits on the institutional frame of reference in water resource decision-making," Water Resources Bulletin, 7, 6 (December 1971), 1117-27.
- Kayser, Carl. "Model-makers and decision-makers: economists and the policy process," The Public Interest, 12 (Summer 1968), 80-95.
- Keene, John C. and Ann Louise Strong. "The Brandywine Plan," Journal of the American Institute of Planners, 36, 1 (January 1970), 50-58.
- Keeney, Ralph L. and Keshavan Naïr. "Decision analysis for the siting of nuclear power plants--the relevance of multiattribute utility theory," Proceedings of the IEEE, 63, 3 (March 1975), 494-501.

- Keller, James A. "Types of motives for ecological concern," *Zygon*, 6, 3 (September 1971), 197-209.
- Keller, Suzanne. "Neighborhood concept in sociological perspective," *Ekistics*, 22 (July 1966).
- Kellogg, W. W. and S. H. Schneider. "Climate stabilization: for better or for worse?" *Science*, 186, 4170 (27 December 1974), 1163-72.
- Kelly, John R. "Review of social impacts in the environmental impact statement of the Bureau of Land Management on the proposed federal coal leasing program," *Environmental Sociology* 3, August 1974. 10 p.
- Kelly, John R. "Social impacts of water supply deficits in the metropolitan Washington area." Unpublished manuscript, July 1974. 5 p.
- Kelly, H. H. "The processes of causal attribution," *American Psychologist*, 28 (1973), 107-28.
- Kenney, William V. and Bruce B. Hanshaw. "The effectiveness of impact statements: the US Environmental Policy Act of 1969," *Ekistics*, 37, 218 (January 1974), 19-22.
- Ketchum, Bostwick H. "An ecological view of environmental management," in Blumstein, Kramraše and Ring (eds.), *Systems Analysis for Social Problems*. Washington, DC: Washington Operations Research Council, 1970.
- Keyes, Langley C., Jr. and Edward Teitcher. "Limitations of advocacy planning: a view from the establishment," *Journal of the American Institute of Planners*, 36, 4 (July 1970), 22-26.
- Khoo, Soo Hock and George Cho. "The Nabawan Valley Scheme: an attempt to change a people," *Ekistics*, 36, 213 (August 1973), 89-93.
- Kidiel, C. C. and others. *Proceedings of the International Symposium on Uncertainties in Hydrologic and Water Resource Systems*. 3 vols. Tucson: University of Arizona, December 1972.
- Kimball, Solon T. "Some methodological problems of the community self-survey," *Social Forces*, 31, 2 (December 1952), 160-64.
- Klages, Helmut. "Assessment of an attempt at a system of social indicators," *Policy Sciences*, 4, 3 (September 1973), 249-61.
- Klapper, Joseph T. *The Effects of Mass Communication*. Glencoe, IL: Free Press, 1960.
- Klaassen, Leo H. *Social Amenities in Area Economic Growth*. Paris: Organization for Economic Cooperation and Development, 1968.
- Klaassen, L. H. and T. H. Botterweg. "Evaluating a socio-economic and environmental project," *Papers of the Regional Science Association*, 33 (1974).
- Klausner, Samuel Z. "Energy rationing." Paper presented at the 139th Annual Meeting of the American Association for the Advancement of Science, Washington, DC, 29 December 1972.

- Klein, David R. "Cultural influences on landscape aesthetics: some comparisons between Scandinavia and northwestern North America," *Environmental Affairs*, 2, 1 (Spring 1972), 80-89.
- Klemmack, David L., John R. Carlson and John N. Edwards. "Measures of well-being: an empirical and critical assessment," *Journal of Health and Social Behavior*, 15, 3 (September 1974), 267-70.
- Kneese, Allen V. and Blair T. Bower (eds.). *Environmental Quality Analysis: Theory and Method in the Social Sciences*. Baltimore, MD: The Johns Hopkins Press.
- Knetsch, Jack L. *Outdoor Recreation and Water Resources Planning*. Water Resources Monograph No. 3. Washington, DC: American Geophysical Union, 1974.
- Knezo, Geneive J. "Government science policy: some current issues on federal support and use of the behavioral and social sciences," pp. 517-68 in *Committee on Science and Astronautics, U. S. House of Representatives (ed.), Federal Policy, Plans, and Organization for Science and Technology, Part II*. Washington, DC: U. S. Government Printing Office, 1974.
- Knezo, Geneive Johanna. "Toward using appropriate social data in technology assessment," *Technology Assessment*, 2, 4 (October 1974), 273-86.
- Knight, Robert L. "Planners and mobile home research," *Socio-Economic Planning Science*, 5 (1971), 213-20.
- Knight, Robert L. and Mark D. Menchik. *Residential Environmental Attitudes and Preferences: Report of a Questionnaire Survey*. Madison: Institute for Environmental Studies, University of Wisconsin, October 1974.
- Knop, Edward and Roy Edmonds. "Sociologists' role in environmental impact assessment." Paper presented at the Annual Meeting of the Midwest Sociological Society, Milwaukee, WI, April 1973. 11 p: mimeo.
- Knox, P. L. "Level of living: a conceptual framework for monitoring regional variations in well-being," *Regional Studies*, 8, 1 (March 1974), 11-19.
- Koelle, H. H. "An experimental study on the determination of a definition for the 'quality of life,'" *Regional Studies*, 8, 1 (March 1974), 1-10.
- Koenig, H. W., W. E. Cooper and J. M. Falvey. "Engineering for ecological, sociological, and economic compatibility," in Douglas Daetz and Richard Harris Pantell (eds.), *Environmental Modeling: Analysis and Management*. Stroudsburg, PA: Dowden, Hutchinson and Ross, 1974.
- Koerfig, Herman E., Thomas C. Edens and William E. Cooper. "Ecology, engineering, and economics," *Proceedings of the IEEE*, 63, 3 (March 1975), 501-11.
- Kohler, Joel E., Albert P. Kenneke and Brian K. Grimes. "A Technique for Consideration of Population in Site Comparison." Washington, DC: Directorate of Licensing, Atomic Energy Commission, October 1974.
- Kohrs, ElDean V. "Social consequences of boom growth in Wyoming." Paper presented at the Rocky Mountain American Association for the Advancement of Science Meeting, Laramie, WY, 24-26 July 1974. 11 p. mimeo.

- Koslowski, J. "The place and role of threshold analysis in the 'model' planning process," *Ekistics*, November 1971.
- Krader, L. "Environmental threat and social organization," *Annals of the American Academy of Political and Social Science*, May 1970.
- Kraenzel, Carl F. "The social consequences of river basin development," *Law and Contemporary Problems*, 22, 2 (Spring 1957), 221-36.
- Kramer, Douglas J. "Protecting the urban environment from the federal government," *Urban Affairs Quarterly*, March 1974.
- Krase, Jerome. "The myth of accountability to the community: resolving conflict and contradictions via community theater." Paper presented at the 44th Annual Meeting of the Eastern Sociological Society, Philadelphia, PA, 6 April 1974. 12 p.
- Krause, Merton S. and Kenneth I. Howard. "Program evaluation in the public interest: a new research methodology." Revision of a paper presented at the Society for Psychotherapy Research, Philadelphia, PA, June 1973. 24 p.
- Krauss, Wilma R. "Toward a theory of political participation of public bureaucrats," *Administrative Science Quarterly*, June 1971.
- Krebs, Girard. "The social impact of surface mining," pp. 1076-87 in House Committee on Interior and Insular Affairs, U. S. House of Representatives (ed.), *Regulation of Surface Mining, Part II*. Washington, DC: U. S. Government Printing Office, 1973. Serial No. 93-11.
- Krieger, Martin F. "Social indicators for the quality of individual life." Working Paper 104. Berkeley: Center for Planning and Development Research, University of California, October 1969.
- Krieger, Martin H. "Some new directions for planning theories," *Journal of the American Institute of Planners*, 40, 3 (May 1974), 156-63.
- Kromm, David E. "The creation, utilization, and depletion of resources as cultural phenomena," *Journal of Geography*, November 1968.
- Krutilla, John V. (ed.). *Natural Environments: Studies in Theoretical and Applied Analysis*. Baltimore, MD: The Johns Hopkins Press, 1972.
- Krutilla, John V. "Welfare aspects of benefit-cost analysis," *Journal of Political Economy*, June 1961.
- Kruzic, P. G. *Cross-Impact Simulation in Water Resource Planning*. Menlo Park, CA: Stanford Research Institute, 1974.
- Krzyczkowski, Roman and Suzanne S. Henneman. *Reducing the Need for Travel*. Santa Barbara, CA: Interplan Corporation, March 1974.
- Kurz, Johannes W. "Transformation of plans into actions," *Journal of the Urban Planning and Development Division, ASCE*, 99, UP2 (September 1973), 183-91.

- La Porte, Todd R. and Daniel Metlay. "Technology observed: attitudes of a wary public," *Science*, 188, 4184 (11 April 1975), 121-27.
- LaGasse, Jean H. "Community development in Manitoba," *Human Organization*, 20, 4 (Winter 1961-62).
- Lagler, Karl F. (ed.). *Man-Made Lakes: Planning and Development*. Rome: Food and Agricultural Organization of the United Nations, 1969.
- Lamanna, Richard A. "Value consensus among urban residents," *Journal of the American Institute of Planners*, 30, 4 (November 1964), 317-23.
- Lampman, Robert J. "What does it do for the poor?--a new test for national policy," *The Public Interest*, 34 (Winter 1974), 66-82.
- Lamson, Robert W. "Corporate accounting for environmental effects," pp. 230-47 in Meinolf Dierkes and Raymond A. Bauer (eds.), *Corporate Social Accounting*. New York: Praeger, 1973.
- Lamson, Robert W. "Policy and futures research--some important questions, principles and issues," pp. 127-34 in Japan Society of Futurology (comp.), *Proceedings of the International Future Research Conference, Vol. II*. Tokyo: Kodansha, 1970.
- Land, Kenneth C. "On the definition of social indicators," *American Sociologist*, 6, 4 (November 1971), 322-25.
- Land, Kenneth C. and Seymour Spilerman (eds.). *Social Indicator Models*. New York: Russell Sage Foundation, 1975.
- Landecker, Werner S. "Types of integration and their measurement," pp. 227-38 in Roland L. Warren (ed.), *Perspectives on the American Community: A Book of Readings*. Chicago: Rand McNally, 1966.
- Landsberg, Hans H. and others. *Energy and the Social Sciences: An Examination of Research Needs*. Washington, DC: Resources for the Future, July 1974.
- Lanford, H. W. *Technological Forecasting Methodologies: A Synthesis*. New York: American Management Association, 1972.
- Lang, Jon and others (eds.). *Designing for Human Behavior: Architecture and the Behavioral Sciences*. Stroudsburg, PA: Dowden, Hutchinson and Ross, 1974.
- Lanham, Orville B. "Attitudes of north central South Dakota residents toward weather modification." Pamphlet 127. Brookings: Department of Rural Sociology, South Dakota State University, May 1974.
- Lanham, Orville B. "Social implications of weather modification." Brookings: Department of Rural Sociology, South Dakota State University, n.d. (1974).
- Lanham, Orville E. and Robert M. Dimit. "Attitudes toward and perceptions of pollution by residents of the Big Stone Lake area." Brookings: Agricultural Experiment Station, South Dakota State University, October 1974.

- Lansing, John B. and Robert W. Marans. "Evaluation of neighborhood quality," *Journal of the American Institute of Planners*, 35, 3 (May 1969), 195-99.
- Lassèrre, P. "Planning through incrementalism," *Socio-Economic Planning Sciences*, 8, 3 (June 1974), 129-34.
- Lasswell, Harold. *Preview of Policy Science*. New York: American Elsevier, 1971.
- Laszlo, C. A., M. D. Levine and J. H. Milsum. "A general systems framework for social systems," *Behavioral Science*, 19, 2 (March 1974), 79-92.
- Laumann, Edward O. *Bonds of Pluralism: The Form and Substance of Urban Social Networks*. New York: John Wiley, 1972.
- Laurent, E. A. and J. C. Hite. "Economic-ecologic linkages and regional growth: a case study," *Land Economics*, 48, 1 (February 1972), 70-72.
- Leach, Edmund. "Planning and evolution," *Journal of the Town Planning Institute*, January 1969.
- Leadley, Samuel M. "Sociological concepts: a critique of water resources planning," pp. 77-78 in Leonard B. Dworsky, David J. Allee and Sandor C. Csallany (eds.), *Social and Economic Aspects of Water Resources Development*. Urbana, IL: American Water Resources Association, 1972.
- Lecht, Leonard A. *Changes in National Priorities during the 1960s: Their Implications for 1980*. Washington, DC: National Planning Association, September 1972.
- Lecht, Leonard A., Ivars Gutmanis and Robert J. Rosen. *Assessing the Impact of Changes in National Priorities for the Utilization of Scientists and Engineers*. Washington, DC: National Planning Association, February 1974.
- Lee, Douglass B., Jr. "Making effective use of analytical methods in planning," pp. 34-37 in Hydrologic Engineering Center (ed.), *Proceedings of a Seminar on Analytical Methods in Planning*, 26-28 March 1974. Davis, CA: Hydrologic Engineering Center, U. S. Army Corps of Engineers, 1974.
- Lee, Douglass B., Jr. "Requiem for large-scale models," *Journal of the American Institute of Planners*, 39, 3 (May 1973), 163-78.
- Lee, Ronald Demos. "Forecasting births in post-transition populations: stochastic renewal with serially correlated fertility," *Journal of the American Statistical Association*, 69, 347 (September 1974), 607-17.
- Lee, T. R. and P. D. Fenwick. "The environmental matrix: input-output techniques applied to pollution problems in Ontario," *Water Resources Bulletin*, 9, 1 (February 1973), 25-33.
- Lee, Terence. "Urban neighborhood as a socio-spatial schema," *Ekistics*, 30, 177 (August 1970), 119-29.
- Leege, David C. "On the measurement of dependent variables in policy impact analysis: some effects of reliability on validity," in Thomas J. Cook, Ronald W. Johnson and Frank P. Scioli, Jr. (eds.), *Policy Impact Analysis: An Interdisciplinary Approach*.

- Leggatt, Timothy (ed.). *Sociological Theory and Survey Research: Institutional Change and Social Policy in Great Britain*. Beverly Hills, CA: Sage, 1974.
- Lehmann, Edward J. *Quality of Life in the Urban Environment: A Bibliography with Abstracts*. Springfield, VA: National Technical Information Service, July 1973.
- Leontief, Wassily. "Environmental repercussions and the economic structure: an input-output approach," *Review of Economic Statistics*, 52 (1970).
- Leontief, Wassily. "National income, economic structure, and environmental externalities," pp. 565-76 in Milton Moss (ed.), *The Measurement of Economic and Social Performance*. New York: National Bureau of Economic Research, 1973.
- Leopold, Luna B. "Landscape esthetics," *Ekistics*, 29, 173 (April 1970), 271-77.
- Leopold, L. B. *Quantitative Comparison of Some Aesthetic Factors among Rivers*. Circular 620. Washington, DC: U. S. Geological Survey, 1969.
- Leopold, Luna B. and others. "A procedure for evaluating environmental impact." *Geological Survey Circular 645*. Washington, DC: U. S. Department of the Interior, 1971.
- Leven, Charles L. and R. B. Read. *A River, A Region and a Research Problem*. IWR Report 74-6. Alexandria, VA: Institute for Water Resources, Corps of Engineers, July 1971.
- Levin, Peter and David Donnison. "People and planning," pp. 87-93 in J. B. Cullingworth (ed.), *Problems of an Urban Society: Vol. III. Planning for Change*. London: George Allen and Unwin, 1973.
- Levin, Simon A. (ed.). *Ecosystem Analysis and Prediction*. Philadelphia: Society for Industrial and Applied Mathematics, 1975.
- Levine, Abraham S. "Cost-benefit analysis and social welfare program evaluation," *Social Service Review*, June 1968.
- Levitan, Sar. A. and Harold L. Sheppard. "Technological change and the community," pp. 159-89 in Gerald G. Somers, Edward L. Cushman and Nat Weinberg (eds.), *Adjusting to Technological Change*. New York: Harper and Row, 1963.
- Lichfield, N. "Evaluation methodology of urban and regional plans: a review," *Regional Studies*, 4 (1970), 151-65.
- Liebman, Lance. "Social intervention in a democracy," *The Public Interest*, 34 (Winter 1974), 14-29.
- Lijesen, Dirk P. "Measure of SWB (social well-being) effects," pp. 267-308 in Henry P. Caulfield, Jr., Harry A. Steele and Sam H. Johnson, III (eds.), *Manual for Training in the Application of the Principles and Standards of the Water Resources Council*. Fort Collins: Environmental Resources Center, Colorado State University, December 1974.
- Lindberg, GÖran. "Qualities of physical and social environments," *Man-Environment Systems*, 5, 3 (May 1975), 188.

- Lineberry, Robert L. "Community structure and planning commitments: a note on the correlates of agency expenditures," pp. 164-71 in Louis A. Zurcher, Jr. and Charles M. Bonjean (eds.), *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler, 1970.
- Linstone, Harold A. "Four American futures: reflections on the role of planning," *Technological Forecasting and Social Change*, 4, 1 (1972), 41-60.
- Linville, William K. "Design of an academic program to facilitate societal choices on technology," pp. 78-88 in Maynard M. Baldwin (ed.), *Portraits of Complexity: Applications of Systems Methodologies to Societal Problems*. Columbus, OH: Battelle Memorial Institute, 1975.
- Lipman, Marvin. "Social effects of the housing environment," pp. 171-89 in Michael Wheeler (ed.), *The Right to Housing*. Montreal: Harvest House, 1969.
- Lipsky, Michael. "Radical decentralization: a response to American planning dilemmas." Reprint No. 28. Madison: Institute for Research on Poverty, University of Wisconsin, 1968.
- Liroff, Richard A. "Environmental administration: NEPA and federal agencies," pp. 291-305 in Stuart S. Nagel (ed.), *Environmental Politics*. New York: Praeger, 1974.
- Liska, Allen E. "Emergent issues in the attitude-behavior consistency controversy," *American Sociological Review*, 39, 2 (April 1974), 261-72.
- Little, Dennis L. "Social indicators and public policy: some unanswered questions." Paper presented at the 70th Annual Meeting of the American Political Science Association, Chicago, IL, 29 August-2 September 1974. 20 p. mimeo.
- Little, Dennis and Richard Feller. "STAPOL: a simulation of the impact of policy, values, and technological and societal developments upon the quality of life." Working Paper WP-12. Middletown, CT: Institute for the Future, October 1970.
- Little, James T., Hugh O. Nourse and Donald Phares. *The Neighborhood Succession Process*. St. Louis: Institute for Urban and Regional Studies, Washington University, 1975.
- Litwak, Eugene. "Models of bureaucracy which permit conflict," *American Journal of Sociology*, 67, 2 (September 1961), 177-84.
- Liu, Ben-Chieh. *The Quality of Life in the United States, 1970: Index, Rating, and Statistics*. Kansas City, MO: Midwest Research Institute, 1973.
- Liu, Ben-Chieh. *Quality of Life Indicators in U. S. Metropolitan Areas, 1970: A Comprehensive Assessment*. Washington, DC: Washington Environmental Research Center, U. S. Environmental Protection Agency, May 1975.
- Llewellyn, Lynn G. "Social and environmental effects of alternative highway locations." Paper presented at the First Federally Coordinated Program Research Review for Category 3: Environmental Considerations in Highway Design, Location, Construction and Operation, Annapolis, MD, 9 August 1973. 10 p. mimeo.

- Llewellyn, Lynn G. and Clare Peiser. "NEPA and the environmental movement: a brief history." NBSIR 73-218. Washington, DC: Environmental Studies Division, U. S. Environmental Protection Agency, July 1973. 36 p.
- Loebl, Andrew S. and Rex R. Campbell. "A method of delineation of homogeneous social-ecological areas." Research paper published for the U. S. Department of Housing and Urban Development by Oak Ridge National Laboratory, November 1974.
- Loewenstein, Louis K. and Dorn C. McGrath, Jr. "The planning imperative in America's future," *Annals of the American Academy of Political and Social Science*, January 1973.
- Long, Burl F. and Donald R. Field. "Toward an integration of economics and sociology," pp. 11-25 in Donald R. Field, James C. Barron and Burl F. Long (eds.), *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Los Angeles Community Analysis Bureau. "Systematic measurement of the quality of urban life--prerequisites to management," Los Angeles: Los Angeles Community Analysis Bureau, May 1971.
- Louis Berger, Inc. *Methodology to Evaluate Socio-Economic Benefits of Urban Water Resources*. East Orange, NJ: Louis Berger, Inc., 30 June 1971.
- Louis Harris and Associates, Inc. "A survey of public attitudes toward urban problems and toward the impact of scientific and technological developments." Study No. 2040, prepared for the Public Broadcast Environmental Center, November 1970.
- Lowe-McConnell, R. H. (ed.). *Man-Made Lakes*. New York: Academic Press, 1966.
- Ludtke, Richard L. and Rabel J. Burdge. *Evaluation of the Social Impact of Reservoir Construction on the Residential Plans of Displaced Persons in Kentucky and Ohio*. Research Report No. 26. Lexington: Water Resources Research Institute, University of Kentucky, 1970.
- Lyle, John and Mark von Wodtke. "An information system for environmental planning," *Journal of the American Institute of Planners*, 40, 6 (November 1974); 394-413.
- Lynch, Robert M. "Complying with NEPA: the tortuous path to an adequate environmental impact statement," *Arizona Law Review*, 14, 4 (1972), 717-45.
- Mack, Ruth P. *Criteria for Evaluation of Social Impacts of Flood Management Alternatives*. New York: Institute of Public Administration, 15 March 1974.
- Mack, Ruth P. *Planning on Uncertainty: Decision Making in Business and Government Administration*. New York: John Wiley, 1971.
- Mack, Ruth P. "Values, social indicators and priorities." Paper presented at the 20th International Meeting of the Institute of Management Science, Tel Aviv, Israel, June 1973. 12 p. mimeo.

- Mackinnon, William J. "Weighting for the future: prospecting the possibilities of weighting Delphi responses with aggregates obtained by the SPAN method," *Futures*, 5, 3 (June 1973), 303-8.
- Madden, J. Patrick. "Poverty data in relation to other indicators of social welfare." Paper presented at the 66th Annual Meeting of the American Sociological Association, Denver, CO, 30 August 1971. 43 p. mimeo.
- Madow, William G. *An Analysis with Improvement Postulation for the Neighborhood Environmental Evaluation and Decision System (NEEDS)*. Menlo Park, CA: Stanford Research Institute, April 1973.
- Maki, Wilbur R. "Social/environmental systems for regional development planning," *Regional Science Perspectives*, 3 (1973), 68-88.
- Malone, David W. "An introduction to the application of interpretive structural modeling," *Proceedings of the IEEE*, 63, 3 (March 1975), 397-404.
- Malone, David W. and Alexander N. Christakis. "The role of model building and analysis in public policy formulation: applications of interpretive structural modeling." Unpublished manuscript. 31 January 1974. 35 p. mimeo.
- Maloney, Michael P. and Michael P. Ward. "Ecology: let's hear from the people, an objective scale for the measurement of ecological attitudes and knowledge," *American Psychologist*, 28 (1973), 583-86.
- Manchik, M. "Residential environmental preferences and choice: empirically validating preference measures," *Environment and Planning*, 4, 4.
- Manderscheid, Ronald W. "A theory of spatial effects," pp. 75-83 in Robert Trappl and Franz R. Pichler (eds.), *Progress in Cybernetics and Systems Research: 1*. Washington, DC: Hemisphere, 1975.
- Manheim, Marvin L. "A design process model: theory and application to transportation planning," pp. 331-48 in Gary T. Moore (ed.), *Emerging Methods in Environmental Design and Planning*. Cambridge, MA: M.I.T. Press, 1970.
- Manheim, Marvin L. *Hierarchical Structure: A Model of Design and Planning Processes*. Cambridge, MA: M.U.T. Press, 1967.
- Manheim, Marvin L. *The Impacts of Highways upon Environmental Values*. Report USL-69-1. Cambridge, MA: Urban Systems Laboratory, Massachusetts Institute of Technology, 1969.
- Manheim, Marvin L. "Reaching decisions about technological projects with social consequences: a normative model," *Transportation*, 2 (1973), 1-24.
- Manheim, Marvin L. and F. L. Hall. *Abstract Representation of Goals: A Method for Making Decisions on Complex Problems*. Paper prepared under DOT grant (DSR 70386), DOD Contract No. DCA 100-67-C-0008, and GM Grant (DSR 70065). 1967.
- Mann, Lawrence D. "Studies in community decision-making," *Journal of the American Institute of Planners*, 30, 1 (February 1964), 58-65.

- Mann, Michael. *Workers on the Move: The Sociology of Relocation*. Cambridge: Cambridge University Press, 1973.
- Manning, G. K. (ed.). *Technology Transfer: Successes and Failures*. San Francisco: San Francisco Press, 1974.
- Mantell, Murray I. "Transient (dual) zoning," *Journal of the Urban Planning and Development Division, ASCE*, 100, UPI (March 1974), 1-6.
- Maranell, Gary M. (ed.). *Scaling: A Sourcebook for Behavioral Scientists*. Chicago: Aldine, 1974.
- Markley, O. W., D. A. Curry and D. L. Rink. *Contemporary Societal Problems*. Research Report EPRC 6747-2. Menlo Park, CA: Educational Policy Research Center, Stanford Research Institute, June 1971.
- Marlow, Thomas A. "Participatory management of professionals," *Civil Engineering*, 43, 10 (October 1973), 71-73.
- Marris, Peter. *Loss and Change*. New York: Pantheon, 1974.
- Marshall, Dale R. "Who participates in what? a bibliographic essay on individual participation in urban areas," *Urban Affairs Quarterly*, December 1968.
- Martin, Philip L. "Conflict resolution through the multiple-use concept in Forest Service decision-making," *Natural Resources Journal*, 9, 2 (April 1969), 228-36.
- Martino, Joseph P. "Evaluating forecast validity," pp. 26-52 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Martino, Joseph P. "Trend extrapolation," pp. 106-25 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Maruyama, Magoroh. "The second cybernetics: deviation-amplifying mutual causal processes," *American Scientist*, 51, 2 (June 1963), 164-79.
- Maruyama, Magoroh. "Human futuristics and urban planning," *Journal of the American Institute of Planners*, 39, 5 (September 1973), 346-58.
- Maruyama, Magoroh. "Cultural, social and psychological considerations in the planning of public works," *Technological Forecasting and Social Change*, 1974.
- Maruyama, Magoroh. "Endogenous research vs. 'experts' from outside," *Futures*, 6, 5 (October 1974), 389-94.
- Maruyama, Magoroh. "Symbiotization of cultural heterogeneity," pp. 127-35 in Anatol Rapoport (ed.), *General Systems: Yearbook of the Society for General Systems Research*, Vol. 18. Washington, DC: Society for General Systems Research, 1973.

- Marsh, V. A. "The multisectoral, interregional long-range optimal planning problem," *Regional Science Association Papers*, 18 (1966), 87-90.
- Masser, Ian. "Planning with incomplete data--population growth and metropolitan planning in the third world," *Town Planning Review*, April 1974.
- Mattill, John I. "Can technology be labor-intensive?" *Technology Review*, 76, 3 (January 1974), 61.
- Mauch, S. P. "A hierarchical model of the planning process," *Town Planning Review*, 44, 1 (January 1973).
- Maurer, Don. *The Delaware Estuary System, Environmental Impacts and Socio-Economic Effects: Impacts of a Deepwater Terminal*. 2 vols. Newark: College of Marine Studies, University of Delaware, May 1974.
- Maxwell, Philip A. R. and Ronald M. North. "The measurement of impacts in small watersheds for flood control," *Water Resources Bulletin*, 10, 6 (December 1974), 1277-87.
- Mayhew, Leon. "Action theory and action research," pp. 474-86 in Louis A. Zurcher, Jr. and Charles M. Bonjean (eds.), *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler, 1970.
- Mayo, Louis H. "Social impact evaluation." Paper prepared for the NATO Advanced Study Institute on Technology Assessment, Milan, Italy, 18-29 September 1972. 50 p. mimeo.
- Mazmanian, Daniel A. and Jeanne Nienaber. "Citizen participation in agency decision-making--can it survive?" Paper presented at the Annual Meeting of the Public Choice Society, New Haven, CT, 21-23 March 1974.
- Mazur, Allen and Eugene Rosa. "Energy and life-style," *Science*, 186, 4164 (15 November 1974), 607-10.
- McAllister, Donald M. (ed.). *Environment: A New Focus for Land-Use Planning*. Washington, DC: National Science Foundation, October 1973.
- McCamy, James L. *The Quality of the Environment*. New York: Free Press, 1972.
- McCuen, Richard H. "Component sensitivity: a tool for the analysis of complex water resource systems," *Water Resources Research*, 9, 1 (February 1973), 243-46.
- McDonald, Richard J. "Report on the development of 'Straw Man.'" Internal working paper. Alexandria, VA: Institute for Water Resources, U. S. Army Corps of Engineers, 15 November 1971. 14 p. mimeo.
- McGranahan, Donald. "The interrelations between social and economic development," *Social Science Information*, 9, 6 (December 1970), 61-77.
- McHarg, Ian L. *Design with Nature*. Garden City, NY: Natural History Press, 1971.
- McKusick, Robert B. and others. "The development of a plan of study--an inter-agency approach to multiobjective planning and evaluation of water and land resource use," *Water Resources Bulletin*, 9, 3 (June 1973), 467-84.

- McPartland, E. J. "Measuring and developing methods of attitude and motivational change in implementing the Big Blue River Basin Water Plan." Crete, NB: Doane College, 1973. (NTIS PB-222 274)
- McPheters, Lee R. and William B. Stronge. "Crime as an environmental externality of tourism: Miami, Florida," *Land Economics*, 50, 3 (August 1974), 288-92.
- Mead, Margaret. "Some cultural anthropological responses to technical assistance experience," *Social Science Information*, 9, 6 (December 1970), 49-59.
- Medford, Derek. *Environmental Harassment or Technology Assessment?* New York: Elsevier Scientific, 1973.
- Meltsner, Arnold J. "Political feasibility and policy analysis." Reprint No. 85. Berkeley: Institute of Urban and Regional Development, University of California. 8 p.
- Meltzer, Jack and Joyce Whitley. "Social and physical planning for the urban slum," pp. 433-52 in Brian J. L. Berry and Jack Meltzer (eds.), *Goals for Urban America*. Englewood Cliffs, NJ: Prentice-Hall, 1967.
- Mendell, Jay S. and Alfred W. Mueller. "Social and technological intelligence," *Technology Assessment*, 2, 1 (November 1973), 47-59.
- Meta Systems, Inc. *Effect Assessment of Five Projects in the Tombigbee River Basin*. Cambridge, MA: Meta Systems, Inc., 10 May 1974.
- Meyer, Gerhard. "Note on technological trends and social planning," *American Journal of Sociology*, 43, 6 (May 1938), 951-63.
- Michael, Donald N. "On coping with complexity: planning and politics," *Daedalus*, 97, 4 (Fall 1968), 1179-93.
- Michael, Donald N. *On Learning to Plan--and Planning to Learn: The Social Psychology of Changing toward Future-Responsive Societal Learning*. San Francisco: Jossey-Bass, 1973.
- Michaels, James W. "On the relation between human ecology and behavioral social psychology," *Social Forces*, 52, 3 (March 1974), 313-21.
- Michelson, William H. *Man and His Urban Environment: A Sociological Approach*. Reading, MA: Addison-Wesley, 1970.
- Michelson, William H. "Urban sociology as an aid to urban physical development: some research strategies," *Journal of the American Institute of Planners*, 34, 2 (March 1968), 105-8.
- Michelson, William H. and Paul Reed. "The theoretical status and operational usage of life style in environmental research." Paper presented at the 65th Annual Meeting of the American Sociological Association, Washington, DC, 31 August 1970. 34 p. mimeo.
- Milbrath, Lester W. and Frederick R. Inschmo. "The environmental problem as a political problem: an agenda of environmental concerns for political scientists." 15 August 1973.

- Milgram, Stanley. "The experience of living in cities," *Ekistics*, 30, 177 (August 1970), 145-50.
- Miles, Ian. "Numerical moralities, social indicators, the quality of life and social forecasting," in Ancel Sol, Pauline Mustard and William Page (eds.), *The Art of Anticipation*. London: Martin Robertson, 1975.
- Miles, Ian. "Social forecasting: from impressions to investigation," *Futures*, 6, 3 (June 1974), 240-52.
- Milhollin, Austin B. "Environmental studies for Rocky Mountain highway," *Journal of the Urban Planning and Development Division, ASCE*, 100, UPI (March 1974), 17-27.
- Miller, Delbert C. *Handbook of Research Design and Social Measurement*. 2nd ed. New York: David McKay, 1970.
- Miller, Delbert C. *Leadership and Power in the Bos-Wash Megalopolis: Environment, Ecology, and Urban Organization*. New York: John Wiley, 1974.
- Miller, W. L. and D. M. Byers. "Development and display of multiple-objective project impacts," *Water Resources Research*, 9, 1 (February 1973), 11-20.
- Milliken, J. Gordon and H. E. Mew, Jr. *Economic and Social Impact of Recreation at Reclamation Reservoirs: An Exploratory Study of Selected Colorado Reservoir Areas*. Denver, CO: Denver Research Institute, University of Denver, March 1969.
- Millward, Robert E. "PPBS: problems of implementation," *Journal of the American Institute of Planners*, 34, 2 (March 1968), 88-94.
- Milsum, J. H. "Technosphere, biosphere, and sociosphere: an approach to their systems modeling and optimization," pp. 37-48 in Ludwig von Bertalanffy, Anatol Rapoport and Richard L. Meier (eds.), *General Systems: Yearbook of the Society for General Systems Research*, Vol. 13. Washington, DC: Society for General Systems Research, 1968.
- Mishan, E. J. *Economics for Social Decisions: Elements of Cost-Benefit Analysis*. New York: Praeger, 1973.
- Mishan, Edward J. "The spillover enemy," *Ekistics*, 29, 173 (April 1970), 239-42.
- Mishan, E. J. "Welfare criteria for external effects," *American Economic Review*, 51 (1961).
- Missouri Division of Resources and Development. "Local effects of the Wappapell Reservoir, Wayne County, Missouri, with suggestions for lessening undesirable effects of reservoirs." Jefferson City: Missouri Division of Resources and Development, February 1950.
- Mitchell, Arnold, Thomas J. Logothetti, and Robert E. Kantor. *An Approach to Measuring Quality of Life*. Menlo Park, CA: Stanford Research Institute, September 1971.

Mitchell, B. "Behavioral aspects of water management: a paradigm and a case study," *Environment and Behavior*, 3, 2 (June 1971); 135-53.

Mitchell, J. Clyde. "The concept and use of social networks," pp. 1-50 in Clyde Mitchell (ed.), *Social Networks in Urban Situations*. Manchester University Press, 1969.

Mitchell, Melvin L., Lawrence Casey Mann, II and Robert F. Jayson. "The case for environmental planning education in black schools," *Journal of the American Institute of Planners*, 36, 4 (July 1970), 279-84.

Mitchell, Robert E. "Some social implications of high density housing," *American Sociological Review*, February 1971.

Mitroff, Ian I. and L. Vaughan. Blankenship. "On the methodology of the holistic experiment: an approach to the conceptualization of large-scale experiments," *Technological Forecasting and Social Change*, 4 (1973), 339-53.

Mogulof, Melvin B. *Citizen Participation: The Local Perspective*. Washington, DC: The Urban Institute, March 1970.

Mogulof, Melvin B. *Citizen Participation: A Review and Commentary of Federal Policies and Practices*. Washington, DC: The Urban Institute, January 1970.

Molinaro, Leo. "Who speaks for the public interest in housing?" pp. 245-47 in Michael Wheeler (ed.), *The Right to Housing*. Montreal: Harvest House, 1969.

Moriarchi, David E., Chester C. Kisiel and Lucien Duckstein. "Interactive multi-objective programming in water resources: a case study," *Water Resources Research*, 9, 4 (August 1973), 837-50.

Montgomery, John D. *Technology and Civic Life: Making and Implementing Development Decisions*. Cambridge, MA: M.I.T. Press, 1974.

Moore, Daniel W. "Planning for a new town," *Journal of the Urban Planning and Development Division, ASCE*, 97, UPI (April 1971), 79-90.

Moore, Gary T. (ed.). *Emerging Methods in Environmental Design and Planning*. Cambridge, MA: M.I.T. Press, 1970.

Moore, J. Robert. "Urban riverside environmental analysis," *Journal of the Urban Planning and Development Division, ASCE*, 97, UPI (April 1971), 105-15.

Moore, John A. (comp.). *Science for Society: A Bibliography*. Washington, DC: American Association for the Advancement of Science, 1970.

Moore, John L. "Development and application of a methodology for estimating the impact on local land and property values from flood plain regulation in Ohio." Battelle Columbus Laboratories report to the Ohio Department of Natural Resources, April 1973.

Moore, John R. (ed.). *The Economic Impact of TVA*. Knoxville: University of Tennessee Press, 1967.

Moore, Wilbert E. "Social consequences of technological change from the sociological standpoint," *International Social Science Bulletin*, 4 (Summer 1952), 280-88.

- Morgan, Wayne C. A Study of the Social and Economic Effects of Keystone Reservoir on the Community of Mannford, Oklahoma. Unpublished masters thesis. Stillwater: Oklahoma State University, May 1970.
- Morris, David. "Inclusion of social values in facility location planning," Journal of the Urban Planning and Development Division, ASCE, 98, UPI (July 1972), 17-31.
- Morris, Robert and Martin Rein. "Emerging patterns in community planning," pp. 23-38 in Bernard J. Frieden and Robert Morris (eds.), Urban Planning and Social Policy. New York: Basic Books, 1968.
- Morrison, Denton E. "The environmental movement: conflict dynamics," Journal of Voluntary Action Research, 2, 2 (April 1973), 74-85.
- Morrison, Denton E., Kenneth E. Hornback and W. Keith Warner (comps.). Environment: A Bibliography of Social Science and Related Literature. Washington, DC: Office of Research and Monitoring, U. S. Environmental Protection Agency, February 1974.
- Morsink, H. J. A. Sociological Aspects of Regional Development and of Planning for Regional Development: Some Issues and Areas for Further Exploration. Geneva: Division of Social Affairs, United Nations, 1971. mimeo.
- Moss, Milton (ed.). The Measurement of Economic and Social Performance. New York: National Bureau of Economic Research, 1973.
- Mostert, Noel. Supership. New York: Alfred A. Knopf, 1974.
- Moynihan, Daniel P. "Goals, systems, and hidden policies," The Futurist, 4, 4 (August 1970), 118-21.
- Moynihan, Daniel P. "Policy vs. program in the '70s," The Public Interest, 20 (Summer 1970), 90-100.
- Muldawer and Patterson. "Decatur rapid transit impact growth strategy," Atlanta, GA: Muldawer and Patterson, 1973.
- Mumphrey, Anthony J., Jr., John E. Seley and Julian Wolpert. "A decision model for locating controversial facilities," Journal of the American Institute of Planners, 37, 6 (November 1971), 397-402.
- Munson, Byron E. Changing Community Dimensions: The Interrelationship of Social and Economic Variables. Columbus: College of Administrative Science, Ohio State University, 1968.
- Munson, Bryon E. "Structural analysis of the community," Rural Sociology, 1968?
- Murray, James R. "Systems research for social intervention: a framework for the empirical evaluation of social and psychological change programs." Occasional Paper 134. Chicago: Industrial Relations Center, University of Chicago, 1972.
- Murrell, Stanley A. Community Psychology and Social Systems: A Conceptual Framework and Intervention Guide. New York: Behavioral Publications, 1973.

- Musial, John J. "A proposal to analyze second order consequences." Unpublished manuscript, 8 December 1972. 15 p. mimeo.
- Musial, John J.. "The social profile: a diagnostic, remedial programming and evaluation tool." Unpublished paper. Detroit, MI: Center for Urban Studies, Wayne State University, February 1968. 20 p. mimeo.
- Musial, John J. and Ed M. Meyers. "Social purpose taxation," *Social Theory and Practice*, 1, 4 (Fall 1971), 71-82.
- Mussivand, T. V. "Application of critical path method to water resources planning," *Water Resources Bulletin*, 8, 4 (August 1972), 685-96.
- Myhra, David. "The use of zoning to mitigate adverse socioeconomic impact: an example of compromise in the siting of a nuclear power plant." Unpublished manuscript. 15 December 1974. 13 p. mimeo.
- Nagel, Stuart S. *Policy Studies and the Social Sciences*. Lexington, MA: D. C. Heath, 1975.
- Napier, Ted L. "An analysis of the social impact of water resource development and subsequent forced relocation of population upon rural community groups: an attitudinal study." Columbus: Department of Agricultural Economics and Rural Sociology, Ohio State University, November 1974.
- Napier, Ted L. *The Impact of Water Resource Development upon Local Rural Communities: Adjustment Factors to Rapid Change*. Unpublished doctoral dissertation. Columbus: Ohio State University, 1971.
- Napier, Ted L. "The social-psychological impact of watershed development upon rural community groups." Columbus: Department of Agricultural Economics and Rural Sociology, Ohio State University, n.d.
- Napier, Ted L. "Social-psychological response to forced relocation due to watershed development," *Water Resources Bulletin*, 8, 4 (August 1972), 784-94.
- Napier, Ted L. and Cathy J. Wright. "Differential acceptance of change: implications for rural development." Columbus: Department of Agricultural Economics and Rural Sociology, Ohio State University, n.d.
- Napier, Ted L. and Cathy J. Wright. "An evaluation of forced relocation of population due to rural community development." *Research Bulletin 1073*. Wooster, OH: Ohio Agricultural Research and Development Center, August 1974.
- Napier, Ted L. and Cathy J. Wright. "Impact of rural development: case study of forced relocation," *Journal of the Community Development Society*, 5, 2 (Fall 1974), 107-15.
- National Academy of Public Administration and General Accounting Office. "Evaluation of federal environmental programs." Summary of a conference held at Silver Spring, MD, 24-26 May 1973. 44 p. mimeo.
- National Academy of Sciences (ed.). *Proceedings of Conference on Hazard Evaluation and Risk Analysis*, Houston, Texas, 18-19 August 1971. Washington, DC: National Academy of Sciences, 1971.

National Academy of Sciences-National Research Council. Environmental Quality and Social Behavior: Strategies for Research. Washington, DC: National Academy of Sciences, May 1973.

Nelson, M. and others. "The Franz-Marshall scale of commitment for community action," *Rural Sociology*, 34 (September 1969), 396-401.

Netting, Robert McC. "The ecological approach in cultural study." Reading, MA: Addison-Wesley, 1971.

New York Academy of Sciences. Critical Human Behavioral Research Issues in Social Intervention Programs. *Annals of the New York Academy of Sciences*, 218 (1973).

New York Academy of Sciences. Public Policy toward Environment, 1973: A Review and Appraisal. New York: New York Academy of Sciences, 1973.

Noble, John H., Jr. "Peer review: quality control of applied social research," *Science*, 185, 4155 (13 September 1974), 916-21.

Noble, John H., Jr. "The uncertainty of evaluative research as a guide to social policy," pp. 451-59 in Louis A. Zurcher, Jr. and Charles M. Bonjean (eds.), *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler, 1970.

Nordheimer, Jon. "A tiny Florida county undertakes the struggle against too much growth," *The New York Times*, 17 February 1974.

Northeastern Illinois Planning Commission. "The plan-study: methodology," *Economics*, 28, 165 (August 1969), 119-39. (also: pp. 441-66 in Gwenn Bell and Jaqueline Tyrwhitt (eds.), *Human Identity in the Urban Environment*. Baltimore, MD: Penguin, 1972)

Nurmi, Hannu. "Social causality and empirical data reduction techniques," *Quality and Quantity*, 8, 2 (June 1974), 159-80.

Office of Economic Opportunity. OEO Poverty Indicators: Community Profile Series. Springfield, VA: National Technical Information Service, 1968.

Office of Research and Development. "Social impact: environmental quality, community effects, and highway transportation." Washington, DC: Bureau of Public Roads, U. S. Department of Commerce, 26 November 1966. 14 p. mimeo.

Office of Research and Monitoring (ed.). *The Quality of Life Concept: A Potential New Tool for Decision-Makers*. Washington, DC: Environmental Studies Division, U. S. Environmental Protection Agency, 1973.

Office of the Chief of Engineers. "Guidelines for the assessment of economic, social, and environmental effects of civil works projects." ER 1105-2-105. Washington, DC: U. S. Army Corps of Engineers, 15 December 1972.

Office of the Chief of Engineers. "Information supplement No. 1 to Section 122 Guidelines (ER 1105-2-105, 15 Dec. 1972)." Washington, DC: U. S. Army Corps of Engineers, September 1973.

- Ogburn, William F. "Technology as environment," *Sociology and Social Research*, 41, 1 (September-October 1956), 3-9.
- Ohio River Division and Pittsburgh District, Corps of Engineers. A Test of Proposed Procedures for Evaluation of Water and Related Land Resources Projects (Water Resources Council): A Special Study of Stonewall Jackson Lake, West Fork River and Tributaries, West Virginia. Washington, DC: Department of the Army, March 1970.
- O'Laoghaire, Domhnall T. and David M. Himmelblau. "Modeling and sensitivity analysis for planning decisions in water resources expansion," *Water Resources Bulletin*, 8, 4 (August 1972), 653-68.
- O'Leary, Joseph T., Donald R. Field and Gerard Schreuder. "Social groups and water activity clusters: an exploration of interchangeability and substitution," pp. 199-215 in Donald R. Field, James C. Barron and Burl F. Long (eds.), *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Olson, Mancur, Jr. "Economics, sociology, and the best of all possible worlds," *The Public Interest*, 12 (Summer 1968), 96-118.
- Olson, Mancur, Jr. "Evaluating performance in the public sector," pp. 355-84 in Milton Moss (ed.), *The Measurement of Economic and Social Performance*. New York: National Bureau of Economic Research, 1973.
- Olson, Mancur, Jr. "The plan and purpose of a social report," *The Public Interest*, 15 (Spring 1969), 85-97.
- Onibokun, Adepoju G. "Evaluating consumers' satisfaction with housing: an application of a systems approach," *Journal of the American Institute of Planners*, 40, 3 (May 1974), 189-200.
- Organization for Economic Cooperation and Development (eds). *Methodological Guidelines for Social Assessment of Technology*. Paris: OECD, 1975.
- Ortolano, Leonard. "Impact assessment in the water resources planning process." Unpublished manuscript. Stanford, CA: Department of Civil Engineering, Stanford University, June 1973. 35 p. mimeo.
- Ortolano, Leonard. "Environmental impact analysis--matters of definition and approach," pp. 4-1 to 4-29 in Leonard Ortolano (ed.), *Analyzing the Environmental Impacts of Water Projects*. Institute for Water Resources Report 73-3. Springfield, VA: National Technical Information Service, March 1973.
- Ortolano, Leonard. "Water resources impact assessment: cause-effect relationships." Unpublished manuscript. Stanford, CA: Department of Civil Engineering, Stanford University, April 1973. 46 p. mimeo.
- Ortolano, Leonard and Thomas P. Wagner. *Alternative Approaches to Water Resources Impact Evaluation*. Stanford, CA: Department of Civil Engineering, Stanford University, October 1973 (draft).
- Ostrom, Vincent. "The social scientist and the control and development of natural resources," *Land Economics*, 29, (1953), 105-16.

Ostrom, Vincent and Elinor Ostrom. "Public choice: a different approach to the study of public administration," *Public Administration Review*, 31, 2 (March-April 1971), 203-16.

Outdoor Recreation Resources Review Commission. *Projections to the Years 1976 and 2000: Economic Growth, Population, Labor Force and Leisure, and Transportation*. ORRRC Study Report 23. Washington, DC: U. S. Government Printing Office, 1962.

Overly, Don H. "Introducing societal indicators into technology asses'sment," pp. 63-91 in Marvin J. Cetron and Bodo Bartocha (eds.), *The Methodology of Technology Assessment*. New York: Gordon and Breach, 1972.

Ozbekhan, Hasan. "The emerging methodology of planning," *Fields within Fields within Fields . . .*, 10 (Winter 1973-74), 63-80.

Ozbekhan, Hasan. "Planning theory," *Ekistics*, 28, 167 (October 1969), 296-99.

Paaswell, Robert E. "Homogeneity analysis and planning studies," *Journal of the Urban Planning and Development Division, ASCE*, 97, UP2 (December 1971), 125-38.

Padfield, Harland and Courtland L. Smith. "Water and culture: new decision rules for old institutions," *Rocky Mountain Social Science Journal*, 1968.

Pahl, R. E. *Whose City? and Other Essays on Sociology and Planning*. New York: Humanities Press, 1970.

Palmedo, Philip F. "The incorporation of social values and thinking into energy policy analysis--preliminary remarks and a proposal." Unpublished manuscript. Upton, NY: Energy Systems Analysis Group, Department of Applied Science, Brookhaven National Laboratory, 23 August 1973. 7 p. mimeo.

Papandreou, Andreas and Uri Zohar. *Project Selection for National Plans: I. National Planning and Socioeconomic Priorities*. New York: Praeger, 1974.

Paper, James E. and Robert E. Jorgensen. *Influences of Wastewater Management on Land-Use: Tahoe Basin 1950-1972*. Washington, DC: Office of Research and Development, U. S. Environmental Protection Agency, October 1974.

Passett, Barry A. *Citizen Participation: Effecting Community Change*. New York: Praeger, 1971.

Passonneau, Joseph R. "A planning inventory for the metropolis," pp. 179-92 in Sam Bass Warner, Jr. (ed.), *Planning for a Nation of Cities*. Cambridge, MA: M.I.T. Press, 1966.

Pattison, E. Scott. "The key ecological unknown," *Technology Review*, 76, 3 (January 1974), 4.

Pearce, D. W. "An incompatibility in planning for a steady state and planning for maximum economic welfare," *Environment and Planning*, 5, 2 (March-April 1973).

- Peelle, Elizabeth. "Social considerations in nuclear power plant siting: choosing the least-social-cost site," Transactions of the American Nuclear Society Conference on Nuclear Power Plant Siting, Portland, OR, 28 August 1974, 50-51.
- Peelle, Elizabeth. "Social impacts of nuclear power plants," Transactions of the American Nuclear Society, 48 (June 1974), 58.
- Peelle, Elizabeth. "Social impacts of nuclear power plants." Paper presented to the short course on "Environmental Impact Statements for Nuclear Power Plants," Georgia Institute of Technology, Atlanta, GA, 26-30 November 1973. 12 p.
- Pendse, Dilip and J. B. Wyckoff. "Scope for valuation of environmental goods," Land Economics, February 1974.
- Perfater, Michael A. "The social and economic effects of relocation due to highway takings." VHRC 72-R10. Charlottesville: Virginia Highway Research Council, October 1972.
- Perfater, Michael A. and David R. Howell. "Evaluation of social impact: a suggested approach." VHRC 73-R10. Charlottesville: Virginia Highway Research Council, September 1973. 15 p. mimeo.
- Perks, W. T. "Basic components of the planning process," Plan: Journal of the Town Planning Institute of Canada, 11, 2.
- Perloff, Harvey S. "Common goals and the linking of physical and social planning," pp. 346-59 in Bernard J. Frieden and Robert Morris (eds.), Urban Planning and Social Policy. New York: Basic Books, 1968.
- Perloff, Harvey S. "Social planning in the metropolis," pp. 331-47 in Leonard J. Duhl (ed.), The Urban Condition. New York: Simon and Schuster, 1969.
- Perin, Constance. With Man in Mind: An Interdisciplinary Prospectus for Environmental Design. 1970.
- Perrucci, Robert. "Engineering: professional servant of power," American Behavioral Scientist, 14, 4. (March-April 1971), 492-506.
- Perrucci, Robert and Joel E. Gerstl (eds.). The Engineers and the Social System. New York: John Wiley, 1969.
- Peterson, David W. "Transferring ideas from engineering to the social sciences," Proceedings of the IEEE, 63, 3 (March 1975), 354-59.
- Peterson, George L. "Evaluating the quality of the wilderness environment: congruence between perception and aspiration," Environment and Behavior, 6, 2 (June 1974), 169-93.
- Peterson, George L., Robert S. Gemmell and Joseph L. Schofer. "Assessment of environmental impacts: multidisciplinary judgments of large-scale projects," Ekistics, 37, 218, (January 1974), 23-30.
- Petrik, James F. "Economic and social impacts anticipated from development of Garrison Diversion Unit," pp. 103-5 in Carle C. Zimmerman and Seth Russell (eds.), Symposium on the Great Plains of North America. Fargo: North Dakota Institute for Regional Studies, 1967.

- Pickard, Jerome P. *Dimensions of Metropolitanism*. Research Monographs 14 and 14A. Washington, DC: Urban Land Institute, 1968.
- Pickard, Jerome P. "U. S. metropolitan growth and expansion, 1970-2000, with population projections," pp. 127-82 in Sara Mills Mazie (ed.), *The Commission on Population Growth and the American Future: Vol. 5. Population, Distribution, and Policy*. Washington, DC: U. S. Government Printing Office, 1972.
- Pirages, Dennis C. and Paul R. Ehrlich. *Ark II: Social Responses to Environmental Imperatives*. San Francisco: W. H. Freeman, 1974.
- Piven, Frances Fox. "Comprehensive social planning: curriculum reform or professional imperialism," *Journal of the American Institute of Planners*, 36, 4 (July 1970), 226-28.
- Pizzo, Joseph. "The application of systems analysis techniques to social impacts due to oil spilled in the marine environment," pp. 49-55 in Gordon A. Enk and others, *Assessing the Social Impacts of Oil Spills*. Rensselaerville, NY: Institute on Man and Science, February 1974.
- Planning Division, Directorate of Civil Works. "Urban studies program: study procedure." Washington, DC: Office of the Chief of Engineers, U. S. Army Corps of Engineers, 1 September 1973.
- Plessas, Demetrius J. and Ricca Fein. "An evaluation of social indicators," *Journal of the American Institute of Planners*, 38, 1 (January 1972), 43-51.
- Poetner, Herbert G. and the ASCE Committee on Research. "Impact of civil engineering projects on people and nature." New York: American Society of Civil Engineers, 1973.
- Poland, Orville F. "Why does public administration ignore evaluation?" *Public Administration Review*, 31, 2 (March-April 1971), 201-2.
- Pollard, William S., Jr. "Operations research approach to the reciprocal impact of transportation and land use," *Journal of the Urban Planning and Development Division, ASCE*, 92, UPI (May 1966), 21+33.
- Poplin, Dennis E. *Communities: A Survey of Theories and Methods of Research*. New York: Macmillan, 1972.
- Portland District, Corps of Engineers. *Operation and Maintenance of the Channels and Breakwaters in Yaquina Bay and River*. 2 vols. (Draft environmental impact statement.) Portland, OR: U. S. Army Engineer District, Portland, March 1975.
- Prest, A. R. and R. Turvey. "Cost-benefit analysis: a survey," *Economic Journal*, 75, 300 (December 1965).
- Preston, James D. "A comparative methodology for identifying community leaders," *Rural Sociology*, December 1969.
- Program on Technology and Society. *Technology and Values*. Research Review No. 3. Cambridge, MA: Harvard University, Spring 1969.

Programme on Man and the Biosphere (MAB) Task Force on the Contribution of the Social Sciences to the MAB Programme. Final Report. MAB Report Series No. 17. Paris: Unesco, 1974.

Puccini, Donald S. P. "Ecological models and environmental studies," Water Resources Bulletin, 7, 6 (December 1971), 1144-52.

Pyke, Donald L. "Mapping--a system concept for displaying alternatives," pp. 81-91 in James R. Bright and Milton E. F. Schoeman (eds.), A Guide to Practical Technological Forecasting. Englewood Cliffs, NJ: Prentice-Hall, 1973.

Quinn, M. C. The Impact of Institutional and Political Factors on Water Management in the Upper Wabash Basin. January 1973. 54 p.

Rahenkamp, Sachs, Wells and Associates, Inc. Land Use Controls: Development Impact Model. Philadelphia: Stetson House, 1971.

Rainwater, Lee. "Poverty, race and urban housing," pp. 3-40 in Lee Rainwater and others, The Social Impact of Urban Design. Chicago: Center for Policy Study, University of Chicago, 1971.

Ramsey, Robert W. "How to charge developers the 'landscape destruction value,'" Landscape Architecture, April 1971.

Rapoport, Amos. "Toward a redefinition of density," Environment and Behavior, 7, 2 (June 1975), 133-58.

Rastogi, P. N. "Prediction and measurement in total social systems," pp. 159-67 in Ludwig von Bertalanffy and Anatol Rapoport (eds.), General Systems: Yearbook of the Society for General Systems Research, Vol. 17. Washington, DC: Society for General Systems Research, 1972.

Rea, Robert H. and Marian H. Henneman. A Handbook for Assessing the Social and Economic Impacts of Water Quality Management Plans. AAI Report No. 73-98. Cambridge, MA: Abt Associates, Inc., July 1973.

Real Estate Research Corporation. The Costs of Sprawl. Washington, DC: U. S. Government Printing Office, April 1974.

Reese, Howard C. and others. "Candidates and priorities for technology assessments: a survey of federal executive agency professionals," Technology Assessment, 2, 2 (1974), 127-44.

Reid, Thomas A., Wesley A. Heitzman and Mary Anne R. Mark. "Ecological, visual and cultural impacts--approaches employed in the Carmel Valley case study," pp. 9-1 to 9-26 in Leonard Ortolano (ed.), Analyzing the Environmental Impacts of Water Projects. Institute for Water Resources Report 73-3. Springfield, VA: National Technical Information Service, March 1973.

Reimer, Paul O. and Joseph B. Franzini. "Urbanization's drainage consequence," Journal of the Urban Planning and Development Division, ASCE, 97, UP2 (December 1971), 217-37.

- Rein, Martin. "Social planning: the search for legitimacy," pp. 425-52 in Murray Steward (ed.), *The City: Problems of Planning*. Baltimore, MD: Penguin, 1972.
- Rein, Martin. "Social policy analysis as the interpretation of beliefs," *Journal of the American Institute of Planners*, 37, 5 (September 1971), 297-310.
- Reiner, J. S., E. Reiner and T. A. Reiner. "Client analysis and the planning of public programs," *Journal of the American Institute of Planners*, 29 (November 1965), 270-82.
- Reiner, Thomas A. "The planner as value technician: two classes of utopian constructs and their impacts on planning," pp. 232-48 in H. Wentworth Eldredge (ed.), *Taming Megalopolis: Vol. 1. What Is and What Could Be*. Garden City, NY: Doubleday, 1967.
- Reiss, Albert J., Jr. "The sociological study of communities," pp. 591-603 in Roland L. Warren (ed.), *Perspectives on the American Community: A Book of Readings*. Chicago: Rand McNally, 1966.
- Reitman, Walter R. "Heuristic decision procedures, open constraints, and the structure of ill-defined problems," pp. 282-315 in Maynard W. Shelly, II and Glenn L. Bryan (eds.), *Human Judgments and Optimality*. New York: John Wiley, 1964.
- Reitz, Jeffrey G. and others. "The gap between knowledge and decision in the utilization of social research." Springfield, VA: National Technical Information Service, April 1973.
- Rescher, Nicholas. "Value considerations in public policy issues of Year 2000," pp. 540-49 in James R. Bright and Milton E. F. Schoeman (eds.), *A Guide to Practical Technological Forecasting*. Englewood Cliffs, NJ: Prentice-Hall, 1973.
- Reynolds, Josephine P. (ed.). "Public participation in planning," *Town Planning Review*, 40, 2 (July 1969), 131-48.
- Rhyne, Russell F. *Projecting Whole-Body Future Patterns--The Field Anomaly Relaxation (FAR) Method*. Research Memorandum EPRC 6747-10. Menlo Park, CA: Educational Policy Research Center, Stanford Research Institute, February 1971.
- Rhyne, Russell F. "Technological forecasting with alternative whole futures projections," *Technological Forecasting and Social Change*, 6, 2 (1974), 133-62.
- Rhyne, Russell F., R. B. Johnson and C. W. Hawks. *Contingent United States Patterns, 1970-2000*. Research Memorandum 69-3. Menlo Park, CA: Stanford Research Institute, December 1969.
- Riley, John W., Frank V. Cantwell and Katherine E. Ruttiger. "Some observations on the social effects of television," *Public Opinion Quarterly*, 13, 2 (Summer 1949), 223-34.

- Riordan, Courtney. "Regional planning and social costs/benefits," pp. 176-78, in Leonard B. Dworsky, David J. Allee and Sandor C. Csallany (eds.), *Social and Economic Aspects of Water Resources Development*. Urbana, IL: American Water Resources Association, 1972.
- Riordan, Courtney. *A Study of the Probable Economic and Social Effects of Constructing and Operating the Bell Nuclear Power Plant in Tompkins County, Ithaca, NY*. Office of Regional Resources and Development, Cornell University, September 1970.
- Ritterbush, Philip C. and Martin Green (eds.). *Technology as Institutionally Related to Human Values*. Washington, DC: Acropolis Books, 1974.
- Rivlin, Alice M. "The planning, programing, and budgeting system in the Department of Health, Education, and Welfare: some lessons from experience," pp. 502-17 in Robert H. Haveman and Julius Margolis (eds.), *Public Expenditures and Policy Analysis*. Chicago: Markham, 1970.
- Rivkin, Malcolm D. "Growth control via sewer moratoria," *Urban Land*, 1974.
- Rivkin/Carson, Inc. *Population Growth in Communities in Relation to Water Resources Policy*. Springfield, VA: National Technical Information Service, October 1971.
- Roberts, Paul O., Jr. "The treatment of multiple goals in systems models: comments on the paper by Colker and Leib," pp. 190-92 in Gary T. Moore (ed.), *Emerging Methods in Environmental Design and Planning*. Cambridge, MA: M.I.T. Press, 1970.
- Roberts, Wyndham J. "International Symposium on Man-Made Lakes: Their Problems and Environmental Effects," *Water Resources Bulletin*, 7, (August 1971), 878-82.
- Robock, Stefan H. "An unfinished task: a socio-economic evaluation of the TVA experiment," pp. 105-20 in John R. Moore (ed.), *The Economic Impact of TVA*. Knoxville: University of Tennessee Press, 1967.
- Rochberg, Richard, Theodore J. Gordon and Olaf Helmer. *The Use of Cross-Impact Matrices for Forecasting and Planning*. Report R-10. Middletown, CT: Institute for the Future, April 1970.
- Roessner, J. David and Jeffrey Frey. "Methodology for technology assessment," *Technological Forecasting and Social Change*, 6, 2 (1974), 163-69.
- Roettger, Garry J. "Just compensation--frustration of an owner's plans," *Appraisal Journal*, October, 1971.
- Rogers, Andrei. *Matrix Methods in Urban and Regional Analysis*. San Francisco: Holden-Day, 1973.
- Rogers, Edward S. "Public health asks of sociology . . .," *Science*, 159 (2 February 1968), 506-8.

- Rogers, Peter and Carl Steinitz. *Qualitative Values in Environmental Planning: A Study of Resource Use in Urbanizing Watersheds, Part 1*. Cambridge, MA: Department of Landscape Architecture Research Office, Graduate School of Design, Harvard University, October 1969.
- Rokeach, Milton. *The Nature of Human Values*. New York: Free Press, 1973.
- Rokeach, Milton and Seymour Parkef. "Values as social indicators of poverty and race relations in America," *Ekistics*, 30, 178 (September 1970), 207-12.
- Rose, Jerome G. (ed.). *Legal Foundations of Environmental Planning*. New Brunswick, NJ: Center for Urban Policy Research, Rutgers University, 1975.
- Rosenfeld, Alan S. "Need surveys and the social construction of reality," *Urban and Social Change Review*, Summer 1974.
- Rosove, Perry E. "A trend impact matrix for societal impact assessment." Los Angeles: Center for Futures Research, Graduate School of Business Administration, University of Southern California, April 1973. 24 p. mimeo.
- Rosow, Irving. "The social effects of the physical environment," *Journal of the American Institute of Planners*, 27 (1961), 127-33.
- Ross, Myron H. "Kalamazoo River flood control proposal: a case study," *Land Economics*, 48, 1 (February 1972), 57-61.
- Rossi, Peter H. "Community social indicators," pp. 87-126 in Angus Campbell and Philip E. Converse (eds.), *The Human Meaning of Social Change*. New York: Russell Sage Foundation, 1972.
- Rossi, Peter and Walter Williams (eds.). *Evaluating Social Programs*. New York: Seminar Press, 1972.
- Rothenberg, Jerome. *The Measurement of Social Welfare*. Englewood Cliffs, NJ: Prentice-Hall, 1961.
- Rothman, Jack. *Planning and Organizing for Social Change: Action Principles from Social Science Research*. New York: Columbia University Press, 1974.
- Rowe, William D. "The environment: a systems approach with emphasis on monitoring," pp. 35-61 in Marvin J. Cetron and Bodo Bartocha (eds.), *The Methodology of Technology Assessment*. New York: Gordon and Breach, 1972.
- Roy, G. G. "A multiple criteria approach to regional planning problems," *Environment and Planning*, 6, 3 (May-June 1974).
- Rubin, David M. and David P. Sachs. *Mass Media and the Environment: Water Resources, Land Use and Atomic Energy in California*. New York: Praeger, 1973.
- Rubin, Neville and William M. Warren (eds.). *Dams in Africa*. New York: Augustus M. Kelley, 1968.
- Ruggles, Nancy and Richard Ruggles. "A proposal for a system of economic and social accounts," pp. 111-46 in Milton Moss (ed.), *The Measurement of Economic and Social Performance*. New York: National Bureau of Economic Research, 1973.

- Rutherford, G. Scott and others: "Goal formulation for socio-technical systems," *Journal of the Urban Planning and Development Division, ASCE*, 99, UP2 (September 1973), 157-69.
- Sagan, L. A.: "Human costs of nuclear power," *Science*, 177, 4048 (11 August 1972).
- Sagan, Leonard A. (ed.): *Human and Ecological Effects of Nuclear Power Plants*. Springfield, IL: Charles C. Thomas, 1974.
- Sahr, Robert C. A Collation of Similar Delphi Forecasts. Working Paper WP-5. Middletown, CT: Institute for the Future, April 1970.
- Said, K. E. "A policy selection/goal formulation model for public systems," *Policy Sciences*, 5 (1974), 89-100.
- Salama, Ovadia. *Planning and Human Values: An Inquiry into the Phenomenon of Urban Growth and the Possibility of Its Control through Water and Land Related Actions*. Cambridge, MA: Abt Associates, April 1974.
- Salomon, Stephen N. "Cost-benefit methodology for the selection of a nuclear power plant cooling system (AD 7 cooling nuclear power plants)." Paper presented at the Energy Forum, 1974 Spring Meeting of the American Physical Society, Washington, DC, 22 April 1974. 13 p. mimeo.
- Sanders, Irwin T. "The community social profile," pp. 604-8 in Roland L. Warren (ed.), *Perspectives on the American Community: A Book of Readings*. Chicago: Rand McNally, 1966.
- Sanderson, Dwight. "Locating the rural community," pp. 179-83 in Roland L. Warren (ed.), *Perspectives on the American Community: A Book of Readings*. Chicago: Rand McNally, 1966.
- Sandow, Stuart A. "The pedagogy of planning: defining sufficient futures," *Futures*, 3, 4 (December 1971), 324-37.
- Sarnoff, Henry. "Social perception of the ecological neighborhood," *Ekistics*, 30, 177 (August 1970), 130-32.
- Sarason, Seymour B. *The Psychological Sense of Community: Prospects for a Community Psychology*. San Francisco: Jossey-Bass, 1974.
- Sarly, Robert M. "Urbanization, suburbanization and superurbanization: on measuring the impact of new towns." Paper presented to the Advanced Study Institute in Urban Systems Simulation and Analysis, London, July 1973. 28 p. mimeo.
- Saunders, Lawrence Walter. *Toward a National Population Redistribution Policy: Some Policy Issues*. Technical Report 58. Ithaca, NY: Cornell University Water Resources and Marine Sciences Center, January 1973.
- Savatsky, Pamela Dee. "A legal rationale for the sociologist's role in researching social impacts," pp. 45-47 in C. P. Wolf (ed.), *Social Impact Assessment*. Milwaukee, WI: Environmental Design Research Association, 1974.

- Savatsky, Pamela Dee. "A methodology for establishing social impact criteria." Unpublished manuscript, 1974. 5 p.
- Sax, Joseph L. "Legal redress of environmental disruption in the United States: the role of courts," *Social Science Information*, 9, 5 (October 1970), 7-15.
- Schaffer, Ruth C. "Sociological analysis of dam impact: a study of twenty-two large dams in Texas," pp. 2.1-2.159 in Earl Cook and others, *Reservoir Impact Study*. College Station: Texas A&M University, November, 1974.
- Scherer, Jacqueline. *Contemporary Community: Sociological Illusion or Reality?* New York: Barnes and Noble, 1972.
- Schlesinger, B. and Douglas Daetz. "A conceptual framework for applying environmental assessment matrix techniques," *Journal of Environmental Sciences*, 14, 4 (July-August 1973), 11-16.
- Schofer, J. L. "Goals-Delphis for urban planning: concepts in their design," *Socio-Economic Planning Sciences*, 7 (1973), 305-13.
- Schofer, Joseph L. and Darwin G. Stuart. "Evaluating regional plans and community impacts," *Journal of the Urban Planning and Development Division, ASCE*, 100, UPI (March 1974), 93-109.
- Schott, Francis H. "The new-priority problem," *Technology Review*, 75, 2 (December 1972), 39-43.
- Schultz, Randall L. "The use of simulation for decision making," *Behavioral Science*, 19, 5 (September 1974), 344-50.
- Schmandt, Henry J. and Warner Bloomberg, Jr. (eds.). *The Quality of Urban Life*. Beverly Hills, CA: Sage, 1969.
- Schneidermeyer, Melvin J. "The metropolitan social inventory: procedures for measuring human well-being in urban areas." Exchange Bibliography No. 39. Monticello, IL: Council of Planning Librarians, 1968. 8 p.
- Schwartz, Joel J. "The social research--social policy nexus," *Public Administration Review*, 31, 6 (November-December 1971), 678-86.
- Scioli, Frank P., Jr. and Thomas J. Cook. "Experimental design in policy impact analysis," *Social Science Quarterly*, 54, 2 (September 1973), 271-80.
- Scott, Robert A. and Arnold Shore. "Sociology and policy analysis," *The American Sociologist*, 9, 2 (May 1974), 51-59.
- Scudder, Thayer. "Social anthropology, man-made lakes and population relocation in Africa," *Anthropological Quarterly*, 41, 3 (July 1968), 168-76.
- Seeger, William R. "Water planning in a no-growth county," *American City*, 89, 6 (June 1974), 54-55.
- Selden, Maury and Lynn G. Llewellyn. *Studies in Environment: I. Summary Report*. Washington, DC: Office of Research and Development, U. S. Environmental Protection Agency, December 1973.

- Self, Peter. "Planning and politics," *Town and Country Planning*, 40, 9 (September 1972), 398-400.
- Sellers, James. "Recapturing ways of saying 'we,'" *Center Magazine*, 7, 6 (November-December 1974), 65-78.
- Selman, Jerome H. N. "Decision risk analysis: risk theory," pp. 79-101 in National Academy of Sciences (ed.), *Proceedings of the Conference on Hazard Evaluation and Risk Analysis*, Houston, TX, 18-19 August 1971. Washington, DC: National Academy of Sciences, 1971.
- Senior, Derek. "Planning and the public," pp. 113-31 in Peter Cowan (ed.), *The Future of Planning*. Beverly Hills, CA: Sage, 1973.
- Sennett, Richard. *The Uses of Disorder: Personal Identity and City Life*. New York: Alfred A. Knopf, 1970.
- Sessions, Vivian S. (ed.). *Directory of Data Bases in the Social and Behavioral Sciences*. New York: Science Associates, 1974.
- Sewell, W. R. "Broadening the approach of evaluation to resources management decision-making," *Journal of Environmental Management*, 1 (1973), 33-60.
- Sewell, W. R. Derrick. "Climate and weather control," pp. 30-41 in Boris Pregel and others, *Public Policy toward Environment, 1973: A Review and Appraisal*. Annals of the New York Academy of Sciences, 216 (18 May 1973).
- Sewell, W. R. Derrick (ed.). *Environmental Quality*. Sage Contemporary Social Science Issues 13. Beverly Hills, CA: Sage, 1974.
- Sewell, W. R. Derrick (ed.). *Human Dimensions of Weather Modification*.
- Shafer, Elwood L., Jr., John F. Hamilton, Jr. and Elizabeth A. Schmidt. "Natural landscape preferences: a predictive model," *Ergonomics*, 29, 173 (April 1970), 278-83.
- Sharkansky, Ira. "System analysis by McNamara and Easton: a proposal of marriage," pp. 148-59 in Thomas R. Dye (ed.), *The Measurement of Policy Impact: Proceedings of the Conference on the Measurement of Policy Impact*, Tallahassee, Florida, 1971.
- Sheaffer, John R., George W. Davis and Alan P. Richmond. *Community Goals--Management Opportunities: An Approach to Flood Plain Management*. IWR Report 70-2. Alexandria, VA: Institute for Water Resources, U. S. Army Corps of Engineers, May 1970.
- Sheldon, Eleanor B. and Wilbert E. Moore. "Toward the measurement of social change: implications for progress," in Leonard H. Goodman (ed.), *Economic Progress and Social Welfare*. New York: Columbia University Press, 1966.
- Sheldon, Eleanor Bernert and Robert Parke. "Social indicators," *Science*, 188, 4189 (16 May 1975), 693-99.
- Shelly, Maynard W., II and Glenn L. Bryan (eds.). *Human Judgments and Optimality*. New York: John Wiley, 1964.

Shepard, Roger N. "On subjectively optimum selection among multiattribute alternatives," pp. 257-81 in Maynard W. Shelly, II and Glenn L. Bryan (eds.), *Human Judgments and Optimality*. New York: John Wiley, 1964.

Shepard, Roger N., A. Kimball Romney and Sara Beth Nerlove (eds.). *Multidimensional Scaling: Theory and Applications in the Behavioral Sciences*. 2 vols. New York: Academic Press, 1972.

Sheridan, Thomas B. "Citizen feedback: new technology for social choice," *Technology Review*, 73, 3 (January 1971), 38-45.

Sheridan, Thomas B. "Community dialog technology," *Proceedings of the IEEE*, 63, 3 (March 1975), 463-75.

Shields, Mark A. *Social Impact Assessment: An Analytic Bibliography*. IWR Paper 74-P6. Fort Belvoir, VA: Institute for Water Resources, U. S. Army Corps of Engineers, October 1974.

Shipman, George A. "The evaluation of social innovation," *Public Administration Review*, 31, 2 (March-April 1971), 198-200.

Shore, William B. *Public Participation in Regional Planning*. Ed. by John P. Keith. New York: Regional Plan Association, 1967.

Shuman, Jack H. "Cultural heterogeneity in social systems: its policy implications." Paper presented at the 71st Annual Meeting of the American Anthropological Association, Toronto, ON, 1 December 1972. 82 p. mimeo.

Siddall, William R. "No nook secure: transportation and environmental quality," *Comparative Studies in Society and History*, 16, 1 (January 1974), 2-23.

Siddall, William R. "The traveler's view: transportation and the appreciation of landscape," *Journal of the American Institute of Planners*, 40, 2 (March 1974), 105-9.

Sigler, J. and A. Langowski. *Citizen Attitudes toward the Environment: An Appraisal of the Research*. Urbana: University of Illinois, November, 1971.

Sills, David L. "The environmental movement at its critics," *Human Ecology*, 3, 1 (1975), 1-41.

Simon, Julian L. "Interpersonal welfare comparisons can be made--and used for redistributive decisions," *Kyklos*, 27, 1 (1974).

Sims, John H. and Duane D. Baumann (eds.). *Human Behavior and the Environment: Interactions between Man and His Physical World*. Chicago: Maaroufa, 1974.

Sinclair, C. "The methodology of risk estimation in technology assessment." Paper prepared for the NATO Advanced Study Institute on Technology Assessment, Milan, Italy, 18-29 September 1972. 13 p.

Sinden, J. A. "A utility approach to the valuation of recreational and aesthetic experiences," *American Journal of Agricultural Economics*, February 1974.

- Singer, Ronald. "The planner as value neutral," *Plan: Journal of the Town Planning Institute of Canada*, 11, 2.
- Singh, Raghu N. *Kona Dam Vs. Konatown: A Sociological Interpretation of Selected Impacts of Reservoir Development on a Community Field*. Commerce: Department of Sociology and Anthropology, East Texas State University, February 1975.
- Singh, Raghu N. "Toward a sociological analysis of Sulphur River Basin," pp. 13-49 in Arthur M. Pullen and others (eds.), *An Environmental Inventory and Survey of the Sulphur River Basin*. Commerce: East Texas State University, 1971.
- Singh, Raghu N. and Kenneth P. Wilkinson. "On the measurement of environmental impacts of public projects from a sociological perspective," *Water Resources Bulletin*, 10, 3 (June 1974), 415-25.
- Sinton, John W. *Charles River: An Urban River in Its Changing Social Contexts*. Publication No. 23. Amherst: Water Resources Research Center, University of Massachusetts.
- Sisk, John P. "The future of prediction," pp. 325-33 in Dick Allen (ed.), *Science-Fiction: The Future*. New York: Harcourt Brace Jovanovich, 1971.
- Skjei, Stephen S. *Information for Collective Action: A Microanalytic View of Plural Decision-Making*. Lexington, MA: D. C. Heath, 1973.
- Skjei, Stephen S. "Urban systems advocacy," *Journal of the American Institute of Planners*, 38, 1 (January 1972), 11-24.
- Sloan, Allan K. *Citizen Participation in Transportation Planning*. Cambridge, MA: Ballinger, 1975?
- Smith, Charles Robert. *Anticipations of Change: A Socio-Economic Description of a Kentucky County before Reservoir Construction*. Research Report No. 28. Lexington: Water Resources Research Institute, University of Kentucky, 1970.
- Smith, Charles R. "Economic institutions as social indicators." Paper presented at the 17th Annual Meeting of the American Society for Ethnohistory. Ithaca, NY, October 1969.
- Smith, Courtland L. "Self-interest groups and human emotion as adaptive mechanisms," pp. 151-68 in Donald R. Field, James C. Barron and Burl F. Long (eds.), *Water and Community Development: Social and Economic Perspectives*. Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Smith, C. L., R. Hart and J. Sanders. "The socio-cultural impacts of water resource development in the Santiam." Paper presented at the Annual Meeting of the American Anthropological Association, New Orleans, LA, 20-23 November 1969.
- Smith, Courtland L. and Thomas C. Hogg. "Cultural aspects of water resources development past, present, and future," *Water Resources Bulletin*, 7, 4 (August 1971), 625-60.

- Smith, David M. *The Geography of Social Well-Being in the United States: An Introduction to Territorial Social Indicators*. New York: McGraw-Hill, 1973.
- Smith, Richard Warren. "A theoretical basis for participatory planning," *Policy Sciences*, 4, 3 (September 1973), 275-95.
- Smith, William L. "Quantifying impact of transportation systems," *Journal of the Urban Planning and Development Division, ASCE*, 100, UPI (March 1974), 79-91.
- Snyder, Harold. "The future directions of assessment of impacts," pp. 7-8 in Gordon A. Enk and others, *Assessing the Social Impacts of Oil Spills*. Rensselaerville, NY: Institute on Man and Science, February 1974.
- Social Change Systems, Inc. - *Sociological Report of the Rapid City Flood*. Denver, CO: Social Change Systems, Inc., 21 August 1972.
- Soil Conservation Service. "Preparation of environmental impact statements: proposed guidelines," *Federal Register*, 38, 222 (19 November 1973), 31909-21.
- Socioeconomic Studies Division, Office of Program and Policy Planning, Federal Highway Administration. *Social and Economic Effects of Highways*. Washington, DC: U. S. Department of Transportation, 1974.
- Sonenblum, Sidney and Louis H. Stern. "The use of economic projections in planning," *Journal of the American Institute of Planners*, 30, 2 (May 1964), 110-23.
- Sorokin, Pitirim A. "Is accurate social planning possible?" *American Sociological Review*, 1, 1 (February 1936), 12-28.
- Spangler, Miller B. *The Role of Research and Development in Water Resources Planning and Management for Achieving Urban Goals*. Washington, DC: Center for Techno-Economic Studies, National Planning Association, May 1972.
- Spangler, Miller B. "The treatment of risk and uncertainty in cost-benefit analysis of environmental impact statements for nuclear power plant licensing actions." Paper presented in Session XI at the Specialty Conference on Probabilistic Methods in Engineering, ASCE, Stanford, CA, 24-26 June 1974. 32 p.
- Sparks, Cecil. "Assessment of social impacts anticipated from the proposed project: Arkansas River--Keystone Lake to Webbers Falls Lock and Dam (Oklahoma)." Dallas, TX: Southwestern Division, Corps of Engineers, November 1973. 15 p.
- Sparks, Cecil W. *The Corps of Engineers and a New Approach to Project Evaluations*. Unpublished masters thesis. Denton: North Texas State University, August 1973.
- Spautz, M. "The socio-economic gap," pp. 111-99 in *Social Science Research*, 1. Logan, UT: Seminar Press, 1972.
- Special Commission on the Social Sciences of the National Science Board. *Knowledge into Action: Improving the Nation's Use of the Social Sciences*. Washington, DC: National Science Foundation, 1969.
- Special Task Force. *A Summary Analysis of Nineteen Tests of Proposed Evaluation Procedures on Selected Water and Land Resource Projects*. Washington, DC: Water Resources Council, July 1970.

- Spengler, Joseph J. "Is social science ready?" pp. 54-73, in Louis A. Zurcher, Jr. and Charles M. Bonjean (eds.), *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler, 1970.
- Spiegel, Hans B. C. "Changing assumptions about community change," *Ekistics*, 36, 213 (August 1973), 125-28.
- Springer, Michael. "Social indicators, social reports, and social accounts." Operation PEP. San Mateo, CA: San Mateo County Board of Education, March 1970.
- Srole, Leo. "Social integration and certain corollaries," *American Sociological Review*, 21 (1956), 709-16.
- Stagner, Ross. "Perceptions, aspirations, frustrations, and satisfactions: an approach to urban indicators," *Ekistics*, 30, 178 (September 1970), 197-99.
- Stanford, Melvin J. "Forecasting future land values with present-value techniques," *Appraisal Journal*, January 1973.
- Stanford Research Institute. *Future Urban Transportation Systems: Impacts on Urban Life and Form. Final Report 2*. Washington, DC: U. S. Department of Housing and Urban Development, March 1968.
- Stankey, George H., John C. Hendee and Roger N. Clark. "Applied social research can improve public participation in resource decision making," *Rural Sociology*, 40, 1 (Spring 1975), 67-74.
- Starr, Chauncey. "Benefit-cost studies in socio-technical systems," pp. 6-39 in National Academy of Sciences (ed.), *Proceedings of the Conference on Hazard Evaluation and Risk Analysis*, Houston, TX, 18-19 August 1971. Washington, DC: National Academy of Sciences, 1971.
- Starr, Chauncey. "Social benefit versus technological risk," *Science*, 165 (19 September 1969), 1232-38.
- Stein, Bruno and S. M. Miller (eds.). *Incentives and Planning in Social Policy*. Chicago: Aldine, 1975.
- Steinitz, Carl and others. *A Comparative Study of Resource Analysis Methods*. Cambridge, MA: Department of Landscape Architecture Research Office and Graduate School of Design, Harvard University, August 1969.
- Sternlieb, George and Robert W. Burchell. "The numbers game: forecasting household size," *Urban Land*, 33, 1 (January 1974), 3-20.
- Stewart, Thomas R. and Derick O. Steinmann. "Community goals: a study of relative importance." Report No. 156. Boulder: Institute of Behavioral Science, University of Colorado, May 1973.
- Stimson, J. Michael. "Impact zoning," *House and Home*, 42, 2 (August 1972), 58-67.
- Stober, Gerhard J. and Dieter Schumacher (eds.). *Technology Assessment and Quality of Life*. New York: Elsevier Scientific, 1973.

- Stockwell, Edward G. "A methodology consideration for studying the consequences of population decline," *Rural Sociology*, December 1969.
- Stokey, Stanley R. "Citizens participation and the new environmentalism," *Journal of the Urban Planning and Development Division, ASCE*, 99, UPI (March 1973), 69-75.
- Stover, John. "Suggested improvements to the Delphi/cross-impact technique," *Futures*, 5, 3 (June 1973), 308-13.
- Stratford, Alan H. *Airports and the Environment: A Study of Air Transport Development and Its Impact upon the Social and Economic Well-Being of the Community*. New York: St. Martin's Press, 1974.
- Studer, Raymond G. and David Stea. "Architectural programming, environmental design, and human behavior," *Journal of Social Issues*, 22, 4 (October 1966), 127-36.
- Suchman, Edward A. *Evaluative Research: Principles and Practice in Public Service and Social Action Programs*. New York: Russell Sage Foundation, 1967.
- Sucov, E. W. and C. K. Liang. "A methodology for evaluating community acceptance of power plants," *Transactions of the American Nuclear Society Conference on Nuclear Power Plant Siting, Portland, OR, 28 August 1974*, 51-53.
- Susskind, Lawrence. "Emerging issues in curriculum development," *DUSP (Department of Urban Studies and Planning, Massachusetts Institute of Technology) Newsletter*, 1, 1 (November 1973), 3, 5.
- Sussna, Stephen. "Mobile home parks and American municipalities," *Journal of the Urban Planning and Development Division, ASCE*, 97, UP2 (December 1971), 139-48.
- Sussna, Stephen and Jack Kirchhoff. "A neglected opportunity: the problem of premature subdivisions," *Urban Lawyer*, 3, 1 (Winter 1971), 126-34.
- Suttles, Gerald D. *Social Construction of Communities*. Chicago: University of Chicago Press, 1974.
- Swan, James A., Fred Arnstein and Robert Ross. *Water Resources Management and Life Styles: A Report to the National Water Commission*. Ann Arbor: Center for Research on the Utilization of Scientific Knowledge, Institute of Social Research, University of Michigan, September 1971.
- Swoboda, Richard A. *Socio-Economic Implications of Urban Transportation. Band 4*. Stuttgart: Institut für Städtebau und Raumordnung.
- Tallet, Margaret. "The factor of the quality of the physical environment as an index of growth potential," *Ekistics*, 29, 173 (April 1970), 286-91.
- Task Committee on Mobile Home Parks. "Report relating the impact of mobile homes on urban plans and housing systems," *Journal of the Urban Planning and Development Division, ASCE*, 100, UPI (March 1974), 7-16.

- Taylor, Carl C. "Sociologists' part in planning the Columbia basin," *American Sociological Review*, 11 (1946), 321-29.
- Technical Committee of the Water Resources Centers of the Thirteen Western States. *Water Resources Planning and Social Goals: Conceptualization toward a New Methodology*. Utah Water Research Laboratory Publication PRWG-94-1. Logan: Office of Water Resources Research, 1 September 1971.
- Technical Committee of the Water Resources Research Centers of the Thirteen Western States. *Water Resources Planning, Social Goals, and Indicators: Methodological Development and Empirical Test*. Logan: Utah Water Research Laboratory, Utah State University, 31 December 1974.
- Teitz, M. D. "Technical and social bases for regional land use policy and planning," *Papers of the Regional Science Association*, 32 (1974).
- Terleckyj, Nestor E. "Estimating possibilities for improvement in the quality of life in the United States, 1972-1981." Summary of the Goals Accounting Study of the National Planning Association. 3 January 1973. 31 p. (draft)
- Terleckyj, Nestor E. "Measuring possibilities of social change," *Looking Ahead*, August 1970.
- Terleckyj, Nestor E. "Measuring progress towards social goals: some possibilities at national and local levels," *Management Science*, 16 (August 1970).
- Theil, Henri. *Statistical Decomposition Analysis: With Applications in the Social and Administrative Sciences. Studies in Mathematical and Managerial Economics*, Vol. 14. New York: American Elsevier, 1972.
- Thiesenhusen, William C. "What changing technology implies for agrarian reform," *Land Economics*, February 1974.
- Thomas, L. and others. *Socio-Economic Impact Analysis of the Proposed Sterling Power Plant Prepared for the Cayuga County Environmental Management Council*. MTR-6737. McLean, VA: Mitre Corporation, August 1974.
- Thomas, William A. (ed.). *Scientists in the Legal System: Tolerated Meddlers or Essential Contributors?* Ann Arbor, MI: Ann Arbor Science Publishers, 1974.
- Thome, P. G. and R. G. Willard. "The systems approach: a unified concept of planning," pp. 211-27 in Stanford L. Optner (ed.), *Systems Analysis*. Baltimore, MD: Penguin, 1973.
- Thuesen, Gerald J. *A Study of Public Attitudes and Multiple Objective Decision Criteria for Water Pollution Control Projects*. ERC-1071. Atlanta: Environmental Resources Center, Georgia Institute of Technology, October 1971.
- Tillman, Donald C. and Lloyd D. Paulsen. "Venice Waterways Project impact reports," *Journal of the Urban Planning and Development Division, ASCE*, 100, UP2 (November 1974), 191-99.
- Toffler, Alvin. "Anticipatory democracy and the prevention of future shock," pp. 74-78 in George Chaplin and Glenn D. Paige (eds.), *Hawaii 2000: Continuing Experiment in Anticipatory Democracy*. Honolulu: University Press of Hawaii, 1973.

- Tryon, R. C. and D. E. Bailey. Cluster Analysis. New York: McGraw-Hill, 1970.
- Tuan, Yi-Fu. "Attitudes toward environment: themes and approaches," pp. 4-17 in David Lowenthal (ed.), Environmental Perception and Behavior. Research Paper No. 109. Chicago: Department of Geography, University of Chicago, 1967.
- Turk, Herman. Interorganizational Activation in Urban Communities: Deductions from the Concept of System. Washington, DC: American Sociological Association, September 1973.
- Turner, John F. C. and Robert Fichter (eds.). Freedom to Build: Dweller Control of the Housing Process. New York: Macmillan, 1972.
- Turner, Jonathan. "Patterns of value change during economic development: an empirical study," Human Organization, 30, 2 (Summer 1971), 126-36.
- Turoff, Murray. "An alternative approach to cross impact analysis," Technological Forecasting and Social Change, 3 (1972), 309-39.
- Turvey, Ralph. "Side effects of resource use," pp. 47-60 in Henry Jarrett (ed.), Environmental Quality in a Growing Economy. Baltimore, MD: Johns Hopkins Press, 1966.
- Tyson, Cyril D. "The control of technology by disadvantaged communities." Paper presented to the 66th Annual Meeting of the American Sociological Association, Denver, CO, 30 August 1971.
- U. S. Advisory Commission on Intergovernmental Relations. Relocation: Unequal Treatment of People and Businesses Displaced by Governments. Washington, DC: U. S. Government Printing Office, January 1965.
- U. S. Bureau of the Census. Indexes to Survey Methodology Literature. Technical Paper No. 34. Washington, DC: U. S. Government Printing Office, 1974.
- U. S. Department of Health, Education, and Welfare. Toward a Social Report. Washington, DC: U. S. Government Printing Office, 1969.
- Utton, Albert E. and Daniel H. Hennings (eds.). Interdisciplinary Environmental Approaches. Costa Mesa, CA: Educational Media Press, 1974.
- Vaccaro, M. J. "A systems approach to the management of large projects: review of NASA experience with societal implications." Greenbelt, MD: Goddard Space Flight Center, National Aeronautics and Space Administration, May 1973. 11 p.
- Van Arsdol, Maurice D., Jr. "Metropolitan growth and environmental hazards: an illustrative case," Ekistics, 21, 122 (January 1966), 2-4.
- Van Arsdol, Maurice D., Jr., Georges Sabagh and Francesca Alexander. "Reality and the perception of environmental hazards," Journal of Health and Human Behavior, 5, 4 (Winter 1964), 144-53.
- van Dresser, Peter. Development on a Human Scale. New York: Praeger, 1973.

- Vaut, Gregory A. and Cleve E. Willis. "Non-efficiency objectives and decision-making in water resources developments," *Water Resources Bulletin*, 9, 6 (December 1973), 1182-87.
- Vedder, James. "Planning problems with multidimensional consequences," *Journal of the American Institute of Planners*, 36, 2 (March 1970), 112-19.
- Vestermark, S. D., Jr. (ed.). "Indicators of social vulnerability." McLean, VA: Human Sciences Research, Inc., August 1968.
- Vickers, Geoffrey. "Projections, predictions, models and policies," *The Planner*, April 1974, 636-40.
- Victor, Peter A. *Pollution: Economy and Environment*. Toronto: University of Toronto Press, 1972.
- Vlachos, Evan. "The human community," pp. 6-1 to 6-80 in David Hendricks and others (eds.), *Environmental Design and Public Projects: I*. Fort Collins: Environmental Engineering Program, Colorado State University, 1973.
- Vlachos, Evan. "Sociology in 'interdisciplinary environmental perspectives.'" Unpublished manuscript. Fort Collins: Department of Sociology, Colorado State University, 1974. 36 p.
- Vlachos, Evan. "Social aspects of the environment," pp. 31-39 in P. O. Foss (ed.), *Environment and Colorado: A Handbook*. Fort Collins: Environmental Research Center, Colorado State University, 1973.
- Vlachos, Evan. "Social data requirements." Unpublished manuscript, n.d. (1973?) 8 p. mimeo.
- Vlachos, Evan. "Sociological considerations in irrigation water management: facing problems of water quality control," pp. 285-306 in *Proceedings of the National Conference on Managing Irrigated Agriculture to Improve Water Quality*, Fort Collins, CO, 16-18 May 1972.
- Vlachos, Evan and others. *Procedural Guidelines for Social Impact Assessment*. Fort Belvoir, VA: Institute for Water Resources, U. S. Army Corps of Engineers, June 1975.
- Vonier, Thomas V. and Richard A. Scribner. *Community Information Expositions: Issue-Oriented Displays and Popular Understanding of Social Problems*. Washington, DC: American Association for the Advancement of Science, 1973.
- Walker, Harvey C., Jr. "A stochastic approach to impact assessment," pp. 106-19 in Hydrologic Engineering Center (ed.), *Proceedings of a Seminar on Analytical Methods in Planning*, 26-28 March 1974. Davis, CA: Hydrologic Engineering Center, 1974.
- Wallace, L. T., John W. Mamer and George E. Goldman. "Citizen options for resource planning," *Planning*, 39, 7 (August 1973), 23-24.
- Walter, G. R. "Towards an operational theory of the urban resident," *Annals of Regional Science*, June 1971.

- Warfield, John N. An Assault on Complexity. Battelle Monograph No. 3. Columbus, OH: Battelle Memorial Institute, April 1973.
- Warfield, John N. Structuring Complex Systems. Battelle Monograph No. 4. Columbus, OH: Battelle Memorial Institute, April 1974.
- Warheit, George J., Roger A. Bell and John J. Schwab. Planning for Change: Needs Assessment Approaches. Bethesda, MD: National Institute of Mental Health, n.d. (1974).
- Warner, Dennis. "A preliminary assessment of the impact of rural water supply upon households and villages in Tanzania," *Ekistics*, 31, 187 (June 1971), 452-58.
- Warner, Maurice L. "Aggregates and externalities: information needs for public natural resource decision-making," *Natural Resources Journal*, 13, 1 (January 1973).
- Warner, Maurice L. "Water resource projects and environmental impacts: towards a conceptual model." Madison: Water Resources Center, University of Wisconsin, 1972.
- Warner, Maurice L. and Edward H. Preston. "A review of environmental impact assessment methodologies." Washington, DC: Office of Research and Development, U. S. Environmental Protection Agency, April 1974.
- Warner, Maurice L. and others. An Assessment Methodology for the Environmental Impact of Water Resource Projects. Washington, DC: Office of Research and Development, U. S. Environmental Protection Agency, July 1974.
- Warner, W. Keith. "Some problems in measuring the social consequences of large-scale development projects," pp. 171-85 in Wade H. Andrews and others (eds.), *The Social Well-Being and Quality of Life Dimension in Water Resources Planning and Development*. Logan: Institute for Social Science Research on Natural Resources, Utah State University, 1973.
- Warner, W. Keith. "The structural matrix of development," in G. M. Beal and others, *Sociological Perspective on Domestic Development*. Ames: Iowa State University Press, 1971.
- Warren, Roland L. "Alternative community paradigms." Paper presented at the 44th Annual Meeting of the Eastern Sociological Society, Philadelphia, PA, 6 April 1974. 24 p. mimeo.
- Water Resources Council. "175 water assessment: the example." Washington, DC: Water Resources Council, July 1974.
- Water Resources Council. "Water and related land resources: establishment of principles and standards for planning," *Federal Register*, 38, 174 (10-September 1973), 24778-869.
- Water Resources Research Institute. Public Participation in Willamette Valley Environmental Decisions. Corvallis: Water Resources Research Institute, Oregon State University, April 1973.

- Watkins, George Alfred. "Developing a 'water concern' scale," *Journal of Environmental Education*, 5, 4 (Summer 1974).
- Watt, D. C. "The high dam at Aswan and the politics of control," pp. 106-27 in Neville Rugin and William H. Warren (eds.), *Dams in Africa: An Interdisciplinary Study of Man-Made Lakes in Africa*. London: Frank Cass, 1968.
- Watt, Kenneth E. F. *The Titanic Effect: Planning for the Unthinkable*. New York: E. P. Dutton, 1974.
- Webb, Kenneth and Harry P. Hatry. *Obtaining Citizen Feedback: The Application of Citizen Surveys to Local Governments*. Washington, DC: The Urban Institute, 1973.
- Webb, Vincent Joel. *Forced Resettlement and Attitude Change: A Study of Cognitive Dissonance*. Unpublished masters thesis. Omaha: Department of Sociology, University of Nebraska, 1969.
- Webber, Melvin M. "Alternative styles for citizen participation in transport planning." Reprint No. 89. Berkeley: Institute of Urban and Regional Development, University of California, 1974. 8 p.
- Webber, Melvin M. "Comprehensive planning and social responsibility," pp. 9-22 in Bernard J. Frieden and Robert Morris (eds.), *Urban Planning and Social Policy*. New York: Basic Books, 1968.
- Webber, Melvin M. "Order in diversity: community without propinquity," pp. 23-54 in Lowden Wingo, Jr. (ed.), *Cities and Space: The Future Use of Urban Land*. Baltimore, MD: The Johns Hopkins Press, 1963.
- Webber, Melvin M. "Planning in an environment of change: I. Beyond the industrial age," *Town Planning Review*, 39, 3 (October 1968), 179-95.
- Webber, Melvin M. "Planning in an environment of change: II. Permissive planning," *Town Planning Review*, 39, 4 (January 1969), 278-95.
- Webber, Melvin M. "The prospects for policies planning," pp. 319-30 in Leonard J. Duhl (ed.), *The Urban Condition*. New York: Simon and Schuster, 1969.
- Webber, Melvin M. "Societal contexts of transportation and communication." Working Paper No. 220. Berkeley: Institute of Urban and Regional Development, University of California, November 1973. 19 p.
- Weidenbaum, Murray L. "Federal resources and urban needs," pp. 61-78 in Sam Bass Warner, Jr. (ed.), *Planning for a Nation of Cities*. Cambridge, MA: M.I.T. Press, 1966.
- Weidenbaum, Murray L. "Toward a modern public sector," *Conference Board Record*, September 1970.
- Weisbecker, Leo W. (comp.). *The Impacts of Snow Enhancement: Technology Assessment of Winter Orographic Snowpack Augmentation in the Upper Colorado River*. Norman: University of Oklahoma Press, 1974.

- Weizenbaum, J. "On the impact of the computer on society," *Science*, 176, 4035 (1972), 609-14.
- Weinberg, Alvin M. "Can technology replace social engineering?" *Bulletin of the Atomic Scientists*, December, 1966, 4-8.
- Weismantel, William. "Legislating the urban design process," *Urban Law Annual*, 1970.
- Wells, Louis T., Jr. "Social cost-benefit analysis for MNCs," *Harvard Business Review*, 53, 2 (March-April 1975), 40-42, 46, 48, 150, 152, 154.
- Wenger, Dennis E. and Jack M. Weller. "Disaster subcultures: the cultural residues of community disasters." Unpublished manuscript, n.d. 35 p.
- Wengert, Norman. "Political and social accommodation as a basic element in planning," 55-71 in John A. Straayer (ed.), *Focus on Change: Intergovernmental Relations in Water Resources Planning*. Policy Science Papers No. 1. Fort Collins: Department of Political Science, Colorado State University, January, 1970.
- Wengert, Norman. "Where can we go with public participation in the planning process?" pp. 9-18 in Leonard B. Dworsky, David J. Allee and Sandor C. Csallany (eds.), *Social and Economic Aspects of Water Resources Development*. Urbana, IL: American Water Resources Association, 1972.
- Wenk, Edward, Jr. "Technology assessment in public policy: a new instrument for social management of technology," *Proceedings of the IEEE*, 63, 3 (March 1975), 371-79.
- Westman, Walter E. and Roger M. Gifford. "Environmental impact--controlling the overall level," *Science*, 31 August 1973.
- Westoff, Charles F. and Ronald R. Rindfuss. "Sex preselection in the United States: some implications," *Science*, 184, 4137 (10 May 1974), 633-36.
- Wheeler, James O. "Social interaction and urban space," *Journal of Geography*, April 1971.
- Whetten, Nathan L. "Sociology and the conservation of renewable natural resources," in *Proceedings of the Inter-American Conference on Conservation of Renewable Natural Resources*, Denver, CO, 7-20 September 1948. Washington, DC: U. S. Department of State, Publication 3382.
- Whinson, Andrew. "Some notes on equating private and social costs," *Southern Economic Journal*, October 1965.
- White, David C. "The energy-environment-economic triangle," *Technology Review*, 76, 2 (December 1973), 11-19.
- White, Gilbert F. *Strategies of American Water Management*. Ann Arbor: University of Michigan Press, 1971.
- White, Gilbert F. (ed.). *Natural Hazards: Local, National, Global*. New York: Oxford University Press, 1974.

- White, Gilbert F. and J. Eugene Haas. *Assessment of Research on Natural Hazards*. Cambridge, MA: M.I.T. Press, 1975.
- Whitman, Ira L., Richard M. Davis and Seymour E. Goldstone. "Measuring impacts of urban water development," *Water Resources Bulletin*, 7, 4 (August 1971), 661-69.
- Whitman, Ira L. and others. *Design of an Environmental Evaluation System*. Columbus, OH: Battelle Memorial Institute, 1971.
- Wholey, Joseph S. "Contributions of social intervention research to government practices." Washington, DC: The Urban Institute, September 1973.
- Wholey, Joseph S. and others. *Federal Evaluation Policy: Analyzing the Effects of Public Programs*. Washington, DC: The Urban Institute, 1970.
- Wicker, Allan W. "Attitudes versus actions: the relationship of verbal and overt behavioral responses to attitude objects," *Journal of Social Issues*, 25, 4 (Fall 1969), 41-78.
- Wiebe, J. E. "Cluster analysis and water project evaluation," *Water Resources Bulletin*, 8, 6 (December 1972), 1189-97.
- Wiek, Klaus D. *Socio-Economic Structures: A Basic Model for Their Identification--Illustrated for West Germany and Illinois*. Berkeley, CA: Lewis, 1971.
- Wilcox, L. D. and others. "Social indicators: an alternative approach for future research." *Journal Paper No. J-7132*. Ames: Iowa Agricultural and Home Economics Experiment Station, 1972.
- Wilcox, Leslie and others. *Social Indicators and Societal Monitoring*. San Francisco: Jossey-Bass, 1972.
- Wildavsky, Aaron. "Does planning work?" *The Public Interest*, 24 (Summer 1971), 95-104.
- Wildavsky, Aaron. "The political economy of efficiency," *The Public Interest*, 8 (Summer 1967), 30-48.
- Wildavsky, Aaron. "Rescuing policy analysis from PPBS," pp. 461-81 in Robert H. Haveman and Julius Margolis (eds.), *Public Expenditures and Policy Analysis*. Chicago: Markham, 1970.
- Wilen, J. E. "A model of economic system-ecosystem interaction," *Environment and Planning*, 5, 3 (May-June 1973), 409-20.
- Wilkening, E. A. and others. *Quality of Life in Kickapoo Valley Communities*. Report 11. Madison: Institute for Environmental Studies, University of Wisconsin, September 1973.
- Wilkinson, Kenneth P. "A field-theory perspective for community development research," *Rural Sociology*, 37 (1972), 43-52.
- Wilkinson, Kenneth P. and Lucy W. Cole. *Sociological Factors in Watershed Development*. State College: Water Resources Research Institute, Mississippi State University, July 1967.

- Wilkinson, Kenneth P. and Raghu N. Singh. "Social science studies of water resources problems: review of literature and annotated bibliography." State College: Mississippi State University, 1968.
- Willeke, Gene E. "Identification of publics in water resources planning." ERC-1774. Atlanta: Department of City Planning and Environmental Resources Center, Georgia Institute of Technology, September 1974.
- Willeke, Gene E. and others. "Design of the social and behavioral data collection and analysis activities of the Atlanta Urban Study." Atlanta: Georgia Institute of Technology, 21 March 1973. 44 p. mimeo.
- Williams, D. C., Jr. and Charles P. Cartee. "Socioeconomic impacts of rural water supplies," Water Resources Bulletin, 10, 1 (February 1974), 144-52.
- Williams, J. Allen, Jr. "The effects of urban renewal upon a black community: evaluation and recommendations," pp. 377-86 in Louis A. Zurcher, Jr. and Charles M. Bonjean (eds.), Planned Social Intervention: An Interdisciplinary Anthology. San Francisco: Chandler, 1970.
- Williams, John S., Jr. and Stephen Spigel. Socio-Economic Impact of Estuarine Thermal Pollution. Washington, DC: MetroStudy Corporation, 1974.
- Willis, Margaret. "Sociological aspects of urban structure," Town Planning Review, 39, 4 (January 1969); 296-306.
- Willis, Reed, Allen LeBaron and Hubert Fullerton. "Preliminary indicators of income/wealth redistribution associated with Bureau of Reclamation projects." Logan: Department of Economics, Utah State University, April 1973.
- Willmott, Peter. "Some social trends," pp. 8-30 in Peter Cowan (ed.), Developing Patterns of Urbanization. Beverly Hills, CA: Sage, 1970.
- Willmott, Peter. "The tasks for planning," pp. 10-23 in Peter Cowan (ed.), The Future of Planning. Beverly Hills, CA: Sage, 1973.
- Wilson, A. G. "Forecasting 'planning,'" pp. 69-89 in Peter Cowan (ed.), Developing Patterns of Urbanization. Beverly Hills, CA: Sage, 1970.
- Wilson, Alan. "How planning can respond to new issues," pp. 24-43 in Peter Cowan (ed.), The Future of Planning. Beverly Hills, CA: Sage, 1973.
- Wilson, Des. "The social aims of planning," Ekistics, 29, 172 (March 1970), 175-78
- Wilson, J. W. People in the Way: The Human Aspects of the Columbia River Project. Toronto: University of Toronto Press, 1973.
- Wilson, James Q. "The dead hand of regulation," The Public Interest, 25 (Fall 1971); 39-58.
- Wilson, John Oliver. "Social experimentation and public-policy analysis," Public Policy, 22, 1 (Winter 1974), 15-37.
- Wilson, John Q. Quality of Life in the United States: An Excursion into the New Frontier of Socio-Economic Indicators. Kansas City, MO: Midwest Research Institute, 1969.

- Wilson, Raymond H. *Toward a Philosophy of Planning: Attitudes of Federal Water Planners*. Washington, DC: Office of Research and Monitoring, U. S. Environmental Protection Agency, March 1973.
- Winthrop, Henry. "Social systems and social complexity in relation to interdisciplinary policymaking and planning," *Policy Sciences*, 3, 4 (December 1972), 405-20.
- Winthrop, Henry. "Total environmental management: an approach to the dilemmas of the affluent society," *Futures*, 2, 4 (December 1970), 332-40.
- Witkin, Erwin. *The Impact of Medicare*. Springfield, IL: Charles C. Thomas, 1971.
- Wohlwill, Joachim F. "Human adaptation to levels of environmental stimulation," *Human Ecology*, 2, 2 (April 1974), 127-47.
- Wohlwill, Joachim F. and Dan H. Carson (eds.). *Environment and the Social Sciences: Perspectives and Applications*. Washington, DC: American Psychological Association, 1972.
- Wolf, C. P. "Social impact assessment: the state of the art," pp. J-44 in C. P. Wolf (ed.), *Social Impact Assessment*. Milwaukee, WI: Environmental Design Research Association, 1974.
- Wolf, C. P. (ed.). *Social Impact Assessment*. Milwaukee, WI: Environmental Design Research Association, 1974.
- Wood, Thomas Joseph. *The Significance of Recreation as a Factor in the Development of Home Sites, Lake Whitney, Texas*. Unpublished doctoral dissertation. College Station: Texas A&M University, May 1972.
- Wortz, E. C. "The design of habitable environments." Paper prepared for the Symposium on Programming for Habitability, n.d.
- Wright, C. McK. "Landscape quality: a method of appraisal," *Royal Australian Planning Institute Journal*, Fall 1973.
- Wright, H. E., Jr. "Landscape development, forest fires, and wilderness management," *Science*, 186, 4163 (8 November 1974), 487-95.
- Wurster, Catherine Bauer. "The social responsibility of the planner," *Town and Country Planning*, 20, 96 (April 1952), 169-73.
- Wurster, Catherine Bauer. "Social effects of decentralization," pp. 41-46 in University of California (ed.), *Proceedings of the First Conference on City and Regional Planning Problems: Problems of Decentralization in Metropolitan Areas*, 1953. Berkeley: University of California, 1954.
- Yeates, M. "The congruence between housing space, social space, and community, and some experiments concerning its implications," *Environment and Planning*, 4, 4.
- Yin, Robert K. and Karen Heard. "Evaluating policy studies by using the case survey method." Unpublished manuscript. Washington, DC: Rand Corporation, n.d.

- Young, Dennis R. "Choosing among alternative complex systems when input characteristics are uncertain," *IEEE Transactions of Systems, Man, and Cybernetics*, January 1971.
- Young, Louise B. *Power over People*. New York: Oxford University Press, 1973.
- Young, Norman and Stanley Dea. "An approach to a new city: Palm Coast," *Environmental Affairs*, 2, 1 (Spring 1972), 127-53.
- Young, Richard R. and Alexander T. Henson. "A legal analysis of the requirements of Section 102(2)(c) of the National Environmental Policy Act of 1969," pp. 2-1 to 2-21 in Leonard Ortolano (ed.), *Analyzing the Environmental Impacts of Water Projects*. Institute for Water Resources Report 73-3. Springfield, VA: National Technical Information Service, March 1973.
- Yutzy, Daniel. "Priorities in community response," *American Behavioral Scientist*, January-February 1970.
- Zald, Mayer N. "The structure of society and social service integration," pp. 182-92 in Louis A. Zurcher, Jr. and Charles M. Bonjean (eds.), *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler, 1970.
- Zaltman, Gerald (ed.). *Processes and Phenomena of Social Change*. New York: John Wiley, 1973.
- Zapf, Wolfgang. "Social indicators: prospects for social accounting systems," *Social Science Information*, 11, 3-4 (June-August 1972), 243-78.
- Zeckhauser, Richard. "Uncertainty and the need for collective action," pp. 96-116 in Robert H. Haveman and Julius Margolis (eds.), *Public Expenditures and Policy Analysis*. Chicago: Markham, 1970.
- Zeckhauser, Richard and others (eds.). *Benefit-Cost and Policy Analysis 1974*. Chicago: Aldine; 1975.
- Zeisel, John. *Sociology and Architectural Design*. New York: Russell Sage Foundation, 1975.
- Zeman, Milos. "Futurology--illusion or reality?" *Futures*, 3, 1 (March 1971), 6-10.
- Zimmerman, Carle C. and Seth W. Russell. "Sociological implications of a Missouri River water diversion scheme," pp. 113-21 in Carle C. Zimmerman and Seth Russell (eds.), *Symposium on the Great Plains of North America*. Fargo: North Dakota Institute for Regional Studies, 1967.
- Zube, Ervin H. "Cross-disciplinary and intermode agreement on the description and evaluation of landscape resources," *Environment and Behavior*, 6, 1 (March 1974), 69-89.
- Zube, Ervin H., Robert O. Brush and Julius Gy. Fabos (eds.). *Landscape Assessment: Values, Perceptions, and Resources*. New York: Halsted Press.
- Zurcher, Louis A., Jr. and Charles M. Bonjean (eds.). *Planned Social Intervention: An Interdisciplinary Anthology*. San Francisco: Chandler, 1970.

Addenda

Environmental, Economic and Social Impacts of Mining Copper-Nickel in Northeastern Minnesota. Minneapolis: Department of Civil and Mining Engineering, University of Minnesota, 1975.

"Evaluation of highway impact." Highway Research Board Bulletin No. 268.