

ARTICLES

**SOCIAL IMPACT ASSESSMENTS CONDUCTED
BY FEDERAL AGENCIES:
AN EVALUATION**

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INTRODUCTION

This article reports on a study of the social impact assessments (SIAs) conducted by three federal agencies: the Army Corps of Engineers (the Corps), U.S. Forest Service (USFS), and Federal Highway Administration (FHWA). Using information gathered from the content of the final environmental impact statements (EISs), the authors evaluated (1) which SIA variables were being examined, (2) how these variables differed from agency to agency, and (3) if the planning agencies used trained social scientists to conduct the EISs. Earlier studies focused on developing a conceptual framework for SIAs, determining the problems encountered in conducting SIAs, or describing the SIA of a specific project. Few studies have systematically compared SIAs across agencies and projects. This study filled that void and tested the validity of the conceptual framework presented by the Interorganizational Committee on Guidelines and Principles (1994), Burdge and Connor

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(1993), and Gramling and Freudenburg (1992). The article concludes with three concrete recommendations for the practitioners and students of SIAs.

LITERATURE REVIEW

In 1978, the Council on Environmental Quality (CEQ) published *Regularions for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA)*, providing the legal foundation for conducting SIAs and requiring that—

. . . human environment should be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. . . . When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are inter-related, then the environmental impact statement will discuss all of these effects on the human environment (40 CFR 1508.14).

Since 1978, SIA has been used in various types of development projects or actions. The literature is replete with works on the development of guidelines, instruments, or conceptual frameworks on conducting SIAs (Burdge 1994; Finsterbusch 1995; Gramling and Freudenburg 1992; Burdge and Connor 1993). But much of the research related to evaluating SIAs has focused on specific projects rather than on systematic comparisons across projects. More important, the potential impacts on the human environment that have been examined have usually been economic, such as monetary compensation for the resettlement of populations who are directly affected (Freudenburg 1993; Rickson et al. 1994). The popular view is that economic impacts are easy to measure and that money can compensate for any adverse effects of the proposed actions (see, for instance, the World Bank's 1994 report detailing the impact of its projects on involuntary "resettlement"). Few SIA studies have focused on the social, religious, and psychological impacts of the proposed projects (Interorganizational Committee 1994). These effects are difficult to quantify and thus are likely to be excluded in the SIA process (Burdge and Vanclay 1996). Furthermore, some planning officials tend to equate SIAs with public-involvement programs, which are mainly designed to resolve the government's contradictory roles as development promoters and as public interest providers (Burdge and Connor 1993: 16; Novek 1995).

Despite the legal and administrative mandates, the number of SIAs conducted has declined significantly since 1980 (Finsterbusch 1995). Moreover, SIAs have not been fully integrated into the decision-making structure of agencies (Burdge and Vanclay 1996; Laska 1993). Agencies may be unwilling to implement SIA procedures because they are complex and there may be political ramifications from making the social consequences of projects and programs explicit. The social environment is different from the natural environment in that the social environment often involves people who can react and interpret the anticipated changes in different ways (Burdge and Vanclay 1996; Gramling and Freudenburg 1992). Although the study presented here did not directly evaluate how the outcomes of SIA processes affected the agencies' final decisions, the systematic examination of large numbers of SIAs will enhance the field's understanding of the role of SIA mandates in the NEPA process as well as improve the effectiveness and responsiveness of the planning agencies.

The three agencies that were studied accounted for the majority of EISs prepared by the federal agencies (CEQ 1985; Finsterbusch 1995). Geographically, the proposed projects-actions of these agencies were dispersed throughout the United States, with about 10 percent in the Northeast, 18 percent in the Midwest, 30 percent in the South, and 43 percent in the West (see table 1). Not only would they involve billions of taxpayers' dollars, but they would directly or indirectly affect the lives of millions of people, especially those of Native American tribes and racial minorities. Thus, the authors thought it was essential to determine whether planning officials seriously considered the possible social, economic, and environmental effects of the proposed projects-actions and whether they adopted mitigative and compensatory measures to minimize the impacts. It is equally important to identify the social and economic impacts on communities surrounding proposed project areas during the planning stage, so potential conflicts between local residents and planning officials or newcomers could be resolved early.

METHODS

Sample

The data analysis of this paper was performed based on the contents of 74 final EISs issued by the *Corps* (27), *USFS* (23), and *FHWA* (24) from August 1987 to August 1988. The unit of analysis is the proposed project or

action, such as the construction of dams, reservoirs, or roads, the repair of roads, or the management of forests and ranges. The authors developed a questionnaire to direct the content analysis. To increase the reliability of transforming qualitative documents into quantitative data, the authors conducted the content analysis independently. Both sets of data were recorded and keypunched into the computer. The results were compared for every variable in the two data sets. If any discrepancies existed, the original documents were checked and any necessary changes were made.

Questionnaire

To effectively evaluate the SIA's conducted by the three agencies, the questionnaire was divided in 5 parts. Parts 1 and 2 included information on the identification number of each proposed action, the type of agency, proposed budget, and areas or regions covered by the proposed project-action (i.e., Northeast, Midwest, South, West).

Part 3 included information about the baseline sociodemographic characteristics of the affected environment or area of influence without the proposed changes. Derived from the guidelines presented by the Interorganizational Committee (1994: 130), 14 variables were created to measure the social and economic conditions of the affected environment (see table 6). This information was obtained from the Affected Environment section of the final EIS. A dummy coding system was used in which a score of 1 indicated that the assessors examined the impact of the proposed action on a particular characteristic and a score of 0 indicated that they did not. It should be noted that since different types of projects may have different impacts on the human environment, a score of 0 should not be interpreted as the assessors' failure to examine the particular characteristic; it may be that the proposed action would not produce any impact on that characteristic.

Part 4 included information on the anticipated social and economic impacts of the proposed action on human environment. The authors created 28 SIA variables (table 7) based on the conceptual frameworks presented by Burdge and Connor (1993), Gramling and Freudenburg (1992), and the Interorganizational Committee (1994). In general, these variables measure impacts of the proposed actions on population (6 variables), community and institutional structure (9 variables), individuals and families (5 variables), and community and cultural resources (8 variables). These data were collected from the Environmental Consequences section of the final EISs. A

similar dummy coding system was used with these variables, with 1 meaning that the particular SIA variable was discussed and 0 meaning that it was not.

Since NEPA also requires planning agencies to adopt a multi-disciplinary approach in conducting EISs, Part 5 gathered information regarding the educational and training backgrounds of the EIS preparers listed in the final EISs. Two aspects of the preparers' backgrounds were examined: the highest degree earned (high school diploma, associate or bachelor's degree, master's degree, doctorate) and area of expertise (engineering, business, economics, social sciences–humanities, natural sciences, and environmental sciences). Each area of expertise was broken down into subareas. Thus, engineering included civil engineering and planning; business and economics included management, administration, economics, and general business; social sciences–humanities included history, archaeology, humanities, social sciences, and communication sciences; natural sciences included ecology, biology, and other natural sciences; and environmental sciences included environmental management sciences and environmental design arts.

It should be noted here that it is not easy to make a direct comparison across agencies or projects because the settings or types of projects may not be compatible. In addition, all the SIA variables may not be of interest to all the projects because the types or settings of the projects vary. Since the proposed projects–actions varied widely by type of agency, the authors also compared the results of the SIAs by type of agency.

RESULTS

Descriptions of the Proposed Actions

Region. As shown in table 1, the Corps-proposed actions were evenly distributed geographically, while most of the USFS-proposed actions (96 percent) were located in the West and 50 percent of the FHWA-proposed actions were located in the South (see table 1).

Type of project. As was expected, different agencies emphasized different types of projects. About 69 percent and 100 percent of the Corps' and FHWA's proposals, respectively, involved construction actions, while 68 percent of the USFS's proposals involved operation and maintenance actions (see table 2). Construction actions included the building of highways, roads, bridges, dams, and reservoirs. Since the law (36 CFR 219.10) requires the

national forests to prepare forest land and resource management plans to guide the management of the national forests for the next 10 to 15 years, most of the USFS's proposals were for maintenance and operation actions. In addition, four Corps and four USFS proposals involved applying for regulatory permit actions. For example, the Dravo Basic Materials Company and the Lake Charles Dredging and Towing Company applied for 10-year permits for the continuation of oyster-shell dredging in Atchafalaya Bay, Louisiana, and adjacent waters in 1987.

Table 1. Region by agency

Agency	Region (n=74)					
	Northeast	Midwest	South			
The Corps	6 (22.2)	6 (22.2)	9 (33.3)	(22.2)	(100.0)	
USFS	0 (0.0)	0 (0.0)	1 (4.3)	(95.7)	(100.1)	
FHWA	1 (4.2)	7 (29.2)	12 (50.0)	4 (16.7)	24 (100.0)	

Figures in parentheses represent percentages.

Table 2. Project type by agency

	Project Type (n=71)				
	Regulatory or permit	Construction	Operation and maintenance	Environmental clean-up	Total
The Corps	4 (15.4)	18 (69.2)	2 (7.7)	2 (7.7)	26 (100.0)
USFS	4 (18.2)	1 (4.5)	15 (68.2)	2 (9.1)	22 (100.0)
FHWA	0 (0.0)	23 (100.0)	0 (0.0)	0 (0.0)	23 (100.0)

Figures in parentheses represent percentages.

Budget. As shown in table 3, there are observable variations in the total budgets and number of preparers of **EISs** for the proposed actions of the three agencies. The total budgets of the proposed actions ranged from \$131,800 to \$753 million, with a mean of \$145.9 million and a standard deviation of \$183.3 million. The USFS's proposed actions had the highest mean (\$324.4 million) and standard deviation (\$216.9 million) of the three agencies, which suggests that its projects were not only the most costly but the most diverse. The total budget for the FHWA's proposed actions was the second highest, with a mean of \$91.2 million and a standard deviation of \$126.5 million. The Corps' proposed actions had the lowest mean (\$57.1 million) and standard deviation (\$74.4 million), indicating that the Corps' projects involved less money and were consistent in the amount of the budget involved.

Preparers. A similar pattern was also found in the analysis of the total number of **EIS** preparers. The USFS had the highest mean number of preparers (31) and the largest standard deviation (16), while the FHWA had the second highest and the Corps had the lowest (see table 3). One possible explanation for these variations is that most of the USFS's proposals were operation and maintenance actions, which cover 10 to 15 years of forest management plans. Consequently, they involve more money and a greater number of preparers to conduct assessments.

Incorporating Trained Social Scientists

Because agencies provided incomplete information about the educational and training backgrounds of their **EIS** preparers, the total number of preparers listed in tables 4 and 5 varies among agencies. As shown in table 4, 979 preparers were involved in the sampled 74 proposed actions—108 from the Corps, 584 from the USFS, and 287 from the FHWA. For all but one project, all the **EIS** preparers had at least a bachelor's degree; for the one USFS project, four preparers had only high school diplomas. For the Corps, 51 percent and 12 percent of the preparers had master's and doctoral degrees, respectively. Although there were differences among agencies in the areas of expertise reported by the **EIS** preparers, most of the preparers listed their expertise in environmental sciences (32 percent), engineering (30 percent), and natural sciences (18 percent). Persons with business–economics and social sciences–humanities degrees accounted for only 22 percent of the preparers (table 5). Preparers in the Corps and the FHWA tended to have engineering backgrounds (33 and 53 percent, respectively), while 52 percent of the preparers in the USFS had environmental sciences backgrounds.

Table 3. Agency by budget and number of preparers

	Total Budget (in \$1,000)				Number of Preparers			
	Minimum	Maximum	Mean	Standard deviation	Minimum	Maximum	Mean	Standard deviation
The corps	\$1,226.5	\$294,000	\$57,111.7	\$74,440.7	4	25	10.5	5.7
USFS	131.8	753,000	324,423.6	216,890.2	4	66	31.0	16.0
FHWA	1,100.0	455,000	91,237.3	126,514.9	4	44	18.7	9.1
Total	131.8	753,000	145,945.0	183,339.8	4	66	19.3	13.5

The overemphasis on backgrounds in engineering, environmental sciences, and natural sciences is not surprising because NEPA does not clearly specify the division of labor among the various disciplines in conducting EISs. As a result, the planning agencies tend to focus on the technical aspects of the proposed actions and to ignore the human consequences, and thus employ primarily engineers, environmental scientists, and natural scientists.

Table 4. Preparers of EISs by highest degree earned, 1987-88

Agency	High School Diploma Freq (%)	Bachelor's/ Associate Degree Freq (%)	Master's Degree Freq (%)	Doctorate Freq (%)
The Corps (n=108)	0 (0.0)	40 (37.0)	55 (50.9)	13 (12.0)
USFS (n=584)	4 (0.7)	403 (69.0)	167 (28.6)	10 (1.7)
FHWA (n=287)	0 (0.0)	197 (68.6)	74 (25.8)	16 (5.6)
Total (n=979)	4 (0.4)	640 (65.4)	296 (30.2)	39 (4.0)

Sociodemographic Profiles of the Affected Environments

Table 6 reports the results of the sociodemographic profiles of the affected environments conducted by the three agencies. Figures in the table represent the percentages of the profiles for the proposed actions that considered the particular attributes. Five sociodemographic variables were examined by the agencies more than 80 percent of the time: cultural-archaeological sites (88 percent), population trends-structure and residential change (82 percent), land-use patterns (80 percent), ~~employment-income-economic~~structure (85 percent), and parks-recreational spaces (91 percent). Quality-of-life and health concerns were reported in 60 percent of the final EISs. The rest of the sociodemographic variables were reported in less than 60 percent of EISs: housing trends-structure (39 percent), churches-schools (34 percent), lifestyles-social values (43 percent), aesthetics-visual resources (47 percent), transportation patterns (27 percent), Native Americans (15 percent), social groups (30 percent), and public facilities-social services (49 percent).

Table 5. EIS preparers by area of expertise, 1987-88

Agency	Engineering Freq (%)	Business/ Economics Freq (%)	Social sciences/ Humanities Freq (%)	Natural sciences Freq (%)	Environmental sciences Freq (%)
The Corps (n=269)	89 (33.1)	34 (12.6)	36 (13.3)	77 (28.6)	33 (12.3)
USFS (n=650)	86 (13.2)	69 (10.6)	44 (6.8)	116 (17.8)	335 (51.5)
FHWA (n=405)	215 (53.1)	47 (11.6)	63 (15.6)	28 (6.9)	52 (12.8)
Total (n=1,324)	390 (29.5)	150 (11.3)	143 (10.8)	221 (16.7)	420 (31.7)

Table 6. Baseline conditions of the affected environment by agency

Sociodemographic Variable	Corps (%) (n=27)	USFS (%) (n=23)	FHWA (%) (n=24)	Total (%) (n=74)	χ^2 Values
Population trends/structure	78	83	88	82	.8
Residential change					
Housing trends/housing structure	37	4	75	39	24.7*** 24.7***
Land-use pattern	70	78	92	80	3.6
Unemployment/employment/income/economic structure	85	87	83	85	.1
Churches/schools	22	0	79	34	35.4***
Parks/recreational spaces	93	91	88	91	.4
Cultural/archaeological sites	96	91	75	88	5.8
Life styles/social values	37	87	8	43	30.2***
Quality-of-life and health effects/concerns	78	52	46	60	6.1*
Aesthetics/visual resources	56	61	25	47	7.2*
Transportation patterns	15	22	46	27	6.7*
Native Americans	4	44	0	15	21.7***
Human and community development/human resource programs/social organizations/social groups	11	74	8	30	31.2***
Public facilities/social services	33	65	50	49	5.1

*: $p \leq .05$; ***: $p \leq .001$

Examining the percentage distributions within each agency and the results of the chi-square test, the authors found differences among the three agencies. In addition to the five variables mentioned earlier, the majority of the **EISs** of the Corps-proposed actions also looked at quality-of-life and health concerns (78 percent) and aesthetics-visual resources (56 percent), and many described the air and water quality of the sites of the proposed actions.

For the USFS-proposed actions, lifestyle-social values (87 percent), aesthetics-visual resources (61 percent), social organizations-groups (74 percent), and public facilities-social services (65 percent) were included in the profiles of the sites of the proposed actions. For the FHWA-proposed actions, the profiles also focused on housing trends-structure (75 percent), churches-schools (79 percent), and public facilities-social services (50 percent), since most of the proposed actions of the FHWA involved the construction and repair of roads or highways—projects that are often located in neighborhoods.

Social and Economic Consequences of the Proposed Actions

Table 7 summarizes the likely social and economic effects of the proposed actions of the three agencies. The figures in the table represent the percentage of the **EISs** for the proposed actions that indicated the possible impact of the actions on the particular attributes.

Population. Overall, the **SIA** variables in **this** category did not receive major attention from the planning agencies. Only one variable, relocation of the population, was mentioned in 50 percent of the **EISs**—96 percent of those for the FHWA-proposed actions and 48 percent of the Corps-proposed actions. Since most USFS-proposed actions involved management plans in the national forests, which would have a less direct impact on populations in local communities, few **EISs** for USFS-proposed actions (4 percent) mentioned this effect, although 35 percent of the USFS-proposed actions would generate an influx or outflow of temporary workers. The results of chi-square tests of these two variables by agency were statistically significant at the .05 level (see table 7).

The rest of the population-impact variables were mentioned in fewer than 35 percent of the **EISs** for the proposed actions in each agency. Furthermore, 25 and 13 percent of the **EISs** for the FHWA's and USFS's proposed actions, respectively, also reported the possible impacts on several social groups, such as the elderly and gender and racial minorities. These lower

percentages suggest that the effects on these social groups are not the agencies' major concerns. In addition, the impacts of seasonal and weekend residents were mentioned in fewer than 9 percent of the **EISs** of the three agencies.

Community and institutional structures. Nine variables related to impacts on community and institutional structures are examined in this study (see table 7). Overall, the majority of the **EISs** for proposed actions, regardless of agency, mentioned two economic variables: employment–income characteristics (**78** percent) and industrial–commercial diversity (**82** percent). These results indicate that the three agencies placed a higher priority on economic and business effects than on other effects.

With respect to differences in specific agencies, the **EISs** of both the USFS and FHWA tended to examine a variety of impacts under this category, while the Corps tended to focus on three major impacts: employment (74 percent), business (82 percent), and local–regional–national linkages (56 percent). The rest of the variables were mentioned in less than 7 percent of the **EISs** of the proposed actions of the Corps. None of the **EISs** reported the effects on interest-group activity, minority groups, or economic inequality.

Both the USFS and the FHWA considered more diverse impacts on communities than did the Corps. For instance, 48 percent of the **EISs** of the USFS-proposed actions examined impacts on local–regional–national linkages and on minority groups, such as Native Americans, and one-third reported impacts related to three other variables: voluntary associations (35 percent), interest-group activity (35 percent), and the size and structure of local governments (30 percent). In addition, 22 percent considered effects on planning and zoning (see table 7).

Similar results were also found for the **EISs** of the proposed actions of the FHWA (table 7). That is, 46 percent of the **EISs** considered the impact on voluntary associations, 33 percent on both minority groups and planning and zoning activity, 29 percent on local–regional–national linkages, 25 percent on interest-group activity, and 21 percent on the size and structure of local governments. Only 4 percent considered the effects on economic inequality.

Table 7. SIA variables by agency

SIA Variables	Corps (%) (n=27)	USFS (%) (n=23)	FHWA (%) (n=24)	Total (%) (n=74)	χ^2 Values
<i>Population Impacts</i>					
a. Population change	37	30	38	35	.3
b. Dissimilarity in age, gender, racial or ethnic composition	0	13	25	12	7.5*
c. Relocated population	48	4	96	50	39.4***
d. Influx or outflow of temporary workers	15	35	4	18	7.8*
e. Seasonal residents	7	9	0	5	2.1
f. Presence of weekend resident	0	9	0	3	4.6
<i>Community and Institutional Structures</i>					
a. Voluntary associations	4	35	46	27	12.5**
b. Interest group activity	0	35	25	19	10.7**
c. Local/regional/national linkages	56	48	29	45	3.7
d. Size and structure of local government	7	30	21	19	4.4
e. Employment/income characteristics	74	87	75	78	1.5
f. Impacts on minority groups	0	48	33	26	16.0***
g. Industrial/commercial diversity	82	74	92	82	2.6
h. Presence of planning and zoning activity	7	22	33	20	5.3
i. Enhanced economic inequality	0	0	4	1	2.1

*: $p \leq .05$; **: $p \leq .01$; ***: $p \leq .001$.

SIA Variables	Corps (%) (n=27)	USFS (%) (n=23)	FHWA (%) (n=24)	Total (%) (n=74)	χ^2 Values
<i>Individual and Family Level Impacts</i>					
a. Perceptions of risk, health, and safety	93	61	100	85	16.1***
b. Trust in political and social institutions	0	0	0	0	NA
c. Residential stability	41	35	54	43	1.9
d. Family and friendship network	4	4	0	3	1.0
e. Concerns about social well-being	22	39	42	34	2.6
<i>Community and Cultural Resources</i>					
a. Change in community infrastructure	44	78	88	69	12.4**
b. Native American tribes	7	52	13	23	16.3**
c. Land use patterns	74	83	96	84	4.5
d. Effects on cultural, historical and archaeological resources	100	100	96	99	2.1
e. Housing	26	9	58	31	14.0***
f. Leisure activities/amenity values/visual quality	93	96	100	96	1.8
g. Public facilities/social services/schools	56	78	100	77	14.2***
h. Human and community development	0	13	0	4	6.9*

** $p \leq .01$; *** $p \leq .001$.

Individuals and families. The results of five variables related to individual and family-level impacts are presented in table 7. Overall, the majority of the EISs mentioned impacts on perceptions of risk, health, and safety. Since most of the Corps' and FHWA's proposed actions involved construction actions, which are often located in highly populated areas, nearly all the EISs mentioned these effects, including those on noise and the quality of air and water. However, the chi-square test also indicated a statistical significance at the .05 level (table 7) because only **61** percent of the EISs of the USFS-proposed actions considered these variables, mainly the impact on public safety. The effects on residential stability were also mentioned by at least 35 percent of the EISs for the proposed actions of all three agencies: the FHWA (**54** percent), the Corps (41 percent), and the **USFS** (35 percent).

The effects on the overall social well-being of the community received moderate coverage by the three agencies, ranging from **22** percent to **44** percent. Finally, only a few EISs for proposed actions considered the impacts on trust in political and social institutions and on family and friendship networks. Impacts on these two variables are probably too subjective or specific to be measured or quantified by planning officials.

Community and cultural resources. Eight variables related to community and cultural resources are examined in this section. Nearly all the EISs on proposed actions considered the impacts on cultural, historical, and archaeological resources (99 percent) and on leisure activities-amenity values-visual quality (96 percent) (table 7). The majority of the EISs also reported effects on land-use patterns (ranging from **74** percent to 96 percent) and on public facilities-social services-schools (ranging from **56** percent to 100 percent).

The results of chi-squares tests also indicate differences by agency. For instance, a high proportion of the **EISs** of the proposed actions of the USFS (78 percent) and the FHWA (88 percent), but only **44** percent of those for the Corps' proposed actions, mentioned changes in the infrastructure of communities, such as traffic patterns. It was not surprising to find that 52 percent of the EISs on the USFS-proposed actions considered impacts on Native Americans because many Native American tribes live in the national forests. Also, 58 percent of the EISs on FHWA-proposed actions, compared to **26** percent on the Corps' and 9 percent on the USFS's mentioned impacts on housing. Finally, only the **EISs** on the proposed actions of the USFS reported the various kinds of social and community programs, such as the Youth Conservation Corps, Senior Community Service Employment

Program, Volunteers in the National Forest Program, and College Work Study Program, that are implemented in the national forests. These programs are conducted to train young people, people with disabilities, minorities, women, and the elderly with employable skills and to provide the necessary personnel to accomplish the USFS's mission.

ANALYSIS

Table 8 summarizes the **SIA** model used in the **EISs** conducted by the three agencies. To simplify the task, only the **SIA** variables examined by the agencies more than 50 percent of the time are listed. **As** the table shows, some **SIA** variables were commonly examined by the three agencies. For the sociodemographic profile of the affected environment, all the agencies examined the following five areas:

- Parks and recreational spaces
- Cultural and archaeological sites
- Employment, income, and economic structure
- Population trends and residential changes
- Land-use patterns.

Using existing census or other official data, many **EISs** provided detailed trend analyses (including past trends and projections) of the populations; residential, employment, income, and economic structures; **and** land-use patterns of the affected environments. Some even described the historical roots of the potential cultural, archeological, and historical sites as far back as the initial human occupation of the affected areas. For the Corps' and FHWA's proposed actions, the states' historical preservation offices or commissions were often consulted to identify any cultural and archaeological sites located in the affected areas. For the USFS proposals, surveys of the forest lands to establish inventories of cultural resources were often conducted before ground-disturbing activities were started.

However, differences among agencies also emerged. While the Corps tended to focus on quality-of-life and health concerns, as well as aesthetics and visual resources, FHWA focused on conditions of housing, churches, schools, public facilities, and social services. In addition to aesthetics, visual resources, public facilities, and social services, the USFS is the only agency that examined the lifestyles and social values of the various social groups who frequently use or have access to the national forests. It also considered

conflicts of values and beliefs among various groups (such as local residents, Native American tribes, ranchers and farmers, retirees, loggers and miners, tourists, and newcomers) pertaining to how to use the forests' resources. Much of this information is descriptive and was not directly generated from members of these groups because an earlier study (Denq and Potter 1989) found that these agencies do not commonly use techniques such as attitude surveys and home interviews for collecting micro-individual data.

A similar pattern was observed when the three agencies examined the likely impacts of the proposed actions. The most common effects examined were those on the industrial and business community and on individual employment and income opportunities, most of which were expected to be positive, such as increases in jobs, personal income, business establishments, and government revenues. The three agencies also evaluated perceptions of risk, health, and safety effects related to changes in the quality of water and air, and the noise, amenity, and visual impacts arising from the proposed actions.

With respect to differences among the agencies, the majority of EISs for the Corps-proposed actions reported that the projects would increase the linkages among local, state, and federal governments in terms of revenues and other financial contributions. One **EIS** mentioned that the construction of a 600-foot second lock and dam on the Mississippi River near Alton, Illinois, would strengthen national defense. In contrast, the EISs for the FHWA-proposed actions emphasized the effects on the relocation of populations and changes in the housing structure and community infrastructure, such as public facilities and traffic patterns, in the targeted areas. The **EISs** for the USFS-proposed actions focused on the impacts on public facilities, such as administrative buildings and the forests' road systems, as well as on the effects of the new management plan on the social and economic lives of the many Native American tribes who live on national forest lands.

Overall, the results shown in table 8 indicate that the three agencies tended to focus on the economic and financial impacts of their proposed actions. This finding is to be expected because these impacts are easy to measure and are of great concern to many people. Of the **28 SIA** variables identified earlier, only 11 were used by the agencies more than 50 percent of the time. There are two possible opposing explanations for this outcome: (1) the proposed actions did not have a direct impact on those variables and thus the variables were not reported or (2) the impacts existed **but** were not considered by the planning officials, either because they were difficult to

quantify or because they would be too costly to measure. The insufficient representation of trained social scientists (as shown in table 5) may also have contributed to this outcome.

Our data analysis also indicates that the majority of the SIAs failed to report data disaggregated by gender, age, and race/ethnicity for many baseline and impact variables. Lack of disaggregated data makes the assessment of the impacts on these subgroups very difficult.

The planning agencies also tended to rely on aggregate and "static" data in describing the baseline conditions and the impacts of the proposed actions rather than micro-level data collected by survey, focus-group meetings, or field study/participant observation techniques. Although micro-level data tend to be "subjective", they do reveal the information pertaining to the social and political dynamics of the various parties involved which might be crucial to agencies' final decision making.

The different types of data collection techniques are especially useful in assessing the psychological impacts of the proposed actions such as impacts on family or friendship networks. The planning agencies did conduct public participation programs and solicited public comments, but participation was voluntary; the comments solicited were incomplete and selective because the class bias of those who participated in the commenting process (Mohai 1985)

RECOMMENDATIONS

Based on the results presented by this study, the authors identify three ways to enhance agency-conducted SIAs. First, as discussed by North (1997) and Bamberger (1997), there is a need to build a well-developed database. If the ultimate goal of conducting SIAs is to develop a final plan that is better from both environmental and public points of views, the planning officials must look into both macro-aggregate and micro-individual data. Normally, compared to the census and other official data that are often free to the general public, collecting micro-individual data costs more **and** takes a longer time. Yet early and accurate detection of potential conflicts among various parties involved may, in the long run, save the agencies money and time. Furthermore, macro-level data disaggregated by gender, age, race/ethnicity, or other social characteristics are equally important in examining the impacts of the proposed actions on these subgroups.

Table 8. Summary of the SIA model conducted by the three federal agencies.

	Time 1. Before Development Event (proposed action): Baseline Conditions	Time 2. Social and Economic Impacts after the Development Event/Proposed Actions
SIA variables commonly examined among the three agencies	<ul style="list-style-type: none"> ● Parks and recreational spaces ● Cultural and archaeological sites ● Employment, income, and economic structure ● Population trends and residential changes ● Land-use pattern 	<ul style="list-style-type: none"> ● Industrial and commercial diversity ● Employment and income characteristics ● Perceptions of risk, health, and safety ● Effects on cultural, historical, and archeological resources ● Leisure activities, amenity values, visual quality
The Corps	<ul style="list-style-type: none"> ● Quality of life/health ● Aesthetics and visual resources 	<ul style="list-style-type: none"> ● Local/regional/national linkages
USFS	<ul style="list-style-type: none"> ● Lifestyle and social values ● Social organizations and groups ● Aesthetics and visual resources ● Public facilities and social services 	<ul style="list-style-type: none"> ● Change in community infrastructure ● Native Americans
FHWA	<ul style="list-style-type: none"> ● Housing trend and structure ● Churches and schools ● Public facilities and social services 	<ul style="list-style-type: none"> ● Relocated population ● Residential stability ● Change in community infrastructure ● Housing

* Only the SIA variables mentioned in more than 50 percent of the cases in each agency are listed here.

Second, there is a need for more comprehensive and systematic data collection techniques such as a combination of secondary data analysis, sampling surveys, focus-group meeting, and field investigations/participant observations. Employing these different types of techniques will ensure an equal representation of different, often opposing, views held by all parties.

Third, a development of the microcomputer model for assessing the social and economic impacts of the proposed actions will definitely reduce the cost and time involved in conducting SIAs. There are already several computerized models for assessing the socioeconomic impacts of development projects available (Leistriz, Coon, and Hamm 1994). None of the proposed actions examined in this study have utilized these models. Continuing efforts in developing a model that incorporates project-type differences, the stage of the project, and micro-level data will certainly increase the efficiency (time and money) of conducting SIAs.

CONCLUSION

In summary, by examining 74 SIAs prepared by three federal agencies, this study attempted to evaluate the applicability of the conceptual SIA model presented in previous research. The data analyses indicated that several gaps exist. First, studies, such as that by Burdge and Connor (1993), have indicated that the stage of the project (planning–policy development, construction–implementation, operation–maintenance, or decommissioning–abandonment) in which an SIA is conducted is an important consideration. In the earlier data collection stage of the present study, the authors attempted to incorporate the project-stage parameter in examining the SIA process. They abandoned this parameter later, however, because information on it was not clearly described in the final EISs, perhaps because the agencies did not incorporate it when they conducted the SIAs.

Second, the three agencies commonly used quantitative data, such as information on population trends–structure and employment–income–business characteristics, but they used other, more qualitative SIA variables, such as public safety, visual quality (except the USFS), lifestyles, social values, community cohesion, and personal and friendship networks less frequently. The use of survey techniques to establish standardized scales for these variables may make this type of information more quantifiable.

Finally, that the agencies examined only 11 of the 28 SIA variables listed in the conceptual framework more than 50 percent of the time suggests that the agencies may not be aware of some of these variables or that it may not be feasible to evaluate some of the variables in real-life situations because of monetary and technical constraints.

Certainly, this study had some limitations. For instance, the data analyses were based on the contents of the final EISs, which were not likely to include complete information about the SIAs conducted by each agency. Also, since the authors examined only if a particular SIA variable was examined by the planning agency, they did not identify the direction and magnitude of the impacts (positive or negative) arising from the proposed actions. Most importantly, they did not evaluate how the results of these SIAs affected the agencies' decision-making processes.

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