

# **DRAFT IAGLR PRESENTATION PAPER**

## **PUBLIC PARTICIPATION IN GREAT LAKES ENVIRONMENTAL MANAGEMENT: SEEKING “PARTICIPATORY EQUITY” THROUGH ETHNOGRAPHIC INQUIRY**

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# **PUBLIC PARTICIPATION IN GREAT LAKES ENVIRONMENTAL MANAGEMENT: SEEKING “PARTICIPATORY EQUITY” THROUGH ETHNOGRAPHIC INQUIRY**

## **ABSTRACT**

This paper reports the activities and preliminary findings of an environmental anthropology fellowship at the Great Lakes Commission (GLC). The fellowship project demonstrated the utility of an ethnographic approach called Risk Perception Mapping (RPM) to the public consultation and social research interests of the Great Lakes Commission (GLC) and other relevant regional organizations. These interests are reflected in the interrelated activities of a network of Great Lakes management agencies and organizations, including the GLC. In this paper I refer to this network as “the Great Lakes Management Network,” or “GLM Network” for short, although no formal institutional structure exists by that name. An RPM demonstration project was conducted in a five county area surrounding the Fermi II nuclear power plant in southeastern Michigan, and focused on cultural, geographical, and social-contextual factors that influence the nature and distribution of perceived risk among potentially affected populations. Key findings pertain to perceptually-specific communities of environmental risk, with implications for what I call “participatory equity” in environmental management. Parallels are drawn with RPM research applied previously to other environmental management issues. Applicability to GLM Network interests was established in consultation with GLC commissioners, staff, and collaborators, and is reflected in the social science component of a recent GLC proposal for an incubation grant to support the development of an interdisciplinary Great lakes Research Collaboratory through the National Science Foundation’s Bio-complexity Initiative. Further application is discussed in the context of developing population-specific information/education exchanges through which more culturally sensitive indicators of Great Lakes ecosystem integrity may emerge.

## **Credits and Acknowledgements**

This paper derives from work supported by several sources. The initial project design and fieldwork were conducted through the Department of Anthropology at the University of Michigan (UM), under the title *Ecological Awareness and Risk Perception* (EARP) study. That portion of the project was supervised by Dr. Conrad Kottak, a professor of anthropology at the UM, and supported by existing grants through the National Science Foundation (NSF) and the Consortium for International Earth Science Information Network (CIESIN). I subsequently received further supervisory support from Drs. Gilbert Kushner and Alvin Wolfe, professors of anthropology at the University of South Florida.

I later obtained additional financial support to continue data management and analysis through *the Risk Perception Mapping (RPM) Demonstration Project*, sponsored by the Environmental Anthropology Cooperative Fellowship Program of the Society for Applied Anthropology (SfAA) and the United States Environmental Protection Agency (EPA). This project was mentored on behalf of the SfAA by Dr. Richard Stoffle, of the Bureau of Applied Research in Anthropology at the University of Arizona, and was conducted on behalf of the Great Lakes Commission (GLC), in Ann Arbor, Michigan, which provided office support throughout the project. The fellowship program is administered by Barbara Rose-Johnston (SfAA) and Theresa Trainor (EPA), although this particular demonstration project was

channeled through the EPA Region Five (Great Lakes), where George Clark served as project liaison. Michael Donahue, Executive Director at the GLC, served as the host agency supervisor and helped position the project for maximum visibility within the institutional framework of Great Lakes ecosystem management.

The positions I take in this paper are mine alone and do not necessarily reflect those of the study hosts, sponsors, or supervisors. Please cite, quote, or reproduce only with my prior consent, as this project is still under way: [jstone@glc.org](mailto:jstone@glc.org); [jvstone@umd.umich.edu](mailto:jvstone@umd.umich.edu).

### List of Acronyms

This paper contains numerous acronyms. The use of acronyms can be confusing at times, but I believe they enhance a paper’s overall readability, provided they are spelled out clearly at first mention and are listed together in an acronym reference table. To that end, I provide in Table 1, below, an alphabetical listing of the acronyms I use in this paper.

**TABLE 1. Definitions of the Acronyms Used in this Paper**

ACRONYM	DEFINITION	ACRONYM	DEFINITION
ANS	Aquatic Nuisance Species	LLRW	Low-Level Radioactive Waste
CIESIN	Consortium of International Earth Science Information Network	NSF	National Science Foundation
EARP	Ecological Awareness and Risk Perception Study	RFP	Request for Proposal
EPA	Environmental Protection Agency	RPM	Risk Perception Mapping
GIS	Geographic Information System	RPS	Risk Perception Shadow
GLB	Great Lakes-St. Lawrence Basin	SfAA	Society for Applied Anthropology
GLC	Great Lakes Commission	SIA	Social Impact Assessment
GLM	Great Lakes Management Network	SSC	Super-conducting Super Collider
GLSAB	Great Lakes Science Advisory Board	USC	United States Congress
IAIA	International Association for Impact Assessment	USNRC	United States Nuclear Regulatory Commission
LAP	Locally Affected Population		

## **Introduction**

The *Ecosystem Charter for the Great Lakes-St. Lawrence Basin* (Charter) was established in 1994 among the nations, provinces, and states that border the Great Lakes-St. Lawrence Basin (GLB) (GLC 10/94). The Charter summarizes commonly held principles for implementing an “ecosystem approach” to environmental management in the GLB. As noted in the Charter’s preamble, the ecosystem approach recognizes that the environmental and socioeconomic attributes of the GLB are fundamentally linked and interdependent, as are the goals for its environmental management. The Charter states that Great Lakes resources must be managed as part of dynamic and complex communities and ecosystems, rather than as separate and distinct elements. Practicing the ecosystem approach in the GLB means that all partners – government, private sector, and citizen-based institutions alike – understand the implications of their actions and strive to avoid unintended adverse consequences.

## **Public Participation in Environmental Management**

Large-scale projects, such as nuclear power plants, can have significant impacts on the natural and social environments in which they are located. In the United States federal mandates such as the National Environmental Policy Act (USC 1969), and various state-level versions of the federal act, require that assessments be made of these potential impacts. These impact assessments help to guide decisions regarding whether or not and/or how to proceed with a project, and if so, to identify appropriate mitigation strategies to minimize its potentially adverse consequences. Two key components in social impact assessment (SIA) studies are the definition and identification of the local populations potentially affected by the project, a collectivity commonly referred to as the “locally affected population,” or LAP. Consultative relationships are typically established among the LAP, project proposers, and relevant environmental management agencies. Thus, the LAP provides the geographic and sociocultural framework for public participation programs in environmental management.

### *Locally Affected Populations*

The boundary of the LAP is typically established when the agency responsible for managing social and environmental assessments issues a Request For Proposal (RFP) to contractors who wish to bid on those assessments. The RFP commonly specifies a study area that has a definite boundary so that contractors may tailor their bids accordingly. The boundary of the study area may be defined by numerous measures, including:

1. Pre-existing political jurisdictions, such as county or state boundaries (USNRC 1983:4.18-15);
2. Predetermined distance-from-site criteria, such as a 10 kilometer radius of a proposed project (USNRC 1983:4.18-14);

3. Various ecosystems approaches at levels ranging from macro-systems (Puntenney 1995) to regional (GLSAB 1991:90-101), to local (Moran 1990; Cortese and Firth 1997); and
4. Extent of known contamination (Edelstein 1988).

Such definitions of the LAP can be problematic, however, because they are not grounded in the social data necessary to identify the geographical extent and distribution of populations potentially affected by a project and to document the unique sociocultural characteristics that may predispose some populations to particular types of impacts. LAPs not defined by social data can limit the social assessment research to an overly restrictive population and a limited set of impact issues (USNRC 1987:3.7.4-1; GLSAB 1991:91), prompting some researchers to develop LAP definitions based on sociocultural data (Cernea 1988) and issue-specific risk perception (Stoffle, Stone, and Heeringa 1993).

### *Specially Affected Populations*

The International Association for Impact Assessment's (IAIA) Interorganizational Committee on Principles and Guidelines for SIA has noted that just as the biological sections of impact statements devote particular attention to species having special vulnerabilities, the socioeconomic sections must also devote particular attention to the impacts on vulnerable segments of the human population – what have been variously termed “specially affected populations,” (Stoffle et al., 1990), “marginalized communities,” (Guyton and Yamashita 1997), “groups of isolated individuals,” (Whitfield and Rimkus 1997), and “vulnerable subpopulations” (Schierow 1999). Examples include the poor, the elderly, adolescents, or unemployed women; members of minority and/or other groups that are racially, ethnically, and/or culturally distinctive; or occupational, cultural, political, or value-based groups for whom a given community, region, or use of some component of the biophysical environment is particularly important (Interorganizational Committee 1993:6).

### *Environmental Discrimination*

Specially affected populations are often socially isolated from the larger communities within which they are embedded and often are unaware of or included in environmental decision-making processes, such as public hearings (Stoffle, Stone, and Heeringa 1993:320). Not surprisingly, these same groups often bear the greatest environmental and social impacts of projects, such as nuclear power plants, that require environmental management at potentially extensive geo-political, sociocultural, and ecosystem scales. “Environmental discrimination” can be said to exist to the extent that such impacts are born consistently and disproportionately by the same groups across numerous projects.

### *Participatory Equity*

At issue are the procedures used to define the boundaries of the LAP, identify its socially relevant constituent populations, and access the knowledge and information these people possess regarding their local environment and how they stand to be affected by deliberate changes to it.

Public hearings, for example, are notoriously self-selective and do not always identify the full range of impact and mitigation issues among the LAP. Consequently important population-specific issues may not be factored into environmental management decisions. Environmental discrimination occurs, at least in part, to the extent that the same populations' issues are consistently overlooked in this process. Environmental discrimination, therefore, can be viewed as a product of consultative procedures that do not provide equitable social access to participatory processes. I use the term "participatory equity" to refer to a principle that I think should guide public participation in environmental management, and I think anthropology provides conceptual and methodological tools to help implement it.

### *Environmental Risk Perception*

SIA studies have documented that a project's social effects occur to the extent that local populations perceive themselves to be at risk from the project. "Project awareness" is a necessary criterion for project-specific risk perception, and it has been used successfully to define the LAP in project-specific SIAs (Stoffle, Stone, and Heeringa 1993). Other researchers (Ellis et al., 1992:44-54; Unger, Wandersman, and Hallman 1992:55-70; Waller and Mitchell 1991:302-329; Gibbs 1990:10-11; Edelstein 1988; van der Pligt, Eiser, and Spears 1986:1-15; Werner 1985:161-167; Ridington 1982:36-42) have demonstrated that the awareness and perception of potentially hazardous conditions or projects provides sufficient impetus for social and psychological impacts to occur. Still others (Gatchel and Newberry 1991:1961-1976; Vyner 1988, 1984:5-10; Flemming et al., 1982:14-22) have shown that such impacts can be psychophysiological as well. Similarly, research on the nature, extent, and causes of environmental awareness and remedial action suggests that local people will not participate in actions designed to manage their environment if they are unaware of or perceive no risks to it (Kottak 1992:295).

Risk Perception Mapping (RPM) is an ethnographic method developed explicitly to identify and map the geographical extent and sociocultural characteristics of an LAP and to document the impact and mitigation issues raised by its various constituents. To the extent that the RPM method seeks to access these issues directly from all segments of the LAP, it stands to provide a more equitable social access to public participation in environmental management.

### **SfAA/EPA Cooperative Agreement and Environmental Anthropology Fellowships**

Largely in response to issues such as these, the SfAA and EPA created a Cooperative Agreement to, among other things, "increase the access of communities and policy-makers to anthropological and other social science expertise in the solution of environmental problems" (SfAA/EPA 1996:4). The SfAA pursues this mission by sponsoring "environmental anthropology fellows to work in regulatory, policy, and planning settings (including national and regional EPA offices) on environmental projects related to their academic or postgraduate careers" (SfAA/EPA 1996:6). A number of these fellowships have been conducted to date, including a group of "sociocultural profiling" projects in EPA Region Five (broadly, the Great Lakes area). One objective of these fellowships is to "develop material that allows environmental managers to better understand the cultural complexity and sociocultural issues associated with their work" (Johnston 1998:8). To meet this objective, the terms and tasks of individual fellowship projects are negotiated in consultation with a host beneficiary or recipient group.

## **Fellowship Project**

To illustrate and support these positions I report in this presentation the preliminary findings, implications, and potential applications of my SfAA/EPA fellowship project in environmental anthropology. My project, titled the “Risk Perception Mapping Demonstration Project,” used a case study of the Fermi II nuclear power plant in southeastern Michigan to demonstrate how the RPM methodology can be used to identify the boundaries and perceptual characteristics of an LAP. Preliminary findings reveal an LAP for Fermi that is both spatially extensive and perceptually heterogeneous, and suggests that awareness of the facility is lowest among minority and geographically isolated communities. These preliminary findings connote differential social access to public participation in environmental management, and they illustrate the potential spatial implications of environmental discrimination. Such findings will be useful to environmental management agencies that wish to develop population-specific information and education exchanges through which more culturally sensitive social indicators of ecosystem integrity may emerge.

### **Fellowship Project Host: The Great Lakes Commission**

The “Risk Perception Mapping Demonstration Project,” is being hosted by the Great Lakes Commission (GLC). The GLC is a binational agency that promotes the “orderly, integrated and comprehensive development, use and conservation of the water and related natural resources of the Great Lakes basin and St. Lawrence River. Its members include the eight Great Lakes states with associate member status for the Canadian provinces of Ontario and Québec. The GLC was established by joint legislative action of the Great Lakes states in 1955 (the Great Lakes Basin Compact) and granted congressional consent in 1968 (USC 1968). A "Declaration of Partnership" established associate membership for the provinces in 1999. Since its establishment the GLC has consistently applied principles of sustainability to the development, use, and conservation of the natural resources of the Great Lakes basin and St. Lawrence River. Three principal functions support this effort: (1) information sharing among the membership and the entire Great Lakes-St. Lawrence community; (2) policy research, development and coordination on issues of regional interest; and (3) advocacy of those positions on which members agree. Further information about the Great Lakes Commission may be obtained through its website: <http://www.glc.org> and associated links.

### **Informational and Methodological Needs**

My fellowship project responds to the GLC’s interest in further developing the methodological rigor that it brings to the public consultation and social research activities it conducts on behalf of the network of agencies and organizations that share an interest in Great Lakes management. In this paper I refer to this network as “the Great Lakes Management Network,” or “GLM Network” for short, although no formal institutional structure exists by that name. This interest in public consultation and social research emanates from the GLC’s more general commitment to integrating social science within the broader framework of Great Lakes ecosystem management, which by and large served as the basis for negotiating this fellowship.

I was meeting with the GLC, as early as 1992 regarding potential social science applications in Great Lakes Basin (GLB) planning and management. At that time, the GLC was involved in drafting what later came to be known as the *Ecosystem Charter for the Great Lakes-St. Lawrence Basin* (GLC 10/94). The Charter is important to this fellowship because it explicitly includes human factors as part of the ecosystem equation, thereby laying the foundation for social science input to Great Lakes ecosystem management programs. Moreover, the Charter defines principles for Great Lakes ecosystem integrity that include, among other things, the development and implementation of public participation procedures (Principles XV-XVII) that incorporate or build upon common data collection measures and indicators of Great Lakes ecosystem health (Principle XI). These principles and definitions specify a purpose for social science methods and data within the broader framework of Great Lakes ecosystem management.

I began the fellowship by participating in the GLC's annual meeting, held last autumn in Pittsburgh. This meeting afforded the opportunity for me to hear and meet with environmental managers working among the institutional structures that have evolved to collaboratively manage Great Lakes resources across numerous jurisdictional and programmatic boundaries. Following the meeting I met with GLC's Executive Director to articulate specific GLM Network interests in public consultation and social research. Three interests in particular were identified:

- (1) demonstrate a methodological framework for identifying and characterizing human communities that are potentially affected by Great Lakes management activities. This framework could potentially be used by the GLM Network to
- (2) develop population-specific information and education exchanges between affected populations and responsible agencies. And through the knowledge gained in these exchanges the GLM Network could further its related interest in
- (3) developing more culturally sensitive social indicators of Great Lakes ecosystem integrity.

In consultation with the fellowship host, mentor, and sponsors, I then revised my project's scope of work to more accurately address these interests.

### **Risk Perception Mapping Demonstration Project**

The primary goal of my fellowship project is to further develop the methodological rigor that the GLM Network already brings to its public consultation and social research activities. My project will address this goal by demonstrating how Risk Perception Mapping (RPM) – an ethnographic approach to public consultation – has been used to meet three specific participatory objectives identified in consultation with GLC commissioners, staff, and collaborators. These objectives include demonstrating the methodological capacity to:

- (1) Define the geographical boundaries of the locally affected population (LAP) for a given project or activity;

- (2) Identify “perceptually-specific communities of environmental risk” within the LAP. This demonstrated capacity should enable Great Lakes environmental managers to:
- (3) Develop locally appropriate and culturally sensitive procedures for exchanging information between affected populations and responsible agencies in future Great Lakes environmental management activities.

In meeting these objectives my demonstration project, and more specifically the RPM methodology, will ultimately provide the GLM Network with an ethnographic methodological framework for identifying and elaborating population-specific social indicators of Great Lakes ecosystem integrity.

### **RPM Conceptual Development**

In the mid-1980s a team of applied anthropologists headed by Dr. Richard Stoffle (project mentor for this fellowship) was conducting social assessment research of a proposed Superconducting Super Collider (SSC) in Michigan. Comparable data from two potential host communities revealed that both differed significantly in their perception of risk from the facility despite their social and cultural similarity (Stoffle et al., 1988, 1987).

#### *Risk Perception Shadows*

Stoffle’s team developed the concept of a "risk perception shadow" (RPS) to account for this phenomenon. The RPS concept was initially based on the premise that past projects, either completed or simply proposed, can create a collective perception of risk that is "applied" to newly proposed projects. The RPS was defined as a generally contiguous human collectivity that calculates itself to be at risk from a proposed or operating project. After becoming aware of the project this entity essentially defines itself as being "at risk" thereby opening itself to measurable social impacts regardless of whether or not adverse human or environmental risks have been scientifically established. Because an RPS is defined by perceived risk, its size, shape, and sociocultural composition may differ significantly from affected communities defined solely by probabilistically derived risk assessments.

#### *RPS and Public Consultation*

The SSC studies called for a *data-based procedure* for identifying the LAP for a project by measuring its RPS. The extent and influence of an RPS can be determined by many factors, including how the members of a LAP perceive a project might affect their lives. Often the LAP is identified *a priori*, that is, according to existing or predetermined criteria so that the agency in charge of managing the social and environmental assessments can issue a Request for Proposal that has a definite study area. Distance-from-site measures -- for example, all residents living or working within a 10-mile radius of a facility -- often are used, as are the boundaries of the political jurisdictions within which a project is located or has been proposed.

Political units can be major channels for public response to specific projects and thus are frequently used to define the boundaries of the LAP for project-specific consultation and participation programs. This procedure, however, can limit participation to an overly restricted population and a limited set of impact issues. The SSC research demonstrated that RPSs typically cross political boundaries, rendering such boundaries inaccurate, hence, inappropriate units for defining LAPs, for analyzing potential social impacts, and for accessing and incorporating local knowledge in project-specific decision-making. Stoffle's team worked to develop a data-based procedure for measuring and characterizing a project's RPS by mapping it across a geographical and sociocultural plane. That procedure is called Risk Perception Mapping (RPM).

### *Risk Perception Mapping*

I joined Stoffle's team at the conclusion of the SSC studies and the start of social assessment research on a proposed low-level radioactive waste (LLRW) facility in Michigan. We contracted with the state to map the RPS for each of three candidate sites as the basis for consultative relationships between the initiating agency and the LAPs for each site. We developed the ethnographic research method called Risk Perception Mapping (RPM) to map the geographical extent of the project RPS and to document key sociocultural characteristics of the populations existing within it. The RPS documented in the LLRW study was operationally defined as "project awareness" because it represented the widest range of potential concerns and impact issues within the study area.

Key RPM findings revealed that the RPS consisted of: (1) a 15 mile radial core area where awareness and intensity of perceived risk and potential social impact were evenly distributed; (2) areas contiguous to the core area but distributed non-linearly in various directions up to an additional 15 miles beyond the core; and (3) "islands," or areas separated from both the core and contiguous areas. Through RPM, both the type and distribution of impact issues defined the LAP, providing a more accurate social basis from which public consultation could then proceed (Stoffle et al., 1991).

### *Ecological Awareness and Environmentalist Participation*

Concurrently, another team of anthropologists headed by Dr. Conrad Kottak was conducting research on the effects that awareness of ecological risks had on the development of Brazilian grassroots environmental organizations and their participation in national environmental decision-making (Kottak and Costa 1993; Costa, Kottak, and Prado 1997; Costa et al., 1995). Kottak's research focused on Angra dos Reis, a coastal town in Rio de Janeiro State, and the site of Brazil's only operational nuclear power plant. Kottak noted that increased perception of environmental risk furthered participation in environmental decision-making, and he was interested in examining his observations cross-culturally within an RPM methodological framework. I partnered with Kottak during the early to mid-1990s to design, conduct, and manage that project, which we titled the Ecological Awareness and Risk Perception (EARP) study.

## **The Ecological Awareness and Risk Perception Study**

The EARP study focused on the Fermi II nuclear power plant in Monroe, Michigan because it is comparable in several ways to the Angra dos Reis site. For example, both communities are of roughly equal size (approximately 25,000); both are situated on large bodies of water (Lake Erie and Ilha Grande Bay, respectively); both are proximal to major urban centers (Detroit and Rio de Janeiro, respectively); both have a history of past environmental degradation (particularly of coastal waters); both have operational nuclear power facilities; and both are reasoned to have cast significant RPSs that could be measured and characterized by the RPM methodology.

### **Relationship to GLC/GLMN Interests**

I have chosen to use the EARP study as the basis for this demonstration project because it provides an extensive RPM database for a sizeable area within the Great Lakes ecosystem, and as such should be of value to the GLM Network. It should be noted, however, that although the EARP study is centered on the Fermi II facility, the GLC has no specific interest in or direct involvement with that facility. As stated previously, the Fermi II facility was selected to meet specific criteria for the EARP study apart from this fellowship. Most notably with respect to the RPM methodology, nuclear power plants typically generate considerable community risk perception and therefore present ideal RPM methodological demonstration case studies. The EARP study is applicable to this fellowship because elements of it can be used to meet the GLM Network interests identified earlier in this presentation.

### **EARP Study Area Definition**

The EARP study area was defined as a 25 mile radial area surrounding the Fermi II facility, and encompassed all or part of five counties, including Monroe, Washtenaw, and Wayne Counties in southeastern Michigan, and Lucas and Ottawa Counties in northwestern Ohio. The study area also extended in extreme southwestern Ontario, Canada, but permission to conduct the study in that region could not be obtained prior to the start of the EARP research (see Figures 1 & 2).

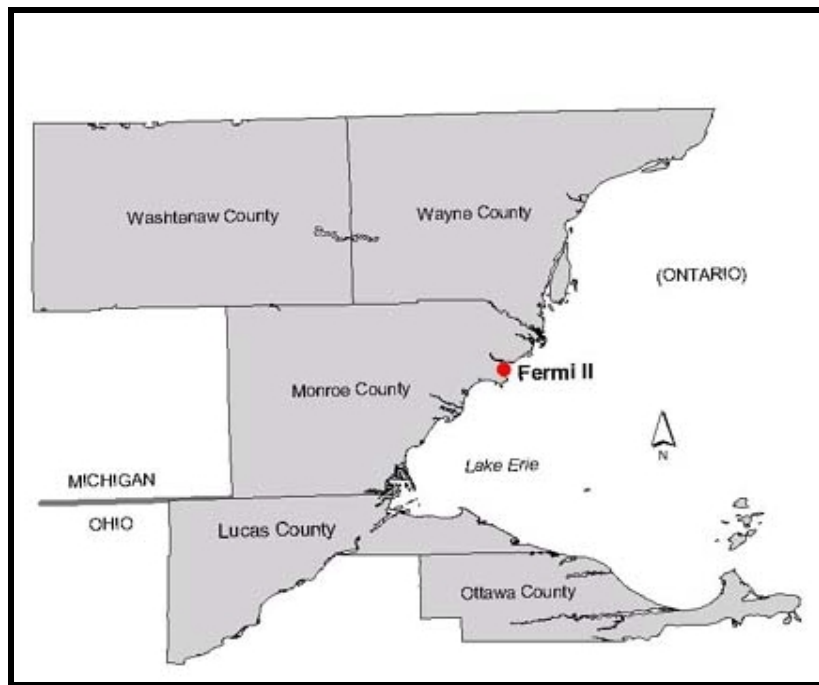
### **Sampling Design**

A center-point radial sampling design was used to define the distribution of sample areas throughout the study area. This procedure, developed in collaboration with the Sampling Section of the University of Michigan's Institute for Social Research, is central to the RPM methodology and will be discussed in much greater detail in the methodological description section of the fellowship project report. Further discussion may also be found in Stoffle, Stone, and Heeringa (1993). Suffice it to say for the purposes of this presentation, the RPM sampling design assumes that perceived risk is greatest nearest the source project – in this case the Fermi II facility – and decreases monotonically as a function of distance away from the facility. Figure 3 shows how this theoretical RPS would appear if viewed from above.

**FIGURE 1. Geographic Area of the EARP Study**

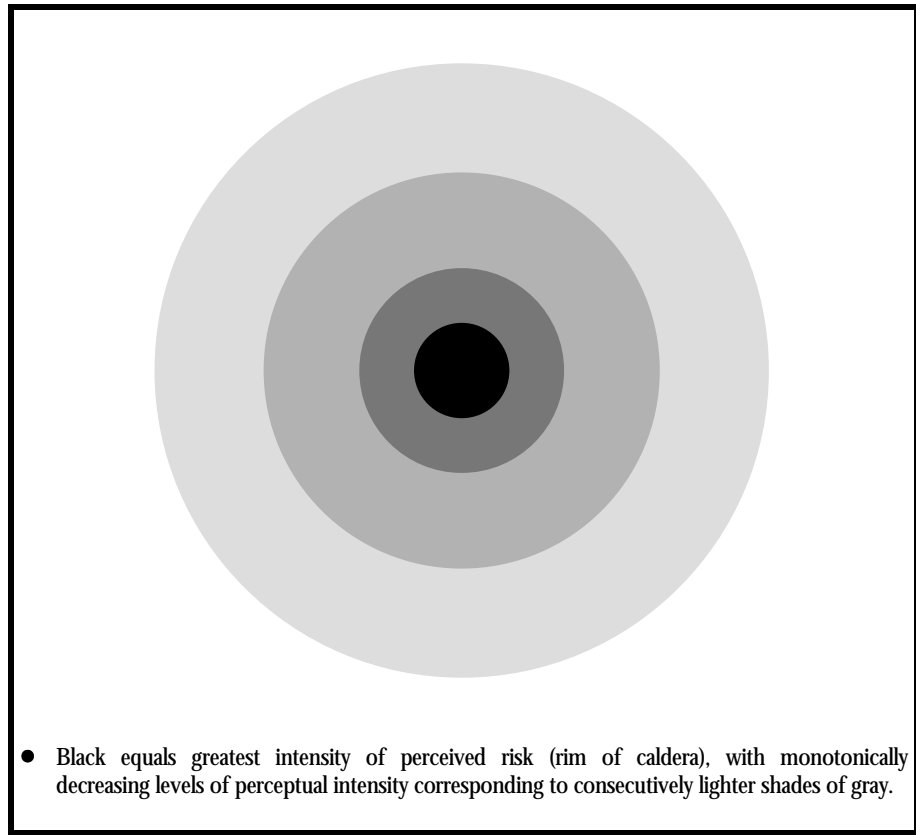


**FIGURE 2. County and State Boundaries of the EARP Study**



The design further assumes that confounding factors such as prevailing climatic conditions, geographical features, and sociocultural attributes, to name but a few, can distort the spread of perceived risk in non-linear ways. One of the goals of RPM is to ascertain those factors and their role in distributing project-specific risk management issues throughout an LAP.

**FIGURE 3. Theoretical RPS as Viewed from Above**

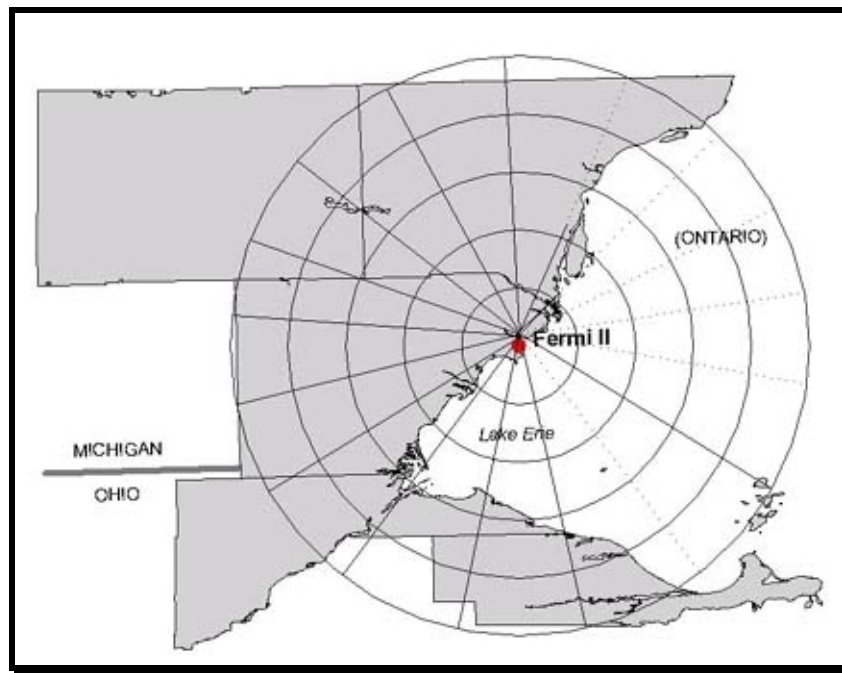


### **Sample Area Definition**

The study area was divided into five five-mile concentric sample zones emanating from the Fermi II facility. A total of 17 equally spaced transecting lines were generated at a random angle from due north, emanating outward from the Fermi II facility much like the spokes of a wheel. Sample areas, defined as one-square mile areas conforming to United States Geological Survey section lines, were randomly generated across each sample zone at equally spaced distances along each transect.

Some transects crossed the open waters of Lake Erie, or extended into Ontario where permission to conduct the research was not obtained, so not all transects contained a full complement of sample areas. A total of 43 sample areas were thus identified within the study area. Figure 4 shows the relationship of the RPM sampling frame to the geo-political boundaries of the EARP study area.

**FIGURE 4. Relationship of the RPM Sampling Frame to the Geopolitical Boundaries in the EARP Study**



### **Pre-field Community Consultation**

Prior to the RPM fieldwork, I arranged and attended meetings with local community officials, opinion leaders, media, and law enforcement agencies to describe the proposed research and elicit their support for the study. The explicit goal of pre-field community consultation was to establish a reciprocal relationship between researchers and locally trusted and respected community leaders, in which the research process was opened to local scrutiny at all phases of the research in exchange for the opportunity to conduct the study in the community. The EARP study would not have been as successful, nor would it have been desirable, without these leaders' understanding of and participation in this reciprocal relationship.

### **Data Collection Instrument**

The EARP study utilized a structured RPM survey questionnaire as its primary data collection instrument, although survey respondents were encouraged to identify others with whom a more ethnographic style of interviewing occurred. The RPM questionnaire was developed concurrently with the sampling design and community consultation phases of the research, and built upon the local input received during community consultation. It was both broad in its range of issues covered and deep in the level of detail sought within particular issue areas. This was largely a result of combining Kottak's Brazilian ecological awareness and environmentalist action measures with standard RPM measures in a new project setting.

In addition to standard demographic information, the EARP instrument covered 11 interrelated issues mostly pertaining to perceived environmental risk and social impact. Of these the most relevant to this fellowship project will be a section on “Perceptions of and Responses to the Fermi Facility,” because it enables the mapping of the Fermi II RPS. Other relevant sections include “technology and environment analogs,” “organizational trustworthiness,” and “participatory preferences.” Time and budget will dictate the extent to which these latter sections are factored into demonstration project-related analyses.

The EARP instrument was pre-tested in four iterations among roughly 20 people of varying ages and backgrounds during the two month period immediately preceding the field work portion of the EARP study.

### **Respondent Selection and RPM Interview Process**

All structures in each sample area were sketched and numbered on a field map. Three potential respondents were selected at random from among the total number of residents identified in each sample area. Potential respondents were presented with a study description featuring photographs of the lead researchers and were encouraged to contact the University of Michigan or their local law enforcement agencies, which had been notified prior to the study, to verify its legitimacy. Interviews were either conducted on the spot, or more commonly an appointment to interview was made at the respondent’s convenience. Respondent confidentiality disclosure and informed consent was obtained in either written or tape recorded format. A total sample of 128 interviews were sought through this procedure, 108 were obtained for a response rate of 84.4 percent.

### **Other Related Research Activities**

Other related methods used in the EARP study included participant observation, key-informant interviews, and informal “snowball” or respondent network interviews. Archival and other secondary data sources, including media and historical documents, were also monitored and reviewed throughout the study period.

### **Data Management**

Completed RPM survey instruments were edited for internal consistency. Closed-ended responses were pre-coded in the survey instrument and required no further coding prior to data entry and analysis. Open-ended responses, however, were abstracted and subjected to an inter-rater reliability process to develop code categories and establish internal consistency among coding staff. A mean reliability rate of 97 percent was obtained in this process, with a range of 75-100 percent across all code categories. Coded data are presently being entered into a database management system based in an ARC-VIEW GIS format.

### **Key RPM Analytical Variables**

SIA studies have documented that *project awareness* represents the widest range of potential concerns and impact issues within a project study area (Stoffle, Stone, and Heeringa

1993). Thus, from both the GLC and an RPM perspective, the key analytical section of the EARP questionnaire focuses on “Perceptions of and Responses to Fermi 2.” Within that section, “project awareness” – i.e., respondent awareness of the Fermi facility – is used as the key analytical variable. Moreover, “awareness” can be spatially mapped rather straightforwardly, so in addition to marking the extent of a project’s risk perception shadow (RPS), it also provides a sound analytical basis upon which to explore potential correlation among this and other key variables. These “other key variables” include standard demographic characteristics – particularly from an environmental justice standpoint, such as race, income, age, and gender, as well as lines of questioning on “Technology and Environment Analogs,” “Participatory Preferences,” and “Organizational Trustworthiness.”

### **Preliminary Findings**

The EARP study documented the presence of an RPS for the Fermi II nuclear facility. The Fermi RPS is operationally defined as "project awareness" because, as noted earlier in this paper, it is consistent with previous RPM studies which documented that local level social impacts occur when two thirds or more of the local population is aware of a specific project. Moreover, as cited previously, similar research on the nature, extent, and causes of environmental awareness and remedial action suggests that local people will not participate in actions designed to manage their environment if they are unaware of or perceive no risks to it.

With "project awareness" as the operative variable in the EARP study, 86 percent of the responding sample claimed to be aware of the Fermi facility, while only 14 percent claimed that they were not aware of it. RPM is uniquely designed to address questions concerning how project awareness is distributed spatially, in this case across the geographic boundaries of the EARP study area, and, secondly, what are the unique demographic characteristics of the respondents within both the aware and unaware populations.

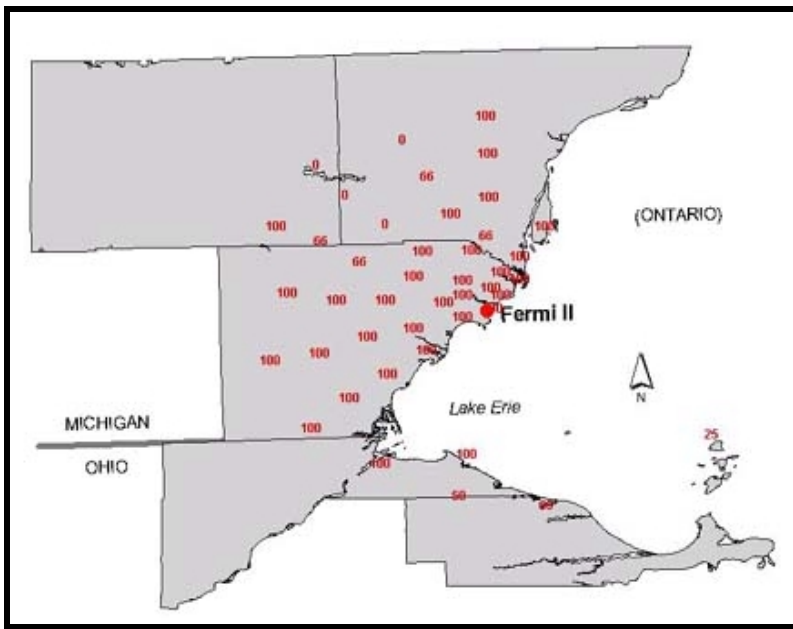
### **Spatial Distribution of the Fermi RPS**

The Fermi RPM data were spatially analyzed with the ARCVIEW GIS program. Figure 5 presents the geographic distribution of the percentages of project awareness, by sample area, for the Fermi RPS.

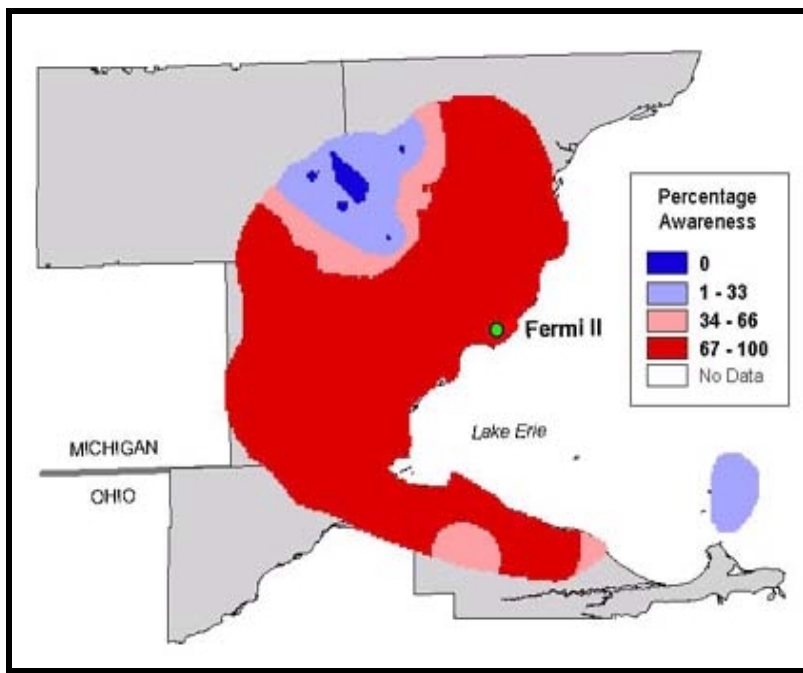
The percentages in Figure 5 have been grouped and color coded according to descending levels of project awareness, where red indicates areas with at least two-thirds awareness and dark blue indicates areas of no awareness. Intermediate awareness levels are represented by light red and light blue. Figure 6 presents these shaded characteristics of the Fermi RPS.

An important analytical note must be made here. The RPM data for Fermi exist as discrete or discontinuous data points on a map. Shading them as I have in Figure 6 suggests that these variables are continuous rather than discrete. Monmonier (1995; 1991) has warned of the dangerous potential misuse of GIS technology, and I am acutely aware of these constraints.

**FIGURE 5. Awareness Percentages for the Fermi II RPS**



**FIGURE 6. Shaded Map of the Fermi II RPS**



One cannot assume that values increase or decrease linearly between discrete points. The function of such maps is not to interpolate values for the areas between the data points but rather to illustrate a hypothetical topography of the Fermi RPS. Recall that the purpose here is to demonstrate the utility of social data in defining the LAP for consultation in environmental management. It may be possible through GIS to infer values for the rest of the study area population by comparing RPM sample characteristics to those of census data for the study area.

To the extent that "unaware" populations are less likely to participate in environmental management programs, such RPM maps can reveal to public participation professionals, environmental decision-makers, and affected populations alike, the potential spatial implications of environmental discrimination and in so doing can help them to visualize this phenomenon so that their efforts to redress it may be focused more efficiently and responsibly. Indeed, this is the impetus behind the GLM Network's interest in this project.

### **Characteristics of the Fermi RPS**

Figure 6 reveals that, as with the Michigan LLRW RPS, the Fermi RPS has at least three distinct features, although they are not quite the same. Both have core and contiguous areas, but whereas the LLRW RPS contained islands of perceived risk, the Fermi RPS contains risk perception *voids*, or areas in which none of the sample respondents were aware of the Fermi facility, but which are surrounded by areas of higher awareness.

#### *RPS Core and Contiguous Areas*

The core component of the Fermi RPS is marked by two-thirds or greater awareness of the facility and extends radially for up to 10 miles from the facility. The contiguous areas of the Fermi RPS extend broadly up to at least 25 miles to the southwest and the northeast and also are marked by at least two-thirds awareness. Previous RPM studies have actually detected the outer edges of the RPS for their respective projects (Stoffle, Stone, and Heeringa 1993); this has not been the case with the Fermi RPS. Additional interviews in successive sampling zones would be necessary to detect the hypothetical edge of the Fermi RPS. Our inability to detect risk perception islands in this study may be a function of our not having detected the edge of the RPS.

#### *RPS Voids*

Perhaps most intriguing was our finding of risk perception voids. As stated above, RPS voids are defined as areas where awareness is absent but which are surrounded by areas of higher awareness. This characteristic of the Fermi RPS was detected in the northwest quadrant of the study area. However, because the outer edge of the Fermi RPS was not detected in this study I cannot state for sure that this would, in fact, constitute an RPS void as defined above. As such, this area might also be thought of as an "RPS trough" or "valley." Again, additional interviews in successive sampling zones would be necessary to accurately identify this phenomenon. In calling it a "void," I'm referring more to its characteristic absence of awareness rather than its situation relative to other areas of higher awareness. The presence of this void or trough is intriguing to me because it occurs so close, relatively speaking, to the Fermi facility -- as close as 12 miles.

Another area where awareness was very low but not entirely void was detected at the far southeastern edge of the study area. This sample area is on North Bass Island, in Lake Erie, and its low level of awareness might be attributable to its geographical isolation relative to the other sample areas. If so, this finding might suggest geographic *isolation*, not necessarily distance, as an environmental discrimination variable.

## **Contours of the Fermi RPS**

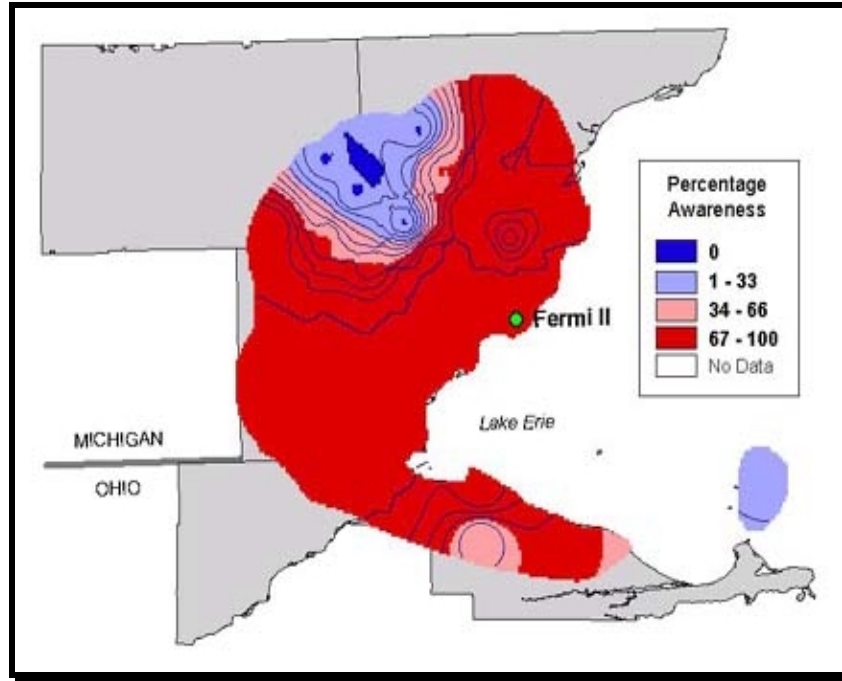
GIS enables spatial analysis of RPM data and, as such, presents the opportunity to display and view attitudinal social impact data across a geographical plane. For the first time, such data can be viewed in terms of a contoured topography where, for instance, greatest potential impact is analogous to the highest ground -- mountains and plateaus, and least potential impact is analogous to low ground -- valleys, troughs, depressions. Conversely, in terms of public participation, lowest levels of "project awareness" correspond to least potential for participation in environmental decision-making, and these would appear on an RPM map as valleys, troughs, and depressions; highest levels of awareness correspond to the greatest potential for participation and, on an RPM map, would appear as high plateaus.

But contour mapping alone tells us little about the *direction* of slope on the contours. For example, a risk perception void could easily be misinterpreted as an awareness "peak," if you will. Figure 7 shows how we compensated for this by integrating awareness contour lines with the shaded RPS presented in Figure 6. Most noteworthy is the degree of the slope at the inner most edge of the void, that is, at its point closest to Fermi. The close proximity of contour lines in that area suggests that awareness of the facility drops off quickly and deeply. And this raises some intriguing questions: What accounts for such a drastic topographical relief? Are there differences between the sample respondents in the RPS void and those in the adjoining core area that might account for this difference in project awareness? The EARP sample is too small to establish causal relationships regarding these questions, but it certainly suggests potential correlation between them, and these will be the subject of further analyses as this study progresses.

## **Demographic Characteristics of "Aware" versus "Unaware" Populations**

It is worth noting that the 14 percent "unaware" population is comprised of 100 percent of the non-white portion of the responding sample but only 12 percent of the white portion of the responding sample. The unaware population also includes higher than average percentages of elderly, disabled, low-income, female, and newly residential -- all considered in the literature to be "environmental discrimination" variables (see, e.g., Petrikin 1995). I also plan to map the study area by the demographic characteristics of both my sample and the study area, and I suspect that racial composition will map very similarly to the awareness shadow.

**FIGURE 7. Shaded Contour Map of the Fermi II RPS**



Given these findings, and from a broader environmental justice perspective, we should be asking how, if at all, is not being aware of a specific environmental project or program related to social, demographic, and geographical factors, and what implications might these have for participatory equity in environmental management? Such questions are particularly germane to the GLM Network’s interest in utilizing social science methodology to identify perceptually-specific communities of environmental risk for consultation in its Great Lakes management activities.

### **Technology and Environment Analogs**

Data were obtained on technology and environment analogs by asking study respondents to identify up to five local projects, proposals, or events, if any, past or present, that they felt had most significantly influenced their perception of local environmental risk. In past RPM studies such information has enabled researchers to construct an environmental risk perception history within an LAP. But to date, analyses have not been conducted of the spatial and/or social distribution of risk perception analogs among the LAP’s constituent groups. Such analyses are presently planned for the RPM Demonstration Project and will be reported in the project’s final report.

Respondents identified a total of 274 technology and environment analogs either within or in the vicinity of the EARP study area. The data coding team collapsed these into nine more general categories or types, each of which contains sufficient subcategories to account for the breadth of analogs mentioned. Table 2 lists the most commonly identified analogs (those mentioned by more than five percent of the responding sample).

**TABLE 2. Rank Order of Top Technology and Environment Analogs in the EARP Study**

<b>Percent of Respondents</b>	<b>Type and Location of Analog</b>
38%	Fermi II Nuclear Power Plant, Newport, MI
14%	Davis-Bessey Nuclear Power Plant, Port Clinton, OH
10%	Proposed Envotech Hazardous Wastes Incinerator, Milan, MI
9%	Detroit Edison Coal Plant, Monroe, MI
7%	Carleton Farms Landfill, southern Wayne County, MI
7%	Detroit Metropolitan Airport Expansion Project, Romulus, MI
7%	Dundee Cement Factory, Dundee, MI
6%	Lake Erie Pronounced “Dead” of Pollution in 1960s & 70s*
6%	New France Stone Quarry, Monroe, MI
6%	Pesticide Use on Farms in the Region*
6%	Sterling State Park, Monroe, MI
5%	Proposed Low-Level Radioactive Waste Storage Facility, Riga, MI**

It’s worth noting that the Fermi II facility was identified more than twice as frequently as the next most frequently identified analog (another nuclear power facility on the outer edge of the EARP study area). This is not a product of having discussed the Fermi facility in the study questionnaire, as the Technology and Environment Analogs section preceded the section on Perceptions of and Responses to the Fermi II facility. Rather, is quite likely a product of the center-point radial sampling design, which provides a greater number of interview observations nearer the center-point project under consideration. Still, one shouldn’t overlook the fact that another nuclear facility was the second most frequently identified analog, and this facility, called Davis-Bessey, is situated at the outer most edge of the outer most sample zone in the study area.

The implication here is that environmental risk perception is most profoundly influenced by nuclear facilities – be they power generation or waste containment facilities. Public consultation and outreach programs targeted to perceptually-specific communities of environmental risk in southeastern Michigan and northwest Ohio must necessarily account for the perceptual effect these facilities have on local communities. Quite simply, they are sociocultural and perceptual

phenomena, in addition to their more obvious utilitarian functions, and as such they can be expected to influence people's responses to other environmental management issues. From a public consultative standpoint, therefore, every effort must be made to understand the spatial distribution of the sociocultural and perceptual impacts these facilities can have on a locally affected population.

Respondents were also asked to describe the effect, if any, that they felt these local analogs had on their perception of local environmental risk – whether positive, negative, neither, or both. A total of 90 different descriptions were given. Respondents characterized 49 percent of these as having a negative effect on their environmental risk perception. They characterized 29 percent as having both negative and positive effects, 17 percent as having a positive effect, and six percent as having neither a positive nor a negative effect. The coding team collapsed respondent descriptions into three more general categories or types to enable more reliable statistical analyses of their spatial and/or social distribution throughout the EARP study area.

## **Discussion**

To more fully understand the extent and nature of the Fermi RPS the EARP study will have to be expanded to include the Ontario sample areas. It is also apparent that the outer edge of the Fermi RPS was not entirely detected, with the possible exception of the northwestern quadrant of the study area in which the risk perception void was detected. More in-depth ethnographic work may need to be completed in these “void” areas of the RPS, for example, a statistically valid sample of those areas would help determine the percentage distribution of awareness among the various social groups existing within them.

### **Connotations of Risk Perception Voids**

Risk perception voids *connote* differential social access to public participation in environmental management, and they illustrate the potential spatial implications of environmental discrimination. People who are not aware of a specific environmental project necessarily do not participate in decision-making processes associated with the project. To the extent that these “unaware” people tend to share certain socio-demographic and geographical factors, their lack of participation suggests a potential “participatory” link to the phenomenon of environmental discrimination. Case in point, more than 25 years after the construction of the Fermi II facility, a sample of a rural, low-income, predominantly African-American community less than 15 miles from the facility reveals that very few if any of its members are aware that the facility even exists.

Further work needs to be done to develop more complete criteria for defining a locally affected population. “Project awareness” may be illustrative and instructive as a first order criterion in such definitions, but it may be insufficient, for example, as a frame for more elaborate social impact analyses. Past studies suggest considering at least four additional criteria when seeking a definition for a locally affected population, including the perceived directness, significance, number, and duration of impacts (Stoffle et al., 1991).

Locally affected populations must be defined broadly and inclusively in environmental management. Special emphasis must be placed on both the identification of “vulnerable subpopulations” AND the social, cultural, contextual, and geographic factors that influence the relative likelihood that members of such populations will become aware of a project in the first place. In short, the *process* of public consultation must be broadly inclusive, culturally sensitive, and locally appropriate. As a methodological foundation for public consultation driven by social data, RPM enables the identification of perceptually-specific communities of environmental risk and lays the procedural basis from which population specific information and education exchanges may be developed.

## **The Anthropological Difference in Public Consultation**

Cernea’s classic “Putting People First” (1991) argues for the earliest possible involvement, not just of people, but of the sociocultural factors they bring to bear on projects. This raises the question of who or what constitutes “the public” (Roberts 1998; 1995). Roberts (1995) notes that in participatory terms “the public” is actually comprised of “multiple publics,” an observation made years earlier by Alvin Wolfe (1978) who recognized the importance of participatory subsystems at different levels of integration. People organize themselves along any number of different and potentially overlapping lines, for various reasons and across various contexts; one person may thus belong to any number of social groups at any one time, and this can present both profound opportunities and headaches for the public participation practitioner.

### *Conceptualizing “Multiple Publics:” Etic and Emic Definitions*

But simply recognizing multiple publics as a sociocultural if not participatory fact is not enough. Anthropologists have long used the concepts of “emics” and “etics” to deal with problems such as these. Most of us here today are familiar with these terms and their range of applications in applied work, so I won’t belabor their distinction here, suffice it to say that in their simplest forms, “etics” can refer to human organizational definitions “imposed” from the outside, that may or may not have any basis in social reality; “emics,” on the other hand, can refer to human organizational definitions that derive from social interaction in cultural context. In terms of understanding the role of multiple publics in public participation, demographic criteria such as age, gender, race, income, and the like are prime examples of etically defined social groups. For the most part, people do not organize themselves into behavioral units that correspond to these etic group definitions. Although such groupings can provide valuable information for describing the demographic characteristics of a locally affected population, they provide little in the way of understanding much less utilizing for participatory purposes the behavioral aspects of the human groups potentially affected by a given project.

By contrast, emically defined groups are self-defined by group interaction and always have their basis in a group’s social reality. For example, I was the ethnographic field manager on an RPM project several years back. Our research team encountered an emic group self-defined as a “milkshed” – an extensive collection zone for milk produced by dairy farms in the project area. The members of this particular milkshed (defined etically by occupation as “dairy farmer”) were reacting to the project as a behavioral unit because their milk was being mutually collected and processed. Interestingly, the boundary of this milkshed cut very near to the project location.

Dairy farmers belonging to a different milkshed just outside the project location expressed neither the level nor type of concerns as those being expressed by those who lived much farther away from the project but whose milk was being mutually collected with that of dairy farms adjacent to or near the project location. These people were not responding to this project as occupationally defined “dairy farmers;” rather, their respective milksheds were their perceptual and behavioral units. Had we not accessed that information we would not have been aware of, much less understood, this socially meaningful behavioral component of the LAP. Subsequent participation programs would have homogenized an important behavioral distinction by presuming that people’s behavior is dictated by etically derived categories, such as in this case, the occupation “dairy farmer.”

### *The Importance of Context*

From a participatory standpoint, it is also very important to note that the people belong to any number of emically defined groups and as such may embody numerous and even potentially conflicting responses to a given project. For example, in the study mentioned above, ethnographic interviews were conducted among several Amish enclaves near the study area. As members of the milkshed discussed above the impact issues they expressed suggested they were not in favor of the project, primarily because they didn’t understand and therefore feared the technology associated with it. However, as members of the larger Amish community, these same people suggested that the rumored drop in property values associated with the project would be of great *benefit* to their community because it might curb the *rising* property values which were causing significant Amish cultural dislocation. Rising property values may bode well for the upwardly mobile suburbanite, but for this Amish community, it was forcing its members onto ever more agriculturally marginal lands at increasingly greater distances from each other. The project, although feared and unwanted, was quite frankly the lesser of two evils. Depending on the behavioral hat one was wearing, the same people in these two “publics” presented different impact concerns and mitigation issues.

### *Emic and Etic Classifications of "Indigenous Knowledge" in Environmental Management*

Partridge (1984:23) has observed that "any response to [a] project, and most specifically people's participation in [it], will be mobilized, organized, and controlled through *indigenous corporate groupings*." It's instructive at this point to consider the current literature on "indigenous knowledge" (Purcell 1998; DeWalt 1994; Greaves 1994) because one sees reference to the concept popping up in documents pertaining to public participation and environmental justice in environmental management (Cohen and Bleakly 1997; National Environmental Justice Advisory Council [NEJAC] 1996). For instance, NEJAC (1996:6) notes in its "Model Plan for Public Participation" that "indigenous knowledge" must be "recognized" at public meetings involving environmental justice issues. Yet no definition of indigenous knowledge is given in that document, nor why or how such a concept is relevant to such issues. Moreover, there seems to be a presumption that the etic category defines the knowledge, rather than vice versa. Clarity in such matters bears practical consequences for both the conduct and output of public participation in environmental management.

Yet even anthropologists have some difficulty with this concept (Purcell 1998:258-272). For example, Greaves (1994) has edited a source book on "intellectual property rights for indigenous peoples." The contributors to that volume have promulgated at least nine different categories or types of "knowledge," including "indigenous," "traditional," "cultural," "local," "indigenous cultural," "indigenous traditional," "native cultural," "collective," "general and collective;" as well as "traditional attitudes" and the "local people" who hold them (Greaves 1994:opcit). Do these categories have specific meanings, or may they be used interchangeably to refer to the same basic concept, knowledge? From a participatory standpoint, are we interested in the knowledge people possess or the categories within which we include them? If the former, our participatory concepts will be broad and inclusive; if the latter, narrow and exclusive.

Purcell (1998:260) notes that "depending on the circumstances, any aspect of culture that functions toward the long-term survival of a group may theoretically be treated as indigenous knowledge." I like this definition because it is broad and inclusive and points to the relevance of human knowledge gained through extended intimate experience with specific environmental and cultural contexts. I think exclusivity of knowledge *types* dilutes the power of the concept of culture by splintering its cognitive aspects into ever more specific, albeit not necessarily mutually exclusive categories. And much like misguided concepts of racial categorization based on insufficiently discrete phenotypical characteristics, they are confusing and potentially misleading, particularly as they relate to public participation in environmental management. Consider the issue of environmental discrimination, where the problem is not over-exploitation of the knowledge possessed by the LAP, but rather under-utilization of that knowledge through institutional arrangements for participation that, although perhaps not deliberately, nevertheless fail to include the participation and therefore incorporate the insights of the multiple publics which comprise it (Stone ND).

*Participatory equity* should be the guiding principle for public participation in environmental management. The focus ought to be on "behavioral" (emic) rather than, or in addition to, "categorical" (etic) knowledge in cross-contextual settings (Wynne 1991). The nature of one's participation will vary according to one's behavioral group affiliation and those groups' situational contexts at the time one's participation is sought. It is incumbent upon those of us who practice anthropology in the context of environmental management to utilize our anthropological perspectives to identify and make explicit the cultural bases of the multiple behavioral groups which comprise the LAP for any given project, and the contextual settings within and between which those groups exist. Indeed, the Region Five Sociocultural Profiling fellowships were conceived to "develop material that allows environmental managers to better understand the cultural complexity and sociocultural issues associated with their work" (Johnston 1999:7-8).

### *Ethnography and Participatory Equity in Environmental Management*

Ethnography alone in public participation will not create equal access to participation for affected populations; rather, it presents a methodological framework within environmental managers may access these populations – their knowledge, insights, etc., on their terms, and in locations and contexts that are familiar to them. Participatory equity will not occur in environmental management simply by increasing the publics' access to decision-making processes. We must also increase the methodological capacity of decision-makers to access the

knowledge – local knowledge, indigenous knowledge, traditional knowledge – call it what you may, that defines locally affected populations as integral and contributing members of the environmental management equation. And this brings me to an exciting potential for the continued application of this work in future GLC activities.

### **Potential Application to GLC/GLMN Interests**

Perhaps most encouraging to date has been the GLC commitment to incorporating social science into its work, as evidenced in a recent grant proposal that I helped prepare *Pro Bono* during non-fellowship hours (Donahue 2000). If funded, this proposal, submitted to the NSF under its “Biocomplexity Initiative” (NSF 1999) will enable the GLC to create a *Great Lakes Research and Management Collaboratory* for Aquatic Nuisance Species (ANS) in the GLB. The proposal explicitly cites this SfAA/EPA fellowship and calls for using RPM as the cornerstone social science methodology for public consultation in ANS risk management. If nothing else, this proposal stands as evidence of the GLC’s support for RPM as a social science methodology that is applicable to Great Lakes ecosystem management.

This is an exciting prospect for the GLB, applied anthropology, and the SfAA/EPA Cooperative Agreement. Pending funding, the GLC proposal will link this fellowship to the future operations of the GLC. It will meet GLC interests while satisfying the demonstration project goal of “enhancing the methodological rigor that the GLC already brings to public consultation and social research in the GLB.” In so doing, it will meet the key social science components of the principles embodied in the Ecosystem Charter for the Great Lakes-St. Lawrence Basin. And to the extent that this work is formally implemented in Great Lakes ecosystem management activities, it will satisfy the mission of the SfAA/EPA Cooperative Agreement, which is to “increase the access of communities and policy-makers to anthropological and other social science expertise in the solution of environmental problems” (SfAA/EPA 1996:4).

### **Conclusion**

SIA studies have documented that a project’s social effects occur to the extent that local populations perceive themselves to be at risk from the project. “Project Awareness” is a necessary criterion for project specific risk perception and it has been used successfully to broadly define the LAP in SIA for environmental management. As an ethnographic method of public consultation, RPM uses social-perceptual data to explicitly define the geographical extent and unique behavioral characteristics of an LAP and document the impact and mitigation issues raised by its various constituents. As such it presents a social scientific mechanism for developing population-specific information and education exchanges through which more culturally sensitive social indicators of Great Lakes ecosystem integrity may emerge.

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