New Directions Workshops: Community Assessment Series

Workshop 2:
Identification and Evaluation of Community Assessment Tools

Summary Report

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STATUS OF THIS REPORT

The objective of this workshop (or workshop series) was to bring together EPA scientists from the regions, programs, and ORD labs and centers to discuss issues of common interest. The focus of the meeting (or each meeting) was preliminary discussion among scientists and managers from different parts of the Agency, each with their individual and office-specific information and viewpoints.

As a result, it is important to understand that this report summarizes individual and program-specific perspectives. References to pre-existing Agency information and policies should be credited as such, but none of the individual workshop statements or summaries in this report should be credited or cited as Agency information or policies. Rather, this report is developed exclusively for internal EPA use and distribution as a record of the meeting for participants in each meeting, and for EPA's use in planning future meetings and discussion. EPA staff will use information from this report, as appropriate, to design and conduct workshops or other activities for broader discussion both within EPA and with external participation, again as appropriate.

Executive Summary

The second New Directions workshop in the Community Assessment Series was held at the Radisson Governors' Inn in Research Triangle Park, NC on June 9-10, 1999. This workshop, entitled "Community Assessment Workshop II: What Tools and Data are Available to Answer Community Assessment Questions?," focused on identifying and evaluating tools and data that are available for use in assessing environmental impacts on a local environment. In addition, the participants conducted a preliminary assessment of gaps in the tools. Relevant tools and data were identified and discussed during both plenary presentations and breakout groups. The results of the breakout groups are given in Exhibits 2 and 3. Exhibit 2 breaks tools and databases into general, exposure, stressors, and receptors categories. Exhibit 3 matches tools and databases with the appropriate community assessment question.

Tools and databases discussed included source-to-dose models, Total Risk Integrated Methodology (TRIM), National Air Toxics Assessment (NATA), the National Toxics Inventory, Geographic Information Systems (GIS) tools, the National Census, the Centers for Disease Control (CDC) data collection system, and the Integrated Risk Information System (IRIS) database. Source-to-dose models, which are soon to be available, are intended for use with pesticides, population exposure, and air toxins. TRIM, which is due for release in 2001 and consists of four modules, assesses community risk through multi-pollutant, multimedia, and multi-pathway assessments. NATA consists of emissions inventories; air quality, exposure and risk modeling; an air monitoring network; and ongoing research on effects and assessment tools. The National Toxics Inventory is a national-level model. GIS systems can be used to create a database out of a map for analysis and modeling. National Census data can provide information on receptor populations, although better, more often-updated sources are needed. CDC data from its many agencies include information on vital statistics, population surveys, hospital discharge data, disease reporting and case-finding, and surveillance systems. IRIS provides limited information on environmental exposure, based on chemicals which have been assessed for toxicological information.

Participants also evaluated the available tools, databases, and methods and discussed gaps that must be addressed to answer community assessment questions. EPA must identify those sources that will provide the best information with minimum resources, with consideration for acceptable levels of uncertainty. The lower limits of information needed to answer community-assessment questions should be determined, as well as the value added by increasing increments of sophistication. Benchmarking and biomarkers should be developed to define reference "healthy communities" so that these models can be used, through comparison, as a standardized community screening tool. A separate "healthy community" model could prescribe steps that could be taken by a community to become "healthy." Data and tools regarding acute effects and non-human and ecological factors, such as noise and odors, are necessary. Reliable sources of data on the local level, including human health data, local emissions and community source inventories, and local monitoring data, are needed. In addition, household-level data sources would be useful.

In addition to creating new tools, gaps may be addressed by improving the use, consistency, and quality of available data sets. Sources of surrogate information should be located and their limitations addressed. An index of databases available for analysis is necessary to place the tools

in the context of their use rather than simply list them. Case studies, developed according to a standard methodology, can provide practitioners with guidance on applicable tools, databases, and methods.

Finally, many of the databases and tools that exist today cannot be used or interpreted by the community without technical support or direct assistance from EPA. Communities must either be provided with training in using these tools or tools should be developed that are more appropriate for laypeople.

The third workshop in the Community Assessment series will more thoroughly assess the gaps in tools, databases, and methods and develop Agency strategies for addressing the them to meet community-assessment needs. The tools matrix, begun in the second workshop and given as Exhibit 3, will be completed.

Preface

The Environmental Protection Agency's (EPA) Office of Research and Development (ORD) is currently pursuing new approaches for using science to address several topics of importance to the Agency. These topics represent new directions for EPA in that they transcend the traditional media- or pollutant-based boundaries and encompass a variety of disciplines and specialities. ORD wishes to link EPA staff interested in these topics with the appropriate science staff in ORD to identify areas for collaboration. To accomplish this goal, ORD's Office of Science Policy (OSP) is hosting a series of New Directions workshops between March 1999 and Spring 2000. The workshops will provide a forum to present information and discuss current and future issues on new topics of interest. There are four topic series being presented under the auspices of New Directions: community assessment, reinvention, risk management, and regional science. Each topic series will consist of three or four workshops designed to bring interested staff together to develop a set of action items that will be completed over the course of the series. The Community Assessment Workshops are designed to improve EPA's ability to provide the tools and information necessary to assess and understand the environmental impacts in a community setting.

The first workshop, held March 3-4, 1999, in Washington, D.C., examined Agency experiences in identifying and clarifying community-assessment needs and developed a list of questions asked by communities. These questions were divided into the following four major categories:

- Is there a threat to our health or our local environment (are we safe)?
- How can we characterize the risks within our community?
- How do the risks in our community compare to other communities?
- How can we improve our environmental quality of life?

The second workshop was held at the Radisson Governors' Inn in Research Triangle Park, NC on June 9-10, 1999. This workshop, entitled "Community Assessment Workshop II: What Tools and Data are Available to Answer Community Assessment Questions?," focused on tools and information available to understand and address the basic questions concerning environmental impacts on a local environment, including both the human and ecosystem aspects of the environment. The workshop was designed as a dialogue between the practitioners of community assessment and the developers of tools. In the first part of the workshop, practitioners described what tools they found to be helpful, and which they did not, in conducting their assessments. The second part of the workshop focused on categories of tools (data, models, and methods) which can, in the developer's view, be used to address the community-assessment questions. In addition, the participants conducted a preliminary assessment of where gaps are in the tools. The third workshop will assess the gaps in tools and develop Agency strategies for filling the gaps to meet community-assessment needs.

This report summarizes the information that was presented and exchanged during the workshop. The organization of the report follows the agenda of the workshop. Approximately 38 senior EPA staff, representing EPA program offices, ORD, and several Regions, participated; Appendix A provides a complete list of participants. The two-day workshop was designed to maximize participant input and collaboration; Appendix B provides a copy of the final agenda.

Appendix C is a draft of the full list of questions prepared following the first workshop. Appendix D provides a table of definitions related to community assessment that was prepared following the first workshop. Appendix E is a table of data and tools that was developed during the first workshop. Appendix F includes copies of the speaker notes and presentations. Appendix G provides copies of the matrices provided to groups of participants during their breakout discussions. Appendix H contains transcripts of the flipcharts and other materials prepared by workshop participants. Appendix I gives a list of comments made during breakout sessions.

1.0 Introduction

1.1 Welcome (Hal Zenick - National Health and Environmental Effects Research Laboratory (NHEERL))

The Community Assessment Series of the New Directions workshops is intended to bring EPA scientists, analysts, and managers together to discuss how new approaches to environmental protection are being addressed across agencies. The series is visionary in its development, targeting new ways of doing business within EPA. The nature of this initiative shifts from traditional EPA programs aimed at regulatory relief to increasing delegation to the states and clients. Community involvement must be integrated into the risk assessment process. Community Based Environmental Assessment (CBEP) theory allows risk assessment to be evaluated on a community level rather than a national level.

The community can be defined on a geographic basis, such as a watershed, or on a political basis, such as a township. Assessing community risk by utilizing resources available both at the community level and the national level, as well as through decisions made in the field, allows for increased accountability of data for the assessment. By shifting the paradigm of risk assessment from a national to a community level, case-by-case scenarios are examined revealing local knowledge, site-specific indicators of change, and other valuable resources that further develop an understanding of the complexities of a community's health. Defining assessment areas through geographic or political boundaries may not allow for the best use of ORD resources. ORD products must be more broadly applicable.

From a community sense, ORD's primary clients are the EPA Regions. However, many of ORD's products require specific technical expertise in their application. Examination of pilot projects that currently utilize the conceptual model for community risk assessment, as well as discussion and priority-setting by clients, allows ORD to plan and develop a tool box for use by the Regions in addressing reoccurring needs for specific community-level solutions. This community-based tool box will assist the Regions and the community in determining the significance of an issue within the defined community.

ORD has established a community science team to develop a decision-tree framework that will contribute to defining and prioritizing research needs. By understanding the commonalities and differences identified through examination of existing pilot projects, ORD's ability to plan and respond to communities will become more applicable and clearly-defined. Through the implementation of a community-based paradigm, uncertainties in risk assessment can be reduced. Accountability of assessment results increases with increasing amounts of available research and site-specific knowledge examined at a community rather than a national level.

EPA's *Framework for Community-Based Environmental Protection (CBEP)* (EPA 237-K-99-001) examines steps for applying and assessing the success of the CBEP process, EPA's role in CBEP efforts, and implementation strategies of this initiative. This document is highly recommended for further explanation of the concepts and implementation of this initiative. This document is available on the Internet through EPA's home page.

1.2 Workshop Goals & Questions List (Claudia Walters - ORD, OSP)

The purpose of the Community Assessment Workshops is to bring together various EPA scientists, community practitioners, and risk assessors to discuss different directions of community environmental protection. The workshops are designed to encourage these diverse EPA personnel to identify and share scientific tools and strategies, and to develop links among the different program offices, Regional offices, and ORD. The most important goal of this workshop is to understand how this approach differs from others and how it will affect the development of tools. Workshop participants will also develop a greater understanding of communities and science.

This series of workshops is designed around the belief that the use of scientific tools can link community questions to answers. To accomplish this link, the three workshops scheduled for FY99 address the various steps. The first workshop, held March 3-4, 1999, worked to develop a better understanding of what questions are asked by communities. The second workshop identifies tools and gaps in making connections to the questions identified in March. In general, the second workshop focuses on determining what works and what does not work in answering community questions. In the third workshop, scheduled for late September, the gaps in technical analysis will be determined and methods for addressing these gaps will be identified.

Meetings scheduled for fall and winter, FY00, will further this examination of community communication and infrastructure capabilities and focus on the implementation of the tools identified in FY99. EPA will integrate the results of the workshops into community partnerships that embody a new geographic approach to environmental problem solving. Because communities understand risk differently and have different tools available to identify risk, EPA works with stakeholders within certain geographic areas to solve their community's environmental problems. EPA believes this new approach integrates environmental, economic, and social aspects in responding to environmental issues. These workshops help articulate a plan of community-based environmental protection. In addition, these workshops further this goal by categorizing available tools, identifying gaps in the tool register, determining why this approach is special, understanding how this approach affects the future development of tools, and relating communities to science.

This workshop identifies models and methods that can address the questions identified in March and analyzes what tools are functional. Tools and databases will be linked to different questions. The community-assessment practitioners are to critique the application of tools to community assessments. This critique will improve EPA's environmental protection programs, and improve EPA's inventory of tools and information required to evaluate and recognize environmental impacts in a community setting.

The first part of the workshop focuses on the availability and expediency of tools for dealing with community assessment. Participants share their experiences with the application of these tools in answering community questions. Next, tools are categorized in terms of data, models, and methods. The results of this workshop will include an evaluation of the usefulness of available Agency tools and an identification of any gaps in the availability of tools to answer community questions

2.0 Practitioner's Panel Discussion - What Works? What Doesn't?

2.1 McFarland Community Environmental Assessment (Gerald Hiatt - Region 9)

The Scenario

Kern County comprises 860,000 acres of agricultural land. The town of McFarland is surrounded by agricultural fields, and its population is 95 percent Latino. This part of California is one of the most heavily farmed areas in the United States. Between the years 1975 and 1989, 14 children were diagnosed with 11 types of cancers. These cancers included leukemia, brain cancer, and liver cancer. Many of these children attended an elementary school located adjacent to agriculture lands with restricted pesticide use. When evaluated against State cancer levels for children, the rate of childhood cancer in McFarland was seven times greater than the expected rate for California children.

The California Department of Health Services conducted an epidemiological study based on data available between the years 1986 and 1990. Soil and drinking water sampling was carried out, health examinations were performed on 1,700 children, and limited sampling and evaluation of regional air data was conducted. The conclusion of the study found no pattern of cancers and no environmental conditions related to cancer.

In 1996, seven additional children were diagnosed in McFarland and in adjacent areas. This increase is twice the expected rate for childhood cancers in the State. Based on this finding, EPA was petitioned under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA) and the Environmental Justice Order to further investigate the probable cause of this childhood cancer cluster. A defined team, with representatives from the State, ORD, and EPA Region 9, convened and reviewed the petition, evaluating the case to determine new approaches to the investigation. Region 9 consulted with the Office of Solid Waste and Emergency Response (OSWER), the Office of Water (OW), the Office of Air and Radiation (OAR), the Office of Prevention, Pesticides, and Toxic Substances (OPPTS), and the Office of Research and Development (ORD), and decided to focus more attention on air pathways and to gain better data regarding pesticide usage in McFarland. Increased data availability, lower analytical limits, and the implementation of a credible third party contributed to the decision to pursue the investigation.

The Region 9 Project goal was to evaluate current environmental conditions and potential chemical exposures via air, water, and soil. The Project was not intended to explain childhood cancers or find the cause. The integration of community involvement through local area knowledge was paramount to the Project. Assessment options included testing for restricted pesticides, and comparing the McFarland community's health to unaffected towns with lower levels of toxins. A cumulative, multi-chemical, multi-pathway human health assessment approach was implemented.

Results of pesticide reports from within a five-mile radius of McFarland were evaluated for the period 1990 through 1997. Drinking water was sampled at wellheads and public buildings were analyzed for 350 contaminants. Investigations of deep soils and surface soils were initiated for more than 150 analytes. Ambient air sampling will be conducted to capture annual averages.

Indoor-air and dust levels from historical use of indoor pesticides and restricted pesticides are planned for evaluation.

Community involvement was achieved through door-to-door visits by field researchers, public meetings, and bilingual presentations and materials. These served to increase community knowledge of environmental health issues. Consultations with State agencies, such as the California Department of Health Services, and local agencies, such as the county agricultural commission, were conducted to increase the availability of local and State data.

The cumulative, multi-chemical and multi-pathway risk assessment will be performed by generally following the guidelines in *Risk Assessment Guidance for Superfund (RAGS)*, EPA/540/1-89/002.

Needs

Several issues were raised during the assessment process, including:

- What constitutes "acceptable risk" for a broad-based community assessment?
- Are high risk standards "safe?" (i.e., are standards set by one EPA program "safe," even if risk assessment performed under another program indicates a high risk potential at the corresponding level of exposure?)
- How do we answer the above question for a community in which standards are met, but risks remain high? (What do we tell a community if exposures to individual chemicals are all low individually, and/or meet regulatory standards, but total risks as judged from a cumulative risk assessment are "high"?)

What Was Learned

It is felt that heightened community involvement through door-to-door interviews, "backyard meetings," neighborhood walks, and public workshops has been an important factor in achieving community acceptance of the project and its conclusions. Community members were often the best sources of information on current and historical sources of environmental exposures, exposure pathways for residents, and specifics of chemicals used in the community. It should be recognized that this level of community involvement may necessitate significant resource allocation by the Agency. The community was also privy to, and given opportunities to comment on, all sampling plans, results, and interpretations of data results.

Another strength was that most decisions regarding the project were made by a cross-programmatic, inter-divisional Team within the Regional Office and with input from ORD and various HQ Offices. It was felt that these decisions were strengthened by the diversity of viewpoints represented on the Team and the (sometimes spirited) discussions arising from those viewpoints.

A third "strength" of the project is that the Team has tried to be open about what the Agency can and (potentially more important) what we can't do in the course of the assessment. We have tried diligently not to raise false expectations.

Many good ideas that the team had originally conceived for this project were not incorporated into the risk-assessment process. Ideas that didn't work out with the community include the development of community advisory panels and independent technical assistance for the community.

2.2 Accessibility of Screening Tools and Data (Hank Topper - Office of Prevention, Pesticides, and Toxic Substances (OPPTS), Office of Pollution Prevention and Toxics (OPPT))

The tools and data available to answer community questions must be developed further through scientific research to make the community risk assessment more complete. Available tools allow us to begin working toward our goal of increased accountability in the results of community assessments. The goal of community assessment is to improve community environmental health. Currently, data and tools available to the community cannot be utilized without direct involvement from EPA.

The Baltimore Assessment, a comprehensive community-assessment project, illustrates needed improvements in the community-assessment process. This heavily-industrialized area had requested cumulative exposure studies. The community wanted to know whether the commercial and industrial facilities in the area have serious health impacts to the community. Priorities for the community included illegal trash dumping, questionable air quality, and overall general health of the community. A comprehensive study of 450 chemicals was conducted and both mobile and industrial sources were evaluated. Available data and tools were implemented for this assessment to provide valuable information to the community. However, accessibility of these tools to the community became an issue in this assessment. Because data for community-assessment analysis are often obtained through doctors, teachers, and university contacts, information is not always shared between scientific groups and community stakeholders.

Needs

Ready-made materials for explaining environmental health issues to local communities need to be developed. Gaps existed in the Baltimore Assessment, including air and particulate analysis. Without an understanding of indoor air quality and particulate levels, the usefulness of the results of community assessments decreases.

Communities must prioritize environmental issues into the political platform, as have programs intended to reduce crime and drug use. Elevating the issue of environmental health through educational materials will increase interest, knowledge, and accountability at the community level.

There is also a need to perform more projects and partnerships with public health agencies to identify what still must be learned. Tools, such as training materials, information templates, and integrated information systems, must be developed.

What Was Learned

Much was learned regarding the usefulness and integration of existing tools available for

community assessment. The use of these existing tools, as well as those tools to be developed, will allow EPA less direct involvement in screening a community's environmental issues of concern. This is especially useful with monetary cutbacks and the focus on increased State and community involvement at the local level. Currently, only limited tools are available that can be used without EPA's involvement. Development of a standardized community screening tool with increased accessibility to the community is important. Coordinating the use of different tools effectively (similar scale and units) and developing community training materials will allow communities to determine where to put their resources to improve environmental health.

2.3 Community Perception and the Environmental Health Paradigm (Hal Zenick - NHEERL)

Many communities perceive that environmental pollution has contributed to overall health problems. By developing a consensus approach, environmental health problems can be characterized, priorities in the community regarding environmental health can be established, and options and actions will be more easily determined. Speculation and multiple hypotheses regarding a community's environmental health, coupled with limited data and limited resources, make this task increasingly difficult. Typical questions that guide a community assessment include: (1) How and where do exposures occur? (2) What are the sources of these exposures? and (3) What is the potential harm to community health?

The environmental health paradigm illustrates linkage problems between source and outcome pathways. There is a need to develop more tools and models to form linkages between the various points of the environmental health paradigm (e.g., source, pathways, dose, effects, outcome) (see Exhibit 1). It is necessary to recognize the limitations of the data sources currently available. The Well Home study, for example, generated a large amount of measurable data.

Interpreting these data accurately is the problem in risk assessment. There are no benchmarks developed for analysis of these data. The data are there, but what are they telling us? How do they compare with other studies? Because different populations are at higher risk than others, we must develop biomarkers for alternate populations, such as infants, who are more susceptible to certain toxins and do not reflect the standardized benchmark data of the adult population.

The good news is that we can measure many things and are getting better at it. However, there are limited funds for new sampling. In addition, the interpretation of data results is not always straightforward, and it may be difficult to define acceptable uncertainty. Other research realities include: (1) multi- *versus* single-pathway exposure; (2) mixtures *versus* single pollutant exposure; (3) varying, concurrent/overlapping exposure scenarios; (4) short half-life versus bioaccumulation; and (5) retrospective exposure-health linkage.

Needs

There is a need for the development of a Regional or Agency newsletter so that information and experiences can be shared throughout EPA.

Exhibit 1: Environmental Health Paradigm

ENVIRONMENTAL HEALTH PARADIGM

SOURCE ? →	PATHWAYS ? →	DOSE ? →	EFFECTS ? →	OUTCOME
*Environfacts Warehouse *GIS *State Inventories	*Monitoring data	*NHANES *NHEXAS *Screening Tests	*Health Records *Surveillance *Data bases (e.g., IRIS)	*Registries *Outbreak Reports *Poisoning Reports

<u>REALITIES</u>

- Substantial experience in understanding Source→Pathway linkage
- At the best, such data useful for hypothesis generation not hypothesis testing

<u>CHALLENGES</u>

- Understand predictive linkages starting at any point in the cascade
- Design data collection (e.g., monitoring) to accommodate different needs
  - Who
  - When
  - Where
  - What
  - How

The formation of an Interagency Committee may aide in creating a network for shared information and experiences throughout the Agency.

3.0 Developer's Panel Discussion - What Could or Should Work?

3.1 Variables for Exposure Assessment (Haluk Ozkaynak - ORD)

Community assessments present different exposure potentials. Each community assessment presents its own unique concerns. This raises questions concerning potential exposures for different geographic areas, different age groups, and the elderly. When we look at exposure distributions and then compare these distributions to external sources, we must examine how the available analytical models link together.

The source-to-dose models are intended for use with pesticides, population exposure, and air toxins. Models are needed to incorporate uncertainty and variability encountered due to site-specific conditions. This does not mean that we ignore or exclude other contributing factors that may affect environmental health.

The emphasis in ORD is on eliminating uncertainty. By implementing benchmarking strategies throughout varying community assessments, we can compare one community's results to another's. Human exposure models for air, water, ground water, emissions, and dietary concentrations are currently addressed individually. There is a great need for a multi-media, multi-pathway exposure model that does not cumulatively increase the uncertainty of the resultant data. There is limited guidance available on how available models can be linked together for multiple-media characterization. Source-to-dose models can be used for research purposes and will be available in the next two to six months.

3.2 Total Risk Integrated Methodology (TRIM) & Other Air Toxics Program Tools (Deirdre Murphy - OAR)

The design features of the Total Risk Integrated Methodology (TRIM) include a scientifically-defensible tool capable of assessing community risk through multi-pollutant, multimedia, and multi-pathway assessments. TRIM has the ability to characterize uncertainty and variability, and to perform both iterative and stochastic analyses.

The design features of TRIM make it flexible in temporal and spatial scale. It is able to assess human and ecological endpoints. TRIM is designed to be used not only by the Office of Air Quality Planning Standards (OAQPS) and the Regions, but also by community stakeholders. It is user friendly, easily accessible, and well-documented.

TRIM consists of four modules: (1) Environmental Fate and Transport, (2) Exposure Event, (3) Dosimetry and Response, and (4) Risk Characterization. Abiotic models include air, soil, surface water, and sediment. Biotic components include both aquatic and terrestrial models.

Outputs of the Exposure Event module take input data from multiple sources, multiple pathways, and multiple stressors. Outputs are defined for any exposure route for various population groups, distribution of people, and occurrences of exposures at the appropriate temporal scale, tracked with ventilation rate/intake dose.

TRIM is due for release in 2001. Currently, EPA is performing QA/QC work and refining

TRIM to prepare it for public use.

Other Air Toxics Program tools may be useful for community assessment. The National Air Toxics Assessment (NATA) consists of emissions inventories; air quality, exposure and risk modeling; an air monitoring network; and ongoing research on effects and assessment tools. Assessment activities include the Integrated Urban Air Toxics Strategy and residual risk assessments. National-scale modeling tools also exist. These include the National Toxics Inventory, the ASPEN air dispersion model, and the HAPEM inhalation exposure model. Urban or neighborhood-scale modeling tools include local emissions inventories; air dispersion models, such as ISC3 and AERMOD; inhalation exposure models, such as HAPEM, pNEM, and APEX; and multi-media, multi-pathway models, such as TRIM.

3.3 Forest Fragmentation as an Economic Indicator: GIS for Landscapes (Jim Wickham - ORD)

The main use of Geographic Information Systems (GIS) in risk assessment is to create a database out of a map for analysis and modeling, which can then be used to answer specific questions. GIS is a computer system capable of storing, manipulating, and displaying spatially-referenced information. GIS is simultaneously the telescope, the microscope, the computer, and the Xerox machine of regional analysis and spatial data.

GIS geographically defines an area for assessment. This may be a mountain range, a watershed, or another defined geographic region. Variables for the area are defined for study; limitations on the use of GIS are largely based on scale. There must be variance in the geographic region to allow for valid comparisons and manipulated data. For example, if an urban area is the defined area of concern, GIS may not be of use in characterizing risk because of a lack of variability in measurement values. Air toxic values may be similar throughout a city. Generating GIS data through modeling two areas of a city with relatively homogeneous concentrations of air toxics is limiting in the information it will offer. On the other hand, GIS can be used to determine forest fragmentation as an economic indicator. At this scale, comparisons for data validity are appropriately defined.

GIS data on forest fragmentation as an economic indicator are available on the Internet for the eastern half of the United States and should be completed for the entire United States by the end of the calendar year. The Internet address to obtain data is http://edcftp.cr.usgs/gov.

3.4 Overview of Exposure Databases and Tools (Loren Hall - Office of Civil Rights (OCR), Office of Environmental Justice (OEJ))

The availability of resources for making a quantitative risk assessment is limited. Screening is an important factor that is restricted by lack of reliable data. Risk-based decisions include screening assessments and formal quantitative assessments. Screening assessments target subcategories of facilities, chemicals, industries, geographic areas for inspection, and regulation. They also establish priorities for follow-up investigations. Formal quantitative assessments determine site remediation, or set permit limits and standards.

Screening tools used in community assessments are limited for several reasons. First, they

are based on limited data and resources, which leads to over-simplified assumptions. Because of this limitation, they are normally used only for relative comparison or in setting priorities. Second, the technical approach and the intended use differ among the various databases associated with the available screening tools.

There are three common forms of risk assessments used for screening purposes: simple combination, weighted combination, and rough exposure estimates. Simple combinations calculate the annual emission or emissions per unit area as an exposure representative. Weighted combinations evaluate emissions by toxicity and/or fate criteria. Minimum-exposure weighted combinations do not encompass ambient condition data because inadequate information is available. Although they tend to be useful at larger scales, these assessments cannot be used on a community basis. Rough exposure estimates apply models with generic release features and environmental parameters.

Stressors, environmental characteristics, physical and chemical properties, and receptors are data sources for exposure assessments. Stressor data vary with size and the particular characteristics of the facilities. The issues limiting stressor data are sales volume, number of employees, unpermitted activity, and missing latitude/longitude data. Even if the data are suitable, they must pass a quality-assurance test. For these reasons, local data are difficult to construct. Receptor population data also have complications. The last census, completed in 1990, had weaknesses. For example, the database for the non-residential population was considered to be inaccurate. These problems hinder the accuracy and usefulness of data sources.

Availability of stressor data issues may vary with facility size or regulatory significance. This results in unsuitable priority designations for releases of interest. Difficulty frequently exists in geographic location of stressors, because often only priority facilities have specific locations. This leads to imprecise documentation of numerous small sources. In addition, databases often vary in nature with regard to the facility. Only a few databases (approximately 10 percent) have real-time data.

There are gaps in data available to assess community risk. In source location and chemical-specific releases, emission factors and treatment efficiency data are often not current. The form and frequency of releases are also undependable. Gaps in site characteristics occur in location accuracy and site characteristics. There is no standard for how often to check the effects of industrial, automotive, and other emission factors. It is unknown when the last comparative test between cars, trucks, and sport utility vehicles was performed to determine emissions from mobile sources.

Data gaps associated with major environmental characteristics involve wind and water. For instance, wind patterns are often incomplete or nonstandardized due to inadequate measurement station density and lack of current data. There are also no standardized methods for recording stream flows and aquifer characteristics. This presents problems in consolidating databases to compare environmental effects related to stressors.

There are also gaps in receptor population data. Specifically, there is limited knowledge of predictive factors for behavioral, vulnerability, and pre-existing exposure. Another issue

involves environmental justice and accessibility differences between communities. Overall, there are several issues and gaps identified in the application and compatibility of databases. These gaps cause problems in data comparisons and in accurately identifying exposure considerations.

3.5 Health/Epidemiology Databases (Jane Gallagher - ORD)

How can environmental exposure databases be linked to health outcomes? What happens when someone has continual exposure? These questions can only be answered currently by comparing local community data to national statistics. Lack of reliable data is an issue at the local level. Molecular epidemiology links environmental exposure to clinical disease by evaluating internal dose, biologically-effective dose, early biological effects, altered structure, malignant tumors, and DNA adducts. The status of a community's environmental health can be linked to health outcome by applying vital statistics, hospital admission data, hospital discharge data, number and kind of birth defects, HMO information, and emergency room information.

The Centers for Disease Control have a data-collection system comprising data from the National Institute for Occupational Safety and Health (NIOSH), National Center for Environmental Health (NCEH), Epidemic Intelligence Service (EIS), National Center for Health Statistics (NCHS), National Center for Infectious Diseases (NCID), and the Agency for Toxic Substances and Disease Registry (ATSDR). These agencies collect information on vital statistics, population surveys, hospital discharge data, disease reporting and case-finding, and surveillance systems. In so doing, data are compiled that can be utilized in determining the outcomes of certain environmental exposure. In addition, these databases can be used to characterize available data on a neighborhood level.

The process of evaluating exposure is a three-part system. At the starting point, alleged exposure is assessed and alleged health effects are determined. Then, data are gathered to link type, time, and degree of exposure to current or expected health effects. In determining expected health effects, a comparison of data to the national or control group is necessary. This analysis and decision-making is the third step. In this final step, citizens and agencies work together to reach a conclusion.

4.0 Breakout Sessions

A list of Community Assessment Questions was developed following the first workshop and based on the results of the workshop as well as practitioner experience. These questions, included in Appendix C of this document, were provided to participants to frame their identification and evaluation of tools. Breakout groups were generally focused on the following questions:

- To what extent did/could the tool address the community-assessment question, e.g., what did/could it answer and what didn't/won't it answer?
- What were the strengths and weaknesses?
- How well (with what certainty) do/would they answer the questions being asked?
- How widely can they be used, i.e., are they practical tools for communities?

Each breakout group was provided with charts and matrices to complete. Copies of these items provided to the breakout groups are included in this report as Appendix G.

4.1 Day 1: Data and Tools Identified and Needed for Exposure, Stressors, Receptors, and General Tool Categories

The agenda for the workshop was altered to combine the two breakout sessions originally scheduled for the afternoon of Day 1 into one breakout session. Workshop participants were divided into three groups. All three groups focused on the same task: to identify data and tools currently available that can be used to obtain general information for use in community assessment, as well as information specific to stressors, exposures, and receptors. A table of definitions related to community assessment was developed following the first workshop and was provided to participants at the second workshop to provide a common starting ground for those with varying experience in community assessment (see Appendix D). The Data and Tools table, prepared during a breakout session in the first Community Assessment Workshop, was provided to participants as examples of categories under which tools could be placed (see Appendix E).

The division of available data and tools into these categories (general, exposure, stressors, and receptors) offered information on what tools should be used to answer specific community-assessment questions. Exhibit 2 combines the lists of all data and tools identified by the three groups. Comments that were presented by the groups addressing the effectiveness of various tools and identified needs are summarized below. Group flipcharts and completed handouts are in Appendix H. Specific comments are given in Appendix I.

Exhibit 2: Available Data and Tools

Categories	Descriptions of Data and Tools
General	• Geographic Information System (GIS) datasets • Land use/land cover datasets • Geo-ease (kriging) • Global Positioning Systems • TIGER (Census) • Statistical Methods • CIMAS-type applications • REACH file (National Hydrogrophy Data Sets) • Available commercial databases (consumer use, income, city directories) • Meteorological data • Florida data sources references book (Deb Martin's Group) • Case Studies Meta tool - methodologies used in CBEP type projects (gap); Chicago, McFarland, Baltimore projects • CAMS
Stressors	• TRI • PCS • CERLIS • AIRS Facility • RAPIDS • CHIEF • AP-42 • California Agricultural Pesticide Applications Database • FIRE • BRS • NTI - 1996 • RCRIS (RCRA sites) • State and local databases • NEPA Documentation databases • National Response Center data • Mobile Sources • Local checks (e-checks) • Geology/radon • Pesticide sales data (manufacturers) • ROD DB (CERCA) R1/F5 etc. • RCRIS • RCRA permits • NPDES (PCS) • Dunn and Bradstreet • Historical Data (library-yellow pages), planning maps, etc. • Community members • Industry • Chamber of Commerce • Risk Management Plan • Community Right-to-Know Information • Hazardous Response Groups (Energy Response Planning Board, highway information) • Land Use Data Sets (eco risk) • Eco Footprint (Methodology) • EnviroMapper

Categories	Descriptions of Data and Tools
Exposure	• RSEI (16-bit) • IEUBK • Gravity • CEP • TRIM • BASINS • Local Databases • PAMS • Exposure Factors Handbook • Air, Water, GW, MM, Models • Non-occupational Pesticides Exposure Study • PRIS • FDA - Pesticide Monitoring Data • EMPACT • CSFII - Consumption Data
Receptors	• RSEI (16-bit) • RSEI (32-bit) • Gravity • Census • Native American Reservation Data • National Wetlands Inventory • NOAA • FWS • Fresh and Saltwater Study by NOAA • EMAP • Nature Conservancy T & C • Christmas and Breeding Bird Counts • Froglog • PRIS - Population Risk Indexing system

Note: See Appendix F for notes made on handouts by Breakout Group 2 for this exercise.

Summary of Participant Comments

While gaps exist in data and tools that are useful for community assessment, it is also necessary to remember that work is always done within the constraints of a budget. In addition to noting all the sources of information that may be useful, EPA must also identify those sources that will provide, with minimum resources, the best information. In addition, the lower limits of information needed to answer community-assessment questions should be determined. In theory, a community assessment could consider every possible source, stressor, or receptor. In reality, this is not possible. Workable parameters for a community-assessment process must be determined, as must the particular role of community assessment. For example, when assessing potential problems in a community, particularly for environmental justice issues, there needs to be a means of determining the level at which the community has exceeded its share of pollution.

Several gaps in data were identified based on the breakout exercise. Data and tools have not yet been identified regarding non-human factors. It is also important to examine sources of information on ecological factors, including noise and odors. Screening tools are also important and should be included in any tool matrix or index. These include tools and databases for air screening at the level of the neighborhood or metropolitan area, for example. Case studies could

also be added as a tool. In general, local-level data are needed, including human health data, local emissions inventories, and local monitoring data. Data on the household level would also be required to perform a comprehensive assessment.

Gaps in data and tools that are identified can be addressed in different ways. One way is to collect the information that is missing and create a new database or tool. Information on a local level could be collected by using a mobile testing facility. It is also possible to facilitate data collection by the communities themselves in cases in which this may be more effective or efficient. This is often called a "bucket brigade" approach. However, the limitations on using such data (for example, considerations for quality control) may make them unusable. In other cases, gaps may be addressed by improving the use and quality of available data sets. When possible, more limited databases could be linked together to provide comprehensive sources of information. The question of mixing different levels of data quality and uncertainty becomes very important when this is attempted. Finally, it is also possible to use surrogate information. However, the quality, usefulness, and reliability of this information must be assessed. For example, potential pesticide releases might be estimated using sales data, crop type, acreage, and climate. However, the extent to which these estimates are accurate must be evaluated. Although data are lacking for some factors, workshop participants noted that they actually do have a high volume of data overall. However, the data are not necessarily useable, either because of data quality issues or because the parameters used when data were collected are not consistent or applicable to the problems at hand.

Participants also discussed the usefulness of identified tools and databases. There is a need for more case studies in order to assist EPA staff in identifying the proper tool to use for the specific type of analysis to be conducted. The large number of databases available makes it difficult to know which are most applicable for a specific use. By providing community risk assessors with case study information on a variety of different scenarios, varying by scale, level of analysis, and variables, the researcher can identify the best tool for the job. A standard methodology for case studies should be created to maximize their comparability and usefulness.

Participants were also concerned about the overall quality of data in available databases, particularly the validity and timeliness of the data. The degree of uncertainty associated with a particular database should be communicated to the user. It is also necessary to define the degree of uncertainty that is acceptable when combining data from a variety of databases. When the risk assessor makes assumptions based upon combining information from a variety of databases, each with its own level of uncertainty, the cumulative levels of uncertainty increase dramatically. Quantifying the acceptable level of uncertainty is a large but needed task. Creation of a standard operating procedure or protocol for gathering data and entering it into EPA databases could help resolve data quality issues.

It was suggested that ORD conduct a stability analysis of EPA databases to ensure that they are consistent not only internally but also between databases. For example, the definitions of parameters included in a particular database should remain the same over time. Consistency among databases will allow for comparison studies. For example, the classification of a "large facility" should be the same across Regions.

An index of databases available for analysis is necessary. It is important to place the tools in

the context of their use rather than simply list them. A complete index should provide a description of each database or tool that discusses the focus of the tool (ecological, human, etc.). It should describe potential uses, the usage history, and the associated level of uncertainty. The index should indicate how often the database is updated. The method of validating the data, model, or tool, as well as the level of quality assurance/quality control, should be identified. The scale of the data is also important to know. For example, does the database provide information on an aggregate, country-wide level or by county, and are the data segmented according to categories within the population? Potential users of each database or tool should be identified. For example, does the tool require the expertise of a scientist or is it accessible to and useable by members of the community? Is a tool meant for use within the context of a regulatory program at EPA or at the state level, or would it also be useful for community groups? User notes can be provided for each item. Finally, information on the accessibility of the database, tool, or model should be given, including how, where, and from whom it can be obtained.

In the interim, the *National Guidance for Conducting Environmental Justice Analyses*, dated October 1, 1998, discusses available tools and databases. It provides recommendations for using available resources, methods, and tools for performing community assessments related to environmental justice. This report, prepared by the Office of Environmental Justice, is available in a peer-review version from Catherine Fox at 404-562-9634. It was produced in response to Executive Order 12898: Federal Actions to Address Environmental Justice in Minority and Low-income Populations.

4.2 Day 2: General Tools Matrix and Gap Identification

On the second day, participants decided to use a different process to gather information than that originally planned. As a result, only one breakout group session was conducted. Each of the three designated breakout groups was given a particular set of questions to answer based on one of three themes: (1) Is there a threat to our health or local environment? (2) How can we characterize the risks in our community? and (3) How do our risks compare to other communities? Participants were charged with identifying and evaluating tools that could address these questions, either in a screening mode or a full-fledged risk assessment. Groups were asked to identify the basic information needed to answer the questions, assuming that there is no or limited opportunity to gather new data. For each question within the set, participants were asked to categorize the tools available for evaluating stressors (or sources), exposures (or pathway/ media concentration), receptors (or exposure), effects (or doses), and incidence (or outcomes). Tools were to be evaluated as: (1) useable for screening; (2) scientific information available for limited use; (3) not user friendly to local communities; or (4) suitable for risk assessment. Gaps in tools for each question were also to be identified.

The output of each group has been fit into matrices as Exhibit 3. The issues identified with regard to the questions provided during this session overlapped among the groups and with the issues already raised during the first breakout session. Comments from all three groups have been summarized together and are given below. Group flipcharts and completed handouts are provided in Appendix H. Specific comments are given in Appendix I.

During the plenary discussion, each group presented their findings on the identification and evaluation of tools. Specific tools are given in the matrices. As part of their evaluation of the

tools, participants noted issues associated with their given set of questions. Key issues are grouped below according to the following categories: general, incidence, stressors, receptors, and exposure. Participants agreed that many of the issues that have been identified, such as necessary guidance from EPA on performing community assessment and more and better data, are in the process of being addressed by ongoing projects within the Agency.

Exhibit 3 - Day 2 Breakout Groups Answers to Questions

Is There A Threat to Our Health or Local Environment? (Group 1, Day 2)		
Question	Tools	Gaps
1. What are the environmental risks in our homes and schools?	NERL tools; Tools for Schools (indoor air); "Checklists" - Home*A*Syst, asthma	Lack of toxicity data for children/sensitive populations; information on outgassing from buildings, materials; screening tool for individuals to know indoor air exposure; cumulative risk from daily activities, chemical mixtures; what does the reference does mean to a particular group?
2. Is our poor health from environmental exposure?	Use tools to answer environmental questions (specific) that we can answer, can assess current situation but not reconstruct past; EPI - tools	Need broad-based approach from multiple agencies; major effects on health, environmental issues, education; EPI resources
3. Is the air safe on the most polluted days of the year?	AIRS	
4. Is the cumulative exposure to toxics from all sources?	MM Exposure Models	Cumulative risk from daily activities in home, food, environment, yard, work; cumulative effect of chemical mixtures; source inventories and their significance
5. Are the levels safe for children and other populations?		Lack of toxicity data for children/sensitive populations; predictive health effects of exposure beyond the reference dose
6. Are we at risk from acute exposures, accidents, and episodic releases?	Risk Management Plans	Information on peak releases and/or exposures; guidance for estimating intermittent releases
7. Does the mixture of different pollutants combine together to adversely impact our health?		Cumulative effect of chemical mixtures
8. Is it safe for my children to swim in the local pond?		
9. Is it safe to eat the local fish that I catch, especially if they are the basis for my diet? What fish should I avoid and why? How much would be considered safe to eat?	Fish Advisories	
10. Is the water from my well safe to drink?		
11. Will this new highway adversely affect our environment?	Smart Growth Tools	
12. Are there areas that we should protect or limit our use?	Alternatives for the Future - Corvallis lab; Sensitive habitat ID tools - USGS GAP program; Greenness Index (land cover) Jones LVLscape eco br	

General: What is the scope of the assessment? Need access to reviewed toxicity data standards and a quick review process.

Exhibit 3 - Day 2 Breakout Groups Answers to Questions (Continued)

How Can We Characterize the Risks in Our Community? (Group 2, Day 2)										
Question	Stressors	Tools to Identify Stressors	Exposure	Tools to Identify Exposure	Receptor	Tools to Identify Receptor	Effects	Tools to Identify Effects	Outcome	Tools to Identify Outcome
1. What environmental information is available for my local community?	S	TRI, PCS, BRS, AFE, SDWIS, State/ local data	X	AQS, Models, etc.	S (X)	Risk Screening, Environ-mental Indicators (community)	Y	IRIS, MSDS	S	Health Data (cancer rates, mortality data, HMO info.)
2. What are the potential impacts, including increases or decreases, of local environmental pollutants?	GIVEN	Same as Question 1	X	Same as Question 1	S (X)	Same as Question 1	Y	Same as Question 1	S	Same as Question 1
3. What is the cumulative impact of environmental exposure?	S	Gaps, same as Question 1	(X)	Same as Question 1	S (X)	Same as Question 1	Y	Gaps, same as Question 1	S	Same as Question 1
4. How do we get a complete inventory of all the sources?	The group did not feel adequate information is available to determine tools most effective for an inventory of all the sources. Gaps include information on stationary, mobile, point, area, NPS pollution, clandestine, non-permitted facilities, and atmospheric deposition sources.									
5. How can we assess the impact that our non-Toxic Release Inventory (TRI) reporters (businesses, households, and schools) have on our environment?	Gap		X		X S		Y		S	
6. What information do we need in order to judge the impact of a new facility planning to open in our community? *(Useful tool for all - provide grants to communities to assist them in using existing scientific data)*	S	Permitting	X	Same as Question 1	X S	Same as Question 1	Y	Same as Question 1	S	Same as Question 1
7. How do we assess the potential for accidents in our community?	S	"Emergency Right to Know" data	X	Accidental release models	X S	Evaluation Plans	Y	Same as Question 1	S	MSDS, NIOSH
8. How do we learn about the impact of synergy with mixtures?	The group did not feel adequate information is available to evaluate the impact of synergy with mixtures for these categories.									

Key:
S = Screening tool
X = Scientific information available, but limited use
Y = Not user friendly to local communities
R = Risk assessment

Exhibit 3 - Day 2 Breakout Groups Answers to Questions (Continued)

Gaps Identified in Evaluations (Group 2, Day 2)
1. IRIS - Limited database for environmental exposure, no cumulative information, limited number of chemicals assessed for toxicological information.
2. Stressors - Locational data is a large problem.
3. Basic Data - Not verified, reported loadings tend to be estimates.
4. Mortality Data - Accuracy of true diagnoses, cause of death may be secondary to primary disease.
5. Many missing pieces of information for multiple stressors, accurate cumulative effect difficult to assess (e.g. mobile sources, area sources, minor stationary sources).
6. Some stationary sources, mobile sources, point sources, area sources, non-point pollution sources, clandestine sources, non-permitted facilities, atmospheric deposition.
7. Need to characterize dry cleaner output, home output, and schools output dependent on location, uses, etc. to use for characterization; lack of area source models.

Exhibit 3 - Day 2 Breakout Groups Answers to Questions (Continued)

How Do Our Risks Compare to Other Communities? (Group 3, Day 2)										
Question	Stressors	Tools to Identify Stressors	Exposure	Tools to Identify Exposure	Receptor	Tools to Identify Receptor	Effects	Tools to Identify Effects	Outcome	Tools to Identify Outcome
1. Is there an unusually high incidence of disease?		American Indian Science and Engineering Society (AISES) - Federally-recognized Tribes (database under construction); NTI, BRS, PCS, AIRS, CERCLIS; Transportation info, Chambers of Commerce, residents, public health data and blood levels, housing data.		Risk Screening Environ-mental Indicators	S	Census data; school population data			S	CDC - county and larger scale, local health department
2. Do we have more than our share of environmental stressors?	S		S/R			Residents, public health data and blood levels, housing data.				
3. Are there disproportionate impacts within or compared to the community?	S		S/R		S	Same as Question 1	S		S	
How Can We Improve Our Overall Environmental Quality of Life?										
4. How can we get an overall picture to set priorities?	S	Comparative Risk Lab Manual	S	Guide to Sustainable Community Indicators	S	Community Input	S		S	
5. How does the environment impact our economic situation? *Group did not easily find answers. General tool: Community has to make the value judgements.*	S (?)	Population growth data; income change over time; data associated with land use; Department of Commerce Data	S?		S?		S?		S?	
6. What information is available regarding traffic, noise, dust, bad odors? *General tool: See Baltimore case studies.*	S	Transportation data (FAA); odors data, including concentrated animal feeding operations (State and local); CAFO; dust from Air Program Monitors and local regulators; Indoor Air Program; OSHA; NOAA meteorological data	S		S		S		S	

Summary of Participant Comments

General

Data that can be used to evaluate actions taken in response to a community assessment are deficient due to a lack of measurable indicators. Many community health problems exist as a result of long-term exposures. There is an absence of valid indicators of actual improvement in health in the short term. Likewise, there is no standard definition of a healthy community. Two types of community models would be useful. One model could describe the characteristics of a "healthy community." However, a variety of models would be necessary to represent different types of communities, for example, a suburb in the Southwest and an urban center in the North. In addition to the difficulty inherent in such an undertaking, it may also be politically untenable. Another model could prescribe steps that could be taken by a community to become "healthy." The publication *Guide to Sustainable Community Indicators, 2nd Ed.*, by M. Hart, 1999, is a source of information on standards against which an actual community might be evaluated. Smart Growth, urban sprawl, and Healthy Cities initiatives in part attempt to address model community identification.

Another general gap is the need to accurately assess the cumulative effects in community assessment. By trying to combine input data from a variety of database sources, incompatibility between data sets can occur. For example, one set of data provides information on counties, while another may provide information at a zip code level. These differences can make cumulative analysis impossible. Can a tool be developed which will allow more streamlined integration of data from a variety of sources?

Finally, community assessments can be performed with different levels of sophistication, and tools exist that range themselves in the sophistication of their results and the level of expertise necessary for their use. Resources and time available in real-world situations often drive the sophistication of the assessment. Because of this, it is necessary to evaluate tools and models based on their level of difficulty of use and sophistication of results. It is also useful to know the value of incremental increases in the sophistication of assessments.

Incidence

Data on the incidence of particular health outcomes are needed on a scale smaller than the zip-code level. Data collected on a smaller scale can provide information on potential cluster or neighborhood problems. This is particularly important with regard to environmental justice issues. Therefore, it would be advantageous to integrate smaller-scale data, e.g., on the level of township or latitude and longitude, particularly when using GIS capabilities. In addition, quality assurance and quality control measures with regard to incidence data are also important. Many forms of health incidence data that exist and would be useful in performing community assessment, such as data from Health Maintenance Organizations (HMOs) or State or local health departments, are simply not available. Such data might be accessible to EPA if the Agency established a partnership with the entity that owned it. However, confidentiality issues must also be addressed. Other sources for such information or data surrogates should be identified. The possibility of establishing agreements that address these confidentiality issues should also be considered.

An accurate and consistent interpretation of the cause of death is needed for mortality data. Currently, the available data used in analysis have taken into account only the primary cause of death listed on the death certificates. This ignores the secondary and potentially more important cause of death, such as a long-term condition which preceded and influenced the event causing death.

Stressors

There are many missing pieces of information for multiple stressors, including mobile sources, area sources, point sources, non-point sources, clandestine sources, non-permitted facilities, minor stationary sources, and atmospheric deposition. When such information is available, the context of the data is not always known, such as the location or circumstances under which it was collected. As a result, cumulative effects are difficult to assess accurately. It is also necessary to develop clearer, stronger connections between sources and stressors and the particular health effects they cause.

General concerns about data on stressors involve the quality of the data. There is a large concern that data available for analysis are not accurate. Of particular concern is the reliability of data centered on location. The need for quality control to eliminate excessive uncertainty in data was a key point throughout much of the discussion. In addition, data that are collected infrequently become outdated and are less useable. Criteria for determining the validity and usability of a data set should be developed. Community assessors should have access to a pool of verified and timely data sets to use in their work.

Existing databases may give information on major sources, such as industrial facilities, but the other smaller sources must be considered. Specific gaps in stressor data include information on location data, such as mobile or area sources, and household-level information, such as diet, indoor air quality, pesticide use, and personal activities. A screening tool for individuals to use to estimate their indoor-air exposure would be useful. Data on outgassing from materials and buildings are needed, as is a cumulative risk estimate from daily activities. In addition, improved human health data are necessary, including indicators for exposure, such as blood lead levels. Criteria standards for odors and other non-chemical specific stressors are needed. There is a lack of quality-reviewed toxicity data for children and other sensitive populations.

In many cases, it is necessary to use surrogate data to supplement many data sources on stressors. Sources for surrogate data include transportation information, which can be obtained from license bureaus and local chambers of commerce. In addition, residents themselves can be thought of as surrogates.

The Integrated Risk Information System (IRIS) database, while useful, provides limited information on environmental exposure. A limited number of chemicals have been assessed for toxicological information. The utility of the database would be improved by including cumulative and more current information.

Receptors

At this time, information on receptor populations is gathered primarily from the national

census, which occurs every ten years. Sources of data that are more regularly updated are necessary so that current data can be used in assessments. In addition, improved data on communities, such as income and land use, are necessary. Availability of such data may be conditioned by the confidentiality of the information.

One of the questions asked during a community assessment concerns whether the community is receiving more than its "fair share" of a pollutant or health effect. However, there is no particular definition for this term.

Exposure

Across the Agency, tools to address gaps in exposure information on both the screening and risk assessment levels are currently under development. These include screening tools and tools for risk assessment. In addition, information on pollutant levels alone will not help show where it occurs. Pockets of pollution should be considered. As with other categories, cumulative data and more current data are necessary.

Specific gaps include the need for data on the cumulative effects of chemical mixtures, effects from peak releases vs. ongoing releases, acute vs. chronic outcomes, and guidance for estimating intermittent releases. The difficulties of documenting episodic releases should be addressed, as well as the probability of the occurrence of accidental releases.

5.0 Wrap-Up

5.1 Workshop Summary

The second Community Assessment Workshop was targeted to scientists involved with the development of data and tools used to answer questions commonly associated with community assessments. The Workshop was intended to evaluate the current tools available, critique these tools, and identify future research needs.

The first day of the Workshop focused on the presentation of tools used for community assessments. Breakout groups identified the tools currently available. In order for these tools to be usable, it is necessary to define the degree of uncertainty acceptable from available data. In addition, an index listing the available tools and databases, complete with descriptions, uses, and intended users, is required. Finally, case studies must continue to be identified to aid community assessors in identifying appropriate tools to use in specific situations.

The second day of the Workshop focused on matching the tools to the community-assessment questions they answer. Categories of tools were considered with regard to their usefulness as a screening tool or for in-depth analysis.

The workshop concluded with a plenary discussion in which major themes and gaps were identified, as well as contacts regarding some general categories of available tools. Group comments were captured on flipcharts and are given in Exhibit 4.

5.2 Next Steps

The next Community Assessment Workshop is anticipated for late September 1999. An agenda for the third workshop is in development. This workshop will assess the gaps in tools and develop Agency strategies for addressing the gaps to meet community-assessment needs. Participants will complete the tools matrix developed during the second workshop.

This will begin Phase II of the Community Assessment Series, which will focus on the community setting. EPA will integrate the results of the previous workshops into an evaluation of community partnerships and a new, geographical approach to environmental problem-solving. Because communities understand risk differently and have different tools available to identify risk, EPA works with stakeholders within certain geographic areas to solve their communities' environmental problems. EPA believes this new approach integrates the environmental, economic, and social aspects of responding to environmental issues. These workshops help achieve a plan of community-based environmental protection.

Exhibit 4: Workshop Wrap-up

Themes and Gaps

- Quality Assurance/Quality Control of available data
- Processed data: Large amounts of data are available but not useable in current form.
- Concise statement about databases/models.
- Healthy community model - big conceptual baseline, what is acceptable, "norm"
  - benchmark or comparison values, e.g., national or baseline values.
- Background health or exposure levels.
  - susceptible populations (children, elderly)
  - health effects, e.g., tox data - relative values, "predictive safe ranges," common chemicals
  - IRIS; necessary to have an interim number before IRIS
- Acute effects.
- Community source inventory (mobile, indoor air, NPS) - "Where should we look?"
- Communication - interpret information.
- Make tools more useable - communities can use more directly.
- Develop better connections between sources and health effects (how to interpret information - our best scientific)
- How good are simple methodologies and the value in increments of sophistication in assessments?
- Validation/research/scientific evaluation of methods used in case studies.
- Grants to communities to apply models/methods/components (decision tree) that can be validated by ORD.
- Assess the effect of input data quality.
- What does it mean to be above Reference Dose?

People/Places to Contact - current tools

- Regions - Carole Braverman
- OI - briefing
- ORD/NERL - ORD
- Centers/OW for comparative risk - Deb Martin, Lawrence Martin, Carole Braverman
- Smart Growth - H. Tregoning
- Land use - ORD
- Reinvention
- Air office - urban (Jenny and Victor McMahon)

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Appendix B

Community Assessment Workshop II:
What Tools and Data are Available to Answer Community Assessment Questions?

June 9-10, 1999
Radisson Governor's Inn
Research Triangle Park, NC

Session Theme:

The goal of the second workshop in the Community Assessment Series is to provide a dialogue – focused around a series of questions commonly encountered in community assessments – between the practitioners of community assessment and the developers of tools (e.g., data, models, methods) to determine which tools might be used to address those questions that were identified at the first workshop held in March. Practitioners will describe what tools they found helpful – and which tools were *not* helpful – in their assessments. Developers will focus on categories of tools, e.g., data, models, and methods, which can be used to address the community assessment questions. The overall output of the workshop will be an evaluation of what tools the Agency has available to address the community assessment questions developed in the first workshop, which ones seem to be the most useful, and which tools might have promise in the near future. The questions which cannot be addressed now or in the near future, and other gaps in our knowledge, will be evaluated in the third workshop.

DAY 1: June 9 — *Agenda*

8:30 - 9:00 **Arrival & Sign-in**

9:00 - 9:30 **Introduction - Plenary Session**:
Welcome.....Hal Zenick
Workshop Goals & "Questions" list.....Claudia Walters

9:30 - 10:30 **Practitioners' Panel Discussion -**
"What Works? What Doesn't?"

- Invited panel critiques availability and usefulness of tools for addressing community assessment. Panelists will be assigned specific areas to discuss and will provide an overview from their own and other practitioners' experience.
  Panelists: Gerald Hiatt (R9), Hal Zenick (ORD), Hank Topper (OPPTS)

10:30 - 10:45 **BREAK**

10:45 - 12:05 **Developers' Panel Discussion -**
"What Could or Should Work? How?"

- Invited panel discusses applicability and usefulness of tools for addressing community assessment. Panelists will be assigned specific areas to discuss and will provide a brief overview of state of the science. Panelists:

Exposure Assessment:	Haluk Ozkaynak, ORD
TRIM:	Deirdre Murphy, OAR
GIS:	Jim Wickham, ORD
Exposure Databases:	Loren Hall, OEJ
Health/Epidemiology Databases:	Jane Gallagher, ORD

12:05 - 1:00 **LUNCH**

1:00 - 2:30 **Break-out Groups - *"Stressors" & "General" Tool Categories*:**

Each group will focus the two categories of tools. Each group will:

- Discuss their own experiences in applying/designing tools in trying to address community assessment questions;
- Identify tools that could used to address community questions;
- Evaluate tools for possible effectiveness in addressing various questions - specific experiences on how effective various tools being considered turned out to be in addressing questions, including tools not selected to use (see questions below);
- Determine where there are few or no tools to answer certain questions. Discuss possibilities for types of tools needed in these areas;
- Offer ideas as to what tools in the specific area might work to address community assessment questions, and specifically how.

2:30 - 4:00 **Break-out Groups - *"Exposure" & "Receptors" Tool Categories*:**

Each group will focus the two categories of tools. Each group will repeat the process used during the previous break-out session.

4:00 - 4:15 **BREAK**

4:15 - 5:30 **Plenary Report & Discussion on four Tool Categories**

Each break-out group will report out and participants will discuss.

DAY 2: June 10

8:30 - 8:45 **Review Day's Activities & Goals**

8:45 - 10:15 **Break-out Groups - *"Effects" & "Incidents" Tool Categories*:** Each group will focus the two categories of tools. Each group will repeat the process used during the previous break-out session.

10:15 - 10:30 **BREAK**

10:30 - 11:15 **Plenary Report & Discussion - *"Effects" & "Incidents" Tools*:**
Each break-out group will re port out and all participants will discuss.

11:15 - 12:00 **Plenary Session: Summary of Tools Inventory & Evaluation**
Participants discuss and prepare a summary of issues and questions that cannot be satisfactorily answered now or in the near future, to be used in the next session.

12:00 - 1:30 **LUNCH**

1:30 - 1:45 **Plenary Session - The Challenge** (preliminary gap analysis)
Review summary prepared from previous sessions.

1:45 - 2:30 **Break-out sessions.**
Brainstorming sessions on how, and by whom, the "unanswered" issues can be addressed successfully. "Outside the box" thinking should include such issues as ORD future research, inter-Agency cooperation, possible expansion of EPA role, novel approaches.

2:30 - 3:15 **Summarize the meeting outcome**

3:15 - 4:00 **Wrap-up Day's activities and Next Steps**

- Identify the action items from this workshop - what and who will work on them, e.g., identify any additional tools
- Use "The Challenge" Break-out results to develop agenda for Workshop #3 and identify any additional activities in preparation for the next meeting

Questions during Break-out sessions:

1. To what extent did/could the tool address the community assessment question, e.g., what did/could it answer and what didn't/won't it answer?
2. What were the strengths and weaknesses?
3. How well (what certainty) do/would they answer the questions being asked?
4. How widely can they be used, i.e., are they practical tools for communities?

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Appendix C. Community Assessment Questions
(Draft - 4/28/99)

INTRODUCTION:

The purpose of the first Community Assessment Workshop was to identify: "*What are the environmental assessment questions communities are asking EPA to address?*" A working list of these questions is presented below for discussion, and for use in the second Community Assessment Workshop as we look into which of these questions we currently have means to address.

In general, there are still large gaps in the kinds of tools and information available to communities to help them answer these questions (in whole or in part), and thereby move more in the direction of sustainability. Our work is part of a long term attempt to develop and provide the tools and information that will be needed to support sustainable development at the community level. The six Community Assessment Workshops will, as a whole, look into the challenges that face EPA in trying to work with communities to address community assessment questions. The focus for the second workshop will be on the tools and information available to understand and address the basic questions concerning environmental impacts on a local environment, including impacts on both the human and ecosystem aspects of the environment.

The second Workshop's focus on the tools that the Agency and communities will need to assess the environmental impacts and risk questions means that not all issues raised in the context of Community Assessment will be dealt with directly in this Workshop. Issues such as where communities will get the resources to do assessments, what the best way is to get community participation, how the assessments can be used to make improvements, and how governments can work together to help communities, are important to the community but they will be addressed later in our Workshop series.

Finally, the scope of the issues that communities raise and the way environmental concerns are understood in communities often includes areas that are beyond the scope of EPA capacity or authority. Rather than eliminate community questions to fit our purpose, we will keep the community perspective and determine which questions our tools can help answer. This approach will make us cognizant of the limits of our abilities and encourage us to seek partnerships with other organizations or governments. Ultimately, our capabilities can be fit into a larger effort (with other organizations) that can begin to answer community questions.

SUMMARY OF "QUESTIONS"

As developed and discussed in our first Workshop, here are some questions that communities have asked the Agency. This list of questions is a starting point for discussion purposes, not an all-inclusive list. The questions can be broken out into four major categories, with some overlap. These categories are as follows: (1) Is there a threat to our health or our local environment?; (2) How can we characterize the risks within our community?; (3) How do the risks in our community compare to other communities?; and (4) How can we improve our environmental quality of life?

1. Is there a threat to our health or our local environment ("Are we Safe?")

1) What are the environmental risks in our homes and schools?

2) Does the poor health in our community, e.g. child birth defects, have anything to do with environmental exposures?

3) Is the air safe on the most polluted days of the year, such as during summer heat inversions?

4) Is the cumulative exposure to toxics from all sources adversely impacting our health and the health of the ecosystem?

5) Are the exposures to the pollutants released from all the industrial and commercial facilities in and around our community affecting our health?

6) Are the permitted levels safe for children and other sensitive populations?

7) Are we at risk from acute exposures, accidents and episodic releases?

8) Does the mixture of different pollutants combine together to adversely impact our health?

9) Is it safe for my children to swim or wade in the local pond or river?

10) Is it safe to eat the local fish that I catch, especially if there are the basis for my diet? What fish should I avoid and why? How much would be considered safe to eat?

11) Is the water from my well safe to drink?

12) Will the creation of this new highway adversely affect our environment or is there a better location to build it?

13) Are there areas that we protect, i.e., either have no development or limit our use?

2. How can we characterize the risks within our community?

1) What environmental information is available for my local community (including information on EPA-regulated and permitted sources)?

2) What are the potential impacts of local environmental pollutants and how can we know if environmental impacts are increasing or decreasing in our community?

3) What is the cumulative impact of total and/or permitted environmental exposures in my community, including "background exposure?"

4) How do we get a complete inventory of all the sources of environmental impacts on our community?

5) How can we assess the impact that our businesses, community households and schools have on our environment?

6) How can we be sure that facilities are not exceeding their permitted releases?

7) What can we use to directly measure our exposure to toxics so we can test the adequacy of the permitting process?

8) What information do we need in order to judge if the pollutants from a new facility planning to open in our community will have an adverse impact on us?

9) How do we assess the potential for accidents in the facilities in and around our community?

10) How do we learn about the impact of synergy with mixtures of chemicals or the impact of endocrine disruptors, and how can obtain an adequate assessment of such issues?

11) What is the relationship of toxic pollutants to disease clusters in my community and how do I focus on these health outcomes to understand what is causing them?

12) What information is available that is specifically related to subpopulations of concern, e.g., children, and will risk assessment adequately address these sensitive subpopulations?

3. How do the risks in our community compare to other communities?

1) Is there an unusually high incidence of disease in our community (cancer clusters, asthma, adverse reproductive outcomes, etc.), and might it be the result of environmental exposures?

2) Do we have more than our share of environmental stresses in our community?

3) Are there disproportionate impacts (race, income, children, etc.) within my community or compared to other communities?

4. How can we improve our environmental quality of life?

1) How can we get an overall picture of all of our environmental impacts so we can set priorities for making improvements?

2) What is the condition of my community's natural resources (parks, surface waters, wildlife, etc.)? What are the sources of the impacts on these resources?

3) What information is available that can improve the economic situation in my community and its quality of life?

4) What information is available regarding traffic, general safety, noise, dust, bad odors, etc.?

5) How do we track our progress so that we know how to proceed in the future?

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Appendix D. Community Assessment Definitions

(Draft 6/3/99)

Categories of Community Assessment Data and Tools for Comparison and Identification of Gaps

Category	Description
Stressors	Databases include known and potential sources of pollution or other environmental agents of concern, such as chemical releases (routine or accidental, stationary or mobile), noise, etc. and their characteristics. Tools include methodologies and emissions estimation models to allow prediction of the amount of an agent from specific or generic source categories.
Exposure/Conditions	Databases include monitoring data concerning the agents of concern (in various environmental and biological media), and the results of the application of tools (e.g. modeled concentrations). Related data include environmental conditions which affect dispersion and fate of agents (e.g. wind patterns, stream flow, pH). Tools include models to estimate levels in the ambient environment, plants/animals and humans.
Receptors	Databases include the geographic distribution and behavioral characteristics of human, plant and animal populations which may be affected by agents of concern (including sensitive subpopulations), as well as anthropomorphic or non-living receptors (e.g. historical sites, aesthetic vistas, etc). Tools include models or methods to identify and estimate the number of receptors which are potentially exposed to measured or predicted conditions (e.g. population estimation)
Effects	Databases and tools for estimating health and environmental effects of agents of concern. Databases range from collections of raw toxicity test results to organized sets for specific groups of chemicals with an evaluation by weight of evidence or other quality assessment criteria. Tools (while rarely used in community assessments) allow prediction of the likelihood of an effect occurring in the absence of test data,.
Incidence	Observed rates of health endpoints of concern in receptor populations, e.g. cancer morbidity/mortality, aquatic species disease rates, etc. Databases would include national, state, and local health department records.
General	Fundamental data and tools useful in a variety of assessment steps, such as road and stream networks, land use/land cover and spatial and statistical analysis methods.

Appendix E. Data and Tools Table

(modified 6/3/99)

Issue	Data	Tools
Stressors	**National Data:** *IDEA, Envirofacts Data* • Toxic Release Inventory (TRI) • PCS • AIRS Facility • RCRIS • CERCLIS *Other* • NTI (on-going) • RMP • Census of businesses **State, Local, and Regional Data:** • RAPIDS (Great Lakes PBT air toxics) • State air toxics inventories (e.g., LA's TEDI) • Emergency Planning and Community Right-to-Know Act (EPCRA) reports • Socio-Economic Data • Dun & Bradstreet • Tax parcel data	• Default emission factors and stack parameters (e.g. CHIEF, AP-42, RAPIDS) • Mobile source emissions predictive models
Exposure/Conditions	**National Data:** • AIRS monitors • STORET • Drinking water contaminant reports • Cumulative Exposure Project (CEP) air concentrations • Remote Sensing data • National Oceanic and Atmospheric Administration (NOAA) and Fish and Wildlife Service (FWS) Ecosystem data • NHANES **State, Local, and Regional Data:** • Ambient monitoring • Blood lead levels • EMPACT	• ISC and other air models • RSEI • BASINS • IEUBK • ASPEN (CEP) • MMEM • IRAP-h
Receptors	• Census of population • Socioeconomic/Demographic data (e.g., Community 2020 updated pop estimates) • NOAA and FWS Ecosystem data • State Endangered Species data • Historical Sites Information • SDWIS • Exposure factors data • Sensitive subpopulation exposure factors	• PECT (proximity analysis) • RSEI (proximity analysis and levels of exposure) • IEUBK • "Gravity " and other models for predicting diurnal population movements
Effects	• IRIS • HEAST • OPPT RSEI Toxicity Data • CEP/OAQPS toxicity data • ATSDR Tox profiles	• Quantitative structure activity relationship (QSAR) models
Incidence	• NCHS Cancer Mortality (county data) • Centers for Disease Control (CDC) (e.g., Agency for Toxic Substances and Disease Registry (ATSDR), STARS) • State/Local/Regional Health Records	
General	• Geographic Information Systems (GIS) • Global Positioning System (GPS) • TIGER (Census) • Land use/land cover	• Statistical Analysis • CIMAS-Type Applications • Kriging (e.g., Geo-ease)

Appendix F

Speaker Notes and Presentations

Hal Zenick – Notes for Welcome

ORD COMMUNITY ASSESSMENT WORKSHOP II; WHAT TOOLS AND DATA ARE AVAILABLE TO ANSWER COMMUNITY ASSESSMENT QUESTIONS

Opening Remarks -

- Increasing empowerment in direction of states and communities
- CBEP Framework - ORD CST and Agency CSW
- Changing landscape as to
  - Nature of client
  - Nature of product
  - Accessibility of product
  - Accountability
- Recognize that risk assessment/risk management decisions in the field are a different creature than those derived by a national program office
- Understanding those commonalities and differences and priorities will facilitate ORD planning and responsiveness
- Similar appreciation by clients for the power and limitations of research tools is essential
- Realities:

  *ORD's primary client from a community "sense" is the regions since much of ORD's activities and products will require technical expertise for application

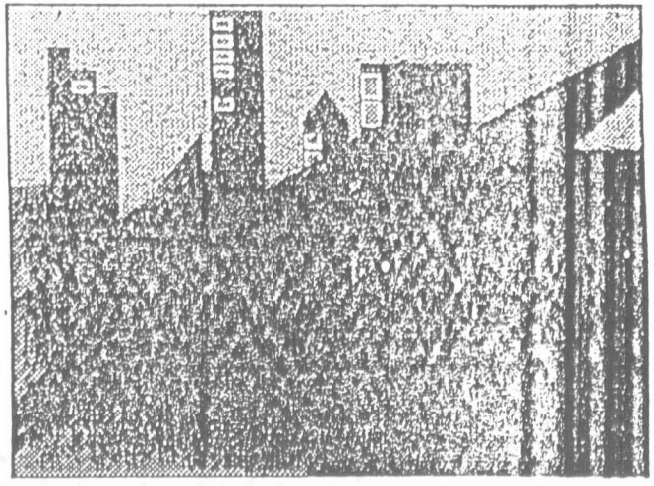
  *Community implies a geographic focus which may not be the best use of ORD who must develop more broadly applicable products

  *Discussions and priority setting by clients (i.e., regions) will help ORD planning

- Parallel exercise is development of a decision tree whose very application will contribute to defining and prioritizing research needs.

"New Directions" Workshops

Community Assessment Series



"New Directions" Workshops

- Focused on new directions of environmental protection;
- Designed to promote the identification and sharing of science tools and strategies;
- Bring scientists, analysts, and managers together to develop linkages between POs, Regions, and ORD.

Description of Community Assessment

- Community *(New Direction)*
  - broad definition
  - various types of communities

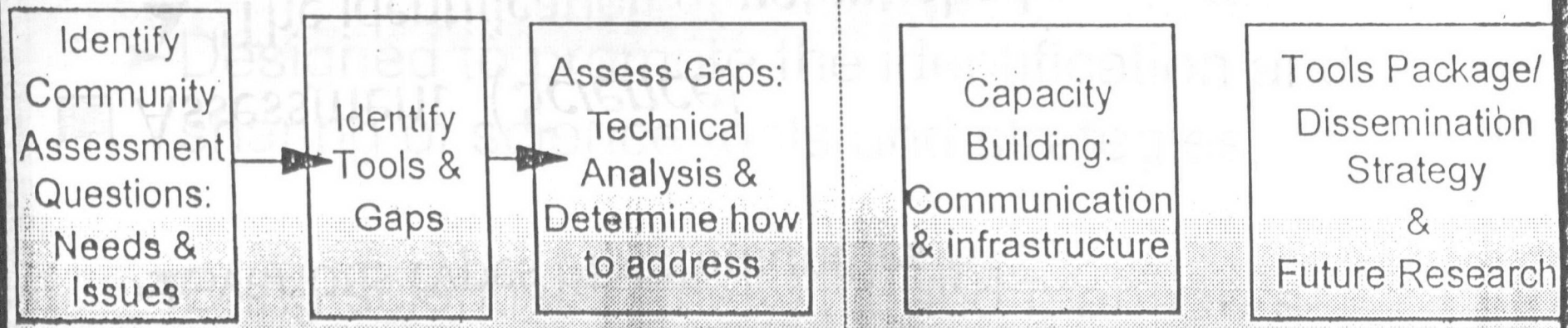
- Assessment *(Science)*
  - "The identification of potential adverse effects to humans or ecosystems"
  - Risk Paradigm - assessment not management

Process

Phase I
"Set The Stage"

Phase II
"Community Setting"

Phase III
"Implementation"



March 3 & 4

June 9 & 10

July 29 & 29

FY 99

late Sept 99

early winter

FY 00

Tools & Data

Cumulative Health Risk.....Tool

Comparative Relative Risk.....Tool

Landscape Ecology Approach.....Tool

Models-3 (Air Multi-scale).....Model

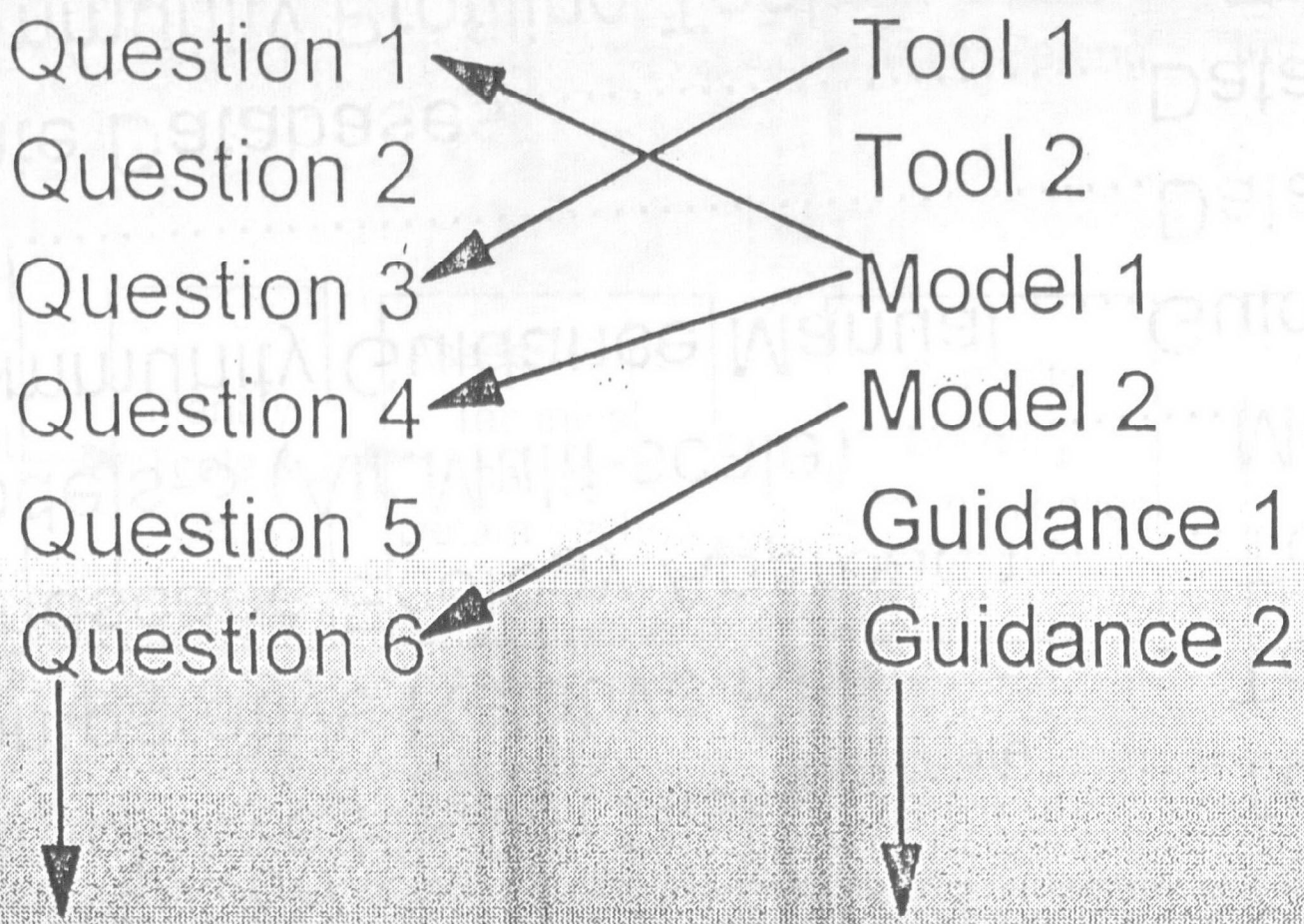
Community Guidance Manual.....Guidance

TRI.....Database

State Databases.....Database

Community Profiling Tool.....Tool

Analysis


Question 1
Question 2
Question 3
Question 4
Question 5
Question 6
Tool 1
Tool 2
Model 1
Model 2
Guidance 1
Guidance 2

What do we hope to accomplish?

- Categorize existing tools
- Identify what tools are needed or improvement
- Understand how this approach is different; how does it affect the tools we develop.
- Develop a better understanding of communities and science.

Paradigm

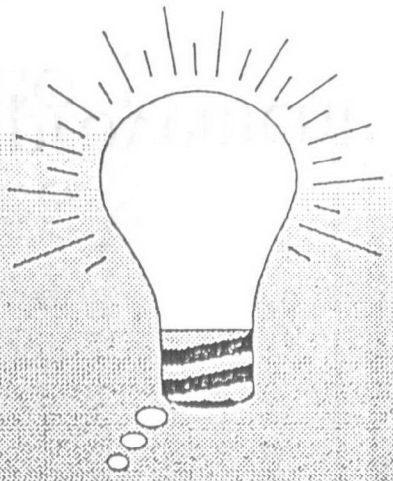
Community
"Questions"

→

Scientific
Tools

→

Answers



McFarland Community Environmental Assessment

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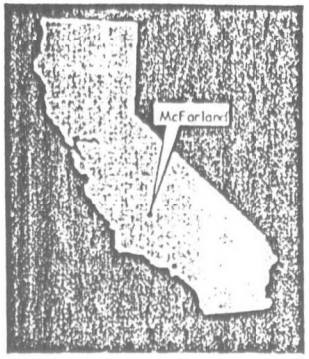
McFarland



- Central Valley of California
- Kern County
  - 860,000 acres of agriculture

McFarland

Population ~ 8000

95% Latino

Surrounded by ag fields ("a residential island in a sea of agriculture")

Childhood Cancer Cluster

1975 - 1989: 14 Children with Cancer

11 different types

leukemia, brain, liver and bone

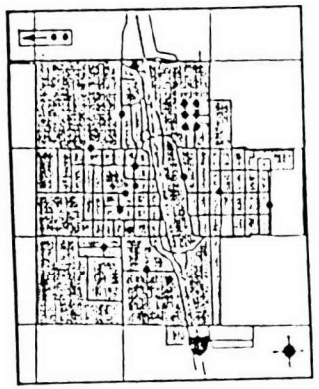
7x expected rate for Calif children

1996: 7 Additional Children with Cancer

5 cases in McFarland, 2 adjacent

2x expected

Childhood Cancer Cases



Childhood Cancer Cases in McFarland Between 1975 - 1995.

6 of 21 total cases occurred in the NE section of town

DHS Study

1984 - 1990: California DHS Investigation:

- Epidemiology study
- Soil & drinking water sampling
- Review of regional air data (+ limited sampling)
- Health exams in 1700 children
- Focus on homes of cancer cases

"No pattern of cancers and no environmental conditions related to cancer"

EPA Petitioned

1995: EPA Petitioned Under CERCLA and the Environmental Justice Order

Team Convened & Reviewed Petition:

Petition granted on a selective basis

some items identified "doable"

some items not "doable"

Team: "Fully implemented project or nothing"

McFarland - What Can EPA Add?

Region 9 consulted with OSWER, OW, OAR OPPTS, ORD and EJAC:

Focus on air pathway

Better info available re: pesticide usage

Lower analytical limits now available

Credible "third party"

Region 9 McFarland Project

Region 9 Project Goal:

"Evaluate Current Environmental Conditions and Potential Chemical Exposures via Air, Water and Soil."

Not an attempt to "explain" childhood cancers or find their cause.

Community involvement "integral" to project.

Pesticide Use Reports

California requires reporting for all agricultural pesticide applications.

1990-1997 pesticide use reports

Within 5 mile radius of McFarland:

2000 tons of pesticide products per year

product - not active ingredient

~ 300 pesticides, formulation agents &/or breakdown products id'd for analysis

Assessment Options / Approaches

1. Test for Restricted Use Pesticides (only) in residential environments.
2. Compare McFarland to "unaffected" towns.
3. Compare McFarland levels to "safe" levels.
4. Cumulative multi-chemical, multi-pathway human health risk assessment
   - Superfund RAGS paradigm

Drinking Water

Two Phases:

Drinking water wells & storage tank

5 wells sampled at wellhead (+/- nitrate treatment system)

DW wells & homes/buildings

wells re-sampled

homes

public buildings (schools, parks, gym)

Over 350 analytes

Soils Investigation

Two Phases:

"Deep" soils:

sampling for traditional Superfund hazardous waste = historical and/or illegal waste disposal

Surface soils:

sampling for constituents to which people may be directly exposed

analytes for airborne fugitive dust sampling

Over 150 analytes

Ambient Air

Intent of Ambient Air Sampling:

Annual average air concentrations

"Capture" some pesticide spraying events

3 to 4 "seasons" per year

Analytes:

Pesticides in current use

Surface soil constituents

Status: Planning stage with OAR and ORD

Indoor Air and Dust

Questions:

Indoor levels of ambient "contaminants"?

"Historical" pesticides indoors?

aldrin, dieldrin, chlordane, heptachlor?

Restricted Use Pesticides (RUPs) indoors?

Status: Planning stage with OAR and ORD

McFarland Process

Superfund project manager (petition)

Region-wide, cross-programmatic Team

Superfund Division

Community Involvement

Water Division

Air Division

QA/QC representative

Senior Staff "Champion"

ATSDR regional representative

McFarland Process

- Developed options/approaches w/in Team
- HQ briefings & consults:
  - Superfund
    - OSWER Ombudsman
  - Office of Water
  - Office of Air & Radiation
  - OPPTS
  - ORD
- ORD Las Vegas & RTP consults re: ambient/indoor air & household dust phase

McFarland Process

- Consult w/ state agencies:
  - Calif EPA
  - Calif Dept of Health Services
- Consult w/ local agencies & entities:
  - County Dept of Health
  - County Ag Commission
  - McFarland City Manager (& Council)
  - McFarland Muni Water Company
  - School Board

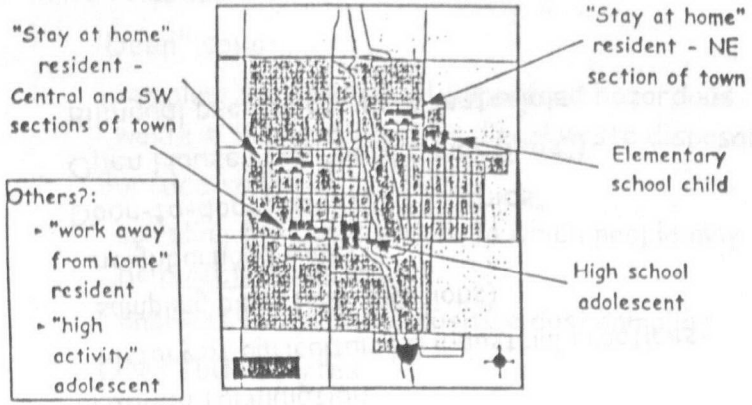
McFarland Process

- Consult w/ community (& petitioners):
  - Problem formulation
    - history of agricultural & industrial practices
    - sampling plans (esp. locations)
    - neighborhood walks
  - Door-to-door, backyard "picnics"
  - Open Houses (vs. "public meetings")
  - Bilingual presentations & materials

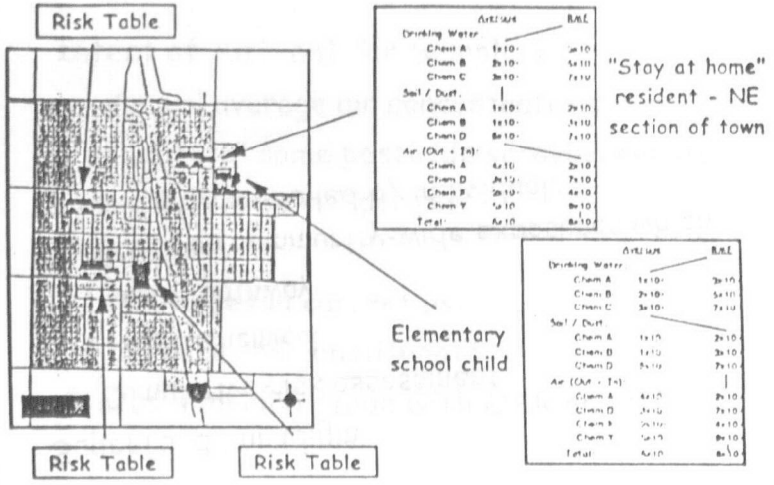
Risk Assessment

- Superfund Paradigm
  - Cumulative risk assessment
    - multi-chemical
    - multi-pathway
  - Focus on community-wide exposures which are <u>not</u> controlled by individuals

Risk Assessment Scenarios



Risk Assessment Scenarios



What's Worked (So Far)

Strong Community Relations/Involvement

- Neighborhood walks (door-to-door)
- In-home meetings
- Frequent public meetings (Open House format)

Share <u>All</u> (including drafts):

- Sampling plans
- Results & interpretations

What Hasn't Worked (So Far)

Good Ideas That We Haven't Been Able to Implement:

- Community Advisory Panel
- Independent technical assistance for petitioners

Issues - Acceptable Risk?

What constituents "acceptable risk" for a broad-based community assessment?

- Superfund range of 10^{-6} to 10^{-4}?
  - cumulative risk assessment paradigm, <u>but</u>
  - single facilities (& usually < 10 chemicals)
- 10^{-6} per chemical? (per pathway?)
  - ignores cumulative risk issues
- Meets "standards" or "non-detect"?
  - standards/n.d.'s > 10^{-6} risk level

Issues - Are High Risk Standards "Safe"?

Communities ask "Is it safe"?

How do we answer when standards are met <u>but</u> risks are "high"?

- Arsenic MCL exceeds the Superfund acceptable range of 10^{-6} to 10^{-4}
- Cumulative risks from DW that meets individual MCLs can be "high"
- Cumulative risk from background inorganics can be "high"

McFarland Team

Superfund Division

- Keith Takata - $F Director & "Champion"
- Elizabeth Adams - Section Chief & original Team Leader
- Mark Calhoon - Team Leader
- Angeles Herrera - Community Involvement
- Gerry Hiatt - Risk Assessment

ATSDR - Bill Nelson

McFarland Team

Cross-Divisonal Representatives

- Barry Pollock - Water
- Ray Chavira - Cross Media (Pesticides)
- Manny Aquitania - Air
- Mike Mahoney - QA/QC
- Jeannie Cervera - Regional Counsel
- Katy Wilcoxen - Environmental Justice
- Arnold Den - Air + Risk Assessment

McFarland Risk Assessment

Exposures in the risk assessment:

- Residential - adults & children at home
- Children at school
- Adolescents at high school (& track/gym?)

Exposures not in the risk assessment:

- Agricultural fields
- Other workplaces
- Cars

ORD COMMUNITY ASSESSMENT WORKSHOP II; WHAT TOOLS AND DATA ARE AVAILABLE TO ANSWER COMMUNITY ASSESSMENT QUESTIONS

PRACTITIONERS' PANEL DISCUSSION

RESEARCH TRIANGLE PARK, NC

JUNE 9-10, 1999

COMMUNITY PERCEPTION

Environmental pollution has contributed to community health problem(s)

THE PROBLEM

Multiple Speculations and Hypotheses

Limited Data for Confirmation

Limited Resources for Exploration

THE SOLUTION

Develop a Consensus Approach That Will Better:

- Identify/Characterize Problems
- Establish Priorities
- Guide Options and Actions

Data shed light on Valley birth defects

5-22-94

Water supplies in 2 counties may harbor pesticides

Discolored pond spurs investigation of anencephaly link

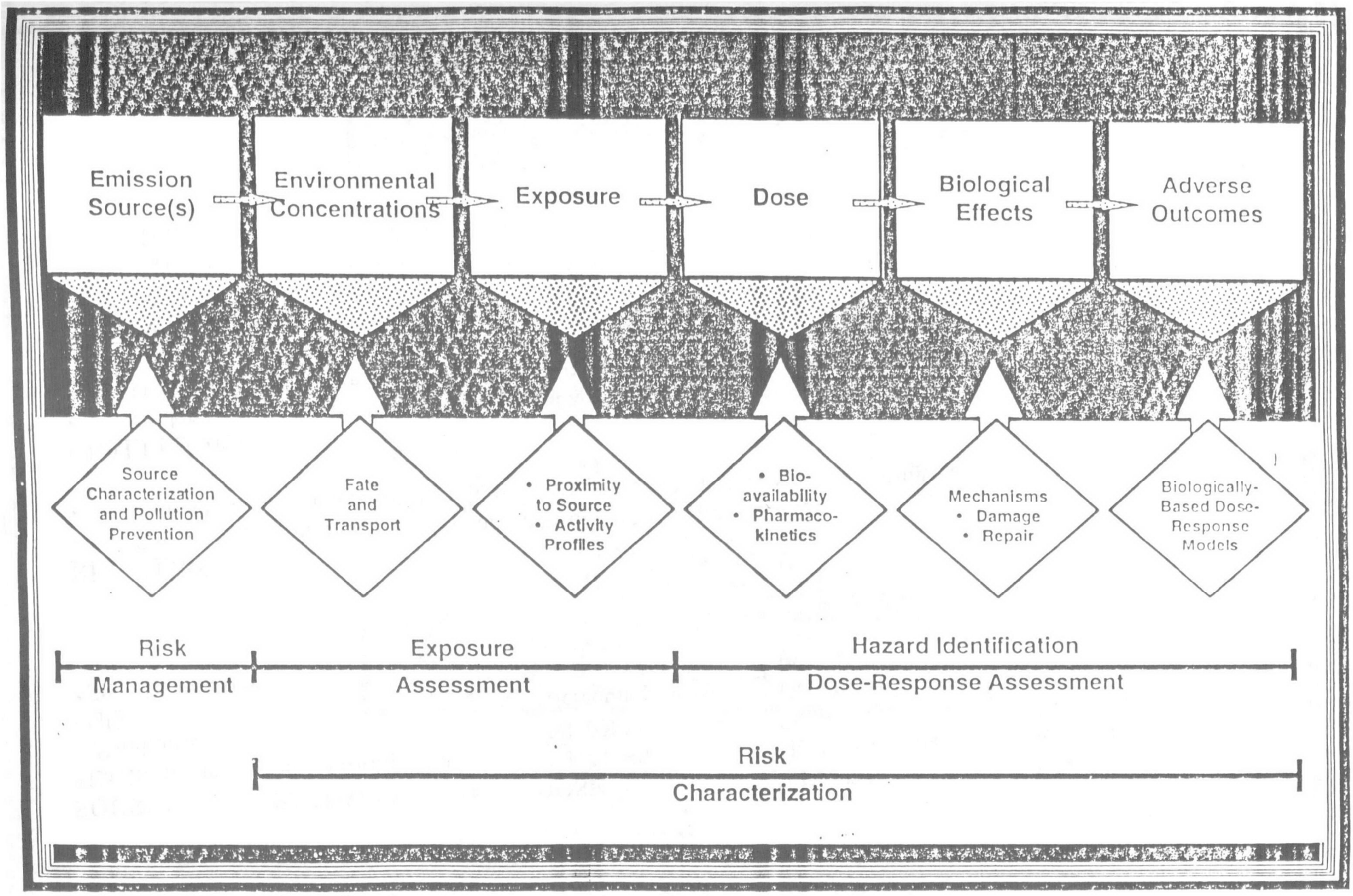
Anencephaly study targets pesticides

Test finds pesticides, arsenic in pink pond

Researcher believes birth defects caused parasitic organisms in Rio Grande

Critical Human Exposure Questions

- Is the population exposed to potentially harmful pollutants?
- How serious are the exposures (i.e., levels)?
- How do exposures occur (i.e., pathways)?
- What are the sources of the exposures?


Emission Source(s)
Environmental Concentrations
Exposure
Dose
Biological Effects
Adverse Outcomes
Source Characterization and Pollution Prevention
Fate and Transport
• Proximity to Source
• Activity Profiles
• Bio-availability
• Pharmaco-kinetics
Mechanisms
• Damage
• Repair
Biologically-Based Dose-Response Models
Risk Management
Exposure Assessment
Hazard Identification
Dose-Response Assessment
Risk Characterization

ENVIRONMENTAL HEALTH PARADIGM

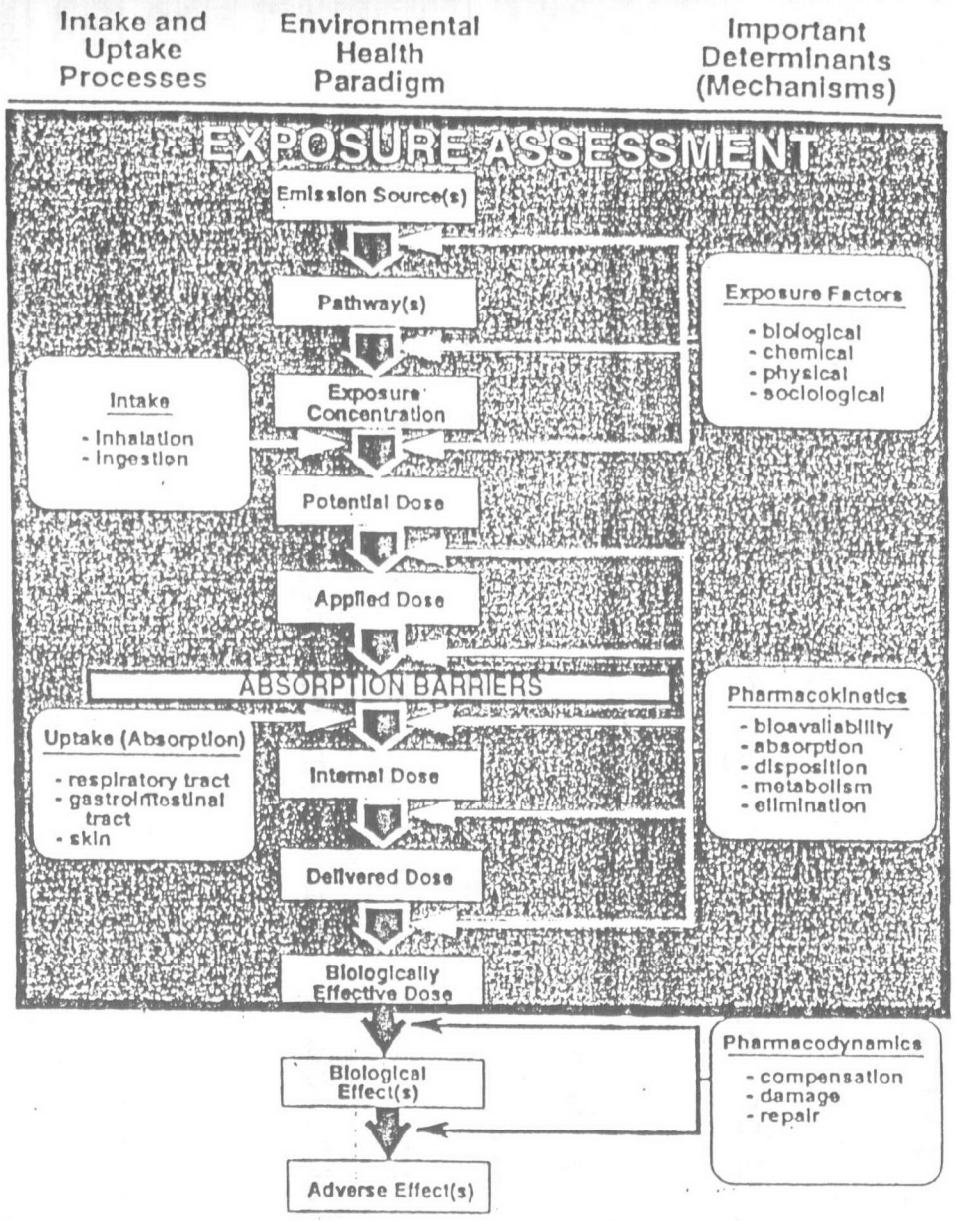
	?		?		?		?	
SOURCE	→	**PATHWAYS**	→	**DOSE**	→	**EFFECTS**	→	**OUTCOME**
*Environfacts Warehouse		*Monitoring data		*NHANES		*Health Records		*Registries
*GIS				*NHEXAS		*Surveillance		*Outbreak Reports
*State Inventories				*Screening Tests		*Data bases (e.g., IRIS)		*Poisoning Reports

<u>REALITIES</u>

- Substantial experience in understanding Source→Pathway linkage
- At the best, such data useful for hypothesis generation not hypothesis testing

<u>CHALLENGES</u>

- Understand predictive linkages starting at any point in the cascade
- Design data collection (e.g., monitoring) to accommodate different needs
  - Who
  - When
  - Where
  - What
  - How



Sexton et al., 1995

VALIDATED, PREDICTIVE BIOMARKERS - SOLVING THE LINKAGE PROBLEM

GOOD NEWS

- Can measure a lot of things and are getting better at it
- Affordability becoming a reality

REALITIES

- Less certain about what should be measured
- Often appear to be measuring for the sake of measuring
- Interpretation is not straightforward

Results of 9–Home Pilot
Lower Rio Grande Valley Environmental Study

Compound Name	% (#) Detected	Highest Value	Environmental Standard	Highest Value in Reference Population
Metals				
Lead				
Zinc				
Cadmium				
Mercury				
Chromium				
Arsenic				
Aluminum				
Volatile Organic Compounds				
1,1,1 Trichloroethane				
Tetrachloroethylene				
m,p–Dichlorobenzene				
o–Xylene				
m,p–Xylene				
Benzene				
Chloroform				
Styrene				
Butanone				
Acetone				
Propane				
Butane				
Butadiene				
Tolulene				
Bromoform				
Nitrophenol				
Trichlorophenol				
Naphthalene				
Dibromochloromethane				
Pesticides				
Diazinon				
Chlorodane				
Propoxur				
PCB				
Permethrin				
DDE				
DDT				
2,4 D				
Malathion				
Atrazine				
Polychlorinated Biphenyl				
Aroclor 1260				
Polycyclic Aromatic Hydrocarbons				
Total PAH's				
Benzo(a)pyrene				
Microbiologicals				
Coliform				

Summary

VALIDATED, PREDICTIVE-BIOMARKERS - SOLVING THE LINKAGE PROBLEM

Exposure Biomarkers

*Different goals = different designs

- Linkage back to source?
- Linkage to effects?

*Design issues - who, when, what, etc.

*Basic metric - time and concentration

*Reference data

Effects Biomarkers

*Relationship of test species data to human

*Relationship of low dose, measurable events to outcome

*Relationship of exposure scenario to outcome - acute→chronic

*Design issues - who, when, what, etc.

*Ability to assess biomarker/outcome

ADDITIONAL RESEARCH REALITIES

- Multi- Versus Single Pathway Exposure
- Mixtures versus Single Pollutant Exposure
- Varying, Concurrent/Overlapping Exposure Scenarios
- Short Half-Life Versus Bioaccumulation
- Retrospective Exposure-Health Linkage

NCP Yuma 9 presentation Practitioners Panel Discussion
Hank Topper (OPPTS)

(1) different look: we do have tools that can help answer community questions ... only some of them ... scientific work needs to be done to make the tools and data more complete. But I want to focus on the data + tools we have and use now and how they relate to community assessment

(2) First look at the goal of community assessment:

(A) data and tools that can be widely used in communities, without much, or little, EPA direct involvement ... does not mean non-technical communities have technical people ... gov employees, doctors, teachers, etc. Now community assessments generally require considerable EPA participation. Balt. illustrates well detail why that is. For effective action on env, especially in these lean gov years, tools + data must be more widely available

(B) real world goal of community assessment: improved environmental decisions on road construction, siting, etc. Most importantly the goal is a measurable improvement in the health of our poorest communities. Communities with terrible public health ~~statistics~~ + levels ... tools + data used as a component of an effort that actually begins to ~~show~~ signs of improved community health ~~env~~.

(3) Let me briefly use the Balt assessment as an illustration of what I think at is assessment tools + data.

(A) background: broad sustainable community project with multiple focus

(B) EPA data + tools most relevant to community air quality

(C) perceived pub health: are industrial + commercial facilities contributing what's in the air that may adversely impact community?

(D) accomplishment demonstrates the value of our tools ... what was accomplished chem., screening, ~~deselection~~ deselection, etc.

(E) what the assessment illustrates about the inconsistent ~~current~~ state of our data + tools

-2-

screening guidance for risk communication
release data
we have ISC exposure modeled
Toxicity data
risk benchmarks
} raw materials but no clear

(4) first point: there is not a ready made procedure developed to complete the assessment: the risk based screening process for these neighborhoods had to be developed in the course of the project. (just as the city screen project in Chicago had to be developed)

(5) > what source inventory to use?

> what is a good way to build a source inventory data base to support a screening exercise ... arranging columns for review

> where are the training, educational materials to make sure everyone can participate

> what is the best source of toxicity data, risk benchmarks e.g. RfC / acute data

> reporting results ... where is the language that adequately expresses what a screening exercise can + can't tell the community

anecdote:

(4) Point is we have a lot of the pieces, but the nuts + bolts that can get them into a driveable car are not there ... our tools + data are a long way from being in a form that communities can use ... each assessment is an EPA custom job ... and that won't get us to the goal we have ... must be much more user friendly

raw-material

(5) Talk about a second problem: data + tools set up to give out bits and pieces of information. very important, but not what communities need in an assessment. They really need the big picture to effectively focus their energies From the environmental perspective

(6) Take the example of the Ball neighborhoods focus on community health + sustainability.

(A) All study did not include particulates

(B) was mostly interested in [illegible]

~~(7)~~

(C) not saying that everything can be done at once, but what communities need is a broad picture of risk so that they can make decisions on resources ...

(D) that environmental risk picture also has to be incorporated into the broader community health & sustainability picture ... jobs, access to health care, life style, crime, etc.

(7) If our goal is community & environmental health then we have to develop an assessment data & tools so that they fit into ~~the broader context~~. first the comprehensive environmental picture and second the community health and sustainable community picture

7a) major change for us, not by ourselves in ~~our~~ community ... as part of team ....

(8) That's when we can make a most effective contribution to the goal of ~~higher~~ ~~Goal~~ healthy & sustainable communities.

(9) ~~How~~ do we get there from here: ~~at the~~ we have to learn by doing: (take the lead in organizing)

by the point where we have useable data & tools, better overall perspective ~~both~~ both env. & broader community health & social ~~con~~

- participate in community assessment efforts ... community health efforts with broad partnerships & broad focus.
- take the custom made ~~tools~~ products ~~that~~ produced in these efforts and use them to make it easier for the next communities
- share experiences, ~~communicate~~ facilitate communication, ~~discuss~~ newsletter
- five years from now we may be a lot close to our goals

learn to use useable product

What Is Synergism?
(proposed by U.S. EPA, 1999)

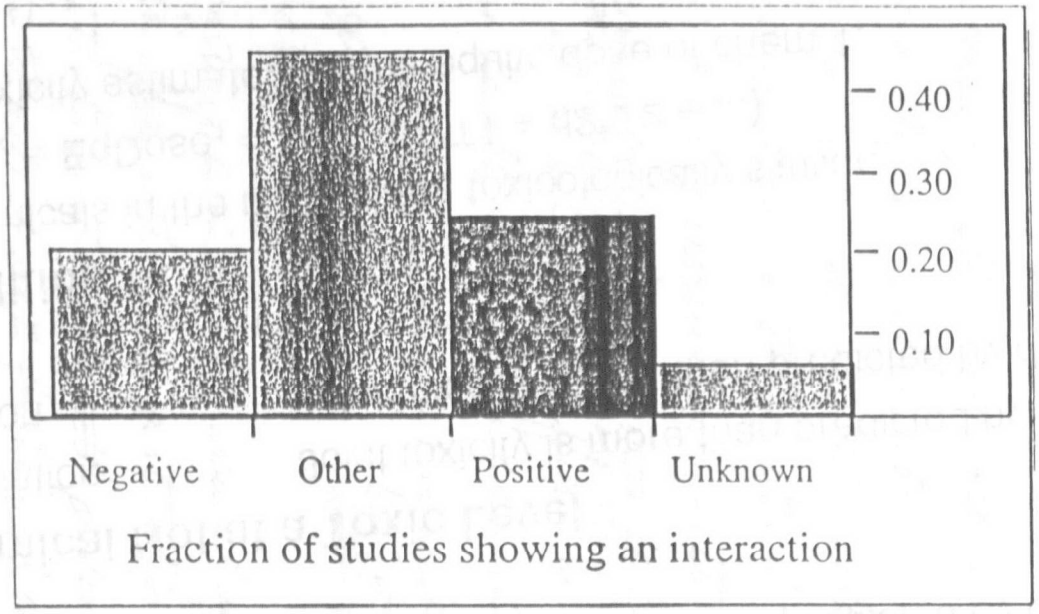
- **Both Chemicals at Toxic Levels**
  - Synergism — Joint toxicity is more than predicted by dose addition
  - Antagonism — Joint toxicity is less than predicted by dose addition

- **One Chemical Not at a Toxic Level**
  - Potentiation — Joint toxicity is more than predicted by dose addition
  - Inhibition — Joint toxicity is less than predicted by dose addition

- **Dose Addition**
  - All chemicals in the mixture are toxicologically similar.
  - $Dose_{MIX} = EqDose_1 = sum(d1*T1 + d2*T2 + ...)$
  - Joint toxicity estimated for the equiv. dose of chem 1.

- **Response Addition**
  - Special case where the chemicals act independently

How Often is Synergism?



- **"Positive" includes synergism and other enhanced toxicity**
- **"Positive" only in 26% of the chemical pairs studied**
- **Same chemical pair can show multiple interactions**

  – Source: EPA review of 1465 chemical pairs, 1990.

How Bad Is Synergism?

- **Most environmental chemical interactions at the more common lower levels in the environment show less than 10-fold interaction.**
  - Interaction = change in minimum toxic dose
- **Very few studies allow interaction to be quantified.**
- **Most mixture health risks are dominated by one or two chemicals**
  - clean up those few chemicals and the rest are at safe levels

Total Risk Integrated Methodology (TRIM) & other Air Toxics Program Tools

Deirdre Murphy
Office of Air Quality Planning & Standards
June 9, 1999

National Air Toxics Assessment (NATA)

- Emissions inventories
- Air quality, exposure & risk modeling
- Air monitoring network
- Ongoing research on effects & assessment tools

Air Toxics Program Assessment Activities

- Integrated Urban Air Toxics Strategy
  - National scale
  - Urban/Neighborhood scale
- Residual Risk Assessments
  - Source-oriented scale

National Scale Modeling Tools

- National Toxics Inventory (NTI)
  - 1996 modeling inventory by 9/99
- Air dispersion model (ASPEN)
- Inhalation exposure model (HAPEM)
- [multi-media, multi-pathway as feasible/appropriate]

Urban/Neighborhood Scale Modeling Tools

- Local emissions inventories
- Air dispersion model (e.g., ISC3, AERMOD)
- Inhalation exposure model (e.g., HAPEM, pNEM, APEX)
- Multi-media, multi-pathway (e.g., TRIM)

Total Risk Integrated Methodology

- Human Health & Ecological Risks posed by
- Multipathway Exposures resulting from
- Multimedia Fate & Transport of Air Pollutants

The NEED for TRIM

- To support the CAA programs
  - Residual Risk Program
  - Integrated Urban Air Toxics Strategy
  - Pollutant / Source Category Petitions
  - Special Studies (e.g., Hg, Great Waters)
  - Setting National Ambient Air Quality Standards (NAAQS)
  - Regulatory Impact Analyses (RIA)

DESIGN FEATURES OF TRIM

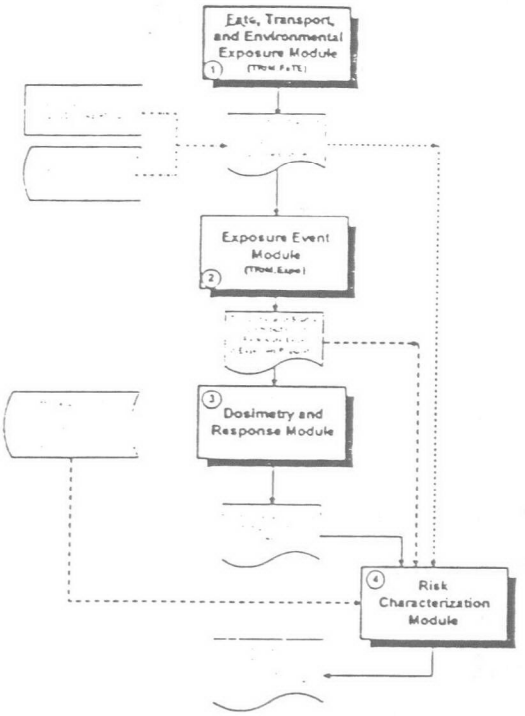
- Scientifically Defensible
  - capable of multipollutant, multimedia, multipathway assessments
  - mass-conserving
  - stochastic
  - able to characterize uncertainty and variability
  - able to perform iterative analyses

DESIGN FEATURES OF TRIM (Cont'd)

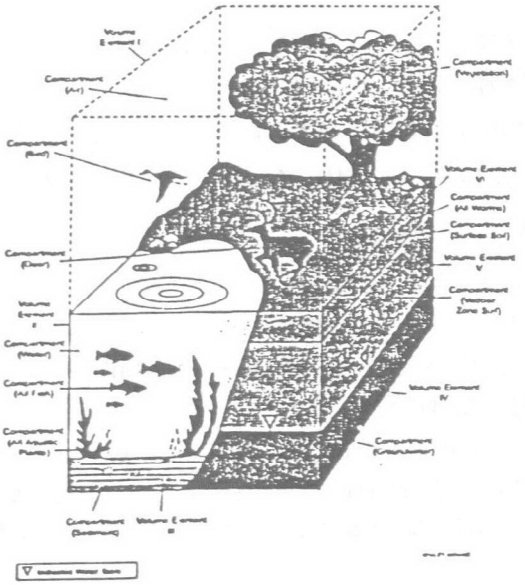
- Flexible
  - modular in design
  - flexible in temporal and spatial scale
  - able to assess human and ecological endpoints
- Usable by OAQPS, Regions, & Stakeholders
  - easily accessible
  - well-documented
  - clear and transparent

COMPONENTS OF TRIM

- Four modules:
  - Environmental Fate and Transport
  - Exposure Event
  - Dosimetry and Response
  - Risk Characterization



Conceptual Overview of TRIM



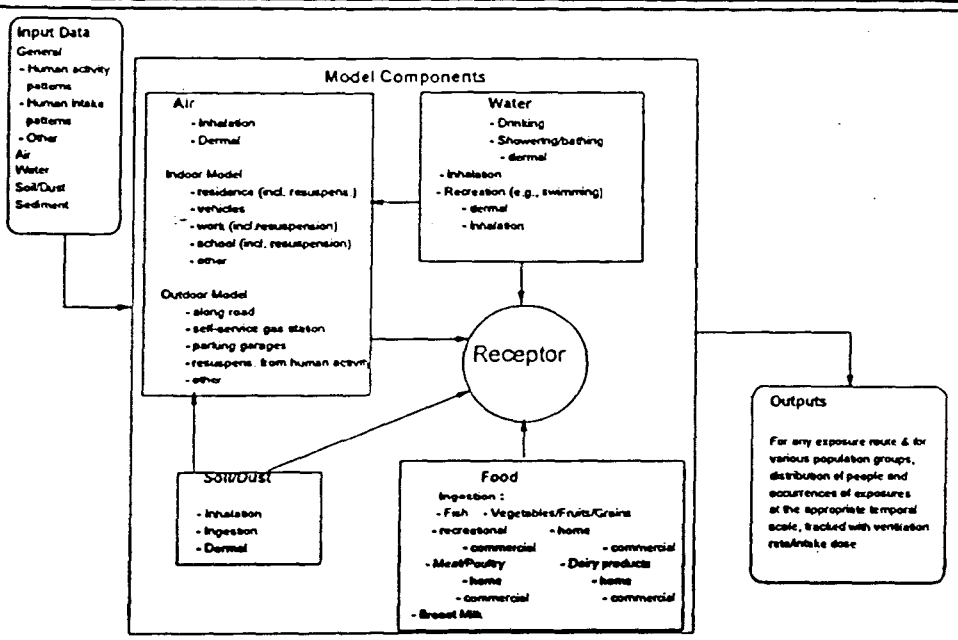
Abiotic Compartment Types Modeled

- Air: upper and lower air layers
- Soil:
  - surface soil
  - root zone
  - vadose zone
  - groundwater
- Surface Water
  - upper and lower lake layers
  - river segments
- Sediment
  - interstitial water
  - sediment

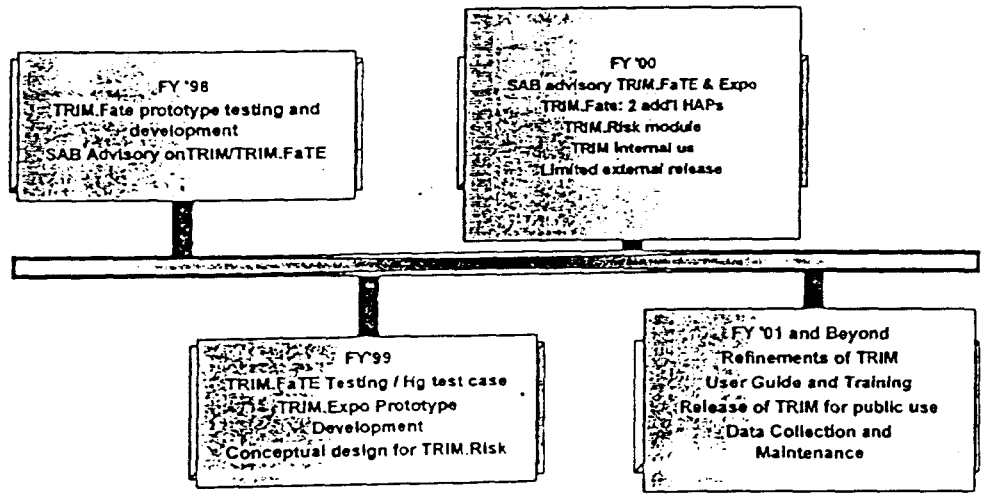
Biotic Compartment Types Modeled

- AQUATIC
  - Wetland plant leaves, roots, xylem, and stem
  - Macrophytes & Mayfly (benthic herbivores)
  - Bluegill (as herbivore), Channel catfish (omnivore), Bass (carnivore)
  - Mallard (herbivore), Raccoon (omnivore), Tree Swallow (insectivore)
- TERRESTRIAL
  - Plant leaves, roots, xylem, and stem
  - Insects, Earthworm (soil detritivore)
  - Black-capped chickadee (insectivore), Red-tailed hawk (predator), Belted kingfisher (piscivore)
  - White-footed mouse (omnivore), Long-tailed weasel (predator),Black-tailed deer (herbivore), Long-tailed vole (herbivore), Mink (piscivore), Trowbridge shrew (ground invertebrate feeder)

Exposure-Event Module

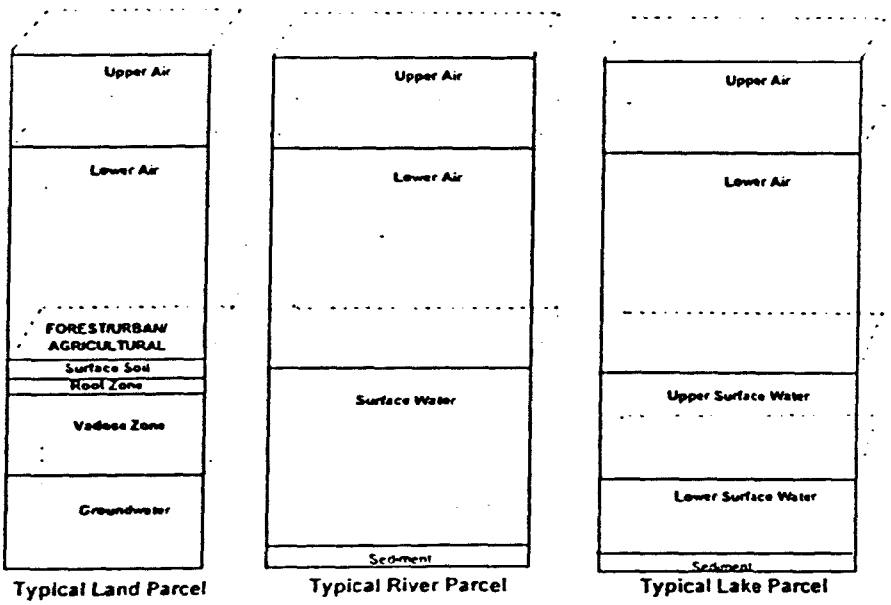


SCHEDULE -- Timeline



WHO IS INVOLVED IN TRIM DEVELOPMENT?

- Cooperative effort between EPA's Office of Air Quality Planning and Standards and:
  - Lawrence Berkeley National Lab
  - Oak Ridge National Lab
  - ICF
  - MCNC
  - EC/R
- Coordination with EPA's Office of Research and Development



Typical Land Parcel | Typical River Parcel | Typical Lake Parcel

Forest Fragmentation as an Economic Indicator

J. Wickham
U.S. EPA
Research Triangle Park, NC

R.V. O'Neill
Oak Ridge National Laboratory
Oak Ridge, TN

K.B. Jones
U.S. EPA
Las Vegas, NV

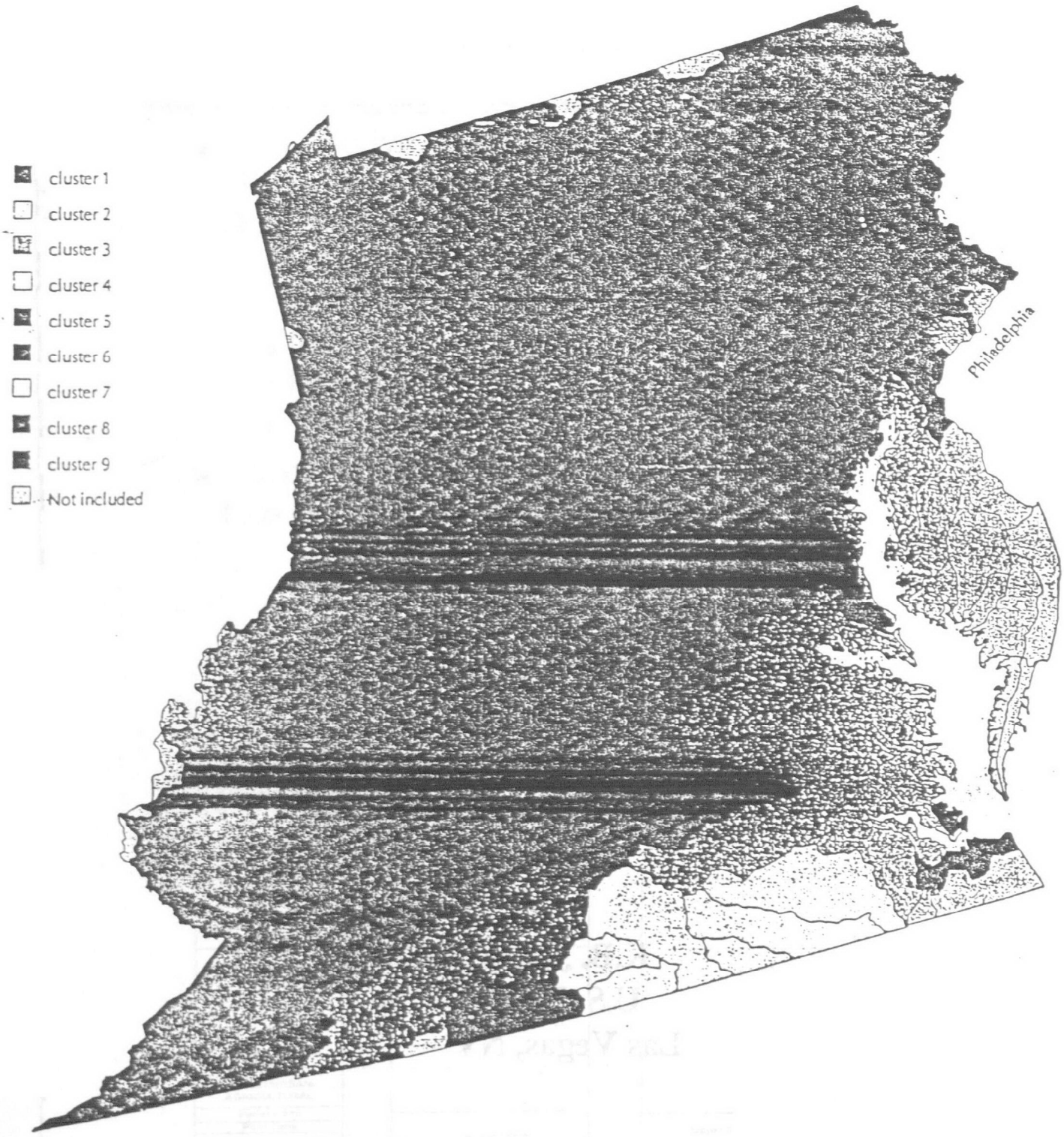
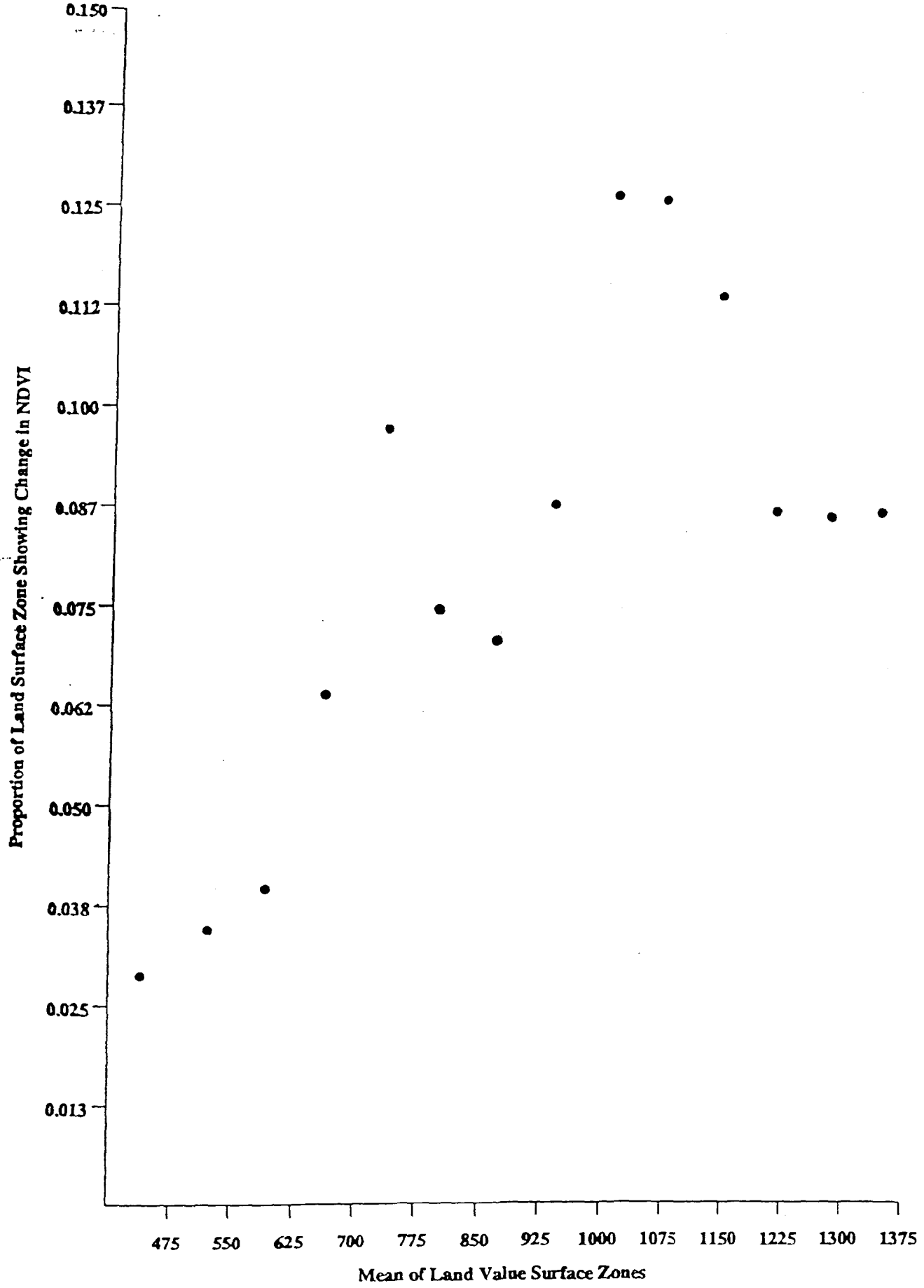
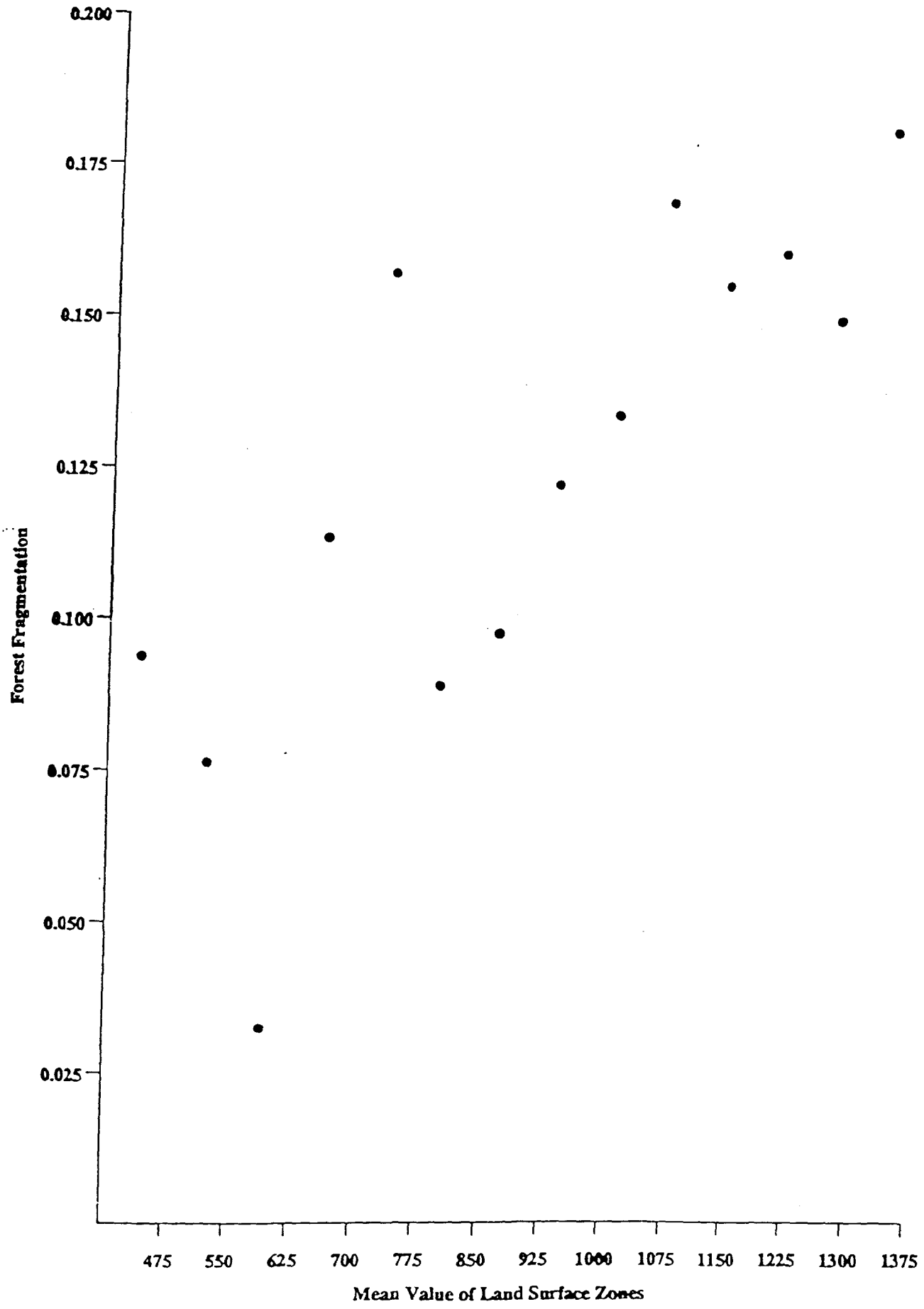
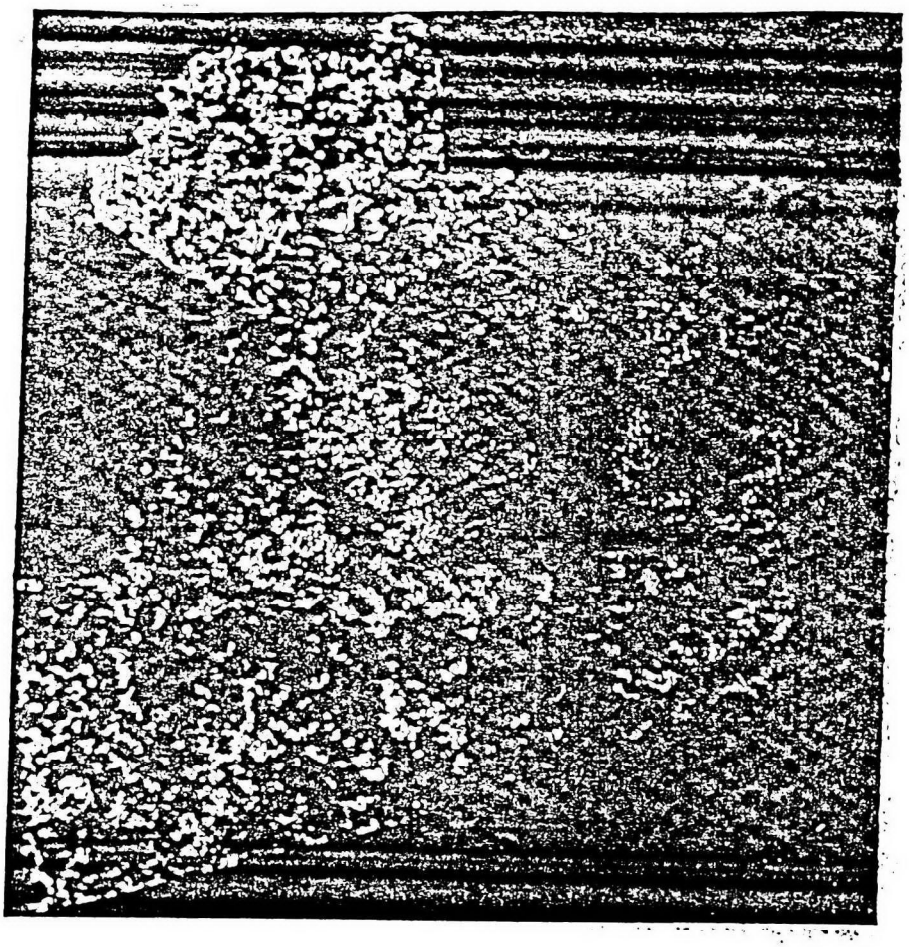
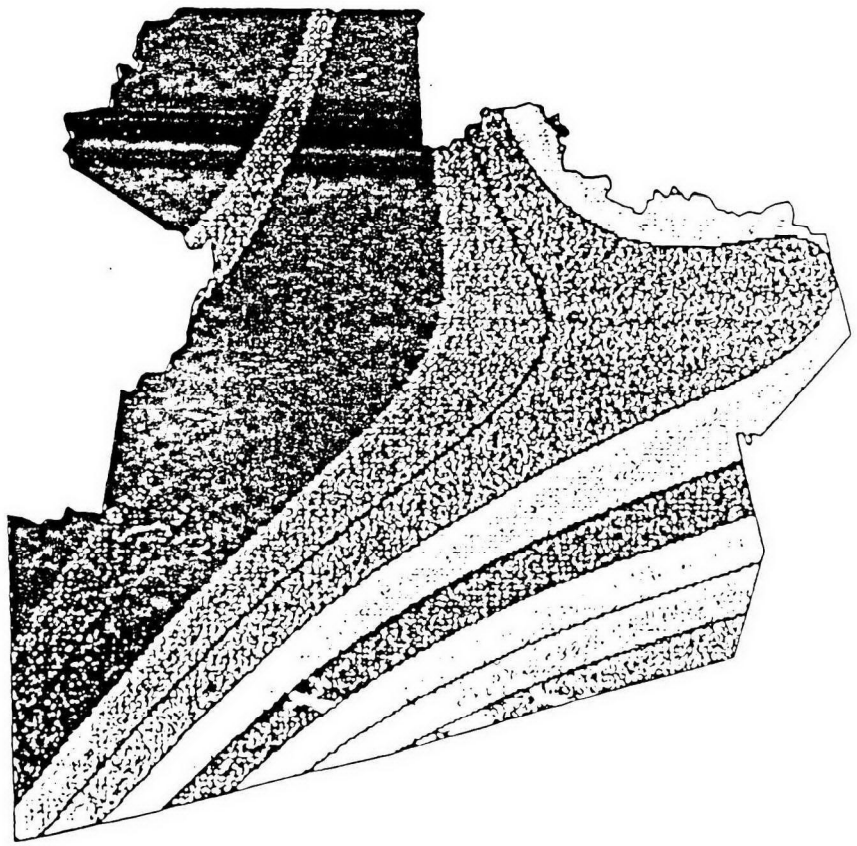


Fig 5.2: Cluster Analysis of Mid-Atlantic Watersheds


0.150
0.137
0.125
0.112
0.100
0.087
0.075
0.062
0.050
0.038
0.025
0.013
Proportion of Land Surface Zone Showing Change in NDVI
475
550
625
700
775
850
925
1000
1075
1150
1225
1300
1375
Mean of Land Value Surface Zones

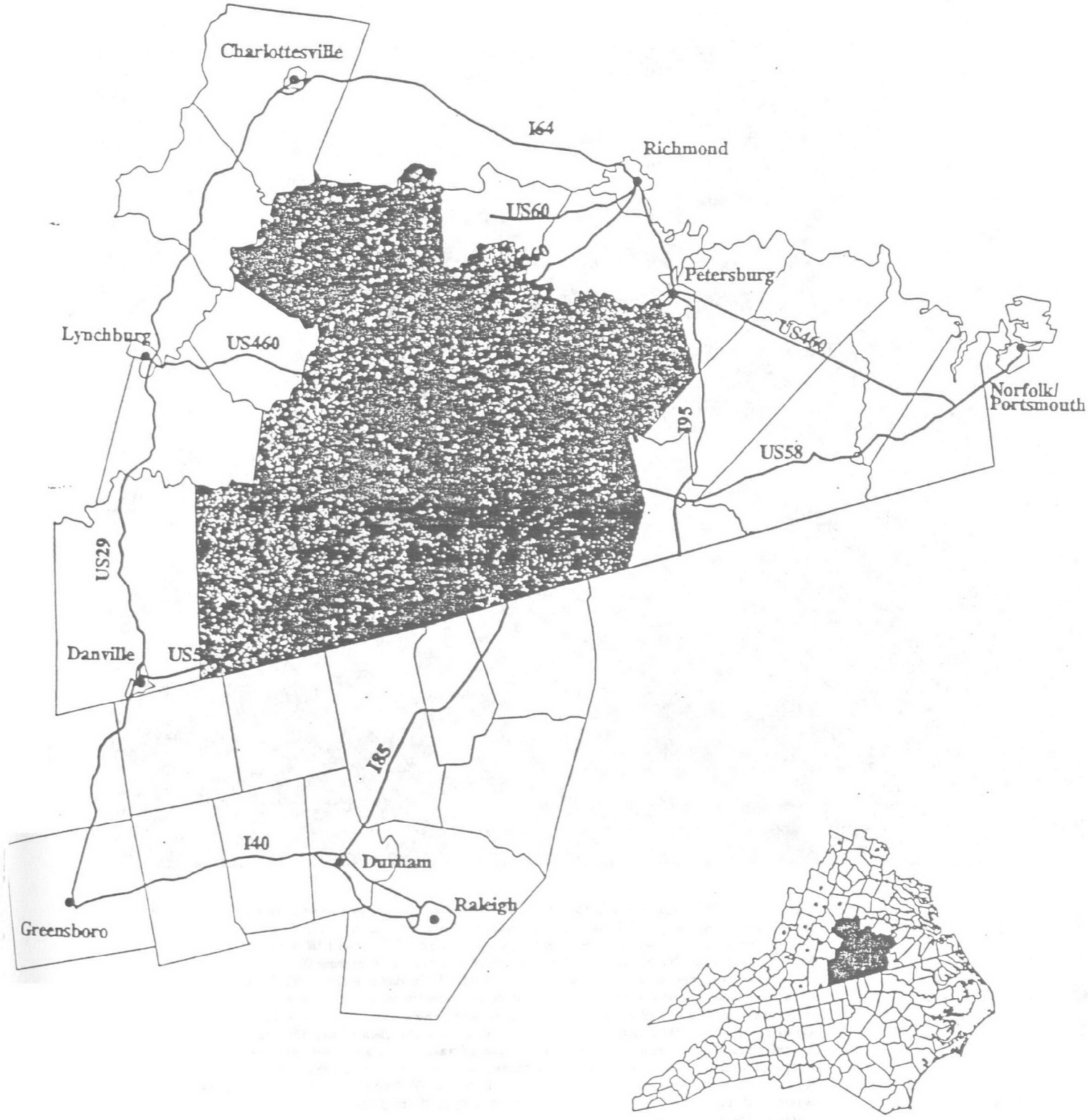

0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
Forest Fragmentation
475
550
625
700
775
850
925
1000
1075
1150
1225
1300
1375
Mean Value of Land Surface Zones





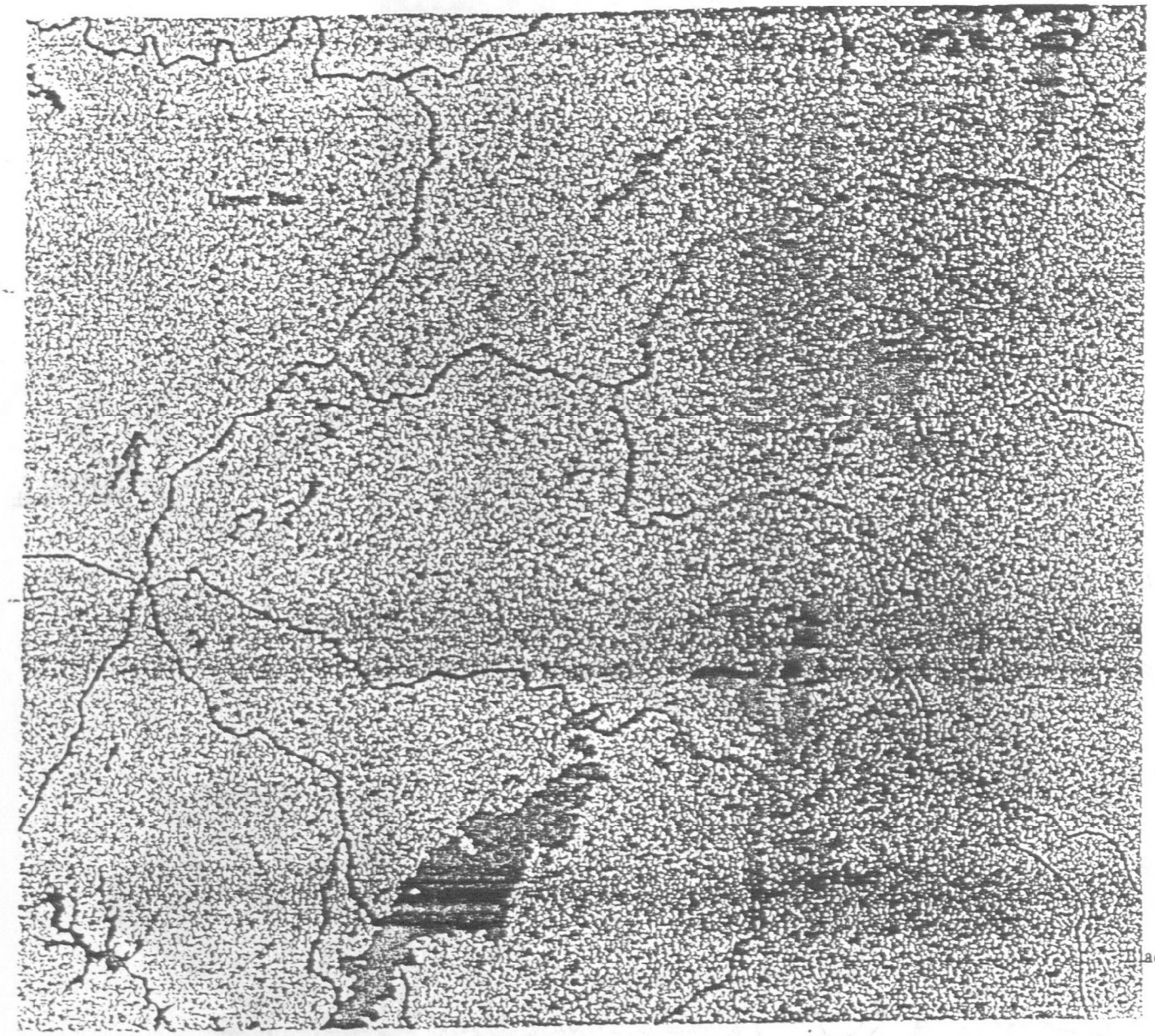
1 : 439
2 : 522
3 : 592
4 : 662
5 : 735
6 : 800
7 : 869
8 : 939
9 : 1011
10 : 1071
11 : 1144
12 : 1214
13 : 1283
14 : 1346

Figure 2


Charlottesville
I64
Richmond
US60
Petersburg
Lynchburg
US460
US460
Norfolk/
Portsmouth
I95
US58
US29
Danville
US5
I85
I40
Durham
Raleigh
Greensboro

igure 1

Change in NDVI by Standard Deviation Classes (1976-1991), Raleigh, NC



- x < -4.5 Std.
- -4.5 =< x < -3.5 Std.
- -3.5 =< x < -2.5 Std.
- -2.5 =< x < -1.5 Std.
- -1.5 =< x < -0.5 Std.
- -0.5 =< x < 0.5 Std.
- 0.5 =< x < 1.5 Std.
- 1.5 =< x < 2.5 Std.
- 2.5 =< x < 3.5 Std.
- 3.5 =< x < 4.5 Std.
- x >= 4.5 Std.

BACKGROUND. Changes in the Normalized Difference Vegetation Index (NDVI) were compared using early fall Landsat MSS images from 1976 and 1991. NDVI is a ratio of infrared (IR) minus red divided by IR plus red (IR - red / IR + red). Before comparing NDVI images, the data were converted to at-satellite reflectance, and regression was used to adjust the 1976 data to the 1991 data. NDVI was calculated for each scene after these adjustments were made. Differences in NDVI between the two images were calculated by subtracting the NDVI image for 1991 from that for 1976. Simple subtraction of satellite data typically results in a near normal distribution of values. Land cover change is typically captured in the tails of this change histogram (see Landscape Monitoring and Assessment Research Plan, EPA/620/R-94/009, 1994). The picture shown here color-codes the differences according to their distance for the center of the histogram.

SPATIAL PATTERN. There are a couple of patterns to the change in the picture. First, there was no significant change in NDVI over the majority of the scene. The class closest to the center of the histogram (blue-gray) comprises 78 percent of the image, and the 3 classes closest to the center of the histogram comprise 92 percent. Second, those classes more likely representing actual land cover change (greens, browns, and reds) are not distributed uniformly throughout the image. Most of the change is concentrated in the southeastern corner of the image, in the Upper Cape Fear, Black and lower half of the Upper Neuse Watersheds. In contrast, there appears to have been relatively little change in the Upper Dan Watershed. Third, the most dramatic change in NDVI was from the creation of reservoirs after 1976. These reservoirs appear in red.

andscape Assessment Team
/SEPA, Las Vegas & TVA, Norris)

Blah . . .

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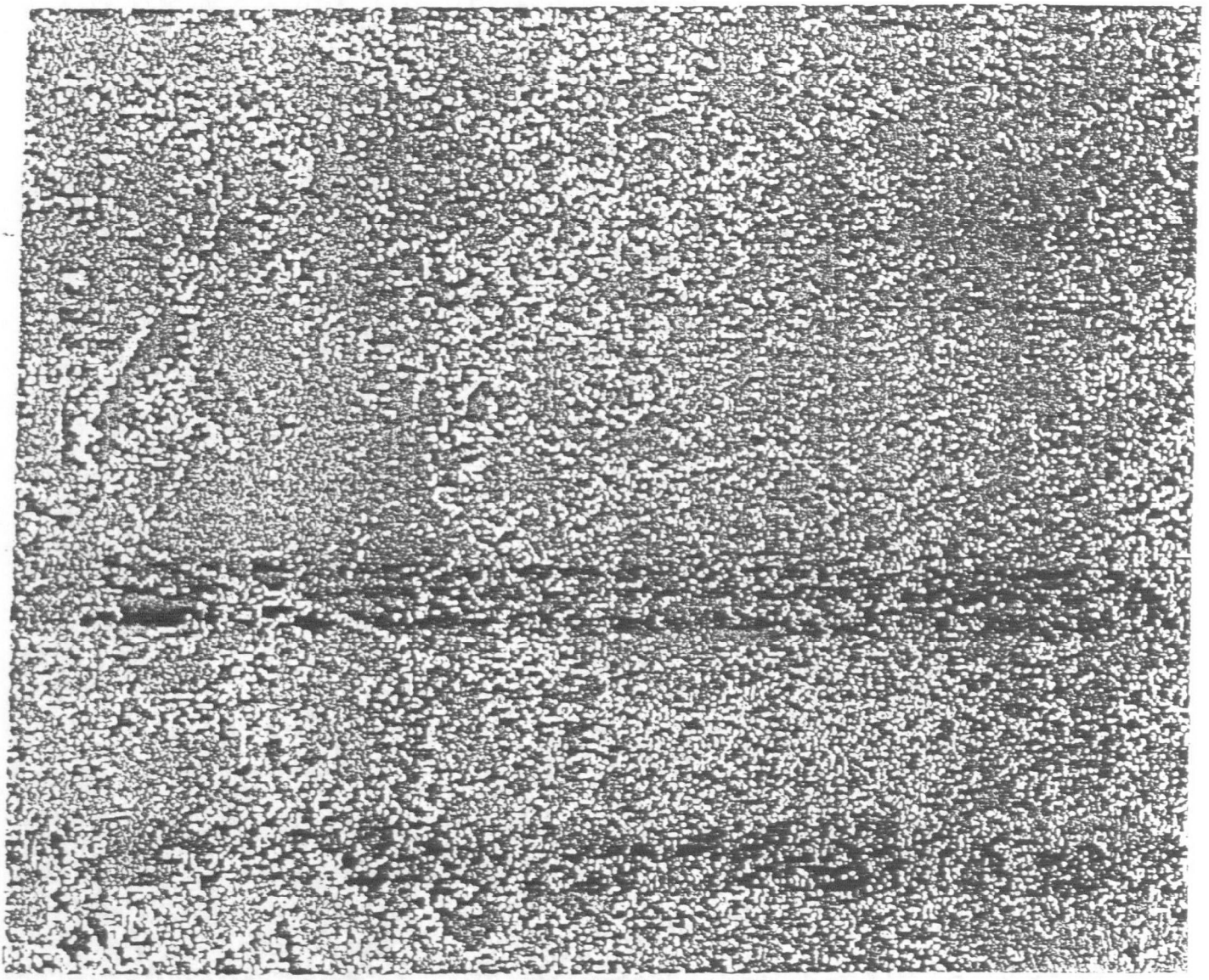
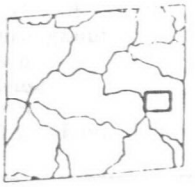
A "Halo" of Change Around Raleigh, NC (1976-1992)



- x < -4.5 Std.
- -4.5 =< x < -3.5 Std.
- -3.5 =< x < -2.5 Std.
- -2.5 =< x < -1.5 Std.
- -1.5 =< x < -0.5 Std.
- -0.5 =< x < 0.5 Std.
- 0.5 =< x < 1.5 Std.
- 1.5 =< x < 2.5 Std.
- 2.5 =< x < 3.5 Std
- 3.5 =< x < 4.5 Std.
- x >= 4.5 Std.

SPATIAL PATTERN. Different patterns of change emerge by zooming in on an area. The picture above is an enlargement of picture 1 around Raleigh, NC. There is clearly a "halo" of change surrounding the city of Raleigh, NC. The construction or improvements to Interstate 440 and U.S. highway 1 show up primarily in brown colors (large changes in NDVI). Changes along the northern portion of I440 complete the ring of change around the city. Also conspicuous is the smaller "halo" of change along Forbes, Spring Forest, and Capital Roads just northeast of the city. Additions to Raleigh-Durham Airport and the emergence of Briar Creek and Crabtree Lakes south and west of the airport are shown in red. The large area of gray between Raleigh-Durham Airport and the city of Raleigh is conspicuous for its lack of change. This area is William B. Umstead State Park. Not surprisingly, inspection of the fine-scale changes around many cities in the Mid-Atlantic States reveals this "halo" pattern, typically modified by the road network.



Definitions of GIS

- A system of hardware, software, and procedures designed to support capture, management, manipulation, analysis, modeling and display of spatially-referenced data for solving complex planning and management problems.

- In the strictest sense, a GIS is a computer system capable of storing, manipulating, and displaying spatially-referenced information, i.e., data identified according to their locations. Practitioners regard the total GIS as including operation personnel and the data that go into the system.

- GIS are simultaneously the telescope, the microscope, the computer, and the xerox machine of regional analysis and spatial data.

- Automated systems for capture, storage, retrieval, analysis, and display of spatial data.

How 'bout

GIS: to make a database out of a map.

Why:

To analyze and model ... so we can ask (and answer) questions.

Community Risk Assessment Workshop

Overview of Exposure Data Bases & Tools

June 9, 1999

Loren Hall
Office of Civil Rights
(202) 260-3931
Email: hall.loren@epamail.epa.gov

Goals of Presentation

I. Provide participants with background, and a framework for categorizing data and tools

II. Highlight data gaps and issues in developing exposure components of risk-based systems

Examples of Risk-Based Decisions

Screening assessments:

- Targeting subcategories of facilities, chemicals, industries, geographic areas for inspection, regulation or voluntary reduction efforts

- To establish priorities for follow up investigations

Formal (Quantitative) assessments:

- Determine site remediation clean up levels

- Set permit limits or ambient concentration standards

Common Forms of Risk Screening Assessments

- Simple Combinations: Sum of annual emissions or emissions per unit area (as exposure surrogate)

- Weighted Combinations: Emissions weighted by toxicity and/or fate criteria

- Rough Exposure Estimates: Use models with mostly generic release characteristics and environmental parameters

Major Stressor Data Gaps

- Source location and chemical-specific releases
  - -- Currency of releases, emission factors, treatment efficiencies
  - -- Comprehensiveness: sectors/types, chemicals, sizes
  - -- Mixtures
  - -- Permitted limits vs. estimated actual
  - -- Mobile sources - geographic distribution and emissions

- Release characteristics
  - -- Form (e.g. particle size distribution)
  - -- Frequency/duration

- Site characteristics
  - -- Location accuracy
  - -- Site characteristics, e.g. stack info, local environment

Major Environmental Characteristics Data Gaps

- Air
  - -- Wind patterns
    - Density of measurement stations
    - Currency, especially for ISCST requirements

- Water
  - -- Stream flows
  - -- Updated coding of release and receptor locations by Reach ID
  - -- Aquifers
    - location, depth, subsurface conditions, flow direction and velocity

Receptor Population Data Issues/Gaps

- Data currency (since 1990 Census)
- Non-residential populations, e.g. schools, hospitals
- Knowledge and Availability of predictive factors
  - -- behavioral
  - -- vulnerability
  - -- pre-existing exposure
- Environmental justice issues, e.g., access to health care

HEALTH/ EPI DATA BASES

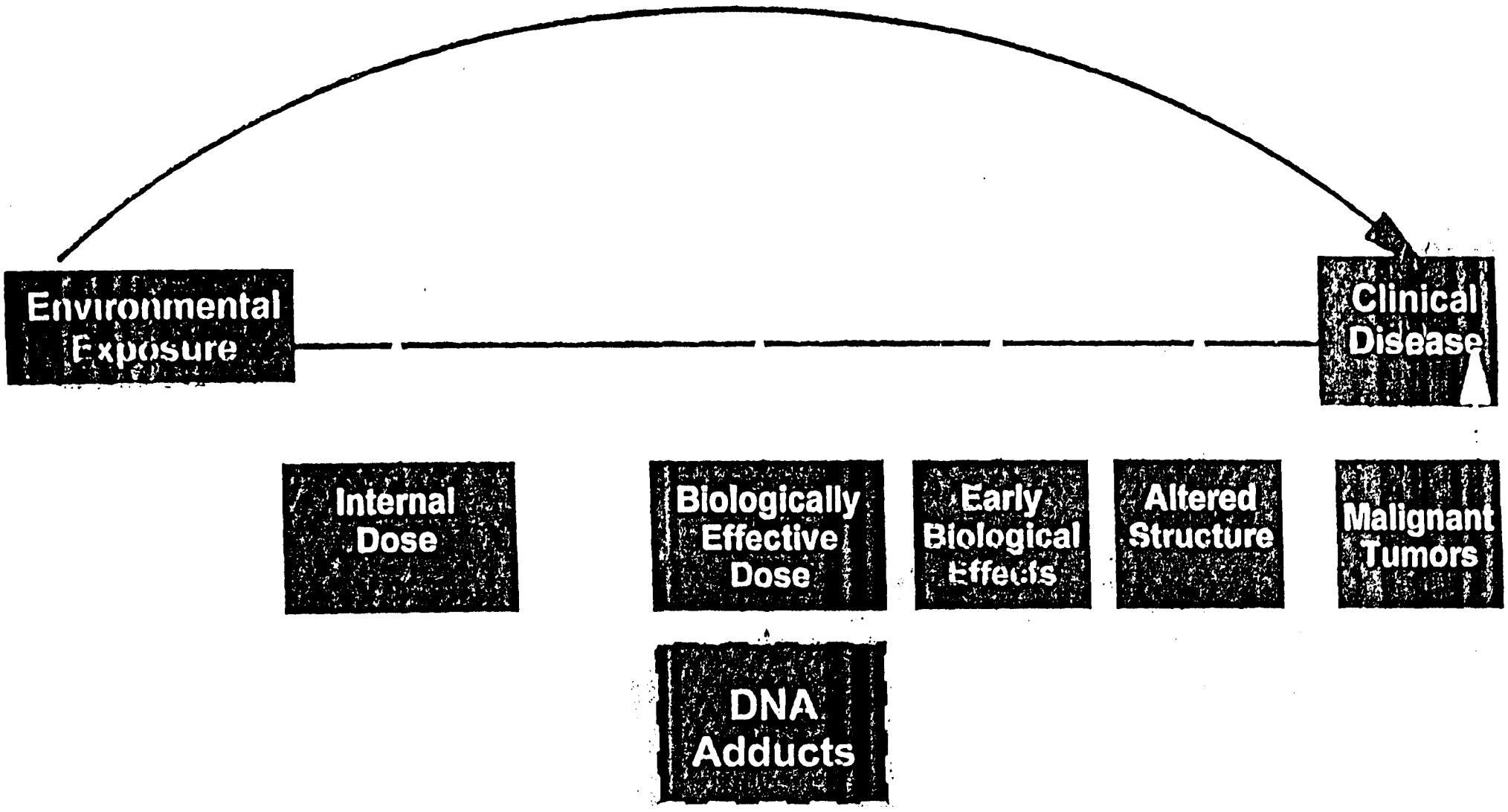
Jane Gallagher
Epidemiology & Biomarkers Branch
Human Studies Division
National Health & Environmental Effects Laboratory
US Environmental Protection Agency

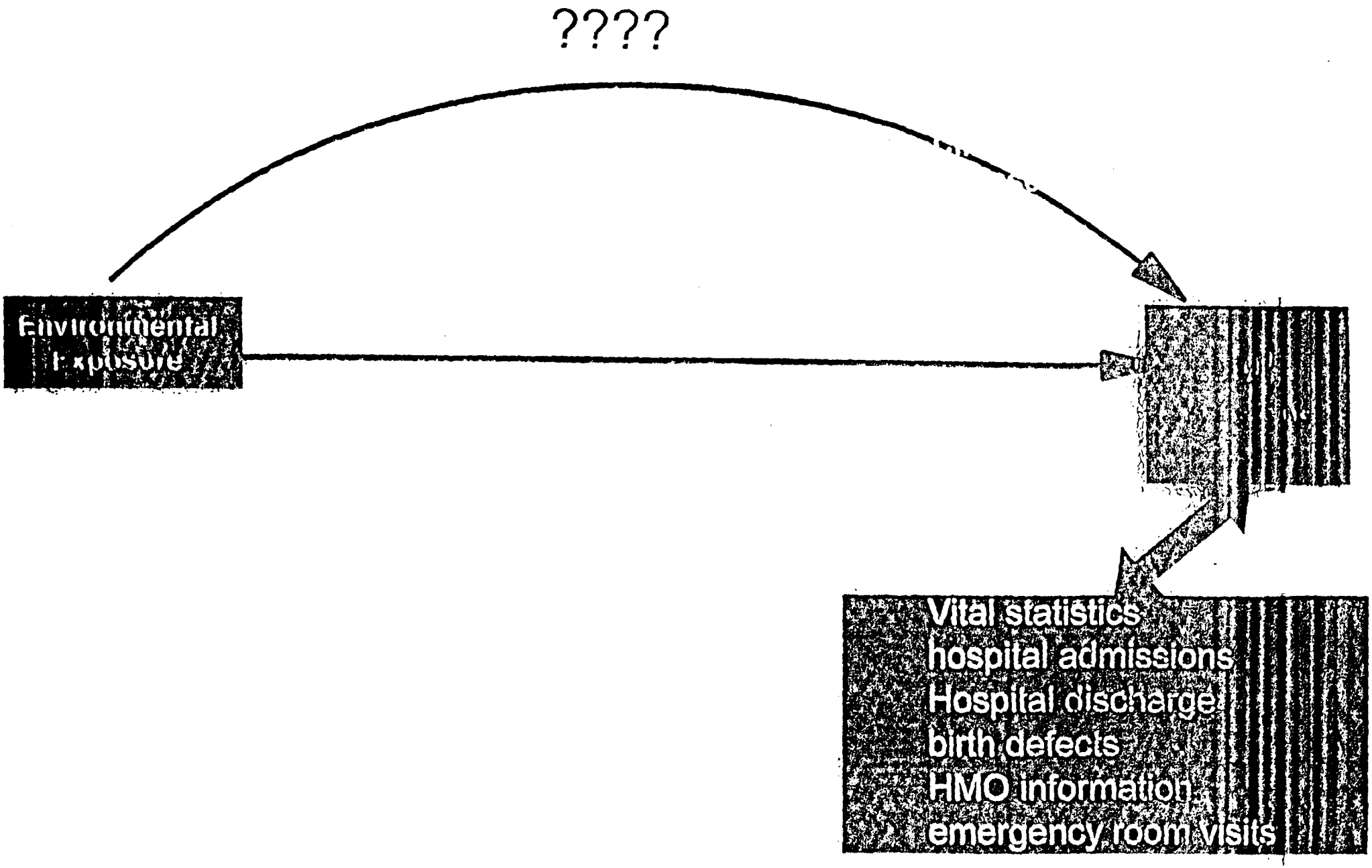
Community Assessment Workshop
June 9, 10, 1999

ENVIRONMENTAL RELATED DISEASES

Asthma hospitalizations (per 100,000)	(1994)	174
Lung Cancer Dealths (age adjusted per 100,000)	(1993)	39.3
Chronic obstructive pulmonary disease (age adjusted per 100,000)	(1994)	20.0
Motor Vehicle crash deaths (per 100,000)	(1994)	15.6
Infertility (married couples 15-44)	(1988)	7.9%
Neural tube defects (per 10,000 live births)	(1993)	7
Foodborne *Salmonella* species (Cases per 100,000)	(1994)	15
Salmonella enteriditis outbreaks	(1994)	44
Hepatitis A (cases per 100,000)	(1994)	30.9
International Travel Illness (number of cases)		
Typhoid fever	(1992)	351
Hepatitis A	(1994)	5,681
Infectious diarrhea among children in childcare centers age 0-5	(1991)	32%
Waterborne Outbreak Cases	(1995-96)	
microbial		2,477
chemical		90
Proportion of people in counties that have exceeded standards for air	(1994)	24.9%
Proportion of people receiving water from community systems that exceeds 1 or more MCL	(1996)	14%

Conceptual Basis for the Development of MOLECULAR EPIDEMIOLOGY

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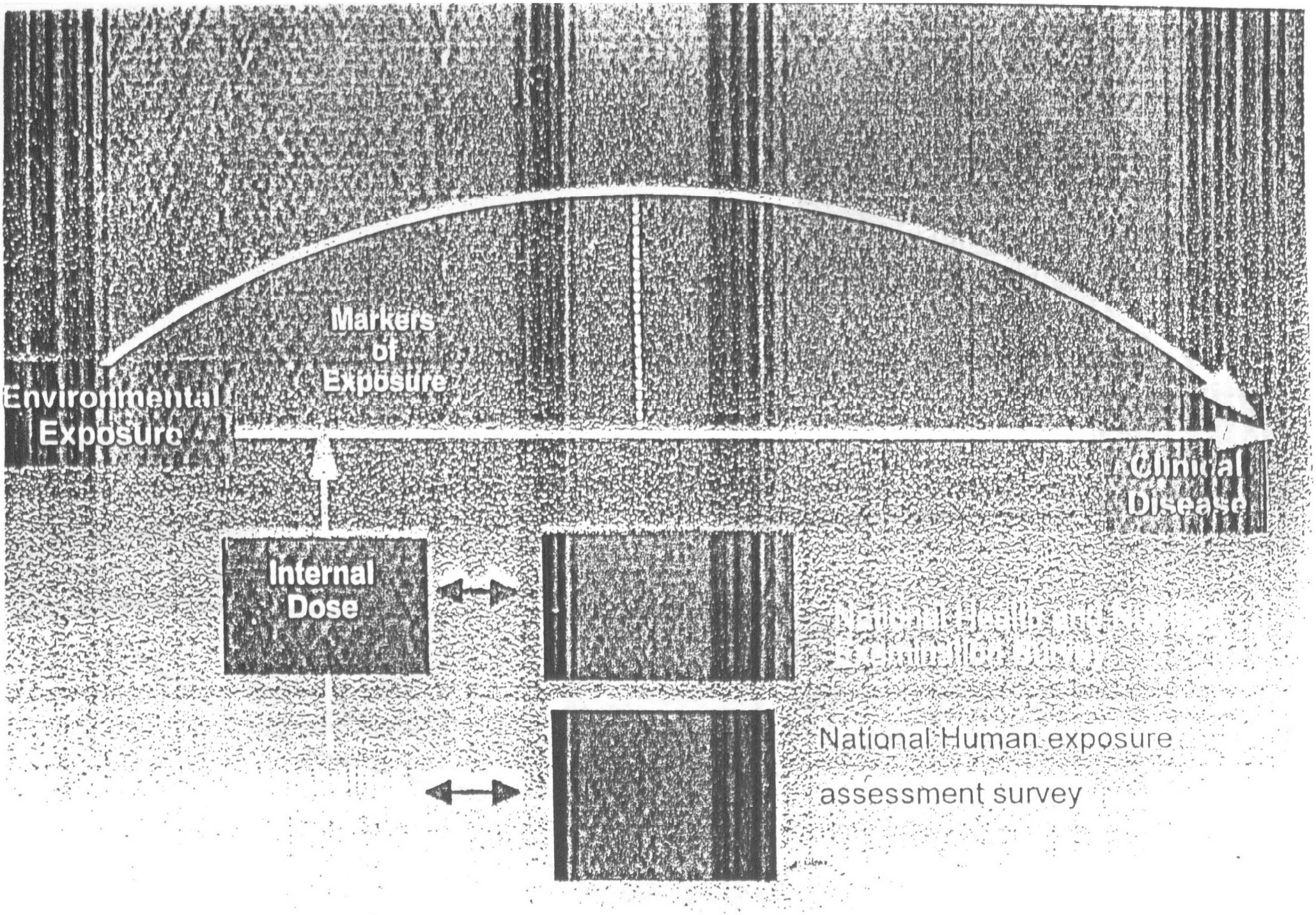
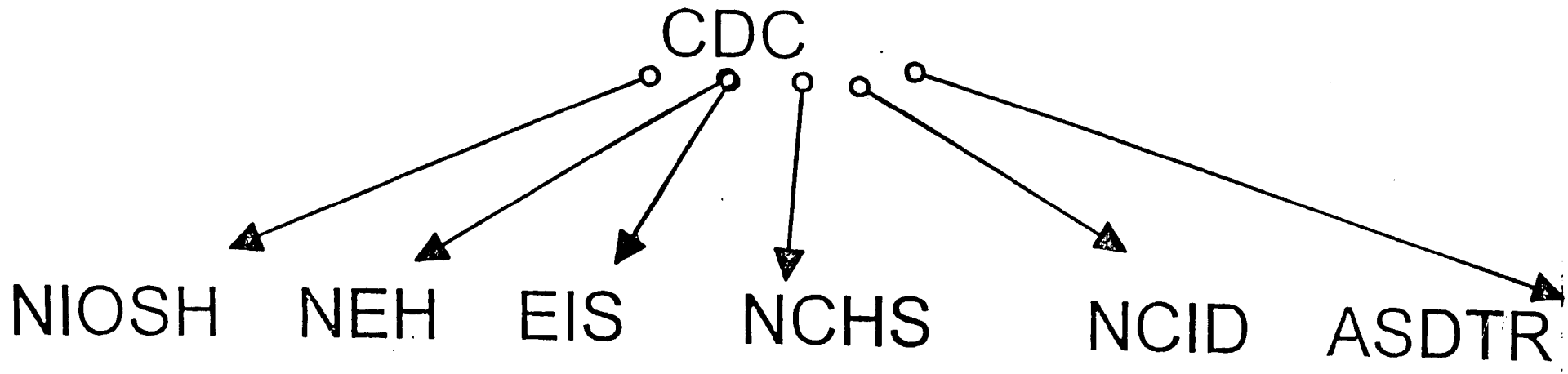
Environmental
Exposure
Vital statistics
hospital admissions
Hospital discharge
birth defects
HMO information
emergency room visits


Markers
of
Exposure
Environmental
Exposure
Clinical
Disease
Internal
Dose
National Human exposure
assessment survey



DATA Collection System

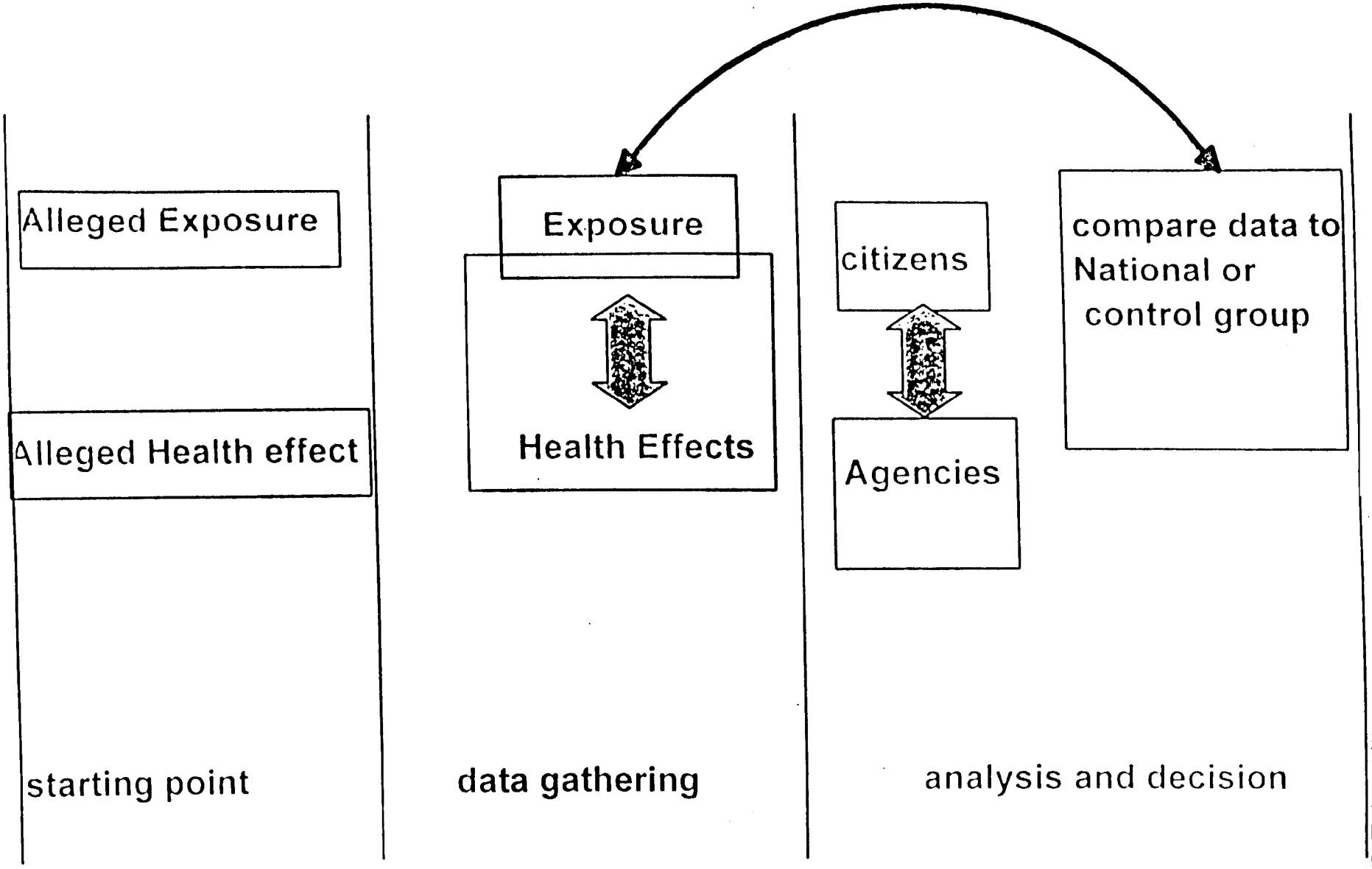
Vital statistics

Population Surveys

Hospital discharge Data systems

Disease reporting and Case -Finding Surveillance Svtems

EVALUATION PROCESS DIAGRAM



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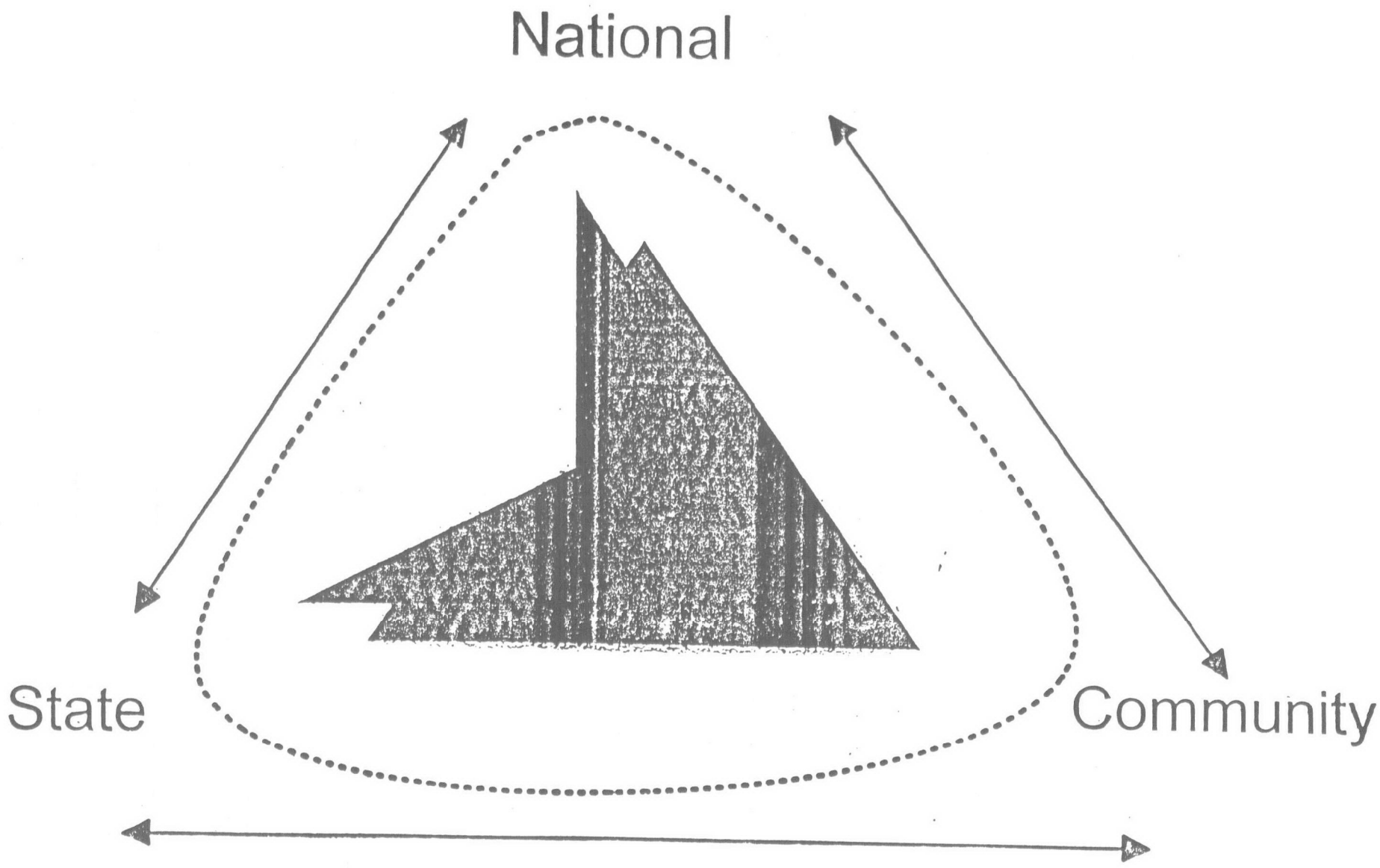
STATE HEALTH PROFILES

- Mortality
- Childhood health concerns
- Deaths from injuries
- Environmentally related Health Concerns
- Occupational Health Concerns
- Infectious diseases
- Chronic Diseases Conditions and Risk


National
State
Community

Appendix G

Breakout Group Handouts

Stressors - National Data

Is there a threat to our health or local environment?	TRI	PCS	AIRS	RCRIS	CERCLIS	NTI	RMP	Census of businesses	
What are the environmental risks in our homes and schools?									
Is our poor health from environmental exposures?									
Is the air safe on the most polluted days of the year?									
Is the cumulative exposure to toxics from all sources?									
Are the levels safe for children and other populations?									
Are we at risk from acute exposures, accidents and episodic releases?									
Does the mixture of different pollutants combine together to adversely impact our health?									
Is it safe for my children to swim in the local pond?									
Is it safe to eat the local fish that I catch, especially if they are the basis for my diet? What fish should I avoid and why? How much would be considered safe to eat?									
Is the water from my well safe to drink?									
Will this new highway adversely affect our environment?									
Are there areas that we should protect or limit our use?									
How can we characterize the risks in our community?									
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What information do we need in order to judge the impact of a new facility planning to open in our community ?									
How do we assess the potential for accidents in our community?									
How do we learn about the impact of synergy with mixtures?									
How do our risks compare to other communities?									
Is there an unusually high incidence of disease in our community (cancer clusters, asthma, adverse reproductive outcomes)?									
Do we have more than our share of environmental stresses?									
Are there disproportionate impacts (race, income, children) within my community or compared to other communities?									
How can we improve our environmental quality of life?									
How can we get an overall picture so we can set priorities for action?									
How does the environment impact our economic situation?									
What information is available regarding traffic, noise, dust, bad odors?									
How do we track our progress?									

Stressors - Regional, State, Local Data

Is there a threat to our health or local environment?	RAPID	State Air Toxics	EPCRA	Socio-eco	Dun & Bradstreet	TAX Parcel			
What are the environmental risks in our homes and schools?									
Is our poor health from environmental exposures?									
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Stressors - Tools

Is there a threat to our health or local environment?	Default factors			Mobile Source emissions predictive models				
	CHIEF	AP-42	RAPID					
What are the environmental risks in our homes and schools?								
Is our poor health from environmental exposures?								
Is the air safe on the most polluted days of the year?								
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How does the environment impact our economic situation?								
What information is available regarding traffic, noise, dust, bad odors?								
How do we track our progress?								

Exposure/Conditions - National Data

Is there a threat to our health or local environment?	AIRS	STORET	Drinking Water	CEP conc	Remote sensing	FWS/NOAA Ecosystem	NHANES		
What are the environmental risks in our homes and schools?									
Is our poor health from environmental exposures?									
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How do we track our progress?									

Exposure/Condition- Regional, State, Local Data

Is there a threat to our health or local environment?	Ambient monitoring	Blood lead levels	EMPACT					
What are the environmental risks in our homes and schools?								
Is our poor health from environmental exposures?								
Is the air safe on the most polluted days of the year?								
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How do we track our progress?								

Exposure/Conditions - Tools

Is there a threat to our health or local environment?	ISC	RSEI	BASINS	IEUBK	ASPEN	MMEM	IRAP-h			
What are the environmental risks in our homes and schools?										
Is our poor health from environmental exposures?										
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General -Data & Tools

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How do we track our progress?									

Incidence -Data & Tools

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How do we assess the potential for accidents in our community?									
How do we learn about the impact of synergy with mixtures?									
How do our risks compare to other communities?									
Is there an unusually high incidence of disease in our community (cancer clusters, asthma, adverse reproductive outcomes)?									
Do we have more than our share of environmental stresses?									
Are there disproportionate impacts (race, income, children) within my community or compared to other communities?									
How can we improve our environmental quality of life?									
How can we get an overall picture so we can set priorities for action?									
How does the environment impact our economic situation?									
What information is available regarding traffic, noise, dust, bad odors?									
How do we track our progress?									

Receptors -Data & Tools

Is there a threat to our health or local environment?									
What are the environmental risks in our homes and schools?									
Is our poor health from environmental exposures?									
Is the air safe on the most polluted days of the year?									
Is the cumulative exposure to toxics from all sources?									
Are the levels safe for children and other populations?									
Are we at risk from acute exposures, accidents and episodic releases?									
Does the mixture of different pollutants combine together to adversely impact our health?									
Is it safe for my children to swim in the local pond?									
Is it safe to eat the local fish that I catch, especially if they are the basis for my diet? What fish should I avoid and why? How much would be considered safe to eat?									
Is the water from my well safe to drink?									
Will this new highway adversely affect our environment?									
Are there areas that we should protect or limit our use?									
How can we characterize the risks in our community?									
What environmental information is available for my local community?									
What are the potential impacts, including increases or decreases, of local environmental pollutants?									
What is the cumulative impact of environmental exposures?									
How do we get a complete inventory of all the sources?									
How can we assess the impact that our businesses, households, and schools have on our environment?									
What information do we need in order to judge the impact of a new facility planning to open in our community ?									
How do we assess the potential for accidents in our community?									
How do we learn about the impact of synergy with mixtures?									
How do our risks compare to other communities?									
Is there an unusually high incidence of disease in our community (cancer clusters, asthma, adverse reproductive outcomes)?									
Do we have more than our share of environmental stresses?									
Are there disproportionate impacts (race, income, children) within my community or compared to other communities?									
How can we improve our environmental quality of life?									
How can we get an overall picture so we can set priorities for action?									
How does the environment impact our economic situation?									
What information is available regarding traffic, noise, dust, bad odors?									
How do we track our progress?									

Effects -Data & Tools

Is there a threat to our health or local environment?									
What are the environmental risks in our homes and schools?									
Is our poor health from environmental exposures?									
Is the air safe on the most polluted days of the year?									
Is the cumulative exposure to toxics from all sources?									
Are the levels safe for children and other populations?									
Are we at risk from acute exposures, accidents and episodic releases?									
Does the mixture of different pollutants combine together to adversely impact our health?									
Is it safe for my children to swim in the local pond?									
Is it safe to eat the local fish that I catch, especially if they are the basis for my diet? What fish should I avoid and why? How much would be considered safe to eat?									
Is the water from my well safe to drink?									
Will this new highway adversely affect our environment?									
Are there areas that we should protect or limit our use?									
How can we characterize the risks in our community?									
What environmental information is available for my local community?									
What are the potential impacts, including increases or decreases, of local environmental pollutants?									
What is the cumulative impact of environmental exposures?									
How do we get a complete inventory of all the sources?									
How can we assess the impact that our businesses, households, and schools have on our environment?									
What information do we need in order to judge the impact of a new facility planning to open in our community ?									
How do we assess the potential for accidents in our community?									
How do we learn about the impact of synergy with mixtures?									
How do our risks compare to other communities?									
Is there an unusually high incidence of disease in our community (cancer clusters, asthma, adverse reproductive outcomes)?									
Do we have more than our share of environmental stresses?									
Are there disproportionate impacts (race, income, children) within my community or compared to other communities?									
How can we improve our environmental quality of life?									
How can we get an overall picture so we can se, priorities for action?									
How does the environment impact our economic situation?									
What information is available regarding traffic, noise, dust, bad odors?									
How do we track our progress?									

Stressors Category Matrix

- Data and Tools -

Description of Category: Databases include known and potential sources of pollution or other environmental agents of concern, such as chemical releases (routine or accidental, stationary or mobile), noise, etc, and their characteristics. Tools include methodologies and emissions estimation models to allow prediction of the amount of an agent from specific or generic source categories.

Database or Tool	Data Source	Time Period	Geographic Area	Measurement Type (measured/estimated)	Pollutant	Units	Environmental Media
TRI							
PCS							
CERCLIS							
AIRS Facility							
RAPIDS							
CHIEF							
AP-42							

Exposure Category Matrix

- Tools -

Description of Category: Databases include monitoring data concerning the agents of concern (in various environmental and biological media), and the results of the application of tools (e.g. modeled concentrations). Related data include environmental conditions which affect dispersion and fate of agents (e.g. wind patterns, stream flow, pH). Tools include models to estimate levels in the ambient environment, plants/animals and humans.

Tools	Data Source	Units	Exposure measurement (e.g.,measured, estimated)	Route of Exposure (oral, inhalation, dermal)	Population Effected	Pathway	Health Impacted (e.g., human or ecology)	Geographic scale	Pollutant Source (e.g., point, area, mobile)
RSEI (16-bit)		pounds	estimated	Oral Inhalation	general	air, water, land	human	km^2, zip, city, cty, st, US	point, area
PECT									
IEUBK									
Gravity									
CEP								census tract	

General Category Matrix

- Data and Tools -

Description of Category: Fundamental data and tools useful in a variety of assessment steps, such as road and stream networks, land us/land cover and spatial and statistical analysis methods.

Database Name	Source of Data	Time Period	Geographic Area	Scale	Other Information	User notes
Geographic Information System (GIS) datasets						
Land use/land cover datasets						
Geo-ease (kriging)						
Global Positioning Systems						
TIGER (Census)						
Statistical methods						
CIMAS-type applications						

Incidence Category Matrix

- Data and Tools -

Description of Category: Observed rates of health endpoints of concern in receptor populations, e.g., cancer morbidity/mortality, aquatic species disease rates, etc. Databases would include national, state, and local health department records.

Database Name	Source of Data	Health Endpoints	Geographic Area	Scale	Other Information	Timeframe/ User notes
Illinois Hospital Admission Data	Patient Admissions IDPH/Illinois Hospitalization Cost Containment Council (IHCCC)	Primary and Secondary diagnosis ICD-9 codes. (asthma, COPD, etc)	Illinois	Zip Code (patient residence)	Includes patient date of birth and sex. Does not include patient name	Annual 1987-1996 Tape or CD format Purchase from IHCCC or by arrangement
National Center for Health Statistics Cancer Mortality						
ATSDR Disease Registry						
NHANES						
Acute pesticide poisoning database						

Receptors Category Matrix

- Data or Tool Category -

Description of Category: Databases include the geographic distribution and behavioral characteristics of human, plant and animal populations (including sensitive subpopulations) which may be affected by agents of concern, as well as anthropomorphic or non-living receptors (e.g. historical sites, aesthetic vistas, etc). Tools include models or methods to identify and estimate the number of receptors which are potentially exposed to measured or predicted conditions (e.g. population estimation).

Tools	Time Period	Geographical area	Data Type (Socioeconomic/Demographic/ Ecosystem)	Data Source		SDWIS	Population Effected
RSEI (16-bit)	1990	block level & group	human race, age (crude)				general population
RSEI (32-bit)		block level & group	human race, income, age (refined)				general, sensitive
PECT							
IEUBK							
Gravity							
CEP		census tract					

Effects Category Matrix

- Database & Tool -

Description of Category: Databases and tools for estimating health and environmental effects of agents of concern. Databases range from collections of raw toxicity text results to organized sets of specific groups of chemicals with an evaluation by weight of evidence or other quality assessment criteria. Tools allow prediction of the likelihood of an effect occurring in the absence of test data.

Database or Tool	Source of data and compilation process	Effects covered	Number of chemicals covered	Update process	User notes
IRIS	U.S. EPA consensus review of available peer reviewed studies	cancer inhalation and oral slope factors as available, chronic and subchronic non-cancer RfDs, RfCs, as available	536	Age of files varies	
HEAST					
RSEI toxicity weights					
ATSDR Toxicity profiles					
Quantitative structure activity relationship (QSAR) models					

Appendix H. Completed Breakout Group Handouts and Flipchart Transcriptions

Group 1 Day 1:

Stressors
Focus: (Eco-human) Database description
Usage history, user notes, QA/QC, accessability (new columns)

NEPA documentation, DBs
RAPIDS
National Response Center Data
State and Local Databases (lead)
Mobile Sources
Local Checks (E-check)
Geology/Radon
Pesticide sales data (manufacturer)
ROD DB (CERCLA) RI/FS, etc.
RCRIS
RCRA Permits
NPDES (PCS)

Dunn and Bradstreet
Historical Data (library - Yellow Pages), planning maps, etc.
Community members
Industry
Chamber of Commerce
Risk management plan
Community Right-to-Know Act
Hazardous Response Groups (Emergency Response Planning Board)
Roads/highway information (location)
Land use data sets (EcoRisk)
Eco footprint (methodology)

General Category
Expand GIS data category
Add GIS as a tool
REACH file - national hydrography data sets
Available commercial databases
- Consumer use
- Income
- City directories

Meteorological data
Florida data sources reference book (Deb Martin's group)
*Case studies meta tool - methodologies utilized in CBEP-type projects (TBD) Chicago, McFarland, Baltimore projects

Exposure (add Validation column)
Exposure Factors Handbook

View Graph (Haluk's)
Air models
Water models
GW models
MM models
Non-occupational pesticide exposure study (NOPE NEXAS Team)
PRIS
FDA - Pesticide monitoring data
    CSFII Consumption data
EMPACT

Receptors
Fresh and saltwater study by NOAA
EMAP
Nature Conservancy T&C
Xmas and breeding bird counts
FrogLog
PRIS - Population Risk Indexing System (?)

Columns to Add
Focus of tool - eco, human, etc.
Usage history
User notes
Point of contact
Validation of models/tools
QA/QC
Accessability
    How
    Where http://www.???
    Whom

Group 2 Day 1

One member of this group marked a few of the handouts. We have transcribed here what is legible; the original handouts are appended in hard copy. General notes are transcribed below and typed-up handouts follow.

Stressors

Where is quantitative database - county level (confidentiality)
Local emissions inventories, local monitoring data
Biological (portion?) To explain results of relevant research in communities

Media Approach #1

1) Relevancy of (???) results to local scale - risk factors for home and schools
2) Difference between screening (uncertainty (???) high) and comprehensive assessment (resource intensive) - what drives uncertainty the most?

Multiple chemical sensitivity - relationship of formaldehyde
Limited to criteria air pollutants, water quality
Lots of data missing from site-specific work (local (???))

Boundary info for Indian Reservations - control of local facilities
Use local communities to help correct data errors (lat/longs)

Stressors - Data & Tools

Is there a threat to our health or local environment? (Good for criteria pollutants - air toxics are much weaker) (Air - primary (???) significant (???) in quality of data - point better than mobile)	Default factors			Mobile Source emissions predictive models				
	CHIEF	AP-42	RAPIDS					
What are the environmental risks in our homes and schools? All - indoor air				(Texas will help)				
Is our poor health from environmental exposures? All								
Is the air safe on the most polluted days of the year? All - air only				monitoring and modeling needed				
Is the cumulative exposure to toxics from all sources? Exp								
Are the levels safe for children and other populations? All								
Are we at risk from acute exposures, accidents and episodic releases? All								
Does the mixture of different pollutants combine together to adversely impact our health? All								
Is it safe for my children to swim in the local pond? All - water								
Is it safe to eat the local fish that I catch, especially if they are the basis for my diet? What fish should I avoid and why? How much would be considered safe to eat?								
Is the water from my well safe to drink?								
Will this new highway adversely affect our environment?								
Are there areas that we should protect or limit our use?								
How can we characterize the risks in our community?								
What environmental information is available for my local community?								
What are the potential impacts, including increases or decreases, of local environmental pollutants?								
What is the cumulative impact of environmental exposures?								
How do we get a complete inventory of all the sources?								
How can we assess the impact that our businesses, households, and schools have on our environment?								
What information do we need in order to judge the impact of a new facility planning to open in our community ?								
How do we assess the potential for accidents in our community?								
How do we learn about the impact of synergy with mixtures?								
How do our risks compare to other communities?								
Is there an unusually high incidence of disease in our community (cancer clusters, asthma, adverse reproductive outcomes)?								
Do we have more than our share of environmental stresses?								
Are there disproportionate impacts (race, income, children) within my community or compared to other communities?								
How can we improve our environmental quality of life?								
How can we get an overall picture so we can set priorities for action?								
How does the environment impact our economic situation?								
What information is available regarding traffic, noise, dust, bad odors?								
How do we track our progress?								

Stressors Category Matrix
- Data and Tools -

Description of Category: Databases include known and potential sources of pollution or other environmental agents of concern, such as chemical releases (routine or accidental, stationary or mobile), noise, etc, and their characteristics. Tools include methodologies and emissions estimation models to allow prediction of the amount of an agent from specific or generic source categories.

Database or Tool	Data Source	Time Period	Geographic Area	Measurement Type (measured/estimated)	Pollutant	Units	Environmental Media	Limitations
TRI	Self-reporting	1 year	nationwide (facilities)	estimated	606 chemicals and chemicals category	lbs 1-100,000,000	multi-media	Point sources
PCS (permit compliance system)	States and Federal monitored	quarterly (variable)	nationwide (by facility)	measured (effluent)	hundreds	lbs (conc. x ???)	Surface water/POTWs	data gaps (??? not included) (Lat/longs 10% definitely off)
CERCLIS (Superfund)	NPL sites					ppm, ppb ???/m^3		
AIRS Facility (3 databases - AQS most reliable)	3 subsets	quarterly (variable)		monitored	(???) (???) Criteria pollutants many		mobile sources point sources	some are very old (??? & emissions)
RAPIDS			Reg 5		mobile, area, and major for '96		air sources	
CHIEF (Emission factors)	?							
AP-42		one-time characterization		individual states test data	many		air	
NTI - 1996	States, industry	every 3 years	national	modeling, emission estimates	188 HAPs	lbs	air	
RCRIS RCRA sites	EPA	variable	national	calculated data		lbs	land only	
State and local data								may not release their data

Exposure Category Matrix

- Tools -

Description of Category: Databases include monitoring data concerning the agents of concern (in various environmental and biological media), and the results of the application of tools (e.g. modeled concentrations). Related data include environmental conditions which affect dispersion and fate of agents (e.g. wind patterns, stream flow, pH). Tools include models to estimate levels in the ambient environment, plants/animals and humans.

Tools	Data Source	Units	Exposure measurement (e.g.,measured, estimated)	Route of Exposure (oral, inhalation, dermal)	Population Effected	Pathway	Health Impacted (e.g., human or ecology)	Geographic scale	Pollutant Source (e.g., point, area, mobile)
RSEI (16-bit)		pounds	estimated	Oral Inhalation	general	air, water, land	human	km^2, zip, city, cty, st, US	point, area
~~PEGT~~	obsolete								
IEUBK	blood lead								
Gravity									
CEP								census tract	
ISC	Marion Olson, Day 2								
(???)	inventories are county level	yearly average	estimated or predicted	inhalation				census tract (uncertainty)	air sources (Air quality model)
TRIM						air			
BASINS	ambient (STORET)	TMDL loadings	3 models			water			
Local databases	fish tissues data		criteria pollutant real-time data						
PAMS									

General Category Matrix

- Data and Tools -

Description of Category: Fundamental data and tools useful in a variety of assessment steps, such as road and stream networks, land us/land cover and spatial and statistical analysis methods.

Database Name	Source of Data	Time Period	Geographic Area	Scale	Other Information	User notes
Geographic Information System (GIS) datasets	Lots on the web Few good ones (QA/QC)	How current?	Broad	Broad		Easy to find good communication tool Vital
Land use/land cover datasets		older data monthly 1980	broad	fine detail		MRKC - Eastern U.S.
Geo-ease (kriging) tool					Estimates from highest concentration!	Interpolation of data
Global Positioning Systems					method is important	Best for lat/long easy and reliable
TIGER (Census) Loren	Census bureau					
Statistical methods						
CIMAS-type applications						

Receptors Category Matrix

- Data or Tool Category -

Description of Category: Databases include the geographic distribution and behavioral characteristics of human, plant and animal populations (including sensitive subpopulations) which may be affected by agents of concern, as well as anthropomorphic or non-living receptors (e.g. historical sites, aesthetic vistas, etc). Tools include models or methods to identify and estimate the number of receptors which are potentially exposed to measured or predicted conditions (e.g. population estimation).

Tools	Time Period	Geographical area Census Data	Data Type (Socioeconomic/Demographic/ Ecosystem)	Data Source		SDWIS	Population Effected
RSEI (16-bit)	~~1990~~ 88-96	block level & group	human race, age (crude)				general population
RSEI (32-bit)	88-97	block level & group	human race, income, age (refined)				general, sensitive
~~PEGT~~	obsolete						
~~IEUBK~~							
Gravity							
~~GEP~~		~~census tract~~					
Census							
Reservation data	variable	all Federally and non-Federally recognized	population	BIA	Piece them together		Native American
Eco National Wetlands Inventory							
NOAA							
FWS							
Protected Area?							

Group 3 Day 1:

Recommendations

- Develop predictive factors for pesticide releases - crops, climate, etc.
  - generally, look for opportunities to fill exposure/stressor data gaps using surrogates
  - evaluate degree of uncertainty (e.g., air toxics, area/mobile sources, predictive lead blood levels)

- Research location method accuracy

Additional Evaluation Factors

- QA cross-checks, audits, enforcement

- Data completeness, consistency

- What uses in mind?
  - community-based, neighborhood scale
  - include "most significant" environmental impacts on residential population
  - available/cheap
  - what degree of uncertainty is acceptable

- Complementary data/tools

Group 1 Day 2

Tools

Q1 NERL Tools?
Tools for Schools (indoor air)
"Checklists" - Home*A*Syst, asthma

Q2 Use tools to answer specific environmental questions that we can answer - can assess current situation but not reconstruct past
EPI - tools

Q3 AIRS

Q4 MM Exposure models

Q6 Risk management plans

Q9 Fish advisories

Q11 Smart Growth tools

Q12 Alternatives for the future - Corvallis lab
Sensitive habitat ID tools - USGS GAP program
Greenness Index (land cover) Jones at LVLscape eco br

Gaps

Q1, 5 Lack of toxicity data for children/sensitive populations

General Q Lack of access to reviewed tox data (standards) - (should prioritize chemicals most seen) establish quick process; establish cross program group for establishing provisional tox values

Q3,6,1 Same as above for acute (benchmarks)

Q6 Info on peak releases +/- exposures; guidance for estimating intermittent releases

Q1 Info needed on outgassing from materials, building

Q1 Need screening tool for individuals to know (measure) their indoor air exposure

Q1, 4 Cumulative risk from daily activities; house, eating, smoking, yard, activity (exercise)

Q7, 4, 1 Cumulative effect of chemical mixtures

Q2 "Can't answer question."
Broad base approach - from multiple agencies
major effort - education... + health + environmental issues
EPI resources

Q5 Exposure above the RfD predictive health effects?

Q5, 1 "What does it mean to me and my kids, my elderly parents, etc.?" (RfD) (also cancer)

General Q Communication and interpretation materials What is the scope of the assessment?

Q4 Source inventories (mobile, stationary, etc.)
Summary info on potential sources and their relative significance

Q6 Probability of accidental releases actually occurring
Difficulty of documenting episodic releases

Q11 Connection to Smart Growth, urban sprawl, Healthy Cities groups

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Group 2 Day 2

How can we characterize the risks in our community?

X = Scientific information available, but limited use
Y = Not user friendly to local community
S = Screening tool

Question	Stressors	Exposure	Receptor	Effects	Outcome
1	S	X	S (X)	Y	S
2	Given	X	S (X)	Y	S
3 Big gap: Bad models for cumulative effect. Databases are difficult to use because we don't know effects	S	(X)	(X) S	Y	S
4					
5	Gap	X	X S	Y	S
6	S	X	X S	Y	S
7 Available through Community Right-to-Know	S	X	X S	Y	S
8	G	A	P	S	

Tools

Question	S	E	R	E	O
1	TRI, PCS, AFE, BRS, SDWIS, State/local data	AQS models, etc.	Risk Screen Environmental Indicators (community)	IRIS MSDS	Health data (cancer rates, mortality data, HMO info)
2	" "	" "	Risk Screen Environmental Indicators	IRIS MSDS	" "
3	Gaps " "	" "	RSEI	Gaps " "	" "
4	(6) see gaps sheet	----------	----------	----------	----------
5					
6	Permitting (Tool for all -	" " grant $ to assist	" " community to use (from NIH -	" " available scientific community-based	" " info) research grants)
7	Emergency Right-to-Know data	Accidental release models	Evacuation plans	IRIS MSDS	MSDS NIOSH
8	G	A	P	S	

Gaps

1. IRIS - Limited database for environmental exposure. No cumulative information. Limited number of chemicals assessed for toxicological information.

2. Stressors - Reliability of locational data - large problem

3. Basic data - not verified (reported loadings tend to be estimates)

4. Mortality data - accuracy of true diagnosis. Cause of death may be secondary to primary disease.

5. Many missing pieces of information for multiple stressors, accurate cumulative effect difficult to assess (e.g., mobile sources, area sources, minor stationary sources)

6. See #4. Some stationary sources, mobile sources, point sources, area sources, n.p. sources pollution, clandestine sources, unpermitted facilities, atmospheric deposition.

7. See #5. Need to characterize dry cleaner output, home output, schools output. Dependent on location, use etc...to use for characterization. Lack of area source models.

8. See #8. Research needed.

Group 3 Day 2

Questions

Question	Source/ Stressors	Pathway/ Exposure	Exposure/ Receptors	Dose/ Effect	Outcome/ Incidence
1. Is there an unusually high incidence of disease?			S	~~S~~	S
2. Do we have more than our share of environmental stresses?	S	S/R			
3. Are there disproportionate impacts within or compared com?	S	S/R	S	S	S
4. How can we get an overall picture to set priorities?	S	S	S	S	S
5. How does the environment our economic situation?	(S		?		)
6. What information is available regarding traffic, noise, dust, bad odors? (contention)	S	S	S	S	S
7. How do we track our progress?					

Tools

Q1 Incidence - CDC - county and larger
Local health department can be source for some incidence data
Receptors - CENSUS data can be useful
School population

Q2 Stressors - American Indian Science and Engineering Society (database under construction) nationwide Federally recognized tribe
NTI, BRS (RCRA sites), PCS, AIRS, CERCLIS
Transportation info - as surrogate for mobile sources
Chamber of Commerce - as surrogate for area sources (license bureaus)
Residents - as surrogate for everything

Exposure - Risk Screening Environmental Indicator (RSEI)

Stressors - Public health data and blood lead levels
Housing data (age) census
Hair, shed teeth

Q3 Stressors (similar to 1 and 2)
Exposure (similar to 1 and 2)
Receptors (similar to 1 and 2)

Q4 Solicit input from community on important issues.
Stressors
Exposures - Comparative Risk Lab Manual
"Guide to Sustainable Community Indicators" second edition M. Hart 1999

Q5 Community has to make value judgements
"Smart Growth Tools" (Federal and State programs)
CERCLA process is tool for estimating cost of action
EPA can provide screening level information to inform pending community decisions.
Can use information from other environmental sites (econ. devel.)

We can use:
Stressors - Land use data, population growth data
Income change overtime (associate with land use)
Department of Commerce Data

Q6 See South Baltimore case studies
Stressors - Transportation data (FAA)
Odors (state and local) concentrated animal feeding operations
Dust from air program monitors and local regulators, Indoor Air Program, OSHA
NOAA - meteorological data

Q7 Need to establish a baseline
Stressors - Bucket Brigades (actually a monitoring tool over time)
Consider use of environmental indicators

Gaps

Q1 Incidence - Data needs to be available at a smaller scale (e.g., lat/long)
QA/QC of incidence data needed
Receptors - Problem with census data is decennial
Multiple Categories - Confidentiality concerns can be problematic

Q2 Stressors - Mobile sources, area sources
QA/QC of all info in all databases
Exposure - RSCEI = TRI only
Stressors - Dietary and indoor information (including indoor air)
Availability of pesticide use information
Personal activity information
More and better human health data (blood lead)

*Definition of "fair share"

Q3 Exposure - Both screening and R/A tools are under development. (NEED more development)
Stressors
Receptors - Need more regular and current data; need QA/QC

Q4 Need to develop model community scenario.
2 options: descriptive, predictive

Q5 Jurisdictional issues are/can be problematic (recommend partnerships)
EPA has little experience
"Smart Growth" is still developing
EPA needs more guidance
Need more and better income, land use data, etc.

Q6 Stressors - Need more information on mobile source emissions
General - Need more and better information
Need criteria/standards (odor)

Q7 Need to develop a healthy community model.

Absence of valid indicators of actual improvement in health

Appendix I:
Comments During Breakout Sessions

In general, each group during each breakout concentrated on identifying tools (Day 1 breakout; see Exhibit 2) or identifying tools that could be used to answer particular questions (Day 2 breakout; see Exhibit 3). During these discussions, the groups brought up gaps and issues for consideration. These are summarized in the text of Sections 4.1 and 4.2.

Other group comments are listed below:

- Are there bounds on community assessment? Radon, for example, is a naturally occurring gas. Low income/minorities could have high radon but may never be tested. The community is probably oblivious to the problem.

- An index with database descriptions should be the main product of the workshop.

- Non-human factors, including ecological factors, noise, and others, should be included.

- A category should be created for screening tools, including tools for metropolitan area and neighborhood air pollutant levels.

- Case studies are useful tools.

- It is important to consider what a person with little expertise will be able to do with a particular tool.

- A list of tools alone will not help; case studies should also include other steps that might have been taken to improve the case. Other steps should include those that were possible with existing tools and data as well as those that would have been done if appropriate tools and data had existed. Case studies should be developed according to a particular methodology.

- Are tools being developed for use by communities, Regions, States, or others? Community assessment most often involves partnership with communities. Sometimes communities join with experts as universities who can help use tools. EPA is not developing tools for "ordinary people."

- Scale of databases is important.

- Information provided should be normalized by bringing together studies and linking databases.

- There is a perceived need for standard operating procedures, including QA/QC in the SOPs.

- Is there a need to add more measurements as a solution, or should we just improve the use and quality of available data sets?

- Can we get communities to perform measurement?

- Is there a need for a mobile testing facility? Enforcement activities have this capability but the worth of this option depends upon the stated endpoint.

- Is surrogate information a good/reliable/useable alternative?

- It is necessary to integrate national-level and community-level tools and data.

- Data and methods gaps include small sources, health outcomes, and ambient conditions.

- It is important to enable better communication and coordination among data and tool developers and users.

- The Toxic Release Inventory (TRI) involves 24,000 facilities in the manufacturing sector, with more to come. It involves 6540 chemicals. The figures reported reflect the companies' own estimates. EPA has performed audits on the information but not to the level of QA/QC. There is no TRI correlation to economic activity.

- Is it possible for communities to perform measurements in a "bucket brigade" style, as done in Richmond, California and Lake Charles, Louisiana? These are generally used in response to an acute exposure. Their sporadic use equates to non-scientific information since testing does not occur at regular intervals.

- Should inquiries focus on air toxics or criteria pollutants?

- It is important for community assessments to consider the community's needs. Different endpoints require different foci. Current measurements are useful for short-term or acute exposure problems such as asthma, but are not sufficient for long-term questions such as environmental contributions to cancer cases. The problem should be identified prior to data collection.

- PCS - list of permitted facilities with water discharges between 75,000 and 80,000. Oxygen absorbers are often regulated.

- CERCLIS - list of 20,000 sites; 30,000 were recently dropped from the list.

- AIRS - covers major sources of criteria pollutants and includes others in response to State regulations. Facilities report to the State, which reports to EPA. Used to identify enforcement actions.

- RAPIDS - database and software package.

- CHIEF and AP 42 - collections of emissions records.

- Example of a multi-state model for pesticides along the Mexican border: Varying State requirements for the reporting pesticide sales and usage make obtaining consistent data difficult. It would be important to determine if sales correspond with yield in areas for which

data exists, in order to determine validity of the surrogate and possible permit extrapolation to areas where information is not complete.

- Reference databases should be considered.
- Quality assurance should consider cross-checks, audits, enforcement, and data completeness.
- Stability assessments for the twelve major EPA databases for consistency across time and space should be conducted.
- Data collection should be based on a neighborhood scale (when appropriate). It may include the 'most significant' environmental impacts on a residential population or it may be wider. Availability of tools and data and their cost should be considered. The degree of uncertainty in the data acceptable for the specific purpose at hand should be determined. Different levels of certainty may be necessary for screening and risk assessments. Can standards be developed regarding uncertainty?
- A data problem involves the differences in definitions across Regions to describe facility types.
- The same question can be answered in conflicting or different ways by different databases. Do complementary data/tools exist that can be combined to feed each others gaps?
- Some data problems are linked to the type of information required. For example, since lead is in the environment for a long period of time, good measurements are possible. On the other hand, some pesticides have a short half-life in the body, increasing the likelihood of bad measurements.
- How can you take information from an information-rich environment and combine it with surrogate data to learn about areas about which few data exist?
- It is important to be familiar with limitations in data.
- A reliable reference list of sources of health effects data is needed.
- Predictive factors for pesticide releases should be developed based on crops, climate, etc.
- Screening techniques should be provided to community members to point out cases where further investigate is necessary

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