
final report

Technical Methods to Support Analysis of Environmental Justice Issues

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The legal framework within which analyses of environmental justice are undertaken is described in Section 3.0. This section was prepared by William Malley of Akin, Gump, Strauss, Hauer & Feld, L.L.P.

A basic purpose of the project was to compile an inventory of the methods being utilized by state departments of transportation, metropolitan planning organizations, and transit agencies in undertaking analyses of environmental justice as part of both systems planning and project development. Staff of 40 agencies contributed to this inventory, several on multiple occasions. Their input, in many ways, represent the core of this report and the willingness of these people to share their experiences is very much appreciated.

Each National Cooperative Highway Research Program project is undertaken with the guidance of a panel of users. For Project 8-36, this includes both an overall project panel and a task-specific panel. Participants providing major guidance and review as part of this process include Ken Leonard of the Wisconsin DOT, Timothy Hill and Suzann Gad of the Ohio DOT, Leigh Lane of the North Carolina DOT, and K. Lynn Berry and Danyell Diggs of the Federal Highway Administration.

The opinions and conclusions expressed or implied in the report, though, are those of the research agencies. They are not necessarily those of the Transportation Research Board, the National Research Council, the American Association of State Highway and Transportation Officials, or the individual states and transportation agencies that participated in any way in this particular project.

Abstract

The objective of this project, undertaken for the Standing Committee on Planning of the American Association of State Highway and Transportation Officials (AASHTO), is to provide an inventory of technical approaches that can be used to address environmental justice issues for systems-level and corridor/subarea planning. Information was compiled from 15 state Departments of Transportation (DOTs), 22 Metropolitan Planning Organizations (MPOs), and three transit agencies.

The focus of the project is on methods that can be used to identify and examine the distribution of benefits and potential burdens across individual population segments. Currently available methods are described that can be immediately applied in transportation planning studies without further research.

The report begins with a discussion of the legal framework for environmental justice and then describes methods, including examples, for defining and identifying population groups, conducting public involvement and outreach, defining measures of benefit and burden, defining disproportionate impacts, and responding to environmental justice issues. While many state DOTs, MPOs, and transit authorities have made a serious response to improving their approaches to issues of environmental justice, these responses are much better and more broadly implemented for project planning and development than they are for statewide and regional systems planning.

Considerable work is ongoing to develop and implement improved analytical capabilities directly related to environmental justice. These capabilities, now being used to support other analyses, include the Year 2000 Census, GIS-based visualization and analysis, spatially disaggregated analysis techniques, and household microsimulation modeling.

Experience is showing that undertaking an assessment of environmental justice requires an understanding of the communities potentially affected, the history of past public and private decisions that have shaped these communities, the institutions that are responsible for these decisions and how they work together, the manner in which transportation system planning and project development decisions are made, knowledge of the strengths and weaknesses of available analytical tools, the range of potentially available information sources, and the legislation and associated court decisions that protect these communities and govern transportation decisions. Environmental justice is interesting and challenging because it requires that these considerations be integrated into all aspects of transportation planning.

1.0 Introduction

■ 1.1 Background and Objective

The provisions of Title VI of the Civil Rights Act of 1964, Executive Order 12898 on Environmental Justice, and other statutes, orders, policies, and guidelines relating to environmental justice affect a wide range of planning and project decisions undertaken by State Departments of Transportation (DOT), Metropolitan Planning Organizations (MPO), public transportation agencies, and other transportation providers. Questions related to the distribution of impacts among different population groups arise in both system-level analyses of regional issues and corridor-level analyses of specific projects. These questions may relate to accessibility to jobs and other activities, as well as to the magnitude and distribution of other consequences of transportation policies and projects. The planning and project development staff of transportation agencies have expressed a desire for improved information regarding the technical approaches that are available to develop answers to these project development and impact-related questions.

This report provides an inventory of technical approaches that can be used to address environmental justice issues in two contexts: systems-level planning and corridor/subarea planning. The focus of the report is on the analysis of transportation benefits and the identification of environmental impacts, with emphasis on the distribution of benefits and potential burdens across individual population segments. The emphasis is on currently available methods that can be immediately applied in transportation planning studies without further research.

■ 1.2 Approach

Work for this project was organized around the following three basic activities:

1. An examination of the **legal issues** relevant to the analysis of environmental justice, and the implications this legal framework has on the kinds of design alternatives that should be considered, the range of effects that should be considered, how distributional issues should be addressed, and the manner in which results should be documented.
2. A compilation of information on **technical methods** in use by State DOTs, MPOs, and transit agencies known to be in a leadership position with respect to the analysis of environmental justice issues. Representatives of 15 State DOTs, 21 MPOs, and three transit agencies were interviewed with respect to the activities they had undertaken to address environmental justice during both systems-level planning and project development, and their experiences with these methods and approaches.

3. An examination of **other existing analytical capabilities** having a proven base of application experience, but which are not now being routinely applied for purposes of environmental justice.

This final report is organized around these three core activities. Beginning with this introduction and the following summary of key findings, the results of each of the above activities are then described in further depth. Two appendices provide additional technical detail with respect to a) various measures of accessibility that have been either applied or proposed and b) use of the Decennial Census of the Population as a source of data to support analyses of environmental justice. The result is a compendium of methods that identify available technical approaches for both regional and corridor planning, for transportation and environmental impacts, and for agencies having a range of technical planning capabilities.

■ 1.3 The Challenge and the Response

In response to both concerns expressed by community groups and the mix of legal requirements, many state DOTs, MPOs, and transit authorities have made a serious response to improving their approaches to issues of environmental justice. These include the development of better analytical tools, undertaking more detailed technical analyses of the distribution of benefits and burdens, expanded programs for public involvement, increased sensitivity to impact mitigation, preparation of guideline documents, and changes in organization structure. These responses, however, are much better and more broadly implemented for project planning and development than they are for statewide and regional systems planning. In addition, transportation agency responses to environmental justice often are better developed within the transit industry than they are for highway planning given the traditionally urban focus of most public transportation programs.

At the same time, pressure to continue to improve the consideration of environmental justice within both statewide and urban area transportation programs continues to expand. Considerable uncertainty, however, exists within transportation agencies regarding the level of analysis that is necessary, the mix of public involvement and technical analysis techniques that is appropriate, and the manner in which environmental justice should be treated during systems planning.

Experience is showing that undertaking an assessment of environmental justice requires an understanding of the communities potentially affected, the history of past public and private decisions that have shaped these communities, the institutions that are responsible for these decisions and how they work together, the manner in which transportation system planning and project development decisions are made, knowledge of the strengths and weaknesses of available analytical tools, the range of potentially available information sources, and the legislation and associated court decisions that protect these communities and govern transportation decisions. Environmental justice is interesting and challenging because it requires that these considerations be integrated into all aspects of transportation planning.

2.0 Summary of Findings

This section summarizes key findings from the research conducted for this project. Activities consisted of:

- An assessment of the legal framework governing the consideration of environmental justice;
- Interviews with representatives of State DOTs, MPOs, and transit agencies; and
- An examination of new and emerging analytical techniques having the potential to support environmental justice analyses.

■ 2.1 The Legal Framework for Environmental Justice

The concept of environmental justice refers, in the broadest sense, to the goal of identifying and avoiding disproportionate adverse impacts on minority and low-income individuals and communities. While the concept of environmental justice is simple, the underlying legal framework is complex. There is no single environmental justice statute or set of environmental justice regulations. Instead, the field of environmental justice is governed by numerous federal statutes, regulations, orders, policies, and guidance documents – many of which are subtly different in their applicability, requirements, and enforcement mechanisms.

Title VI of the Civil Rights Act of 1964 prohibits discrimination on the basis of race, color, or national origin. Environmental justice as a national policy goal was first articulated in the 1994 Executive Order 12898. Concepts of environmental justice, though, also are contained in the National Environmental Policy Act of 1969 (NEPA) and in Title 23 and other transportation laws. While Title VI requirements themselves remain unchanged, the recent U.S. Supreme Court decision in the *Sandoval* case and the Third Circuit U.S. Court of Appeals ruling in the *South Camden* case severely reduce the ability of private plaintiffs to bring lawsuits challenging on Title VI grounds. This change should reduce – but does not eliminate – the exposure of state DOTs and MPOs to Title VI litigation.

The U.S. Department of Transportation policy calls for efforts to prevent a disproportionate distribution of burdens and, consistent with Title VI, a “denial of, reduction in, or significant delay in the receipt of benefits.” While this policy requires, at a minimum, an analysis to determine *whether* benefits and burdens are proportionately distributed, current FHWA practice is not to mandate proportionate outcomes. This is consistent with the practical problems cited in the 1999 *Jersey Heights* decision by the Fourth Circuit U.S. Court of

Appeals. Measuring the proportionality of benefits and burdens raises numerous conceptual and practical problems, and established standards or guidelines for practitioners to follow in addressing these problems do not exist at present. Under both Title VI and Executive Order 12898, standards are defined for approving actions that are found to have disproportionate impacts.

■ 2.2 Overall Approach to Environmental Justice

Staff at 15 State DOTs, 22 MPOs, and three transit agencies were interviewed for this project to determine what efforts the agencies were undertaking to address environmental justice. Each of these agencies was contacted because they were either known or believed to be active in addressing environmental justice issues. The findings described, therefore, represent a snapshot of the “state of practice” at the time the interviews were conducted of addressing environmental justice in transportation planning.

Most of the agencies interviewed stated that they are interested in improving the methods through which environmental justice concerns are addressed. Agencies typically start this effort by attending U.S. DOT-led training on environmental justice and by establishing an internal process for determining how they can best address environmental justice. Agencies are responding cautiously, however, in developing specific changes to planning activities. The most common changes are to define and identify low-income and minority communities, and to revisit public involvement procedures to improve outreach to these communities. A smaller number of agencies are attempting to quantify the impacts of a project or plan on different population groups. Even fewer agencies have attempted to create and apply specific tests for “disproportionate” impacts.

The types of activities undertaken to address environmental justice depend, in part, upon the scope of the planning activity that is being considered – project-development or system-level planning either at the metropolitan or statewide level. State DOTs generally have addressed environmental justice in project development for a number of years as a result of NEPA EIS requirements for assessing impacts to the human environment, which under FHWA’s guidance includes an analysis of social groups specially benefited or harmed by a proposed project. A number of DOTs currently are expanding project-level planning and design activities by updating community impact and utilizing context-sensitive design practices to respond more specifically to environmental justice requirements.

At a statewide planning level, in contrast, DOTs have only begun to address environmental justice since the late 1990s. The major emphasis is on expanding public involvement activities and developing statewide demographic profiles to characterize the location of low-income and minority population groups. Some are beginning to apply quantitative measures to test the distribution of impacts of their long-range plan (LRP) or statewide transportation improvement program (STIP).

MPOs have responsibility for regional transportation planning but in most cases, do not undertake project development activities other than through the conduct of corridor-type

studies. A number of MPOs have formed joint committees of staff and stakeholders to develop an approach for addressing environmental justice in regional transportation planning. Like state DOTs, many MPOs are examining and enhancing their public involvement processes to improve outreach to low-income and minority populations. A number also have begun to measure the distribution of benefits of their long-range plan. Only a small number of MPOs, in contrast, are attempting to measure negative impacts or “burdens” associated with the regional transportation plan.

The leading edge of environmental justice practice can be characterized by those practices where environmental justice is fully integrated into the transportation planning or project development process rather than being treated as a supplemental analysis. In these cases, the objective of improved transportation mobility is carefully coordinated with parallel objectives to improve the social and economic quality of a community. Further, a few of the people interviewed articulated a linkage between environmental justice and environmental streamlining. Effectively addressing issues of environmental justice and community impact reduces the cost and time necessary to complete a project by reducing the potential for conflict.

■ 2.3 Defining and Identifying Population Groups

Among the agencies contacted, the first step in defining an overall approach to environmental justice usually is to identify the locations of population groups to be considered. Most agencies have focussed their EJ activities on low-income and minority populations, as identified in Executive Order 12898 and the U.S. DOT policy on environmental justice. Agencies to date typically have relied upon 1990 Census data using a geographic information system (GIS) platform to develop a demographic profile of the project study area, metropolitan area, or state. Some agencies, particularly those that employ a travel demand model with income as an input variable, project the future distribution of household income using various land use models or regression techniques. Agencies also are beginning to make immediate use of the year 2000 Census redistricting data released during the spring of 2001.

In developing demographic profiles, most states and MPOs identify environmental justice communities by using a threshold level for percentage of minority or low-income individuals within a given geographic area. This percentage varies from region to region. Some agencies have used local data sources such as social service provider client databases, or qualitative technique such as direct observation to assist in characterizing populations in a specific project study area. Agencies then have used this demographic profile to assist in targeting public outreach efforts, to display the locations of population groups in comparison to planned transportation projects, and as a basis for comparing impacts among different groups.

■ 2.4 Public Involvement

Public involvement procedures at all levels of planning – project-level, statewide, and metropolitan – are being re-examined from the perspective of environmental justice. Many of the agencies interviewed are experimenting with a range of techniques that more specifically target minority and low-income communities and make it easier for people to express their opinions within the transportation planning process. Efforts to enhance public involvement include conducting publicity through community-based organizations; making meetings accessible by holding them locally, providing child care, and providing translation services; and using alternative involvement methods such as focus groups, interviews, surveys, and design workshops. Successful examples exist where school systems are being used to both actively involve children and as a means of reaching their families. This is proving to be particularly effective in those communities where English may not be the primary language. The practice of community impact assessment (CIA) is being adapted by some state DOTs to ensure that the concerns of potentially effected low-income and minority communities are fully considered. Other agencies interviewed felt that their public involvement procedures already adequately address the needs of environmental justice populations, and are working to document their existing activities in this area.

Some agencies, especially MPOs, increasingly are recognizing that environmental justice communities need to be actively engaged and involved from the earliest stages of a planning process so as to ensure that a technical evaluation addresses the issues that are of importance to these communities. Most commonly, this early involvement is accomplished through use of a working committee that provides input helping to define agency policy, recommend public involvement approaches, and select key performance measures and evaluation criteria with respect to environmental justice.

■ 2.5 Measuring Impacts

Measures of the distribution of transportation benefits have been developed by a number of MPOs for the purpose of assessing a regional transportation plan. The most common measures, which can be calculated readily from standard travel demand models, relate to accessibility and/or travel times to jobs or other activities. A smaller number of MPOs and a few state DOTs have measured the quality of transit service or the distribution of transportation projects by geographic area and/or population group. This can include consideration of the location and quality of bus shelters and the availability of sidewalks and other pedestrian amenities. Many agencies report that non-construction issues such as maintenance, management, operations, safety, and transit hours of service are cited by environmental justice communities as areas of concern. However, agencies are struggling to develop feasible and mutually agreeable ways of measuring the distributions of these measures. For example, many state DOTs and MPOs lack roadway condition and performance data for facilities that are not part of the state highway system.

While measures of benefit most commonly have been compared among population groups at a regional or systems level, measures of burden most commonly are evaluated at the project level. Most agencies noted that they address transportation burdens through community and environmental analysis procedures undertaken as part of project-development activities. Impacts, such as relocations, traffic, air quality, and noise, typically are quantified, while others, such as community cohesion, are described in qualitative terms. With the exception of relocations, however, the magnitude of quantifiable impacts normally is not compared among population groups. Instead, the incidence of most impacts to the human environment is compared subjectively. Many agencies report that they use the environmental analysis process undertaken for individual projects to identify mitigation measures that directly respond to community concerns with the project. These agencies report that mitigation can be an important tool in reducing disproportionate impacts.

■ 2.6 Emerging Analytical Techniques

Considerable work is ongoing to develop and implement improved analytical capabilities directly related to environmental justice. While in many cases these methods have not yet been directly applied by state DOTs and MPOs for environmental justice analyses, the methodologies nonetheless are readily available and routinely used for other analysis purposes. These technical methods include use of data from the year 2000 Census of the Population, GIS-based mapping and spatial analysis methodologies, FHWA's Surface Transportation Efficiency Analysis Model (STEAM), and the use of household-level microsimulation modeling techniques. The year 2000 Census data represents a rich new source of data that can be immediately applied to support analyses of environmental justice, even before the new Census Transportation Planning Package (CTPP) is completed and released. Many of the analysis techniques now being developed and introduced into use are explicitly designed to better estimate the distribution of benefits and burdens by population group. When used in connection with GIS capabilities, spatial differences can be readily examined and visually compared.

■ 2.7 Conclusions

While most agencies are still in the early stages of developing environmental justice procedures and analysis methods, important lessons nonetheless can be learned from the efforts undertaken to date. Enhancing public involvement appears to be the most common approach and is widely acknowledged as having important benefits. In many ways, these enhancements are simply a continuation of the increased emphasis on public involvement and community impact assessment that have taken place over the past 30 years. Some agencies have noted that their increased public involvement activities have identified issues not previously identified as being of concern to local communities.

Others have noted that by involving community representatives in project planning and development activities, mitigation strategies can be developed that reduce the burdens and increase the benefits of a project to the community.

Quantitative analysis methods can be used to support an analysis of environmental justice but these applications have not always proven to be successful. Some agencies have found the identification and definition of low-income and minority population groups to be helpful in structuring public outreach efforts and comparing the distribution of impacts. Others, however, express concern about establishing specific, numeric thresholds to define population groups or labeling particular areas as “low-income” or “minority.”

Quantitative measures of impact, in some cases, have helped to provide a basis for identifying whether or not impacts are truly disproportionate. It has proven to be a challenge, however, to identify measures acceptable to the community and also feasible to calculate with existing data and resources. Furthermore, the interpretation of such measures can be difficult, especially when different measures lead to conflicting conclusions about whether or not impacts are disproportionately distributed. Perhaps the most accepted use of quantitative analysis to date has been to provide impact-specific measures of performance to aid decision-making, rather than to make a definitive statement about whether or not a particular project or plan has “disproportionate” impacts on a given population group.

Two issues were identified by some of the state DOTs and the MPOs contacted for this project as needing more attention but which typically are not now being directly addressed in environmental justice analyses associated with transportation planning and project development. These are consideration of 1) the secondary and cumulative impacts of transportation and community investment decisions, and 2) the public health effects associated with the operation of transportation facilities. Many of the concerns expressed by community groups relate to the cumulative effects of past highway and public transportation decisions, often extending over a period of many years. Looking into the future, consideration of secondary and cumulative impacts involves issues such as the use of land resources and the location of employment opportunities relative to the location of low-income and minority populations. While transportation agencies acknowledge the importance of these secondary and cumulative impacts, they feel that in many ways these issues are beyond their ability to either analyze or control.

The scope of air quality analyses undertaken by transportation agencies normally is limited to the transportation and emission impacts of alternative investment and management actions. Air quality concentrations may be examined for primary pollutants such as carbon monoxide but estimating changes in ambient air quality for secondary pollutants such as ozone and fine particulate matter normally is the responsibility of a state or regional air quality agency. Transportation-related health effects associated with ozone, fine particulate matter, and air toxics, though, increasingly are being raised in the public consideration of transportation investments. A specific environmental justice question is whether low-income and minority populations are disproportionately affected in terms of different kinds of medical conditions, and the role that transportation sources may have in contributing to these differential effects. Additional research, designed to improve this understanding, would contribute to improved assessments of environmental justice.

Finally, the state-of-the-practice in environmental justice analysis is evolving rapidly. Some agencies were contacted multiple times for this research effort, and reported new or different information each time. Many agencies are trying new approaches or techniques at a rapid pace. Agencies report that some of these endeavors have not been successful, and subsequently were either dropped or modified. Mostly, however, the agencies indicated that their efforts have produced both tangible and intangible results, and they continue to consider different approaches as they learn about successes in other areas.

The following is a brief summary of the general planning and design practices that emerge from this review as being effective for incorporating environmental justice into both systems-level and corridor or project-level transportation planning:

1. **Develop transportation plans and projects so as to accomplish multiple objectives.** The practice of context-sensitive design is one example of this approach. The TEA-21 established Transportation and Community and System Preservation (TCSP) Pilot Program is a second example where states and local governments throughout the country are developing transportation projects that contribute to a variety of community, economic, and social objectives as well as providing improved transportation benefits.
2. **Examine the distribution of benefits and burdens.** The core of an environmental justice analysis is determining the manner in which impacts are *distributed* among low-income, minority, and other protected populations. Transportation plans and projects often are characterized in public debates primarily in terms of their adverse impacts or burdens. Most projects, however, also result in a variety of benefits, and it is important that these benefits be weighed against the potential for negative consequences. Consequently, it is important that benefits and burdens should not be examined just in the aggregate but in terms of their incidence upon particular populations or communities.
3. **Examine issues from a community perspective.** An analysis of environmental justice requires simultaneously addressing **multiple geographic scales, time horizons, and performance measures**. To effectively engage a community in the development of a long-range regional plan, it may be desirable to also address issues that may be of more immediate concern to a community such as the time periods during which transit service is available. This also may mean examining impacts at the scale of a localized community or neighborhood while simultaneously assessing measures of regional performance.
4. **Utilize technical analyses to inform** and supplement a program of public involvement activities. The analysis of environmental justice is more than just undertaking expanded public involvement targeted at low-income and minority populations. Effective assessments of environmental justice involve a parallel and carefully coordinated stream of technical analysis and public involvement activities. The results of technical analyses should be communicated so that they can be quickly and easily understood by community groups that may not be trained in the particular analysis methodologies utilized.
5. Environmental justice analyses can be enhanced by **fully utilizing available data sources**. Transportation planning and project development is based, in large part, on the results of a traditional four-step travel demand modeling systems. While these

analysis systems and their underlying databases can be useful in supporting an assessment of environmental justice, this is not the primary purpose for which such systems were designed. Other available data sources can be effectively used in addition to this traffic analysis zone (TAZ)-based information. These other data sources may include safety, pavement and other asset management databases; local traffic count information; transit ridership counts; and the U.S. Census of the Population.

6. **Engage the full diversity of community groups early and continuously** in the transportation planning and project development process. The objectives are to establish trust; listen; develop an understanding of community issues; and communicate using a community's established channels, culture, and language. Data and analytical results should be interpreted and synthesized into an easy-to-understand story.
7. **Recognize a community's history.** The baseline condition is not simply the current year, existing conditions; it also includes developing an understanding of the various policies, actions, institutional arrangements, and other considerations that combined together create this existing condition, and that will continue to influence future development. Far more factors than just transportation investment are influencing development patterns, including economic conditions, housing policy, educational policy, and zoning practices.

3.0 The Legal Framework for Environmental Justice*

■ 3.1 Introduction

The purpose of this section is to explain the legal framework for environmental justice, as applied by U.S. Department of Transportation (U.S. DOT) under Executive Order 12898 (E.O. 12898), Title VI of the Civil Rights Act of 1964 (Title VI), and other authorities.

This section is organized into the following subsections:

- **Foundations of Environmental Justice.** This section reviews the statutes and regulations that provide the underlying legal basis for the environmental justice policies that govern surface transportation plans and projects, including Title VI and the U.S. DOT Title VI regulations.
- **Environmental Justice Orders.** This section analyzes the environmental justice orders themselves – in particular, the policies embodied in E.O. 12898, U.S. DOT Order 5610.2, and FHWA Order 6640.23. Rather than discussing each order separately, this section synthesizes their requirements on issues that frequently are faced by practitioners – e.g., how to define “minority” or “low-income,” what types of impacts to consider, how to determine whether impacts are “disproportionate,” and under what circumstances actions with disproportionate impacts on protected populations can be approved.
- **Enforcement Methods.** This section reviews the enforcement mechanisms that exist under Title VI and the Title VI regulations. This section also assesses the opportunities that may exist for the U.S. DOT to undertake environmental justice investigations without invoking the usual Title VI procedures.
- **Recent Case Law.** This section reviews recent court decisions – in particular, the *Sandoval* and *South Camden* cases – which have greatly reduced, if not eliminated, the ability of private plaintiffs to bring “disparate impact” claims under the U.S. DOT’s Title VI regulations. It also discusses other court decisions involving environmental justice issues involved in transportation projects.
- **Conclusions.** This subsection summarizes the major findings in this section.

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■ 3.2 Foundations of Environmental Justice

This subsection reviews the federal statutes and regulations that provide the primary legal basis for applying environmental justice policies to transportation plans, programs, and projects.

3.2.1 Title VI of the Civil Rights Act of 1964

Section 601 of the Civil Rights Act of 1964 prohibits discrimination “on the basis of race, color, or national origin” in any “program of activity receiving federal financial assistance.”¹ As interpreted by the U.S. Supreme Court, this section prohibits only instances of *intentional discrimination*.² The existence of a disparate impact on minorities – e.g., a statistical disparity in benefits or impacts – is not sufficient to establish a violation of Section 601.

3.2.2 U.S. DOT’s Title VI Regulations

Section 602 of Title VI authorizes and requires federal agencies to issue rules, regulations, or orders implementing Section 601.³ Pursuant to its authority under Section 602, the U.S. DOT issued its Title VI regulations in 1970.⁴ The U.S. DOT’s Title VI regulations prohibit, among other things, actions that would have the “purpose or effect” of discriminating against individuals on the basis of race, color, or national origin.⁵ Thus, rather than only prohibiting intentional discrimination, the U.S. DOT Title VI regulations also prohibit actions that have a *disparate effect* on minorities. The U.S. DOT’s disparate-impact regulations were upheld by the Supreme Court in the early 1980s.⁶ The Supreme Court has

¹ 42 U.S.C. §2000d (“No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.”)

² *Alexander versus Choate*, 469 U.S. 287, 293 (1985) (“Title VI itself directly reach[es] only instances of intentional discrimination.”); *see also Regents of University of California versus Bakke*, 438 U.S. 265 (1978) (holding that §601 prohibits only those instances of discrimination that would violate the Equal Protection Clause of the Constitution, which prohibits only intentional discrimination).

³ 42 U.S.C. §2000d-1.

⁴ 49 C.F.R. §21.5(a).

⁵ 49 C.F.R. §21.5(a).

⁶ *See Guardians Association versus Civil Service Commission of New York City*, 463 U.S. 582 (1983).

recently expressed reservations about the validity of disparate-impact regulations issued under Title VI, but it has not overturned them.⁷

Several items on the list of prohibited actions in the U.S. DOT Title VI regulations are particularly relevant to transportation project planning and development:

- “A recipient ... may not, directly or through contractual or other arrangements, on the grounds of race, color, or national origin ... [p]rovide any service, financial aid, or other benefit to a person which is different, or is provided in a different manner, from that provided to others under the program”;⁸
- “In determining the site or location of facilities, a recipient or applicant may not make selections with the purpose or effect of excluding persons from, denying them the benefits of, or subjecting them to discrimination under any program to which this regulation applies, on the grounds of race, color, or national origin; or with the purpose or effect of defeating or substantially impairing the accomplishment of the objectives of the Act or this part.”⁹
- “A recipient may not make a selection of a site or location of a facility if the purpose of that selection, or its effect when made, is to exclude individuals from participation in, to deny them the benefits of, or to subject them to discrimination under any program or activity to which this rule applies, on the grounds of race, color, or national origin; or if the purpose is to, or its effect when made will, substantially impair the accomplishment of the objectives of this part.”¹⁰

3.2.3 National Environmental Policy Act (NEPA) of 1969

The National Environmental Policy Act (NEPA) requires federal agencies to consider environmental impacts before taking major actions with the potential to cause significant

⁷ See *Alexander versus Sandoval*, 532 U.S. 275, 121 S. Ct. 1511, 1516-17 (2001) (“[W]e must assume for purposes of deciding this case that regulations promulgated under §602 of Title VI may validly proscribe activities that have a disparate impact on racial groups, even though such activities are permissible under §601. Though no opinion of this Court has held that, five Justices in *Guardians* voiced that view of the law at least as alternative grounds for their decisions. . . . These statements are in considerable tension with the rule of *Bakke* and *Guardians* that §601 forbids only intentional discrimination . . . , but petitioners have not challenged the regulations here. We therefore assume for the purposes of deciding this case that the DOJ and DOT regulations proscribing activities that have a disparate impact on the basis of race are valid.”).

⁸ 49 C.F.R. §21.5(b)(1)(ii).

⁹ 49 C.F.R. §21.5(b)(3).

¹⁰ 49 C.F.R. §21.5(d).

impacts on the human environment.¹¹ In contrast to Title VI, which prohibits certain activities, NEPA is purely procedural. In other words, NEPA defines procedures that must be followed before making a decision, but it does not restrict the decisions that can be made once the required procedures have been completed.¹²

As interpreted in the Council on Environmental Quality (CEQ) regulations, NEPA establishes two types of procedural requirements that provide some support for the policies embodied in E.O. 12898. These are 1) evaluating effects, and 2) providing opportunities for public involvement.

NEPA Requirements – Evaluating Effects

As interpreted by the CEQ, NEPA requires the consideration of the “reasonably foreseeable” direct, indirect, and cumulative effects of a proposed action.¹³ The term “effects” has been defined by the CEQ to include “aesthetic, historic, cultural, economic, social, or health” effects.¹⁴

Pursuant to that regulation, FHWA policy – since at least 1987, when the current technical advisory T6640.8A was issued – has required consideration in an EIS of impacts on “general social groups” affected by the action, including “minority and ethnic” populations, the elderly, the handicapped, and the transit-dependent.¹⁵ The same policy also states that “[t]he discussion [in an EIS] should address whether any social group is disproportionately impacted and identify possible mitigation measures to avoid or minimize any adverse impacts.”¹⁶

Thus, relatively long-standing NEPA policies require the analysis – at least in an EIS – of the potential for disproportionate effects on minority groups. While the policies do not specifically mention low-income groups, the reference to “general social groups” could be

¹¹42 U.S.C. §4332(2)(C).

¹²See *Robertson versus Methow Valley Citizens Council*, 490 U.S. 332, 350-51 (1989) (“The sweeping policy goals announced in §101 of NEPA are realized through a set of “action-forcing” procedures that require that agencies take a “‘hard look’ at environmental consequences” . . . and that provide for broad dissemination of relevant environmental information. Although these procedures are almost certain to affect the agency’s substantive decision, *it is now well settled that NEPA itself does not mandate particular results, but simply prescribes the necessary process.* . . .”) (emphasis added).

¹³40 C.F.R. §1508.8.

¹⁴40 C.F.R. §1508.8.

¹⁵FHWA, Technical Advisory T 6640.8A, “Guidance for Preparing and Processing Environmental and Section 4(f) Documents” (October 30, 1987), at 20.

¹⁶FHWA, Technical Advisory T 6640.8A, “Guidance for Preparing and Processing Environmental and Section 4(f) Documents” (October 30, 1987), at 20.

interpreted to require consideration of low-income populations, in addition to those groups specifically mentioned in the policy.¹⁷

NEPA Requirements – Public Involvement

NEPA also requires efforts to provide opportunities for public involvement in the environmental review process. Both CEQ and FHWA regulations provide substantial flexibility to determine the appropriate public involvement procedures in each case.

The CEQ regulations require agencies to make “diligent efforts to involve the public in preparing and implementing their NEPA procedures”¹⁸ and require agencies to “provide public notice of NEPA-related hearings, public meetings, and the availability of environmental documents so as to inform those persons and agencies who may be interested or affected.”¹⁹

The FHWA regulations establish similarly broad requirements. They require each state to adopt a public involvement/public hearing program for use in the NEPA process, and require that the program include, among other things, “[e]arly and continuing opportunities during project development for the public to be involved in the identification of social, economic, and environmental impacts, as well as impacts associated with relocation of individuals, groups, or institutions.”²⁰

Distinctions Between NEPA Requirements and E.O. 12898

NEPA establishes broad requirements for evaluating effects and involving the public in the NEPA process. As part of that effort, it is necessary to consider impacts on minority and low-income communities, and to provide opportunities for involvement by those communities in the NEPA process. However, there are important distinctions between NEPA requirements and E.O. 12898:

- NEPA establishes general requirements concerning the evaluation of effects and the involvement of the public. It does not establish specific rights or standards of protection for specific resources or population groups.
- NEPA is a procedural statute. It does not require or prohibit specific outcomes, nor does it require findings to be made in order to authorize impacts on a particular resource or population group (e.g., a finding of no practicable alternative).

¹⁷FHWA, Technical Advisory T 6640.8A, “Guidance for Preparing and Processing Environmental and Section 4(f) Documents” (October 30, 1987), at 20.

¹⁸40 C.F.R. §1506.6(a).

¹⁹40 C.F.R. §1506.6(b).

²⁰23 C.F.R. §771.111(h)(2).

- NEPA compliance is required for project development, but not for statewide or metropolitan planning. While NEPA procedures may be followed in planning, NEPA does not provide a basis for requiring actions to be taken in the planning process.

3.2.4 23 U.S.C. Section 109(h)

Enacted as part of the Federal-Aid Highway Act of 1970, Section 109(h) of Title 23 requires the Secretary of Transportation to issue “guidelines designed to assure that” certain impacts are considered and that the ultimate project decision is in the “best overall public interest.”²¹ The statute requires the guidelines to assure that “possible adverse economic, social, and environmental effects relating to any proposed project on any federal-aid system have been fully considered in developing such project.”²² The guidelines also must assure that the final decision on the project is made:

in the best overall public interest, taking into consideration the need for fast, safe, and efficient transportation, public services, and the costs of eliminating or minimizing such adverse effects and the following: 1) air, noise, and water pollution; 2) destruction or disruption of man-made and natural resources, aesthetic values, community cohesion and the availability of public facilities and services; 3) adverse employment effects, and tax and property values losses; 4) injurious displacement of people, businesses and farms; and 5) disruption of desirable community and regional growth.”²³

There are currently no Section 109(h) “guidelines,” as such. However, current FHWA regulations include a provision, Section 771.105(b), that appears to be based on Section 109(h). According to Section 771.105(b), it is the policy of FHWA that:

Alternative courses of action be evaluated and decisions be made in the best overall public interest based on a balanced consideration of the need for safe and efficient transportation; of the social, economic, and environmental impacts of the proposed transportation improvement; and of national, state, and local environmental goals.²⁴

Thus, both Section 109(h) and current FHWA regulations require the consideration, in some form, of socioeconomic effects when making decisions on transportation projects. However, two important caveats should be kept in mind evaluating the legal relationship between Section 109(h) and environmental justice:

²¹23 U.S.C. §109(h).

²²23 U.S.C. §109(h).

²³23 U.S.C. §109(h).

²⁴23 C.F.R. §771.105(b).

- Section 109(h) does not prohibit actions that have disproportionate impacts on a particular resource or social group. On the contrary, Section 109(h) requires decisions to be made in the “best overall public interest.” By requiring decisions to be based on the good of the public as a whole, Section 109(h) implicitly allows for decisions that – in some cases – may disproportionately impact a particular resource or group.
- Section 109(h) applies to “all proposed projects *with respect to which plans, specifications, and estimates are approved by the Secretary* [i.e., the U.S. Secretary of Transportation] after the issuance of such guidelines.”²⁵ Over time, the role of the U.S. DOT in approving plans, specifications, and estimates (PS&E) has been greatly reduced, as PS&E approval authority has been delegated to the States. Today, PS&E approval authority has been, or can be, delegated to state DOTs for all non-Interstate projects.²⁶ Thus, in any state that has received full delegation of PS&E approval authority, the only projects that are still subject to Section 109(h) are projects on the Interstate System.

3.2.5 Other Civil Rights Statutes

In the context of environmental justice, consideration may be given to impacts on groups such as the elderly and the disabled. Obviously, those groups are not covered by the environmental justice executive order, which applies only to minority and low-income groups. However, these other groups *are* protected against discrimination under a series of laws enacted after Title VI. Generally, these statutes parallel the language of Title VI:

- **Age Discrimination:** “No person in the United States shall, *on the basis of age*, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.”²⁷
- **Federal-Aid Highways Act:** “No person in the United States shall, on the ground of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal assistance.”²⁸
- **Rehabilitation Act of 1973:** “No qualified handicapped person in the United States shall, solely by reason of his handicap, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.”²⁹

²⁵23 U.S.C. §109(h) (emphasis added).

²⁶See 23 U.S.C. §106(c).

²⁷42 U.S.C. §6102.

²⁸23 U.S.C. §324.

²⁹29 U.S.C. §790, *repealed*, Pub. L. 102-569, Title V, Sec. 502(a), 106 Stat. 4424 (October 29, 1992).

- **Americans with Disabilities Act of 1990:** “No qualified individual with a disability shall, by reason of such disability, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal assistance.”³⁰

Because of these statutes, recipients of federal assistance also must take action to prevent discrimination against the elderly, the disabled, and women. Those actions may be similar to the actions taken under E.O. 12898 – e.g., data gathering, public involvement, etc. However, it is important to recognize that the elderly, disabled, and women are not covered under E.O. 12898 itself.

■ 3.3 Environmental Justice Orders

On February 11, 1994, President Clinton issued Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.”³¹ The order requires each federal agency to “make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations”³²

As directed by E.O. 12898, representatives from 17 federal departments and agencies were convened to form the Interagency Working Group on Environmental Justice. The Interagency Working Group issued guidance interpreting key terms in the executive order. Later, individual agencies, including U.S. DOT, issued their own environmental justice policies, which govern the activities of those agencies. The key policy documents governing FHWA are:

- U.S. DOT Order 5610.2, “Department of Transportation Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” (February 3, 1997).
- FHWA Order 6640.23, “FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” (December 2, 1998)

³⁰42 U.S.C. §§12101-12213.

³¹Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 Fed. Reg. 7629 (Section 1-101) (1994), 3 C.F.R. §859, reprinted in 42 U.S.C. §4321.

³²E.O. 12898, at §1-101.

In addition to these policies, FHWA issued a number of memoranda from headquarters to the field offices on the topic of environmental justice in 1999 and 2000.³³ FHWA also maintains statements of its environmental justice policies on its web site.³⁴ These memoranda and web site materials provide additional guidance on FHWA's interpretation of the requirements of E.O. 12898.

3.3.1 Population Groups to Be Considered

The definitions of the terms "minority" and "low-income" were initially defined by the Interagency Working Group. Those definitions were incorporated into the U.S. DOT and FHWA policies, and have remained essentially unchanged. Under the FHWA policy, these terms are defined as follows:

- **Minority.** A minority is any individual who is an American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; and Hispanic.³⁵
- **Minority Population.** A minority population means "any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity."³⁶
- **Low-Income.** A low-income person is a person with a "household income at or below the Department of Health and Human Services poverty guidelines."³⁷
- **Low-Income Populations.** A low-income population means "any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed FHWA program, policy, or activity."³⁸

³³See Memorandum from Kenneth R. Wykle, Administrator, FHWA, and Gordon J. Linton, Administrator, FTA, to FHWA Division Administrators and FTA Division Administrators, "Implementing Title VI Requirements in Statewide and Metropolitan Planning" (October 7, 1999); Memorandum from Cynthia J. Burbank, FHWA, and Charlotte Adams, FTA, to FHWA Division Administrators and FTA Regional Administrators, "Status of Environmental Justice Activities," (January 19, 2000).

³⁴FHWA, "The Facts – Questions and Answers on Environmental Justice," <http://www.fhwa.dot.gov/environment/ejustice/facts/index.htm> (last modified January 30, 2002).

³⁵FHWA Order 6640.23, ¶2(c).

³⁶FHWA Order 6640.23, ¶2(e).

³⁷FHWA Order 6640.23, ¶2(b).

³⁸FHWA Order 6640.23, ¶2(d).

While the basic definitions of “minority” and “low-income” are relatively well-settled, numerous issues of interpretation continue to arise. These include:

Size of Minority or Low-Income Population

FHWA has determined that a disproportionate impact may exist on a minority or low-income population even if that population is very small. FHWA policy states that:

Disproportionately high and adverse effects, not size, are the bases for Environmental Justice. *A very small minority or low-income population in the project, study, or planning area does not eliminate the possibility of a disproportionately high and adverse effect on these populations.* What is needed is to show the comparative effects on these populations in relation to either non-minority or higher-income populations, as appropriate.

Some people wrongly suggest that if minority or low-income populations are small (“statistically insignificant”), this means there is no environmental justice consideration. *While the minority or low-income population in an area may be small, this does not eliminate the possibility of a disproportionately high and adverse effect of a proposed action.* Environmental Justice determinations are made based on effects, not population size. It is important to consider the comparative impact of an action among different population groups.³⁹

Consideration of Elderly, Disabled, and Others

FHWA has determined that impacts on the elderly, disabled, and others should be considered when addressing environmental justice, even though those groups are not mentioned in E.O. 12898, U.S. DOT Order 5610.2, or FHWA Order 6640.23. Current FHWA policy states that:

Within the framework provided by Executive Order 12898 on Environmental Justice, the U.S. DOT Order (5610.2) addresses only minority populations and low-income populations, and does not provide for separate consideration of elderly, children, disabled, and other populations. *However, concentrations of the elderly, children, disabled, and other populations protected by Title VI and related nondiscrimination statutes in a specific area or any low-income group ought to be discussed.* If they are described as low-income or minority, the basis for this should be documented.

. . . . All impacts on sectors of the community, including minority and low-income populations as well as impacts on the community as a whole,

³⁹FHWA Environmental Justice web site, “The Facts – Questions and Answers on Environmental Justice,” Question No. 15, <http://www.fhwa.dot.gov/environment/ejustice/facts/index.htm> (emphasis added).

should be routinely investigated, analyzed, mitigated, and considered during decision-making, *similar to investigations of impacts on minority populations and low-income populations. . . .*⁴⁰

Combining Groups for Analysis

FHWA has determined that minority and low-income groups “should not be presumptively combined” when analyzing environmental justice issues. FHWA also has recognized that “minority groups can be of several categories” and that it may be necessary to analyze each group separately, depending on the circumstances. Current FHWA policy states that:

The two terms “minority” and “low-income” should not presumptively be combined. There are minority populations of all income levels; and low-income populations may be minority, non-minority, or a mix in a given area. As the definition of minority indicates, even minority populations can be of several categories. When such distinctions exist, appropriate assessment, discussion, and consideration should be provided using appropriate and accurate descriptors. Within documentation, an Environmental Justice discussion may appear either with discussion of other demographic information (other protected-group and general area information), assessment, and consideration, or as a separate discussion. As in any public document, specific information about any one individual or any very small group should not appear in the document to protect privacy; however, backup data should appear in the files. Descriptions in such documents should be statistical, group, or location-based.

3.3.2 Types of Adverse Effects to Be Considered

E.O. 12898 requires consideration of “adverse human health or environmental effects.” Over time, the concept of “adverse human health or environmental effects” has been interpreted broadly, to include 1) “interrelated social and economic effects,” as well as 2) “the denial of, reduction in, or significant delay in the receipt of, benefits”⁴¹

Accordingly, the appendix to the U.S. DOT order provides the following list of the effects that must be considered in an analysis of environmental justice issues:

Adverse effects means the totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic

⁴⁰FHWA Environmental Justice web site, “The Facts – Questions and Answers on Environmental Justice,” Question No. 13, <http://www.fhwa.dot.gov/environment/ejustice/facts/index.htm> (emphasis added).

⁴¹U.S. DOT Order No. 5610.2 (February 3, 1997), at 2.

*effects, which may include, but are not limited to: bodily impairment, infirmity, illness or death; air, noise, and water pollution and soil contamination; destruction or disruption of man-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of, benefits of DOT programs, policies, or activities.*⁴²

Current FHWA policies incorporate the U.S. DOT's definition of "adverse effects."⁴³ Thus, even though E.O. 12898 only refers to "human health and environmental" effects, it has been interpreted to require consideration of "*all reasonably foreseeable social, economic, and environmental effects on minority populations and low-income populations.*"⁴⁴

Lastly, it is important to note that the term "adverse effects," as defined by U.S. DOT, includes "cumulative" effects, not just the direct impacts of a proposed action.⁴⁵ Therefore, depending on the circumstances, it may be necessary to consider environmental justice as part of a cumulative effects analysis in a NEPA document.

3.3.3 Extent to Which Benefits Should Be Considered

The consideration of benefits – not just burdens – has been an important theme in recent policy statements by FHWA and FTA on environmental justice. In attempting to determine what is required (as opposed to what is good practice, good policy, etc.), it is useful to distinguish among three different ways in which benefits can be considered in an analysis of environmental justice issues:

Denial of Benefits as an "Adverse Effect"

The U.S. DOT has interpreted the concept of "adverse effects" to include a "denial of, reduction in, or significant delay in the receipt of benefits." Thus, in determining whether an action will cause adverse effects on a protected population, it is not sufficient to analyze

⁴²U.S. DOT Order No. 5610.2 (February 3, 1997), Appendix, ¶ 1(f).

⁴³FHWA Order No. 6640.23, at §2(f).

⁴⁴FHWA Environmental Justice web site, "The Facts – Questions and Answers on Environmental Justice," Question No. 9, <http://www.fhwa.dot.gov/environment/ejustice/facts/index.htm> (emphasis added).

⁴⁵U.S. DOT Order No. 5610.2 (February 3, 1997), Appendix, ¶ 1(f).

adverse impacts only on human health or the environment. Rather, compliance with E.O. 12898 (as interpreted by the U.S. DOT) also requires an assessment of whether the action will deny, reduce, or significantly delay benefits to a protected population. If so, the action will have an “adverse effect” on that population.

Off-Setting Benefits

The U.S. DOT order encourages the modal administrations, when assessing adverse effects, to take into account “all offsetting benefits” to the adversely affected minority and low-income populations.⁴⁶ The FHWA order incorporates the same language.⁴⁷ Thus, if an action will have adverse effects on a protected population, the environmental justice analysis should consider any off-setting benefits that the population might receive from the action. However, the need to consider off-setting benefits is similar to the need to consider mitigation: it is, in essence, a device for ensuring that *net* impacts are considered when determining whether an action results in disproportionate adverse effects.

Overall Distribution of “Benefits and Burdens”

In 1999, FHWA and FTA issued a memorandum to field offices regarding consideration of Title VI and environmental justice in compliance reviews for statewide and metropolitan planning processes. In that guidance document, FHWA and FTA introduced a concept that had not appeared in the previous orders on environmental justice – namely, the analysis of the *overall distribution of benefits and burdens*. The guidance requires FHWA and FTA to ask the following questions in reviews of statewide and metropolitan planning procedures:

“Does the planning process seek to utilize demographic information to examine the distributions across these groups [minority and low-income] of the benefits and burdens of the transportation investments included in the plan and TIP (or STIP)?”

“Does the planning process have an analytical process in place for assessing the regional benefits and burdens of transportation system investments for different socioeconomic groups? Does it have a data collection process to support the analysis effort? Does this analytical process seek to assess the benefit and impact distributions of the investments included in the plan and TIP (or STIP)?”⁴⁸

⁴⁶U.S. DOT Order No. 5610.2, at §8(b).

⁴⁷FHWA Order No. 6640. 23, (December 3, 1998) at ¶ 6(b).

⁴⁸Memorandum from Kenneth R. Wykle, Administrator, FHWA, and Gordon J. Linton, Administrator, FTA, to FHWA Division Administrators and FTA Division Administrators, “Implementing Title VI Requirements in Statewide and Metropolitan Planning” (October 7, 1999), Attachment 1.

In keeping with the policy embodied in the 1999 guidance, the current FHWA environmental justice web site states that environmental justice “focuses on enhanced public involvement and *an analysis of the distribution of benefits and impacts*.”⁴⁹

3.3.4 Definition of “Disproportionate”

E.O. 12898 itself does not define the term “disproportionate,” but the Interagency Working Group established under E.O. 12898 indicated that an effect should be considered disproportionate if it “appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group.”⁵⁰

The U.S. DOT and FHWA orders on environmental justice do not specifically adopt the Interagency Working Group’s standard for determining disproportionality, nor do they provide additional guidance. Moreover, this issue is not specifically addressed in the guidance on FHWA’s web site, or in other FHWA or FTA guidance documents on environmental justice. As a result, judgments about what constitutes a “disproportionate” distribution of impacts (or of benefits) must be made on a case-by-case basis.

Finally, it should be noted that neither the U.S. DOT nor FHWA guidance currently addresses the *time period* over which the proportionality of benefits and burdens should be considered, nor does the guidance explain how the overall benefits and burdens to a particular group should be aggregated (i.e., how to “add up” different types of benefits and different types of burdens). As a result, significant legal questions remain about what evidence would be needed to support a finding that benefits or burdens are disproportionately distributed.

3.3.5 Standards for Approving Actions with Disproportionate Effects

Unlike Title VI, which flatly prohibits discrimination, E.O. 12898 does not prohibit actions that have disproportionate adverse effects. Rather, it require actions to “identify and address, as appropriate” actions that have such effects. The implication of this language is that federal agencies have discretion to decide, in some cases, to approve actions that have a disproportionate adverse effect on minority and/or low-income populations.

In their environmental justice orders, the U.S. DOT and FHWA have established specific legal standards for approving actions that have disproportionate adverse effects on

⁴⁹FHWA Environmental Justice web site, “The Facts – Questions and Answers on Environmental Justice,” Question No. 22, <http://www.fhwa.dot.gov/environment/ejustice/facts/index.htm> (emphasis added).

⁵⁰CEQ, “Environmental Justice Guidance Under the National Environmental Policy Act,” (December 10, 1997), Attachment 1 (copy of Interagency Working Group guidance under E.O. 12898).

minority and/or low-income populations. The orders establish two distinct legal standards. The first applies to all groups protected under E.O. 12898, including low-income groups; the second, which is more stringent, applies only to groups protected under Title VI (i.e., minorities).

Standard for All Groups Covered by E.O. 12898

For both minority and low-income groups, the U.S. DOT order establish an “avoid if practicable” standard of protection. The U.S. DOT order states that:

“The [U.S. DOT officials] will ensure that any of their respective programs, policies or activities will only be carried out if further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse effect are not practicable. In determining whether a mitigation measure or an alternative is ‘practicable,’ the social, economic (including costs) and environmental effects of avoiding or mitigating the adverse effects will be taken into account.”⁵¹

Standard For All Groups Covered by Title VI

For groups protected under Title VI (minorities), the U.S. DOT order establishes a more stringent requirement. The order states that:

“The [U.S. DOT officials] will also ensure that any of their respective programs, policies or activities that will have a disproportionately high and adverse effect on populations protected by Title VI (‘protected populations’) will only be carried out if”:

- “1) a *substantial overall need* for the program, policy, or activity exists, based on the overall public interest, and
- “2) alternatives that would have less adverse effects on protected populations (and that still satisfy the need identified in paragraph 1) above, either (i) would have other adverse social, economic, environmental or human health impacts that are more severe, or (ii) would involve increased costs of extraordinary magnitude.”⁵²

The U.S. DOT order states that “the findings, determinations, and/or demonstration made in accordance with this section [e.g., finding of no practicable alternative] must be appropriately documented, normally in the environmental impact statement or other NEPA

⁵¹U.S. DOT Order No. 5610.2, at §8(c).

⁵²U.S. DOT Order No. 5610.2, at §8(d).

document prepared for the program, policy, or activity, or in other appropriate planning or program documentation.”⁵³

In sum, the U.S. DOT order on environmental justice is not purely procedural. Instead, it establishes findings that are to be made before U.S. DOT agencies approve a project that has disproportionately high and adverse effects on a minority or low-income population.

Lastly, it is important to remember that the findings specified in the U.S. DOT order *cannot be used to authorize actions that would constitute discrimination under Title VI or the U.S. DOT Title VI regulations*. As discussed earlier, both Title VI and the Title VI regulations *prohibit* discrimination. Because discrimination is prohibited, it can *never* be authorized – regardless of the circumstances. On the other hand, if there is no discrimination, then there is no violation of Title VI or the Title VI regulations. Thus, the failure to make these findings would not – in and of itself – constitute a violation of Title VI or the U.S. DOT Title VI regulations.

3.3.6 Proportionality of Outcomes (Including Funding)

On January 19, 2000, FHWA and FTA headquarters issued a memorandum on environmental justice to the FHWA and FTA field offices. The memorandum states that one of the three basic principles of environmental justice is to “[a]ssure low-income and minority groups receive a proportionate share of benefits.”⁵⁴

As drafted, the January 2000 memorandum appears to require a specific outcome – namely, a proportionate distribution of benefits. However, current FHWA policy – as reflected on FHWA’s web site – specifically states that FHWA does *not* interpret E.O. 12898 to mandate proportionate outcomes, at least with respect to transportation funding:

Environmental Justice is intended to ensure that the process of transportation planning is consistent with the provisions of Title VI of the Civil Rights Act. *Environmental Justice focuses on enhanced public involvement and an analysis of the distribution of benefits and impacts*. Consistent with the U.S. DOT Order on Environmental Justice, disproportionately high and adverse impacts should be mitigated where possible, if not totally avoided. *Beyond this mitigation requirement, there is no presumed distribution of resources to sustain compliance with the Environmental Justice provisions*. The intent is to ensure that no person is denied benefits based on race, color, or national origin.⁵⁵

⁵³U.S. DOT Order No. 5610.2, at §8(f).

⁵⁴Memorandum from Cynthia J. Burbank, FHWA, and Charlotte Adams, FTA, to FHWA Division Administrators and FTA Regional Administrators, “Status of Environmental Justice Activities,” (January 19, 2000), p. 1 (emphasis added).

⁵⁵FHWA Environmental Justice web site, “The Facts – Questions and Answers on Environmental Justice,” Question No. 22, <http://www.fhwa.dot.gov/environment/ejustice/facts/index.htm> (emphasis added).

■ 3.4 Enforcement Methods

Title VI is binding on all recipients of federal assistance and creates enforceable legal rights. By contrast, E.O. 12898 applies only to the agencies of the executive branch and does not create enforceable legal rights. The executive order states that:

“This order is intended only to improve the internal management of the executive branch and is not intended to, nor does it create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity by a party against the United States, its agencies, its officers, or any person. This order shall not be construed to create any right to judicial review involving the compliance or noncompliance of the United States, its agencies, its officers, or any other person with this order.”⁵⁶

Thus, when issues of enforcement arise, it is critically important to distinguish between Title VI and E.O. 12898.

3.4.1 Title VI Enforcement

The U.S. DOT Title VI regulations establish a comprehensive set of requirements to ensure compliance with those regulations. The requirements address general compliance and oversight activities; administrative complaint procedures; and enforcement actions.

General Compliance and Oversight Activities

The U.S. DOT Title VI regulations require recipients of federal assistance to implement compliance programs designed to ensure non-discrimination. Key elements include:

- **Assurances.** Every application for U.S. DOT financial assistance must include assurances that the applicant will comply with the U.S. DOT’s Title VI regulations.⁵⁷
- **Certification.** Every application by a state agency (e.g., a state DOT) to carry out a program involving continuing federal assistance must include a statement that the program is being carried out in accordance with the Title VI regulations.⁵⁸
- **U.S. DOT-Approved Methods of Administration.** Every application by a state agency (e.g., a state DOT) to carry out a program involving continuing federal assistance

⁵⁶Id. at §6-609.

⁵⁷49 U.S.C. §21.7(b).

⁵⁸49 U.S.C. §21.7(b).

must provide for “methods of administration” that the U.S. DOT finds will give a “reasonable guarantee” of compliance with the Title VI regulations.⁵⁹

- **Compliance Reports.** Each recipient of federal assistance must submit “compliance reports” to the U.S. DOT containing information sufficient to enable U.S. DOT to determine whether the recipient is complying with the Title VI regulations.⁶⁰
- **Access to Documents and Information.** Each recipient of federal assistance must give the U.S. DOT access to the recipient’s “books, records, accounts, and other sources of information” and to its facilities as necessary to allow the U.S. DOT to assess the recipient’s compliance with the Title VI regulations.⁶¹ In addition, each recipient must make available to “participants, beneficiaries, and other interested persons” information apprising them of the protections afforded under Title VI and the Title VI regulations.⁶²
- **Oversight.** The U.S. DOT is required to review recipients’ practices “from time to time ... to determine whether they are complying with this part.”⁶³

Administrative Complaint Procedures

The Title VI regulations establish procedures for investigations by U.S. DOT of alleged Title VI violations. Key elements include:

- **Complaints Filed by Private Parties.** “Any person” who believes he or she has been subjected to discrimination in violation of Title VI or the U.S. DOT Title VI regulations may file a complaint with the U.S. DOT. The complaint must be filed within 180 days after the date of the alleged discrimination, unless the U.S. DOT agrees to extend the deadline.⁶⁴ (Important Note: Recent court decisions that restricted private parties’ ability to bring environmental justice lawsuits in federal court *do not* affect private parties’ ability to file administrative complaints with U.S. DOT under this regulation. For more on the recent case law, see Section 3.5 below.)
- **Investigations Conducted by U.S. DOT.** The U.S. DOT is required to make a “prompt investigation” when a complaint, compliance review, report, or other information “indicates a possible failure to comply” with the Title VI regulations.⁶⁵

⁵⁹49 U.S.C. §21.7(b).

⁶⁰49 U.S.C. §21.9(b).

⁶¹49 U.S.C. §21.7(c).

⁶²49 U.S.C. §21.9(d).

⁶³49 U.S.C. §21.11(a).

⁶⁴49 U.S.C. §21.11(b).

⁶⁵49 U.S.C. §21.11(c).

Enforcement Actions

Following an investigation, the U.S. DOT has the authority to terminate or suspend federal funding to a recipient if it finds that:

- (1) “there appears to be a failure or threatened failure to comply” with the U.S. DOT Title VI regulations, and
- (2) the actual or threatened non-compliance cannot be corrected through informal means.

However, before terminating, suspending, or refusing to grant assistance based on an actual or threatened violation of Title VI or the Title VI regulations, the U.S. DOT must ensure that the following conditions have been met:

- (1) the U.S. DOT must advise the applicant of its failure to comply, and determine that compliance cannot be secured by voluntary means;
- (2) the U.S. DOT must make an express finding of non-compliance, after an opportunity for a hearing, which must be held in accordance with procedures outlined in the regulations;
- (3) the finding must be personally approved by the Secretary of the U.S. DOT; and
- (4) a full written report must be submitted to the House and Senate committees having jurisdiction over the program involved, for a 30-day review.

The actual order terminating, suspending, or refusing to grant financial assistance based on a Title VI violation must, among other things, identify the specific regulations with which the recipient has failed to comply and give reasons supporting the finding of non-compliance.⁶⁶

The U.S. DOT itself cannot sue recipients to compel compliance with Title VI. However, if the U.S. DOT is unable to bring about compliance through its own actions, it can refer a matter for enforcement to the U.S. Department of Justice, which has the authority to file a lawsuit in federal court to achieve compliance with the Title VI regulations.⁶⁷

⁶⁶49 C.F.R. §21.17.

⁶⁷49 U.S.C. §21.13(a).

3.4.2 Environmental Justice Investigations (Outside Title VI)

The procedures described in Section 3.4.1 apply specifically to the enforcement of Title VI and the U.S. DOT Title regulations. As such, those procedures *must* be followed if a violation of Title VI or the Title VI regulations is alleged. On the other hand, if there is no alleged violation of Title VI or the Title VI regulations, then the Title VI procedures would not apply.

The limited scope of the U.S. DOT Title VI regulations becomes important in situations in which the U.S. DOT is seeking to enforce compliance with aspects of E.O. 12898 that are not directly based on Title VI or the Title VI regulations. For example, the U.S. DOT Office of Civil Rights conducted an “Assessment of Environmental Justice and Public Involvement in the Atlanta Metropolitan Area.” In that document, the U.S. DOT included the following statement:

The observations and recommendations in this report identify actions to improve the involvement of low-income communities and minority communities in the transportation decision-making process. *This effort was not intended to be a complaint or compliance review under Title VI of the Civil Rights Act of 1964 or the U.S. DOT’s implementing regulations.*⁶⁸

As the Atlanta situation makes clear, state DOTs and MPOs may encounter situations in which the U.S. DOT undertakes investigations – and requests the adoption of specific corrective actions – without proceeding under the procedures prescribed in the U.S. DOT’s Title VI regulations.

■ 3.5 Update on Recent Case Law

E.O. 12898 explicitly prohibits judicial review of compliance with that order.⁶⁹ As a result, plaintiffs seeking to bring environmental justice claims generally have based their claims on other statutes – principally, Title VI and NEPA. However, recent case law suggests that each of these avenues for bringing environmental justice claims may be closing. It remains to be seen whether other avenues will emerge, through case law or legislation, for private parties to bring environmental justice claims.

⁶⁸U.S. DOT, “Assessment of Environmental Justice and Public Involvement in the Atlanta Metropolitan Area” (emphasis added). The report cited here was attached to a letter from Ronald A. Stroman, Director, Office of Civil Rights, U.S. DOT, to Frank Danchetz, Chief Engineer, Georgia Department of Transportation, received May 26, 2000.

⁶⁹E.O. 12898, at §6-609.

3.5.1 “Disparate Impact” Claims under Title VI (*Sandoval* Case)

Title VI itself only prohibits *intentional* discrimination, which is extremely difficult to prove. However, the U.S. DOT’s Title VI regulations go a step further, prohibiting actions that have a *disparate effect* on minority populations.

The “disparate effect” standard in the Title VI regulations is similar, at least in concept, to the standard embodied in E.O. 12898, which addresses “disproportionately high and adverse effects” on minority and low-income populations. As a result, plaintiffs seeking to bring environmental justice lawsuits have frequently based their legal claims on the U.S. DOT’s Title VI regulations – not on Title VI itself.

In *Alexander versus Sandoval*, issued on April 24, 2001, the U.S. Supreme Court held that private plaintiffs can no longer bring lawsuits under the U.S. DOT’s Title VI regulations.⁷⁰ As a result, private plaintiffs no longer can bring claims in federal court alleging a “disparate impact” on the basis of race, ethnicity, or national origin. The only avenues still open to private plaintiffs under Title VI are: 1) filing a lawsuit in federal court based on an allegation of *intentional* discrimination, which cannot be proven based solely on evidence of disproportionate effects; and 2) filing an administrative complaint with U.S. DOT, which can include a disparate-impact claim, but does not involve a private lawsuit in federal court.

3.5.2 “Disparate Impact” Claims under Section 1983 (*South Camden* Case)

In the *Sandoval* case, the Supreme Court did not resolve the issue of whether private plaintiffs may be able to bring the equivalent of a Title VI disparate-impact claim under another federal statute – 42 U.S.C. §1983. Just a few weeks after *Sandoval* was decided, a U.S. District Court in New Jersey issued a decision in another high-profile case, *South Camden Citizens for Action versus New Jersey Department of Environmental Protection*. In that decision, the District Court held that Section 1983 *does* allow private plaintiffs to bring disparate-impact claims.⁷¹

The District Court’s decision, however, was overturned by the U.S. Court of Appeals for the Third Circuit in December 2001.⁷² In its decision, the Third Circuit held that Section 1983 *does not* allow private parties to bring the type of disparate-impact lawsuits that the Supreme Court barred in *Sandoval*.

⁷⁰See *Alexander versus Sandoval*, 532 U.S. 275, 121 S. Ct. 1511 (2001)

⁷¹*South Camden Citizens in Action versus New Jersey Department of Environmental Protection*, 145 F. Supp. 2d 505 (D.N.J. 2001).

⁷²*South Camden Citizens in Action versus New Jersey Department of Environmental Protection*, 274 F. 3d 771 (3d Cir. 2001).

The Third Circuit's decision appears to close off, at least for now, the possibility of using Section 1983 as a legal basis for bringing disparate-impact claims. However, it is possible that U.S. Courts of Appeals in other regions of the country will allow disparate-impact claims to be filed under Section 1983. It also is possible that the Supreme Court itself will hear a case involving this issue. Thus, while the *South Camden* case is undoubtedly important, it may not be the last word on Section 1983 claims.

3.5.3 Environmental Justice Issues in NEPA Lawsuits

Unlike Title VI, NEPA is purely procedural: it requires an analysis of environmental impacts and also requires opportunities for public involvement, but it does not restrict the types of decisions that can be made once the necessary process has been completed. As a result, environmental justice claims based on NEPA are quite different from those based on Title VI. In NEPA cases, plaintiffs generally allege that a NEPA document *did not sufficiently consider impacts on minority and low-income groups*; the relief requested in such a lawsuit is usually an order requiring that further study be done.

The ability of private plaintiffs to raise environmental justice issues in NEPA lawsuits remains unresolved. On one hand, there are several reported cases in which courts have rejected efforts to raise environmental justice issues in a NEPA lawsuit; those courts have held, in essence, that raising environmental justice claims under NEPA would be tantamount to circumventing E.O. 12898, which specifically states that it does not create any enforceable legal rights.⁷³ On the other hand, there are a few reported cases in which courts appear to have assumed – without explanation – that a court can review the adequacy of an agency's environmental justice analysis as part of its review of an EIS under NEPA.⁷⁴

Thus, at this point, there remains some uncertainty about whether plaintiffs can challenge an EIS (or other NEPA document) based on alleged inadequacies in the review of impacts on low-income or minority populations. This issue may be resolved in coming years through additional NEPA litigation.

⁷³See *Acorn versus U.S. Army Corps of Engineers*, 2000 U.S. Dist. LEXIS, * 24 (E.D. La. April 20, 2000) (holding that environmental justice claim could not be based on NEPA, even though CEQ regulations required agencies to integrate NEPA analyses with analyses “required by . . . other environmental laws and executive orders”); *Citizens Concerned About Jet Noise, Inc. versus Dalton*, 48 F. Supp.2d 582 (E.D. Va. 1999) (holding that “NEPA does not require an environmental justice analysis” and, as a result, “the court does not have jurisdiction to review this portion of the FEIS [i.e., the environmental justice analysis]”); *New River Valley Greens versus U.S. Department of Transportation*, 1996 U.S. Dist LEXIS 16547, *16 (W.D. Va. October 1, 1996) (holding that plaintiffs cannot “do indirectly under NEPA what cannot be done directly under the Order [i.e., bring an environmental justice claim]”).

⁷⁴See *Donald Young versus General Services Administration*, 99 F. Supp. 2d 59, 84-85 (D.D.C. 2000) (holding that FEIS for federal agency office building adequately considered environmental justice impacts); *American Bus Association, Inc. versus Slater*, 1999 U.S. Dist. LEXIS 20936 (D.D.C. September 10, 1999) (holding that U.S. DOT adequately considered environmental justice issues when deciding not to prepare an EIS for proposed regulations).

3.5.4 Proportionality in Distribution of Benefits and Burdens

There has been relatively little case law that directly addresses the core issues presented in E.O. 12898 – namely, how to determine whether a particular population group is “disproportionately” affected by a project and, if so, how to determine whether such disproportionate impacts are justified. However, in one relatively recent case *Jersey Heights Neighborhood Association versus Glendening*, the U.S. Court of Appeals for the Fourth Circuit directly addressed some of these issues. In that case, the plaintiffs alleged that the location of a highway in a minority neighborhood violated the non-discrimination requirements of the federal Fair Housing Act.⁷⁵ One of the plaintiffs’ arguments was that “similarly situated residents” are entitled to an “equal distribution” of benefits and burdens of the project. The Fourth Circuit rejected this line of reasoning as follows:

“This proportional burden theory is an unmanageable proposition. Under the [plaintiff’s] standard, how is a multicultural society ever to locate a highway? Suppose a roadway runs by a neighborhood that is 35 percent Anglo, 45 percent Latino, and 20 percent African American. Does the predominant ethnic group have a disparate impact claim? What if 35 percent of a route runs proximate to a predominately Asian American neighborhood and 25 percent next to a predominately Hispanic American neighborhood? Will planners have to relocate the corridor to ensure that it affects each ethnicity proportionally? Simply to pose these questions is to demonstrate the absurdity of the result: a twisting, turning roadway that zigs and zags only to capture equally every subset. Such a standard would lead to race-based decision-making of the worst sort. We do not think the drafters of the Fair Housing Act ever contemplated such a reading.”⁷⁶

As a matter of legal precedent, the *Jersey Heights* decision only applies to cases under the Fair Housing Act. However, this case is noteworthy because it signals that courts may be skeptical of lawsuits based on the claim that the benefits and burdens of a transportation project have been distributed disproportionately.

■ 3.6 Conclusions

The basic concept of environmental justice is straightforward: it refers, in the broadest sense, to the goal of identifying and addressing disproportionate adverse impacts on minority and low-income individuals and communities.

⁷⁵ See *Jersey Heights Neighborhood Association versus Glendening*, 174 F.3d 180 (4th Cir. 1999).

⁷⁶ See *Jersey Heights Neighborhood Association versus Glendening*, 174 F.3d 180, 193 (4th Cir. 1999).

However, while the basic concept is simple, the underlying legal framework is complex. The field of environmental justice is governed by numerous statutes, regulations, orders, policies, and guidance documents – many of which are subtly different in their applicability, their requirements, and their enforcement mechanisms. Moreover, the legal framework for environmental justice is still evolving, due to court decisions and the continuing development of U.S. DOT and FHWA policy. The fluidity of the legal regime creates a degree of uncertainty about what actions are needed to comply with E.O. 12898.

Despite the complexity and uncertainty associated with environmental justice, it is possible to draw some general conclusions about the current state of the law in this area:

- **Contexts for Environmental Justice Analysis.** Under E.O. 12898, FHWA requires an analysis of environmental justice issues in three distinct contexts: 1) as part of statewide transportation planning; 2) as part of metropolitan transportation planning; and 3) as part of the NEPA process for individual projects. Each context presents distinct conceptual, practical, and legal issues, as summarized in Table 3.1:

Table 3.1 Contexts for Environmental Justice Analyses

Statewide Planning	Metropolitan Planning	Project Development
Focus is on statewide network – all modes	Focus is on metropolitan network – all modes	Focus is on specific project
Led by state DOT	Led by MPO	Led by FHWA
Considers benefits and burdens	Considers benefits and burdens	Considers benefits and burdens
Subject to Title VI and Title VI regulations	Subject to Title VI and Title VI regulations	Subject to Title VI and Title VI regulations
Not subject to NEPA	Not subject to NEPA	Subject to NEPA

- **Protected Groups.** E.O. 12898 protects both minority populations and low-income populations. Title VI protects minorities against discrimination, but does not apply to low-income groups. Other statutes protect the elderly, the disabled, and women against discrimination, but these groups are not protected under E.O. 12898. Table 3.2 summarizes the sources of protection for each of these groups.

Table 3.2 Groups Protected

Protected by Specific Statute and by E.O. 12898	Protected by Specific Statute but Not Protected by E.O. 12898
Minorities (Title VI)	Elderly (Age Discrimination Act) Disabled (ADA, Rehabilitation Act) Women (Federal Highway Act)
Not Protected by Specific Statute but Protected by E.O. 12898	Not Protected by Specific Statute and Not Protected by E.O. 12898
Low-Income	Other Socioeconomic Groups

- **Types of Effects to Be Considered.** Under E.O. 12898, U.S. DOT requires consideration of “all reasonably foreseeable social, economic, and environmental effects on minority populations and low-income populations.” Thus, essentially every impact category considered as part of the NEPA process – including secondary and cumulative impacts – needs to be considered in an environmental justice analysis.
- **Need to Consider Benefits.** U.S. DOT requires consideration of benefits in three distinct ways. First, the “denial, reduction, or significant delay in the receipt of” benefits constitutes an “adverse effect” for purposes of E.O. 12898, and therefore is to be considered in determining whether there is an adverse effect. Second, “off-setting” benefits should be considered when evaluating the adverse effects on a protected population. Finally, the *overall* distribution of benefits also must be considered.
- **How to Determine “Proportionality.”** There are no established legal standards or guidance for deciding how to measure the proportionality of the distribution of benefits and burdens for a plan or project. Measuring the proportionality of benefits and burdens raises numerous conceptual and practical problems. How is a “benefit” or a “burden” defined? Over what time period should benefits and burdens be evaluated? How should the sum total of benefits and burdens be measured? Is it even possible to calculate such a total? These questions must be answered in order to develop legally sound methods for assessing compliance with E.O. 12898. However, at present, there are no established legal standards or federal guidelines for practitioners to follow in answering these questions.
- **Need to Achieve Proportionate Outcomes.** In early 2000, FHWA and FTA issued guidance stating that one of the three basic principles of environmental justice was to “[a]ssure low-income and minority groups receive a proportionate share of benefits.” Current FHWA guidance, however, “focuses on enhanced public involvement and an analysis of the distribution of benefits and impacts.” The guidance goes on to state that “there is no presumed distribution of resources to sustain compliance with the Environmental Justice provisions.” This more recent guidance confirms that there may be circumstances in which actions with disproportionate benefits or disproportionate burdens can be approved.

- **Approval of Actions with Disproportionate Effects on Protected Groups.** The U.S. DOT and FHWA orders establish standards for approving actions that are found to have a disproportionate impact on minority populations or low-income populations. The orders establish two distinct standards: one for groups that are protected only under E.O. 12898, and one for groups that are protected both under E.O. 12898 and under Title VI. (The orders do not address the elderly, disabled, or women.) The standards set forth in the U.S. DOT and FHWA orders are summarized in Table 3.3.

Table 3.3 Standards for Approving Actions with Disproportionate Effects

Disproportionate Effects on Groups Protected Only by Title VI (Minorities)	Disproportionate Effects on Groups Protected by E.O. 12898 (Low-Income and Minority)
May be approved if:	May be approved if:
1. “A substantial overall need for the program, policy, or activity exists, based on the overall public interest”; and	1. Avoidance alternatives “are not practicable”; and
2. “Alternatives that would have less adverse effects on protected populations (and that still satisfy the need identified in paragraph (1) above, either:	2. Additional mitigation measures also “are not practicable.”
– Would have other adverse social, economic, environmental or human health impacts that are more severe, or	Practicability assessment will take into account:
– Would involve increased costs of extraordinary magnitude.”	– “Social, economic (including costs) and environmental effects of avoiding or mitigating the adverse effects . . .”

- **Enforcement.** There are substantial differences between Title VI and E.O. 12898 with respect to enforcement, as summarized in Table 3.4. Specific and detailed enforcement procedures exist under Title VI and the Title VI regulations. While recent court decisions have reduced the potential for Title VI lawsuits, it is still possible for private parties to file administrative complaints under the U.S. DOT’s Title VI regulations, and the U.S. DOT itself retains the power to enforce these regulations. By contrast, E.O. 12898 does not impose legally binding requirements on entities outside the executive branch of the federal government, nor does it create any rights of judicial review. The U.S. DOT, however, may conduct informal investigations of compliance with E.O. 12898.

Table 3.4 Enforcement Options

Title VI	E.O. 12898
Key issue: actual or threatened “discrimination” based on “race, color, national origin.”	Key issue: “disproportionately high and adverse “ effects on minority and low-income populations.
U.S. DOT may investigate, enforce; subject to specific procedures provided in Title VI regulations.	U.S. DOT may investigate, recommend actions without invoking Title VI procedures.
Private party can file administrative complaint with U.S. DOT.	No administrative complaint procedure is available.
Private party may file lawsuit based on <i>intentional</i> discrimination.	No lawsuits are allowed.
Private party cannot file lawsuit based on “disparate impact.”	

In sum, the legal issues related to environmental justice are both fluid and complex. By developing a clearer understanding of those issues, practitioners can address more effectively the challenges that inevitably arise as part of an ongoing effort to develop and apply technical methods for addressing environmental justice issues.

4.0 Findings from Interviews

■ 4.1 Approach

Interviews were conducted with staff at 15 state DOTs, 22 MPOs, and three transit agencies to determine the particular efforts these agencies were undertaking to address environmental justice in transportation system-level planning and project-development activities.¹ The DOTs and MPOs selected were known or believed to be active in addressing environmental justice issues, and the responses are intended to provide a “snapshot” of the range of current activities rather than represent a random sample of agencies. Agencies active in addressing environmental justice were identified through the NCHRP Project Panel, prior professional contacts, attendance at conferences, and input from FHWA Headquarters, Resource Center, and Division Office staff. In many cases, two or three people within a single agency were interviewed separately, particularly for state DOTs, since project-development and system-level planning are generally conducted through separate offices. A handful of transit agencies believed to be addressing environmental justice issues also were interviewed, to identify approaches used in transit planning. A complete list of agencies interviewed is provided in Table 4.1.

Interviewees were asked about the following general topics:

- What activities has the agency undertaken to address environmental justice?
- How have these activities differed for project-level versus systems-level planning?
- How are “environmental justice” populations defined and identified?²
- What public involvement and outreach activities have been undertaken to reach low-income and minority communities?

¹ An initial round of interviewing was conducted between October 2000 and February 2001. A selected number of these agencies then were periodically recontacted to determine their experience with methods that were being utilized during 2001 as part of either system or project-level transportation planning. Additional follow-up contacts then were undertaken with selected agencies in January and February 2002 to obtain a final update of agency activities and experience.

² The term “environmental justice populations” is not universally accepted as a label, but is used here for conciseness and consistency to refer to the population groups protected under Executive Order 12898. Other labels include “target populations,” “protected populations,” “Title VI populations,” “underserved populations,” and “communities of concern.” Some of these labels may have a meaning that is broader than just low-income and minority populations.

Table 4.1 Agencies Contacted

State DOTs (15)	Arkansas Arizona California Colorado Florida	Georgia Illinois Iowa Kansas Maryland	Minnesota North Carolina Ohio Washington Wisconsin
Metropolitan Planning Organizations (22)	Atlanta – Atlanta Regional Commission (ARC) Baltimore – Baltimore Metropolitan Council (BMC) Binghamton, NY – Birmingham Metropolitan Transportation Study (BTMS) Boston – Boston MPO, Central Transportation Planning Staff (CTPS) Burlington, VT – Chittenden County MPO Chicago – Chicago Area Transportation Study (CATS) Cincinnati – Ohio-Kentucky-Indiana Council of Governments (OKI) Columbus – Mid-Ohio Regional Planning Commission (MORPC) Indianapolis – Indianapolis MPO Los Angeles – Southern California Association of Governments (SCAG) Milwaukee – Southeastern Wisconsin Regional Planning Commission (SEWRPC) Northern New Jersey – North Jersey Transportation Planning Authority (NJTPA) Northwest Indiana – Northwest Indiana Regional Planning Commission (NIRPC) Phoenix – Maricopa Association of Governments (MAG) Punta Gorda, FL – Charlotte County MPO San Antonio – San Antonio-Bexar County MPO (SABCMPO) San Francisco – Metropolitan Transportation Commission (MTC) Stockton, CA – San Joaquin Council of Governments (SJCOG) Springfield, OH – Clark County – Springfield Transportation Study Tucson – Pima Association of Governments (PAG) Washington, D.C. – Metropolitan Washington Association of Governments (MWCOG) Wilmington, NC MPO		
Transit Agencies (3)	Boston – Massachusetts Bay Transportation Authority (MBTA) Cleveland – Greater Cleveland Regional Transit Authority (GCRTA) Seattle – Sound Transit		

- What performance measures have been used to identify the distribution of benefits or burdens of a project or plan?
- How is a “disproportionate impact” defined?

- Which measures and methods have been viewed as useful/successful? Which have been unsuccessful, and why?
- What data and technical resources have you used for environmental justice analysis? What data and technical challenges have you faced?

The remainder of this section describes key findings from the interviews with agencies.

■ 4.2 Summary of Agency Responses

Environmental justice has been considered in transportation planning as a result of the legislation and executive orders described in Section 3.0.³ For example, since 1987, FHWA Technical Advisory T 6640.8A (*Guidance for Preparing and Processing Environmental and Section 4(f) Documents*) has required an assessment of the social, economic and relocation impacts of federally funded transportation projects, including issues such as:

- Changes in neighborhood or community cohesion;
- Changes in travel patterns and accessibility;
- Impacts on overall public safety; and
- General social groups (particularly elderly, handicapped, non-drivers, transit-dependent, and minority groups) that are specially benefited or harmed by a proposed project.

Since the U.S. DOT's adoption of its policy on environmental justice in April 1997 in response to Executive Order 12898, many state DOTs and MPOs have examined the adequacy of their current approaches to environmental justice, and developed ways to strengthen the manner in which environmental justice is addressed. Most of the agencies interviewed noted that they consider addressing environmental justice to be a priority issue. In some cases, they have examined their practices and concluded that the concerns of environmental justice groups already are well integrated into the planning process. In other cases, agencies are identifying changes and enhancements to public outreach and impact assessment activities to better address the needs and concerns of low-income, minority, and other population groups.

³ For general references on environmental justice in transportation planning, see FHWA's environmental justice web site, <http://www.fhwa.dot.gov/environment/ej2.htm>; and

The Council for Environmental Quality's *Environmental Justice Guidance Under the National Environmental Policy Act* (December 1997). <http://www.whitehouse.gov/ceq/>.

Activities to Address Environmental Justice

State DOTs and MPOs are undertaking a variety of activities to address environmental justice. The activities reported in these interviews include:

- Placing items in their work program that devote staff time to assessing and developing environmental justice approaches;
- Co-sponsoring or attending workshops led by the U.S. DOT on addressing environmental justice, as well as sponsoring regional trainings or internal trainings for agency staff;
- Preparing policy statements about how the agency will address environmental justice;
- Preparing materials that include guidance on how to address environmental justice;
- Convening committees that include representatives of community groups and other stakeholders, to identify how environmental justice could be better addressed and to define measures of impact;
- Making staffing changes, such as adding a public involvement specialist;
- Re-examining and expanding the scope and nature of public involvement activities;
- Defining low-income and minority populations, gathering and analyzing data to identify the locations of these groups, and identifying specific actions that would provide improved transportation services to these communities;
- Developing quantitative measures of impact for specific plans or projects; and
- Developing and applying tests for disproportionate distributions of impacts.

Table 4.2 summarizes the extent of these activities among the agencies surveyed. Approaches to environmental justice differ by type of agency (DOT versus MPO) and scope of planning (project-development versus system-level planning), as discussed below.

Table 4.2 Frequency of Activities to Address Environmental Justice

Activity	State DOT		MPO
	Project-Development	System-Level Planning	System-Level Planning
Item on work program		Most	Most
Attend workshops		Most	Most
Sponsor workshops/training		Some	Few
Prepare policy statement or guidance		Some	Few
Convene stakeholder advisory committee		Few	Some
Add staff/reorganize		Few	Few
Enhance public involvement		Most	Most
Develop population profiles	Most	Few	Some
Develop measures of benefit	Few	Few	Some
Develop measures of burden	Some	Few	Few
Define “disproportionate” impacts	Few	Few	Few

Note: The categories “most,” “some,” and “few” can be loosely interpreted as meaning “more than two-thirds of the agencies interviewed,” “between one-third and two-thirds of the agencies interviewed,” and “less than one-third of the agencies interviewed,” respectively.

Differences by Type of Agency and Scope of Activity

State DOTs typically address environmental justice as part of both project-development activities and system-level planning. Project-development encompasses a range of project-specific activities, including corridor studies, environmental analysis and permitting, preliminary engineering, and final design. System-level planning encompasses a range of policy and analytically oriented tasks that typically culminate in preparation of the statewide transportation plan (STP) and state transportation improvement program (STIP). Many state DOTs also provide technical assistance to MPOs and other regional planning agencies as part of their system-level planning efforts.

MPOs, in contrast, focus mainly on system-level planning, but at a regional rather than statewide scale. Project-development activities in a metropolitan area typically are performed by the state DOT, a city or county highway department, a transit agency, port authority, or other local agency. Some MPOs, however, have taken on increasing project development responsibilities in recent years, especially in operational areas such as intelligent transportation systems (ITS) and incident response/freeway patrol. Also, many MPOs have funded, managed, and/or performed corridor-type studies that have involved planning and initial environmental activities for individual projects.

State Departments of Transportation

Within state DOTs, environmental justice issues have been addressed during project development for many years, at least partially, in response to conducting project-level environmental analyses. In response to the recent U.S. DOT emphasis on environmental justice, some state DOTs noted that they are re-examining their environmental analysis techniques within project development to identify if the specific needs of low-income and minority community concerns can be better addressed. Other agencies noted that their existing environmental analysis practices and public involvement techniques for project development adequately consider the needs and concerns of these populations. Some of these agencies are currently focusing on better documentation of their existing practices.

For those DOTs that are revising their project development activities, the most commonly reported activity – noted by at least eight DOTs – is to enhance and expand the public involvement process. Many DOTs, including California, Florida, Iowa, Kansas, Maryland, Minnesota, North Carolina, and Ohio, also are providing internal training or guidance for agency staff on how to identify environmental justice populations and address potential environmental justice impacts. In only a few cases are additional technical analysis methods being proposed to measure and compare project impacts among different population groups.

In contrast to project development, state DOTs that were contacted reported that they are only beginning to address environmental justice as part of system-level planning. For statewide planning, as for project development, a common activity among agencies contacted is to take a closer look at public involvement activities to determine whether input could be solicited from minority and low-income groups in more effective ways. A smaller number of states, including Kansas and Iowa, are beginning to look at ways to identify concentrations of low-income and minority populations at a statewide level. Georgia and Ohio are beginning to assess how the benefits and impacts of transportation programs are distributed statewide. DOTs in Florida and California have developed community impact assessment handbooks for the use of DOT field staff and local and regional agencies in both project and systems-level planning; these DOTs believe that environmental justice issues can be addressed as part of the broader community impact assessment process.⁴

⁴ California Department of Transportation. *Caltrans Environmental Handbook Volume 4: Community Impact Assessment*. (June 1997). <http://www.dot.ca.gov/hq/env/cultural/cia/>.

Florida Department of Transportation. *Community Impact Assessment: A Handbook for Transportation Professionals*. Prepared by Center for Urban Transportation Research, University of Florida; Draft (January 2000). http://www11.myflorida.com/emo/pubs/phys_soc/phys_soc_sci.htm.

The FHWA's guidance for the conduct of community impact assessments is contained in two 1998 publications: *Community Impact Assessment: A Quick Reference for Transportation* (publication No. FHWA-PD-96-036) and *Community Impact Mitigation: Case Studies* (Publication No. FHWA-PD-98-024).

Metropolitan Planning Organizations

MPOs – like state DOTs – are examining and improving public involvement activities on a widespread basis. A significant number of MPOs, however, are also developing data to identify the locations of low-income and minority populations, and many are developing quantitative measurements of the distribution of benefits of the regional transportation plan (RTP) among population groups. Benefits measured for regional plan alternatives have included accessibility, travel times, and transit service provision, as described in Appendix A. In contrast, fewer MPOs have attempted to measure disbenefits (burdens) at the regional level; examples of those who have include MPOs in Atlanta, Los Angeles, and California's San Joaquin Valley. MPOs that have quantified benefits typically have gone through one round of applying these measures and are now in the process of revising and refining their performance measures and evaluation criteria, based on stakeholder feedback.

A number of MPOs noted that they are limited in their ability to address many concerns of environmental justice communities, since they play limited roles in project development, locally funded projects, and maintenance activities. For example, the Southern California Association of Governments noted that it must often point local groups to implementing agencies (such as the state DOT, airport authority, or city) to address project-specific impacts and concerns. Some MPOs have used their role as a regional coordinator, however, to work with other agencies in addressing environmental justice issues. The Pima Association of Governments in Tucson, Arizona has provided training for local agencies to address both technical and outreach aspects of environmental justice during project development. The Indianapolis MPO has sponsored luncheon meetings between community members and other agencies, such as the city transportation department and transit agency, to connect people with others who can address their concerns at a project-specific level. The Metropolitan Transportation Commission in Oakland, CA has begun to work with the county-based Congestion Management Agencies to ensure that they institute appropriate public involvement processes for addressing equity issues during development of their local project-priority lists for the RTP.

Other Agencies

While the outreach effort for this project was focused on state DOTs and MPOs, planning experience indicates that other types of agencies also are addressing environmental justice in various ways, with findings that potentially are relevant to state DOTs and MPOs.

Some transit agencies have addressed environmental justice directly through public involvement in transit service and project development, and through impact assessment in the MIS/NEPA process. Approaches to impact assessment for major projects bear resemblance to those employed by state DOTs, which is not surprising given that similar impacts must be addressed. One transit agency, Sound Transit in Seattle, was contacted for this project because it has applied unique quantitative methods for assessing the distribution of project-specific benefits and burdens. These methods are discussed in greater detail in Appendix A. Other transit agencies, such as AC Transit in Oakland, California, have addressed environmental justice indirectly; for example, through the provision of

access-to-jobs programs to address the needs of mobility-limited populations. While access-to-jobs programs are not directly identified as “environmental justice” programs, they address many of the same goals as environmental justice by improving mobility for low-income populations. Also, transit agencies that receive FTA formula funds have had a long-standing requirement for annual assessment, documentation, and certification of Title VI compliance.

More specific findings of how agencies are addressing specific aspects associated with environmental justice are described in Sections 4.3 through 4.9. Approaches are described for the following activities:

- Establishing an approach to environmental justice;
- Defining and identifying population groups;
- Conducting public involvement and outreach;
- Measuring benefits;
- Measuring burdens;
- Defining disproportionate impacts; and
- Responding to identified environmental justice issues.

■ 4.3 Establishing an Approach to Environmental Justice

A common initial step among agencies contacted has been to systematically assess the adequacy of the agency’s current planning activities in addressing environmental justice issues. An environmental justice item in its work program, and an internal committee may be formed to review the agency’s approaches to environmental justice. If it is determined that deficiencies exist, actions to address these deficiencies are then considered.

In addition to an internal working group, some agencies have formed external advisory committees or task forces that include representatives of various stakeholder groups. These committees are used to help monitor and assess approaches to environmental justice, as well as also serving as a mechanism for public involvement. The purpose and composition of advisory committees are discussed in more detail below.

Early steps in defining and strengthening an agency’s approach to environmental justice also include preparing a policy statement on environmental justice, developing internal guidance for staff, and holding training workshops.

Advisory Committees

A number of agencies – for example, MPOs in Cincinnati, Columbus, San Francisco, and Washington, D.C. – have convened an environmental justice committee or task force to help assess their planning activities with respect to environmental justice. (A few noted that they have used an existing citizens’ advisory committee as a forum to address environmental justice.) The advisory committees are comprised not only of planning staff, but also stakeholders or “representatives” of environmental justice groups such as elected officials, religious leaders, and community leaders. Obtaining community input through an advisory committee can help an agency improve its environmental justice efforts in the following ways:

- The committee can help to formulate an agency’s policy statement or overall approach to addressing environmental justice. Input from stakeholders increases the likelihood that the agency’s approach will be viewed as a “good-faith” effort to address the needs of the community, and not just an exercise that is being done to conform to Federal requirements.
- The committee can help to identify areas of concern to the community that were not viewed as priorities by the MPO. In Columbus, the Mid-Ohio Regional Planning Commission found that issues such as heavy truck impacts, safety and security, and physical conditions were of concern to the environmental justice community. However, these impacts were not well-addressed by existing data sources and analytical approaches.
- The committee can help to identify where the MPO is deficient in its outreach and public participation methods, and how it can improve these methods. For example, participants in the Minnesota DOT’s Non-Traditional Transportation Stakeholder Dialogue Project helped the Minnesota DOT develop public involvement practices that were more effective at reaching non-traditional stakeholders.⁵ The San Joaquin Council of Governments (SJCOG) in California reached an agreement with an organization known as “Oasis,” a local group of black ministers and social service providers, whereby Oasis will provide **formal** critiques of the public involvement process. The critiques will be documented in writing and will be used as a management tool by SJCOG. Plans are being developed to establish similar critique arrangements with the Latino and Laotian communities.
- The committee can help to refine the analytical measures proposed to assess environmental justice impacts. For example, the Environmental Justice Advisory Group (EJAG) in San Francisco examined alternative accessibility measures to identify those which were most meaningful to the community.

⁵ Biko Associates, Inc., and CORE Associates. *Mn/DOT Non-Traditional Transportation Stakeholder Dialogue Project: Final Report*. Prepared for Minnesota Department of Transportation (April 1997).

The committee approach and similar forms of direct outreach to environmental justice communities have not been without debate. Some agencies reported internal disagreement as to whether they should be directly contacting or engaging individual citizens in an advisory or pseudo decision-making capacity; instead, some leaders in these agencies have suggested that they should only be directly contacting the elected officials who represent these communities. Other agencies reported that they feel strongly that direct contact with environmental justice communities is appropriate and provides both tangible and intangible benefits for the agency, for the reasons described above. One particular use of a stakeholder-based committee is described in Example 4.1.

From a logistical standpoint, it may be harder to convene an environmental justice committee with external stakeholders at a state level than for a metropolitan area. The Florida DOT, however, has developed community impact assessment oversight committees for both project development and planning. The Minnesota DOT's stakeholder dialogue project represents another statewide example.

Policy, Guidance, and Training

A few agencies are developing policy statements on environmental justice. Caltrans' policy directive, under development, will discuss what to do, who should do it, and why. This directive will specify a general structure for addressing environmental justice as well as the motivation for addressing it throughout the agency. Southern California Association of Governments has developed a Policy and Procedure document that describes how they are analyzing environmental justice and why.⁶

Other agencies have developed guidance on the assessment of environmental justice. Such guidance has been developed by the Minnesota, Maryland, and Ohio DOTs for the use of district staff.⁷ Caltrans and the Florida DOT have developed guidance for community impact assessment (CIA) that encompasses environmental justice issues. These CIA guidance documents are intended for use by MPOs and regional planning organizations, as well as by DOT staff. In addition to producing guidance, these DOTs have sponsored training designed for district staff, MPO staff, and consultants. A number of DOTs have also co-sponsored FHWA-led training seminars within their states.

⁶ Southern California Association of Governments. Compliance Procedure for Environmental Justice in the Transportation Planning Process. Draft (October 2000).

⁷ Maryland Department of Transportation. *Environmental Justice Guidelines*. Draft (January 2001).

Ohio Department of Transportation. Guidance and Best Practices for Incorporating Environmental Justice into Ohio Transportation Planning and Environmental Processes. January 2002. <http://www.dot.state.oh.us/planning/enviro-just/ej-main.htm>.

Example 4.1 The Mid-Ohio Regional Planning Commission's Approach to Environmental Justice

The Mid-Ohio Regional Planning Commission (MORPC) in Columbus, Ohio convened an environmental justice Task Force in January 2000 to guide its overall environmental justice work. The Task Force was comprised of MORPC staff and 11 members from outside agencies and environmental justice constituencies. The group met six times between January and March, providing significant guidance to MORPC on types of issues to consider and the format of its technical report. The Task Force was specifically charged with three items:

- Review the public involvement process to ensure that targeted populations are included in transportation decision making;
- Develop, identify, and review measures to gauge the regional burdens and benefits of the transportation system investments on the targeted populations; and
- Recommend strategies to improve or mitigate any negative effects.

The Task Force also encouraged MORPC to host an environmental justice open house with members of the public. This open house included a formal presentation of environmental justice analysis results and an opportunity for an open dialogue between MORPC staff and the general public. The major environmental justice-related issues emerging from the work of the Task Force and the open house can be summarized as:

- A lack of reliable, accessible, affordable, convenient and timely transportation systems that can respond to an individual's full range of daily activities;
- A lack of commitment to transportation and public transit by employers and the general public; and
- A lack of alternative modes of transportation.

MORPC also performed an environmental justice technical analysis in April 2001 to support its long-range plan update. In addition, MORPC has focused on enhancing its outreach efforts to environmental justice communities such as by attending community group meetings and submitting articles for community newsletters. MORPC also has written to local jurisdictions to encourage incorporation of environmental justice issues into local project development activities.

For further information: Mid-Ohio Regional Planning Commission. 2025 Transportation Plan (June 2001). www.morpc.org

The Minnesota DOT provides an example of the use of these various strategies to improve the agency's consideration of environmental justice issues (see Example 4.2).

Example 4.2 Minnesota DOT's Approach to Environmental Justice

In June 1997, Mn/DOT formed a Committee on Environmental Justice which brought together planners, engineers and project development managers to develop guidance on implementing environmental justice. The committee prepared Mn/DOT's Environmental Justice Draft Guidance in August 1998. The guidance was run through Mn/DOT's management hierarchy to get official approval from top decision-makers. Mn/DOT points to senior management involvement and support as a major reason for its success in revamping environmental justice and public involvement activities.

In the planning area, the guidance presents 15 general strategies for considering environmental justice. These strategies apply to all planning and programming documents, and Mn/DOT explicitly requested all planning partners to incorporate the strategies in their planning processes. Mn/DOT also committed to assess the composition of decision-making bodies and determine whether the performance measures that it uses have the potential to be prejudicial. For project development, the guidance presents a specific five-step sequence for analyzing and documenting environmental justice concerns.

Mn/DOT's project managers for project development activities are given significant training and authority to work with local constituents in modifying project scope and identifying appropriate mitigation strategies. The project managers are very "visible" to the local community and act as a point of contact from initial layout all the way through project construction. Mn/DOT's project managers build trust with all communities by assuring that decisions and commitments are not revisited at each project stage.

For further information: Minnesota Department of Transportation. Mn/DOT's Environmental Justice Draft Guidance (August 1998). http://www.dot.state.mn.us/pubinvolve/pdf/envjustice_1.pdf

■ 4.4 Defining and Identifying Population Groups

Once an overall approach to environmental justice has been defined, the next step taken by many of the DOTs and MPOs interviewed has been to identify the locations of population groups to be considered. To do this, the agency has needed to define both the characteristics of "EJ" groups and the spatial unit at which these characteristics will be assessed. Environmental justice population groups are usually defined for one of two distinct reasons. The first is to identify areas or population groups that may need to be targeted for special outreach and public involvement efforts. The second is to identify neighborhoods or groups for which to compare the impacts of a project or plan with other, "non-EJ" neighborhoods or groups.

Groups Included

All agencies surveyed include both low-income and minority populations as “environmental justice” populations. A few agencies also have included elderly and/or disabled/mobility-impaired populations within their environmental justice efforts. The agencies that have included additional groups have done so because similar issues are faced, i.e., designing outreach methods and transportation services for special populations.

The specific definitions of “low-income” and “minority” populations vary somewhat from area to area. According to the DOT’s Order of April 1997, “low-income” is defined as “a person whose household income is at or below the Department of Health and Human Services [DHHS] poverty guidelines.”⁸ (The Order notes that a state or locality may adopt a higher threshold for low-income as long as the higher threshold is not selectively implemented and is inclusive of all persons at or below the DHHS poverty guidelines.) The DHHS poverty guidelines set different income standards according to household size. In practice, however, states and MPOs typically set thresholds for “low-income” populations based on household incomes below a set amount – such as \$15,000 or \$17,500 – independent of household size. Setting thresholds based on household size would require the use of two-way tables (number of persons by income category and household size) to identify the population in poverty. Furthermore, while such two-way tables are available in the Census Transportation Planning Package (CTPP), the income categories are set at round numbers and therefore do not directly correspond to DHHS thresholds. Some MPOs worked with income quartiles or quintiles with thresholds as defined in their travel demand model.

The DOT Order defines “minorities” as people who are black, Hispanic, Asian American, or American Indian or Alaskan Native.⁹ Most state DOTs and MPOs contacted either combined some or all of these groups into an overall “minority” grouping, or focused on individual groups with the highest populations in the state or region (usually black, Hispanic, and/or Asian).¹⁰ Some agencies noted that they grouped minority populations in order to simplify their quantitative analysis. Other agencies noted that they considered it more appropriate to analyze population groups separately, since different issues and needs exist for different groups. Appropriate and effective outreach techniques vary, for example, depending upon whether the community is an inner-city minority neighborhood or a rural Native American tribe. Mobility needs also may differ for minority groups compared to elderly, disabled, or low-income populations.

⁸ For the year 2000, the DHHS poverty threshold for a family of four was \$17,050; see <http://aspe.os.dhhs.gov/poverty/for> thresholds for all household sizes, and also for different thresholds for Alaska and Hawaii.

⁹ See <http://www.fhwa.dot.gov/environment/ejustice/facts/index.htm>.

¹⁰ Note that it is technically incorrect to add Hispanic populations to other minority populations, because “Hispanic” is not defined in a mutually-exclusive manner from other racial/ethnic definitions; i.e., Hispanic people may be either white, black, or another race.

Definition of Population Groups

Population groups may be identified on either a geographic basis (characteristics of neighborhoods) or a non-geographic basis (individuals, regardless of neighborhood composition).

Geographic Definitions. The most common approach among agencies contacted is to identify populations based on aggregate characteristics of geographic areas, such as percent minority population, or percent of population with household income below a certain level.¹¹ The level of geographic detail varies by application. Counties or census tracts are commonly used for statewide planning; census tracts, TAZs, neighborhoods or census block groups for MPO system planning; and census block groups, census blocks, or individual households for project development activities.

For the purposes of environmental justice analysis, areas are usually described on a “yes/no” scale – minority or non-minority, low-income or non-low-income – rather than along a continuum. Low-income and minority areas are usually identified separately, as encouraged in DOT guidance. Local agencies typically set their own thresholds or criteria for defining low-income and minority communities. Thresholds for low-income are usually based on the percent population with household income below a certain level, as discussed above. Thresholds for defining minority areas vary widely from place to place. For example, areas in Atlanta are categorized as “minority” if they exceed 50 percent minority population (one standard deviation above the regional mean for census tracts), while areas in Columbus, Ohio are categorized as “minority” if they exceed 17 percent minority population (the regional average). Additional examples of how different areas have defined low-income and minority areas are provided in Example 4.3.

¹¹ The DOT Order on environmental justice states that, “A Low-Income [Minority] population is any readily identifiable group of low-income [minority] persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity.” The common tendency by states and MPOs to use geographic definitions appears to be more a result of analytical necessity than theoretical preference, since common data sources such as the Census provide data in a geographically-aggregated format.

Example 4.3 Definitions of “Minority” and “Low Income” Areas

Minority areas have been defined by the **Mid-Ohio Regional Planning Commission** (MORPC) and some other agencies as those in which the percent minority population for a census tract exceeds the average percent minority for the metropolitan area as a whole. Similarly, low-income areas have been defined as those in which the percent of population in poverty exceeds the regional average.

In preparing an update to its Statewide Transportation Plan, the **Georgia DOT** used a cutoff of one standard deviation above the mean percent minority population or population in poverty.

The **Southern California Association of Governments** describes the income level of communities by quintile, so that impacts can be compared for the lowest 20 percent of incomes with other income groups.

The **Maryland DOT** compares the percent minority or low-income in a census tract or block to the study area as a whole. Tracts or blocks with a “meaningfully greater” percentage are flagged. (“Meaningfully greater” is defined and documented on a study-by-study basis.) Additional data sources are recommended for more detailed investigation.

The **Atlanta Regional Commission** defines EJ communities at the census tract level using the following criteria: 1) those with 20 percent or more of population aged 60 years and older; 2) those with 20 percent or more of the population in the lowest income category (less than \$20,000 per year), 3) those with non-white population of 50 percent or more; and 4) those areas with 20 percent or more of households without autos.

The **Punta Gorda, FL MPO** defines an environmental justice community as meeting one of three categories:

1. Areas consisting of 20 percent or greater minority composition;
2. Areas in which 20 percent or more of households have an annual income below \$10,000; or
3. Areas that have a concentration of single family housing structures valued under \$25,000.

The **City of Tucson, Arizona** used a statistical technique known as “V-scores” to develop population “stress factors” based on 31 socioeconomic and demographic variables. The stress factors were then mapped (www.ci.tucson.az.us/planning/). This approach was taken to address concerns that simply mapping income or race does not fully represent where people are suffering from poverty or disadvantaged conditions. The **Pima Association of Governments** is planning to enhance this approach using factor analysis, once 2000 Census data become available.

The **Metropolitan Transportation Commission** (MTC) in Oakland, CA found that selecting target zones based on a minority concentration that exceeds the regional average resulted in selecting half of the zones as “minority.” Based on discussions with stakeholders, the MTC agreed to use a minority population of 70 percent or more as indicative of a “meaningfully greater” concentration of minority residents, and this threshold was used to define minority “communities of concern.” To identify low-income areas, MTC selected a threshold of 200 percent of the federally defined poverty level to reflect the relatively high cost of living in the Bay Area. Low income “communities of concern” were defined as those zones where at least 30 percent of the total population was below the low-income threshold.

A few agencies noted a concern with mapping or designating specific neighborhoods as low-income or minority neighborhoods. They felt that the designations were a revised form of red-lining, or were concerned about the potential political implications of labeling certain areas as “low-income” or “minority.” Some agencies have been unable to identify significant concentrations of low-income or minority populations, because their overall numbers are low and/or they are not concentrated in a particular neighborhood.

Non-Geographic Definitions. Population groups also can be defined on a non-spatial basis. The elderly and mobility-impaired, for example, may be evenly distributed throughout a region rather than concentrated in specific neighborhoods. Efforts to target these populations may more effectively be performed through service providers or media with an area-wide scope, rather than focusing on institutions and media in specific neighborhoods.

Some environmental justice analysis methods do not require characterizing an area as belonging to one population group or another, but instead require knowing only the percentage of population in that area belonging to the group. For example, environmental justice analyses in Columbus and Seattle have proportioned travel time benefits for trips originating in a particular TAZ among minority and non-minority groups based on the percent of TAZ population that is minority. Another (untested) method would be to correlate travel time benefits with percent minority population by TAZ, to determine whether there is a positive or negative relationship between minority population and travel time benefits.

Data Sources. The decennial U.S. Census is by far the most commonly used source of demographic data, due to its widespread availability, completeness, and consistency. Nearly all of the agencies interviewed, including smaller MPOs, noted that they have a GIS system in which they can work with and display Census data. The Florida DOT has worked to make Census and other data more accessible to local communities through the Florida Geographic Data Library, a statewide “GIS warehouse” containing 220 layers of demographic, environmental, public facility, growth-related, and other data.

A number of agencies expressed concerns that the 1990 Census data – now 12 years old – were unreliable because of shifts in population over the past decade. Some agencies have attempted to use data from local sources, such as social service agencies, or from private vendors to supplement 1990 Census data. The cost or level of effort for acquiring supplemental data varies depending upon the type of data. Examples of supplemental data sources are provided in Example 4.4.

Example 4.4 Data Sources to Supplement Census Data

The **Chicago Area Transportation Study** has used data from the Illinois Department of Human Services' welfare client database to identify the location of low-income families and racial minorities, and to verify the validity of 1990 Census data. CATS has used employment data from the Illinois Department of Employment Security, geocoded by TAZ and industrial category by the Northeastern Illinois Planning Commission, to identify the location of entry-level jobs.

The MPO in **Punta Gorda, FL** has used property appraisals to identify neighborhoods with single-family homes assessed under \$25,000.

For project development, the **Minnesota DOT** "essentially goes to a household level to identify very small groupings of minority and low-income populations," making extensive use of field observation and interviews.

The Bureau of the Census produces annual estimates of minority populations and five-year estimates of population in poverty at the county level. The **North Jersey Transportation Planning Authority** has used these data to revise TAZ-level demographic estimates, consistent with revised county-level totals.

The **Metropolitan Washington Council of Governments** and the **Baltimore Metropolitan Council** have purchased private data that include updated demographic estimates at a more detailed level than is available in Census updates. Some private sources include Claritas and Applied Geographic Solutions.

Iowa DOT has used free and reduced-cost school lunch program data as a proxy for the percentage of population in poverty.

Note: This exhibit does not constitute an endorsement of any particular source of data. Every data source has certain strengths and weaknesses, and it is important for an agency to understand these weaknesses so that a data source is not used in an inappropriate manner.

A few agencies, such as the Arkansas Highway and Transportation Department, noted that they rely heavily on qualitative analysis (e.g., observation, self-definition by neighborhood groups) in addition to quantitative data sources to characterize different neighborhoods and identify low-income and minority population groups. Qualitative assessment typically is done by staff persons with backgrounds in sociology and/or urban planning. The most common use of this approach is to survey and characterize neighborhoods in proximity to a specific planned project. Observational techniques are especially helpful in characterizing neighborhoods that are small or do not correspond well to census geography (i.e., a trailer park). They also can be used as validity checks when existing census data are many years old. Florida DOT's guidance for community impact assessment, used by FDOT districts for most transportation planning and project development activities, reflects an emphasis on qualitative methods rather than quantitative assessment. The desired outcome of the impact assessment is to "know your district."

Future Distributions of Population. Long-range transportation plans are typically developed with a 20-year time horizon, with transportation conditions forecast for a “future year” under various plan alternatives as well as for a “base year.” Future shifts in the distributions of population groups therefore can change the implications of a long-range plan with respect to environmental justice. Some areas forecast changes in income distributions for use in regional travel demand modeling (some travel models rely upon cross-classifications of number of households in a TAZ by income and household size), although in most cases this is done based on current trends. In at least one area, however, future transportation conditions affect the future distribution of households by income; the Northeastern Illinois Planning Commission employs transportation accessibility measures from the Chicago Area Transportation Study travel demand model to forecast the distribution of households by income level.

Reliable techniques for forecasting shifts in racial and ethnic characteristics among small areas do not exist, and none of the agencies interviewed had attempted to do this. For environmental justice analysis involving future year population levels, MPOs typically used regional forecasts of total population by census tract or TAZ, and assumed the same demographic breakdown within each TAZ as existed in the most recently available data (i.e., the 1990 Census). The Southern California Association of Governments did adjust regional totals for forecasted shifts in population by racial/ethnic group, but it assigned these increases to small areas in proportion to the existing racial/ethnic population of each area.

The Census Public Use Microsample (PUMS) is a five percent disaggregated sample of household and person information from the 1990 Census. The Baltimore Metropolitan Council used PUMS data to develop base year (1996) and forecast year (2005) samples of its population according to demographic characteristics, by writing a program to “age” the 1990 sample population based on birth rates and death rates. The demographic data then were used in conjunction with a travel microsimulation model to estimate travel impacts according to personal characteristics. This method, however, does not account for the migration of different population groups.

Mapping and Display of Population Data

Geographic Information Systems (GIS) are a commonly used tool to display population data. Many of the agencies contacted have mapped concentrations of low-income and/or minority populations, for example, by highlighting census tracts with a high percent minority population. The proposed transportation projects are then visually overlaid on the population maps to show where the projects are in relationship to low-income and/or minority populations. The Philadelphia urban area’s Delaware Valley Regional Planning Commission (DVRPC) provides an example of the use of a GIS-based mapping to support the analysis of environmental justice. This is summarized in Example 4.5.

Example 4.5 Delaware Valley Regional Planning Commission's Strategy for Fair and Meaningful Involvement of All People, "... and Justice for All"

The Delaware Valley Regional Planning Commission GIS mapping methodology is based on the following seven steps:

1. Identify census tracts at or above the regional threshold for the following indicators: minority, Hispanic, poverty, car less households, elderly, and disabled;
2. Overlay these indicator coverages by census tract to obtain a measure of, "degree of disadvantage";
3. Overlay rail and bus system maps, the region's arterial highway network, Job access/Reverse Commute transportation services, hospitals, and employment centers to create a, "Quality of Life" factors map;
4. Overlay a map combining Degrees of Disadvantage and Quality of Life factors on the regional transportation plan and TIP;
5. Assess gaps or areas of lower quality transportation accessibility or areas lacking recommended projects;
6. Recommend mitigation activities to identify the identified service or project gaps; and
7. Simultaneously assess how the adopted land use and transportation plan addresses these disadvantaged areas qualitatively.

Recommend policy or program recommendations to address any issues found in the qualitative analysis.

For further information: Delaware Valley Regional Planning Commission,
<http://www.dvrpc.org/planning/ej.htm>

Mapping of population data has been performed for two primary purposes. The first is to illustrate to planners where specific population groups are located, so that special outreach or assessment can be applied to those areas. The second is to illustrate to both planners and the public the distribution of transportation projects in relation to different population groups.

It may, however, be difficult to show through mapping alone how well a project or plan performs along environmental justice lines. Unless there is an obvious overlap (or lack of overlap) between the projects and specific population groups, the extent to which some groups are impacted compared to others may not be clear. Thus, additional quantitative analysis often is required to measure the relationships between population groups and specific benefits or burdens. For example, the proportion of population within a defined "service area" or "impact area" that is minority can be estimated and compared to the proportion of minority population in the region as a whole.

■ 4.5 Conducting Public Involvement and Outreach

A common theme among agencies interviewed was to move beyond “traditional” public involvement techniques such as area-wide public meetings, newsletters, and announcements in regional newspapers. Agencies are experimenting with a range of techniques that more specifically target minority and low-income communities and make it easier for people to express their opinions within the transportation planning process. Many of the innovative techniques being applied to ensure the participation of low-income and minority communities are having benefits beyond these communities, and are being used to increase the level of citizen participation in general.

Public involvement in transportation planning has received significant attention over the past three decades, with additional reinforcement provided by the Intermodal Surface Transportation Efficiency Act of 1991. As a result, much has been learned about effective public participation techniques. Techniques for involving low-income and minority communities, in particular, have become more widely understood. Some recent guidance on public involvement is found in EPA (1998).¹²

The remainder of this subsection discusses how state DOTs and MPOs lay the groundwork for a more effective public involvement approach, as well as specific techniques that have been applied within the context of environmental justice. Some DOTs and MPOs, such as the Ohio-Kentucky-Indiana Council of Governments in Cincinnati, have formally defined their approach, by revising their Public Involvement Plan. Others have moved informally toward enhancing their public involvement activities. Some like Florida, California, and North Carolina are enhancing their existing approaches for conducting community impact assessments. A few, including the Baltimore Metropolitan Council and Maricopa Association of Governments, have hired additional staff with expertise in outreach methods. To improve public involvement at the project level, some DOTs have placed greater emphasis on this in their trainings for district-level project managers. Other agencies have been working to document pre-existing public involvement procedures that they feel provide adequate outreach to low-income and minority populations.

Groundwork

The first step usually taken by the DOTs and MPOs contacted to improve their outreach efforts has been to develop an understanding of the communities that are being targeted. Community or neighborhood boundaries, population characteristics, key community organizations and leaders, locations of activity centers, and communication channels are all considerations that are important in helping to design an effective public outreach

¹² United States Environmental Protection Agency. *Final Guidance For Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses*. Office of Federal Activities (April 1998). <http://es.epa.gov/oeca/ofa/ejepa.html>.

program. Accumulated staff knowledge is helpful in this regard. For example, the Arkansas Highway and Transportation Department has a trained sociologist on staff who has worked with the agency for 20 years and developed a close familiarity with communities throughout the State. Staff at city and county planning departments also can be a valuable source of knowledge about local communities. Developing a database of contacts, including organizations and individuals, can assist in conducting systematic outreach.

To assist in designing appropriate public involvement and environmental justice analysis techniques, a number of agencies also have established environmental justice advisory committees. These committees, made up of various stakeholders including community leaders, can help to represent community viewpoints. MPOs in areas such as Baltimore, Cincinnati, San Francisco, Stockton, and Washington, D.C. have utilized advisory committees to help identify outreach methods that have the greatest chance of success at reaching people.

Examples of community leaders or groups that have been tapped for representation on advisory committees include elected officials, neighborhood associations, clergy, faith-based groups, minority chambers of commerce, neighborhood business associations, community development corporations, local advocacy groups such as chapters of the National Association for the Advancement of Colored People (NAACP), and homeowners associations. Developing a truly “representative” committee can nevertheless be a challenge, especially when organized groups are weak or nonexistent. Some agencies have expressed concern over whether the people or groups they had reached out to were representative of the community; for example, whether a minority business association would reflect the interest of residents of the area.

Surveys, focus groups, or one-to-one interviews also can be used to identify effective outreach techniques. For example, for its current RTP update, the Pima Association of Governments in Tucson, Arizona initiated a pre-survey of environmental justice groups to get their direct input on what types of outreach activities the communities would like to see. This pre-survey builds on discussions with local jurisdictions and one-on-one interviews with selected individuals to gauge satisfaction with outreach activities during the last RTP cycle. The Atlanta Regional Commission has used one-to-one interviews with environmental justice community leaders to identify barriers to participation. The San Antonio-Bexar County MPO has plotted the locations of RTP and TIP meeting attendees to help identify the success of their outreach efforts.

At a state level, public involvement activities often vary by district. DOTs in states such as Arizona, California, Florida, and Ohio typically leave districts free to tailor public involvement activities to the needs of the specific project and area. States are increasingly providing guidance or training to district staff, however, to ensure that consideration is given to environmental justice issues in designing a project-specific public involvement plan. Example 4.6 describes the Minnesota DOT’s approach towards examining and improving its public involvement procedures.

Example 4.6 Examining Public Involvement in Minnesota

In 1995 and 1996, Mn/DOT convened the Non-Traditional Transportation Stakeholder Dialogue Project (NTTSDP) to identify non-traditional stakeholder groups, build better relationships with these groups, and create a forum for dialogue and two-way learning. Based on feedback from process participants, general recommendations were developed for statewide public involvement and presented to Mn/DOT management for adoption. In 1997, a Public Involvement Task Force undertook extensive market research, including citizen focus groups, to develop a public involvement guidance document for the agency. This document includes findings from the NTTSDP project and therefore specific strategies for reaching out to environmental justice populations.

Mn/DOT currently is in the process of expanding their NTTSDP process statewide. This statewide process will provide input to the next statewide transportation plan update, which is due in January 2003.

Enhancements to public involvement generally fall under one of two categories: first, making special efforts to involve people in existing formats such as public meetings and comment opportunities; and second, developing alternative participation techniques that more effectively engage people in the transportation planning process.

Making Special Efforts to Involve People

Obtaining public participation can be chronically difficult unless people see how they will be directly affected by a project. Obtaining participation in minority and low-income neighborhoods can be further hampered by cultural or socioeconomic barriers, lack of transportation, and perceived disempowerment. Thus, agencies may need to make extra effort to reach out to low-income and minority communities. Many of the state DOTs and MPOs surveyed noted that enhancing and expanding public involvement activities has been a primary component of their environmental justice efforts. Some of the lessons that have been learned by DOTs and MPOs include:

- **Focus publicity in the neighborhood.** A mailing list of affected residents may be feasible in the case of a specific project, but not for a regional or statewide plan. Announcements or articles in community or ethnic newspapers, flyers at local destinations/activity centers, announcements on local radio stations, ads in transit vehicles, and “tabling” at community fairs or events are techniques that have been used to bring information directly to people in specific neighborhoods. Communication through existing channels (e.g., social service agencies, churches) has also been found to be effective.
- **Facilitate attendance at public meetings and forums.** People often do not attend meetings because they are too far away, the time is inconvenient, or they require child care. Many agencies have increased participation in meetings by holding them in community locations such as a community center, church, or library, rather than

centrally at city hall or the transportation building. Holding meetings in the evening or at different times of day can make it easier for working people to attend. Some agencies, such as the Iowa DOT and Northwest Indiana Regional Planning Commission, have also provided child care at meetings or even transportation to meetings, which is especially important for the mobility-impaired. The Arkansas Highway and Transportation Department has a mobile public involvement trailer that is used when there is no readily available building in the area to host a meeting with citizens. The Pima Association of Governments (PAG) in Tucson, Arizona works with social service agencies to co-sponsor targeted events, and has found that providing interpreters, child care, and food are effective enticements for increasing turnout. The Atlanta Regional Commission (ARC) has learned that it is helpful for environmental justice groups rather than ARC to call and sponsor public meetings.

- **Involve people early and keep them engaged.** Many agencies have learned to solicit opinions and involvement at the beginning of the planning process. This can make the entire planning process run more smoothly because issues of concern can be identified and addressed early on, before plans are well-developed. Engaging people early also helps to build trust. In addition, as staff at the Mid-Ohio Regional Planning Commission in Columbus have noted, participants need to feel that their opinions are respected and being considered, otherwise, they will not stay engaged in the process.
- **Explore other creative techniques.** Children, for example, can serve as a way of reaching adults who would otherwise be difficult to engage. Information can be sent through schools for children to take home to their parents, or a class project can be developed around the transportation project. Florida and Wisconsin are examples of states that have made effective use of this approach.

Overcoming Language Barriers

In addressing issues of environmental justice during the transportation planning and project development process, attention needs to be devoted to population groups having a limited proficiency in the English language. The U.S. DOT on January 22, 2001 issued policy guidance, pursuant to Title VI of the Civil Rights Act of 1964 and implementing regulations, to assist agencies in meeting their responsibilities to limited English proficient (LEP) persons in order to avoid discrimination against LEP persons on the grounds of national origin.¹³ The policy is designed to ensure that reasonable steps are taken to ensure reasonable access to programs, services, and information that are consistent with

¹³ Federal Register: January 22, 2001 (Volume 66, Number 14), *DOT Guidance to Recipients on Special Language Services to Limited English Proficient (LEP) Beneficiaries*. The guidance is consistent with Presidential Executive Order 13166, *Improving Access to Services for Persons with Limited English Proficiency*, and the Department of Justice Policy Guidance document, *Enforcement of Title VI of the Civil Rights Act of 1964 – National Origin Discrimination Against Persons with Limited English Proficiency*, both of which were issued on August 11, 2000. Copies of these documents are located on the following Department of Justice web site: <http://www.usdoj.gov/crt/cor/13166.htm>.

available resources. Each recipient agency is asked to conduct an assessment of needs, develop a language assistance plan, train staff in LEP-related issues, provide special language assistance, and monitor the effectiveness of the activities undertaken.

The agencies contacted have taken a number of steps to respond to persons having a limited proficiency in English, primarily during the project development process. These include translating materials into one or more languages; involving the target community in the review of translated materials to eliminate inappropriate word choice and increase the effectiveness of the messages; including a person having language translation skills as part of the project team or in public meetings; utilizing schools, community centers, or faith-based organizations to help reach these populations; and broadcasting announcements and participating in shows on non-English local radio stations. An example of an approach employed by a Caltrans district-level project manager is given in Example 4.7. Staff at the Fayetteville, North Carolina MPO and the Chicago Area Transportation Study (CATS) have taken Spanish lessons to assist in communicating with Hispanic populations. Since Title VI of the Civil Rights Act of 1964 applies to “people in the United States,” special language services also should be provided to non-citizens, regardless of immigration status. In states such as Texas, care is taken in these situations not to travel in vehicles that might be mistaken for being an official vehicle and to be sensitive to the styles and colors of clothing that are worn.

Example 4.7 Connecting with an Ethnic Minority Group

A project in Caltrans’ District 3 illustrates the use of innovative public involvement techniques. A planned crossing of the Feather River would have sent traffic directly into a Hmong neighborhood. There was no attendance at a public meeting, which concerned the district engineer. The engineer then went to a local church and had a priest translate the information, and also mention an upcoming public meeting and request peoples’ input. To the community, this was an important endorsement of Caltrans’ request for involvement. Caltrans also took information to school and asked kids to take it home with them. As a result of these efforts, at the next public meeting (where child care was provided), 80 people were in attendance.

Alternative Participation Techniques

In addition to making special efforts to reach out to people, agencies have undertaken a variety of alternative or supplemental involvement techniques. These techniques can help to systematize or broaden the base of public participation, rather than simply relying upon whoever shows up at community meetings. Techniques that have been utilized include:

- **Focus groups.** Focus groups can be used to assess transportation needs as well as reactions to various alternatives. The Wisconsin DOT held focus groups with minority groups and Indian tribes to identify the concerns of these groups at multiple stages in

the statewide planning process, including at the beginning, alternatives analysis, draft plan, and final plan stages. Focus groups also have been used by DOTs in Georgia, Iowa, and Maryland. The Pima Association of Governments used focus groups with environmental justice communities (elderly, low-income and minority) throughout its previous RTP process. Each focus group was targeted at topics for a specific phase of plan development including needs assessment, priority development, and feedback on the draft plan. PAG has found focus groups to be one of their most effective mechanisms for interacting with EJ communities.

- **One-to-one or small group meetings.** Meetings with community leaders can serve, in addition to larger public meetings, to ascertain the needs and concerns of a community. Regular contact with these leaders can help to build up working relationships between the planning agency and the community. The San Antonio-Bexar County MPO has met one-to-one with representatives of community and neighborhood groups to discuss the regional transportation plan. Discussions with other agencies whose clients rely on transportation services can help to identify transportation needs and target programs. For example, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) in Milwaukee has worked with public transit operators, welfare-to-work agencies, and workforce development boards to facilitate and attempt to identify best projects for Federal welfare-to-work and reverse commute funding. SEWRPC is also working with these agencies to involve people in long-range planning for the region. The agency has found that particularly when the topic is as abstract as a long-range transportation plan, it is easier to involve people through one-on-one discussions than through group or public meetings. The Indianapolis MPO has sponsored a luncheon meeting on a bi-monthly basis with target neighborhoods. At these meetings they have brought in other people who can better address concerns such as sidewalks and bus stops that are below the level of detail that the MPO can attend to. These luncheons have been “very successful” in helping people meet others who can address their concerns.
- **Design workshops/charrettes.** For a project that will physically impact a community, design charrettes can be utilized to help identify design solutions that minimize impacts or maximize benefits to the community. Charrettes increasingly are being used in land use and transportation planning to successfully engage people in what otherwise could be an abstract discussion of traffic volumes and zoning regulations.
- **Public opinion surveys.** Surveys can be taken to obtain feedback on the quality of transportation services. In its most recent customer survey, SEWRPC over-sampled low-income and minority areas to obtain statistically valid samples in these areas. To address environmental justice issues, needs and attitudes can then be examined specifically for these areas and compared to the region as a whole.

■ 4.6 Measures of Benefit

Among the agencies interviewed, measures of the distribution of benefits were most commonly developed by MPOs for the purpose of assessing the regional transportation plan. A few examples were also found in which project-level benefit measures were compared among population groups. Georgia DOT is an example of a state that has compared measures of benefit for the statewide transportation plan. A number of agencies that had not already applied quantitative measures of benefit, especially MPOs, noted that they were considering doing so.

Measures of benefit used for environmental justice have included:

- Accessibility to jobs or other activities;
- Travel times to selected activity centers;
- Provision and quality of transit service; and
- Other measures, including proximity to projects, user characteristics, and asset conditions.

These measures typically are compared among two or more population groups (i.e., minority versus non-minority), and for pre- and post-project conditions for a given population group. Additional detail on specific measures is contained in Appendix A.

Accessibility

Accessibility can be defined as the ability to reach desired destinations such as jobs, shopping, or recreational opportunities. The most common and easily understandable measure of accessibility is the number of jobs within X minutes travel time of the average person (thresholds of 15 to 90 minutes have been used, with a range of 30 to 45 minutes the most common). Alternatively, a travel-time-weighted index of job accessibility can be constructed. Accessibility also can be measured to discrete opportunity points; e.g., the percentage of population within Y minutes of a hospital, shopping mall, regional park, or other locally defined places of significance. In addition, accessibility measures typically are calculated separately for automobile versus transit modes.

At least eight MPOs noted that they had applied accessibility measures to assess the distribution of impacts of their most recent regional transportation plan.¹⁴ Accessibility to jobs can be measured fairly simply using travel model data. Accessibility to other

¹⁴ An example of one approach is described in the National Capital Region Transportation Planning Board and Metropolitan Washington Council of Governments report, *A Regional Accessibility Analysis of the 1999 Financially Constrained Long-Range Transportation Plan and Impacts on Low-Income and Minority Populations*, Washington, D.C., (May 2000).

activities requires a bit more work to define the activities to be included (e.g., hospitals or shopping centers of a given size) and identify their location. At least two MPOs – the Chicago Area Transportation Study and the Southern California Association of Governments – have measured accessibility for low-income workers specifically for entry-level jobs.

The Metropolitan Transportation Commission (MTC) in San Francisco noted some limitations, however, with regional accessibility measures. For example, once environmental justice advocates were presented with regional measures of job accessibility, they were interested in additional detail such as accessibility to specific activities and by specific locations and population groups. The MTC noted the difficulties in achieving a balance between keeping the number of measures limited (both for ease of comprehension and to keep the analysis manageable), and providing a sufficient level of detail to adequately characterize conditions from the viewpoint of the affected population groups. Furthermore, some advocates felt that travel model results may be too removed from real world equity issues that are perceived as important. For example, accessibility measures for the discrete destinations that are of most interest to EJ communities may not be adequately determined from regional models in which all activities are assumed to be geographically concentrated in a centroid of a traffic analysis zone. Such an analysis, it is contended, glosses over walk access requirements and may not adequately assess the lack of reliability in transit service and schedules.

While accessibility measures have been used primarily for regional systems analysis, they have been applied for analyzing major projects as well. For example, accessibility measures have been applied to analyze the distributional impacts of major transit investments in San Juan, Puerto Rico and Seattle, Washington.

Travel Times

Travel time measures are closely related to accessibility, although expressed in different terms (time from point A to point B, rather than number of opportunities within X minutes). Conceptually, a variety of travel time-related measures of benefit are possible. In EJ practice, at least three measures have been used: average travel times to regional activity centers (San Antonio and Raleigh); average travel times by trip type (Columbus); and travel time savings resulting from the project (Seattle). In each case, the travel time measures were compared among population groups. As with accessibility, travel time measures can be computed with relative ease from travel demand model data.

While the measures appear similar, they can be compared and interpreted in different ways. San Antonio's evaluation compared travel times to major activity centers from minority versus non-minority neighborhoods under the regional transportation plan. Columbus' analysis was the most complex, comparing travel times by trip type for nine combinations of population groups and four alternative regional conditions. This was done graphically, however, in a manner that was easy to interpret. In Seattle, travel time savings resulting from a project were allocated among population groups, and the

proportion accruing to each group was compared to the proportion of each population group in the transit agency's service area as a whole.

Transportation Services

A handful of areas have developed measures related to the availability and/or quality of different transportation services. Measures have been developed that relate to the distribution of both transit service and roadway projects. In contrast to accessibility and travel time measures which evaluate the *opportunities* that can be reached by different transportation modes, these measures simply describe the extent of transportation services available.

Availability of transit service. The most basic measure of transit service is the percentage of population, by population group, within a given distance of a bus route or transit station (one-quarter mile is typically used for a bus route and one-quarter to one-half mile for a transit station). While this measure describes the availability of transit service, it does not say anything about the quality or coverage of this service, or the availability of this service by time-of-day. The Boston MPO considered quality of service by assessing a variety of measures, including availability of transit service of different levels of frequency, load factors, average age of vehicles, and percent of vehicles with air conditioning. These measures were compared for routes in minority versus non-minority and low-income versus non-low-income areas. Other measures of transit service, such as those presented in the *Transit Capacity and Level of Service Handbook*,¹⁵ also could be used. On a statewide basis, Georgia DOT has compared the availability of local transit service among counties with different population characteristics.

Distribution of RTP, TIP, or STIP projects. The GIS approach of overlaying projects with population data can be taken one step further to quantify the distribution of projects with respect to the distribution of population. For example, the percentage of TIP projects in minority neighborhoods can be compared to the percentage of regional population in minority neighborhoods. To further refine the analysis, the distribution of funds could be compared instead of the distribution of projects. Such a "proximity" analysis has been proposed but seldom applied in practice. It assumes that neighborhoods *benefit* by proximity to a project, which may be true for some types of projects (such as pedestrian improvements) but not others (e.g., freeways or other projects with significant negative localized impacts). The San-Antonio-Bexar County MPO has plotted all funded MPO projects and overlaid them with demographic information. At a state level, Ohio DOT compared the distribution of STIP projects by geographic area.

Distribution of TIP or STIP project users. This is an enhancement on the concept of looking at the distribution of TIP projects. Instead of examining the neighborhoods in which the project is located, the characteristics of the *users* of the project are identified.

¹⁵ Kittelson Associates, Inc. *Transit Capacity and Level of Service Manual*. Prepared for Transit Cooperative Research Program; TCRP Web Document 6 (January 1999). <http://www4.nas.edu/trb/crp.nsf>.

This can be done with a travel model using a “select link” analysis, in which the origins and destinations of trips on the specific transportation facility (link) are identified. Population characteristics of the origin zones then can be used to infer the characteristics of the users of the facility. The hypothesis is that people benefit from the project in proportion to their usage. There are some limitations to this hypothesis, however, since (for example) zero-car households are less likely to benefit from a highway project than car-owning households in the same origin zone. The “select link” technique is most applicable for individual projects or for analyzing a set of specific projects contained in a TIP or RTP. It has been proposed for use in New Jersey as well as in the Atlanta metropolitan area. This type of analysis could be expanded to analyze the distribution of performance measures (change in vehicle-miles of travel, vehicle-hours of travel, etc.) by neighborhood, as proposed in Indianapolis.

Maintenance-Related Measures

Stakeholder groups in some metropolitan areas have expressed concern that maintenance expenditures (pavement, bridges, sidewalks, landscaping, etc.) are not equitably distributed by neighborhood. If TIP projects are geocoded, it may be possible to analyze the distribution of maintenance-expenditures in a TIP by geographic area using a GIS. An enhancement of this approach is to establish various standards for asset conditions and compare the conditions among neighborhoods. Bridge conditions (e.g., structural deficiencies or functional obsolescence) or pavement conditions (e.g., pavement serviceability rating) can be obtained in many areas through state- or MPO-maintained bridge and pavement management systems. The coverage of these systems may be limited, however, as state asset management systems typically include only roads maintained by the state. One challenge in looking at asset-related measures is to identify measures that have significance to the communities being impacted, rather than simply using measures that are convenient because the data are readily available. Also, the relatively long lifespan of transportation assets needs to be considered; at any given point in time, relative capital and maintenance investment needs may vary from area to area depending upon the age of existing infrastructure in the area.

■ 4.7 Measures of Burden

While it has been most common among the agencies interviewed to compare measures of benefit among population groups at a regional or systems level, measures of burden (negative impacts) most commonly are evaluated at the project level. Potentially negative impacts of transportation projects may include:¹⁶

- Community cohesion/disruption;
- Economic (reduced business revenue and employment);
- Fiscal decline (tax base and property values);
- Costs borne by taxpayers;
- Displacement of residents, businesses, or public amenities;
- Restricted access to other transportation modes (i.e., pedestrian);
- Reductions in safety and personal security;
- Emissions, air quality, and health;
- Increased noise; and
- Diminished aesthetics.

Most agencies interviewed noted that they addressed transportation burdens through the traditional NEPA process. Populations in the project study area are first characterized, and concentrations of low-income and minority populations are identified. The anticipated impacts on different population groups may be described from a qualitative standpoint; for example, community cohesion or business disruption in different neighborhoods. Takings (residential or business) are typically quantified, as are traffic, emissions, air quality, and noise impacts. With the exception of takings, however, the magnitude of quantifiable emissions impacts is not normally compared among population groups. Procedures have been developed for community impact assessment that cover a range of community impacts, including considerations for low-income and minority populations; c.f. FHWA (1996),¹⁷ as well as the previously referenced community impact assessment manuals by Caltrans and the Florida DOT.

¹⁶ A project's community impacts could be positive as well; for example, a transportation project may spur local economic development or improve conditions for pedestrians in a neighborhood.

¹⁷ Federal Highway Administration. *Community Impact Assessment: A Quick Reference for Transportation*. Publication No. FHWA-PD-96-036 (September 1996).

NCHRP Project 25-19 has resulted in a guidebook on methods, primarily quantitative, for assessing social and economic effects of transportation projects.¹⁸ Forkenbrock demonstrates a methodology for using noise and air quality models in conjunction with Census data and a GIS to assess impacts according to population characteristics.¹⁹ GIS data disaggregation techniques also have been used in conjunction with dispersion models to analyze the distribution of impacts at a regional level in European cities. These methodologies are described in a recent FHWA publication.²⁰

Another important impact relevant at the systemwide level is the distribution of who pays for transportation improvements. Equity in transportation finance is a topic that has been considered in the academic literature, particularly equity among income groups and geographic areas. An application of fiscal equity analysis to environmental justice, however, was uncovered during this review in only one agency, the Southern California Association of Governments (SCAG). SCAG analyzed the sources of tax revenue used to finance the long-range transportation plan and the incidence of each source by income quintile. SCAG then compared the distribution of benefits of the plan by monetizing travel time savings and accident cost reductions.

From a systems perspective, many of the negative impacts of transportation are hard to quantify because traditional assessment techniques (e.g., air quality dispersion models) depend upon a level of detail about projects that can be cumbersome to implement for a regionwide collection of projects. Qualitative impacts by population group are even harder to assess from this perspective. The U.S. DOT-sponsored benefits and burdens project in Atlanta tested methods for examining the distribution of some of the more quantifiable impacts of a regional transportation system. These include air quality, noise, safety (accidents), and transportation costs. The analysis methods are described in more detail in Section 5.6.

Table 4.3 summarizes the various types of transportation benefits and burdens, as well as their typical scale of analysis for environmental justice purposes (systems or project level) and nature of analysis (quantitative or qualitative).

¹⁸ Forkenbrock, David J., and Glen E. Weisbrod. *Guidebook for Assessing the Social and Economic Effects of Transportation Projects*. National Cooperative Highway Research Program (NCHRP) Report 456, Washington, D.C., 2001. <http://www4.nationalacademies.org/trb/crp.nsf/>.

¹⁹ Forkenbrock, David J. and Lisa A. Schweitzer. *Environmental Justice and Transportation Investment Policy*. Public Policy Center, University of Iowa (1997).

²⁰ U.S. Department of Transportation, Federal Highway Administration: *Toolbox for Regional Policy Analysis*. <http://www.fhwa.dot.gov/environment/plngtool.htm>.

Table 4.3 Measures of Transportation Performance as Used to Assess Environmental Justice

Measure	Benefit or Burden	Scale and Nature of Analysis (Typical)	
		Systems Level	Project Level
Accessibility/travel times	+	✓	✓
Transportation services	+	✓	
Maintenance	+	✓	
Fiscal (transportation finance)	-	✓	
Community cohesion	+/-		○
Economic development	+/-		○
Fiscal (local government)	+/-		
Displacement	-		✓
Safety and security	+/-		○
Air quality	-		✓
Noise	-		✓
Aesthetics	+/-		○

+ = Benefit (positive impact of transportation).

- = Burden (negative impact of transportation).

✓ = Quantitative analysis.

○ = Qualitative analysis.

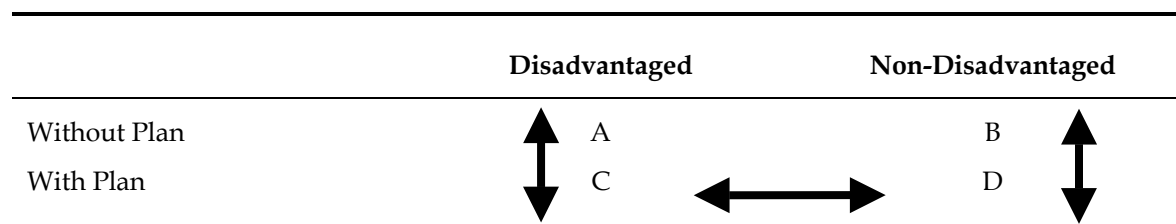
■ 4.8 Defining “Disproportionate” Impacts

Whereas many states and MPOs have identified low-income and minority populations, and some have measured the impacts of a project or plan on these groups as compared to other groups, very few have specifically defined “disproportionately high and adverse effects” or identified how they are to be measured. This is true at both the systems and the project planning level. The Florida DOT’s community impact assessment handbook outlines what is probably a typical approach to evaluating disproportionate impacts in project planning. The handbook states that disproportionate impacts should be identified by identifying the potential population that might be affected by the transportation project, comparing the distribution of potential impacts on local populations, and reviewing results with members of the potentially impacted population. The handbook, however, does not identify a specific means of testing for disproportionality, aside from the use of judgment by the analyst in consultation with the community.

The lack of specificity in testing for disproportionate impacts is not surprising because the issues involved in determining whether impacts are truly “disproportionate” are not easy. In particular, the following questions must be answered:

- What precisely is being compared – an *absolute* measure of performance (e.g., accessibility, ambient air quality) under baseline and/or plan conditions for different population groups? The *change* in a measure between baseline and plan conditions for EJ populations? Or the *relative change* between baseline and plan conditions, for EJ versus non-EJ population groups? (Figure 4.1.) The choice of comparison may lead to different conclusions. For example, if minority neighborhoods are worse off than non-minority neighborhoods under plan conditions, but *relatively less* worse off than they would be without the plan, are the impacts of the plan “disproportionate”?
- For the measure that is being compared, is the difference between two population groups, or the change resulting from the project or plan, statistically significant? (i.e., are we confident that the variation among neighborhoods is not due to chance?) Even if statistically significant, is it practically significant? (i.e., could an average person discern the difference?)
- What if multiple measures give conflicting results? For example, what if a port expansion improves low-income accessibility to jobs but also creates additional environmental impacts on low-income neighborhoods?

Figure 4.1 Possible Comparisons in Assessing Proportionality of Impacts



Possible environmental justice comparisons:

- A versus C: Is disadvantaged better off with plan than without?
- C versus D: Is disadvantaged better or worse off than non-disadvantaged, if plan is implemented?
- $(C - A)$ versus $(D - B)$: Does disadvantaged benefit more from plan than non-disadvantaged?

Only two of the respondents indicated that they have taken steps toward defining disproportionate differences from a quantitative standpoint. These included:

- The Metropolitan Transportation Commission in the San Francisco Bay Area, which utilized statistical tests to compare changes in accessibility between baseline and regional plan conditions for “disadvantaged” neighborhoods (A versus C in Figure 4.1). These tests indicated whether the changes were statistically significant or not.

Statistical tests also were applied to determine whether differences under regional plan conditions between disadvantaged and non-disadvantaged neighborhoods were significant (C versus D in Figure 4.1).

- Sound Transit in Seattle, calculated the percentage of total project benefits and impacts accruing to minority (or low-income) population groups, and then compared that percentage to the total percentage of minority (or low-income) population in the study area. If the amount of benefit or impact accruing to the minority/low-income population was at least one standard deviation greater than the mean percentage of minority/low-income population in the study area, the difference was determined to be significant.

Questions about the statistical significance of a particular measure can be resolved with the help of statistical tests. Other questions, such as the weighting of different measures that lead to different conclusions about the distribution of benefits and burdens, do not have straightforward answers. Instead, these may need to be resolved, as with other problems where multiple criteria are involved, through a decision process in which public involvement and professional judgment are used to weigh the relative importance of the various measures and the merits of the possible tradeoffs.

■ 4.9 Responding to Identified Environmental Justice Issues

Agencies are considering environmental justice not simply to satisfy legal requirements, but with the intent of responding to these issues throughout the planning process. This section provides examples of how state DOTs and MPOs have addressed environmental justice considerations that have arisen during project or systems-level planning.

At the project level, environmental justice concerns tend to be explicitly voiced in only a small number of specific projects undertaken by a DOT. When environmental justice concerns are raised, the response is increasingly as it would be for any project with significant community impacts. Treat the issue seriously and avoid the impacts as much as possible through alternative alignments, design strategies, etc. If there are no practical alternatives, then develop minimization and mitigation strategies. Transportation agencies increasingly are trying to work through problems with communities instead of potentially subjecting themselves to time-consuming and project-threatening lawsuits. The ideal approach is to come up with an approach that will enhance the social, economic, and other benefits to the affected communities, as well as providing improved mobility within the broader region.

Mitigation approaches increasingly include not only reducing direct impacts (e.g., through the provision of soundwalls or pedestrian overpasses), but also compensating the community in other ways. For example, community improvements such as parks or pedestrian amenities may be offered as compensation for the negative impacts resulting from the project. Example 4.8 illustrates how the North Carolina DOT has worked with a local

community to identify and implement measures that benefit the community. Not only these measures, but also the DOT's demonstrated good faith in attempting to find alternatives and compensation, have helped to gain local acceptance for the project in this example.

Example 4.8 Addressing Community Concerns Through Mitigation

A planned bypass of Wilmington, NC illustrates how environmental justice issues can be addressed by listening to and addressing community concerns. A "southern" bypass alternative initially preferred by the DOT would have passed through Wrightsboro Center, a primarily non-minority community. When this alternative encountered strong opposition, the DOT re-evaluated a "central" alternative to the north of Wrightsboro. This alternative, however, disrupted an established minority community, and would have resulted in the destruction of a church as well as a cemetery that were extremely important to the community.

To address these issues, the DOT embarked upon a "comprehensive" public involvement strategy aimed at mitigation. Two task forces made up of agency staff and local stakeholders were convened – one to look at each alternative. Rather than arguing the merits of the alternatives, each group was charged to identify major concerns with their alternative and propose mitigation strategies. A resulting detailed analysis showed that the central alternative was clearly preferable to the southern alternative, based on a variety of measures such as relocations and wetlands impact. The central alternative, however, still caused many concerns for the local minority community.

To address these concerns, the DOT put a strong effort into implementing the mitigation strategies proposed by the central alternative task force. These included measures to reduce impacts, such as building soundwalls in excess of departmental policy and redesigning an interchange to avoid the cemetery. Even more significantly, the DOT committed to measures that would benefit the community. Some of these measures included paving roads, clearing ditches, and landscaping a relocated arterial adjacent to the church. The most important action to the community, however, was that the DOT commissioned a biographical sketch of the state's first black senator, Lou Grady, who was buried in the cemetery. The sketch was published in a booklet, and a ceremony was held to dedicate a historical marker for Senator Grady placed by the church.

The biography brought Senator Grady to life for the community, and gave a very uplifting sense to a community which had expected at the beginning of the study that it was going to be "dumped on" once more. Because of the mitigation strategies emerging from the public involvement process and NCDOT's demonstrated efforts to go above and beyond expectations, the final design of the highway was of general satisfaction to all of the communities involved.

The extent to which environmental justice considerations have affected systems-level planning is more difficult to discern since many of the MPOs and DOTs contacted are still in the early stages of developing system-level environmental justice performance measures and figuring out how to interpret these measures. Some have concluded that there are no disproportionate burdens on low-income and minority communities, or that these communities would benefit from the proposed plan or program. Others are explicitly

incorporating environmental justice initiatives. As part of its regional transportation planning process, the San Francisco Bay Area's Metropolitan Transportation Commission is taking several major equity initiatives that are specifically directed at serving the targeted "communities of concern." These include a lifeline transit system that will cover key spatial and temporal service gaps in the region's current transit system, the development of community transportation plans that identify needs and strategies within disadvantaged communities, a transit affordability study, and subsidized transit fares for low-income students. If environmental justice considerations are introduced during the early stages of a systems planning process, then the combined results of public involvement and technical analysis can help to guide the kinds of projects considered and the priorities that are assigned. As environmental justice measures become more routinely considered at an earlier stage of the long-range plan development, they may have greater potential to influence the outcome of the plan.

In addition to the specific effects that can be identified, the anecdotal evidence gathered in the interviews indicates that environmental justice efforts are leading to greater awareness among planning staff of the needs and concerns of minority and low-income communities. Perceptions of planning staff about what is important are not always equal to what the community perceives as important. For example, the set of accessibility measures used in the San Francisco area were perceived favorably by planners, but were viewed as limited in their usefulness by stakeholders convened as part of an environmental justice advisory committee. Involvement also has led to the identification of specific issues that the agency was not aware were a concern, such as truck traffic in neighborhoods of Columbus, Ohio.

Finally, most agencies that have addressed environmental justice have made an effort to document their overall approach, specific activities, and any findings that have resulted. Not only does this satisfy state and Federal officials that these issues are being addressed, but it also helps to communicate the approach and findings to local stakeholders, who may in turn provide feedback to the agency.

■ 4.10 The U.S. Environmental Protection Agency's Approach to Environmental Justice

The charge of the U.S. Environmental Protection Agency (EPA) is protecting the environment, and public health associated with environmental pollution or contamination. Since there has been a long time concern that low income and minority communities may be disproportionately impacted by the effects of environmental degradation, environmental justice constitutes a significant focus of EPA's activities. For example, EPA recently sponsored the development of a report assessing the legal basis and opportunities for further

involvement in environmental justice in its various fields of jurisdiction.²¹ The authorities of the Clean Air Act with respect to standard setting, permitting, and enforcement have important implications for environmental justice since disproportionate numbers of low-income and various racial and ethnic communities live in urban environments having high levels of air pollution. Public health is the underlying theme of the Clean Air Act, including not only average or healthy individuals but also more sensitive populations such as those living in “hot spots.” There is a concern that exposure to air pollutants may explain why these communities are particularly susceptible to respiratory illnesses such as asthma and bronchitis. Mobile source-related air toxics are another subject of significant current interest.

A review of how the EPA has approached environmental justice, thus, can help to provide some context for current state DOT and MPO approaches. EPA helps to address environmental justice issues associated with pollution point sources such as powerplants, waste treatment and disposal facilities, and other forms of environmental pollution that are regulated by the agency. EPA created an Office of Environmental Justice in 1992, commissioned a task force to address environmental justice issues, and developed an implementation strategy, as required under Executive Order 12898. EPA also formed the National Environmental Justice Advisory Commission to help define and coordinate Federal policy on environmental justice. While EPA headquarters has set overall policy and implemented some national research and demonstration programs, discretion largely has been left to EPA Regional Offices to develop more specific environmental justice approaches for projects and programs over which the EPA has regulatory authority.

Overall Approach

EPA’s environmental justice strategy includes five general components:

1. **Promoting partnerships, outreach, and communication** with “affected communities, Federal, Tribal, State, and local governments, environmental organizations, academic institutions, non-profit organizations, and business and industry.”
2. **Conducting health and environmental research** to improve the scientific basis for making decisions, prioritizing risks, and pursuing pollution prevention opportunities.
3. **Identifying and filling gaps in data** required to identify and address disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.
4. Including a focus on environmental justice issues in **enforcement initiatives and through compliance analysis, data analysis, and regulatory review.**

²¹ Environmental Law Institute. Opportunities For Advancing Environmental Justice: An Analysis of U.S. EPA Statutory Authorities. Washington, D.C. (November 2001).

5. **Implementing model projects** to address specific pollution issues affecting low-income and minority communities, for example, Brownfields redevelopment or addressing industrial pollution in the Mississippi Delta Region.

EPA has issued guidance for incorporating environmental justice into the NEPA process.²² This guidance largely makes reference to the recommendations of the Interagency Working Group on Environmental Justice (IWG) on issues such as identification of populations and measurement of disproportionate impacts. The guidance generally identifies factors that people should consider, but it is not prescriptive. For example, with respect to disproportionate impacts, the guidance simply states that “The IWG’s guidance suggests the need for the analyst to exercise informed judgments as to what constitutes ‘disproportionate’ as well as ‘high and adverse.’” Recommended responses if EJ populations are identified include enhanced outreach efforts, increased sensitivity to cumulative impacts, and serious consideration of alternatives and mitigation.

EPA’s Office of Environmental Justice currently is in the process of developing more specific guidance on environmental justice, which should be released during 2002. This guidance is likely to include a recommended general approach plus an array of tools that can be used to identify and define population groups, conduct public outreach, measure “disproportionate” impacts, etc. The guidance will not be prescriptive because the EPA feels that appropriate procedures depend upon the context of the analysis.

To provide technical assistance in addressing environmental justice issues, EPA has developed and distributed LandView, a CD-ROM reference atlas that combines maps with demographic and economic census data along with EPA facility databases.²³

Regional Approaches

Specific environmental justice policies and implementation actions are largely left to the EPA Regional offices. Some examples of Regional initiatives include:

- **Region 5** has developed *Interim Guidelines For Identifying And Addressing A Potential Environmental Justice Case*.²⁴ The guidelines outline “a multi-step process for determining whether a case should be considered a potential environmental justice case,” based on demographic data for areas surrounding a site (see Example 4.9).

²² United States Environmental Protection Agency. Final Guidance For Incorporating Environmental Justice Concerns in EPA’s NEPA Compliance Analyses. Office of Federal Activities (April 1998). <http://es.epa.gov/oeca/ofa/ejepa.html>.

²³ <http://www.epa.gov/swerosps/bf/lvinfo.htm>.

²⁴ <http://www.epa.gov/reg5oair/ej/ejmain.htm>.

Example 4.9 Excerpts from EPA Region 5 Interim Guidelines

To begin, the assessor is prompted to obtain demographic information for the census block group in which the case is located and other adjacent block groups within a one mile radius. If the low-income population or minority population percentage is greater than twice the State percentages, the case should be identified and addressed as a potential environmental justice case. The assessor should then follow the enforcement, permitting and community involvement protocols, as appropriate. ["Protocols" include prompt response and enhanced public outreach.]

If the low-income population or minority population percentage is less than twice but greater than the State percentages and if there are community-identified environmental justice issues, the case should be identified and addressed as a potential environmental justice case and the protocol followed as indicated above.

- **Region 6** developed a ranking scheme to determine whether an "environmental justice indicator" exists. The formula ranks facilities or actions on a scale of zero to 100. Population density, percent minority population, and percent of economically depressed household data are important analytical factors.²⁵
- **Region 7** has collected data to assess concerns that minority and low-income populations are exposed to greater risk because they live in close proximity to toxic and hazardous waste facilities. GIS maps have been developed for each of the combustion facilities located in Missouri, Kansas, and Nebraska.²⁶
- **Region 9** has begun to identify and address environmental justice issues through an Environmental Justice Assessment Project. GIS is being used to target low-income communities and minority communities in the Region that are in close proximity to a high number of potential pollution sources. The Agency "will then examine current federal, state, and local activities aimed at reducing or eliminating potential exposures and risks in these 'environmental justice communities,' in order to identify communities where environmental needs are not being adequately addressed."²⁷

According to staff in the Office of Environmental Justice, the relative emphasis on public involvement versus technical analysis varies according to the context of the case. In general, however, public involvement has been more widely pursued than technical analysis as a response to potential environmental justice concerns. One approach espoused by the office (but not necessarily followed everywhere) is, rather than first attempting to identify environmental justice population groups, to instead identify the geographic areas where

²⁵ U.S. EPA Region 6, Office of Planning and Analysis. *Computer Assisted Environmental Justice Index Methodology*. July 1994. Referenced in EPA Guidance, April 1998.

²⁶ <http://www.epa.gov/swerosps/ej/ejaa96/execsum.htm>.

²⁷ http://www.epa.gov/region09/cross_pr/ej/index.html.

the project will have the most significant impacts. Then, demographic data are used to characterize the local population, which helps to determine the most appropriate outreach/involvement methods.

With respect to cumulative (versus project-specific) impacts, EPA has in a few cases been proactive but is more often “responsive” to issues that are raised by other parties. For example, EPA responded to an article in a national law journal raising questions about whether penalties for Superfund sites in low-income and minority neighborhoods were disproportionately low. EPA analyzed data on this and also looked for potential underlying causes for this effect. An example of the proactive approach is with the new Tier 2 regulations for sulfur content of fuels. Under these regulations, numerous refineries will need New Source-Review (NSR) permits. EPA will look at potential disproportionate impacts on low-income and minority communities, with aggressive up-front outreach to identify and address any potential problems early in the process.

National Environmental Justice Advisory Commission

Two specific efforts by the National Environmental Justice Advisory Commission (NEJAC) are notable. The first involves Waste Transfer Stations (WTS). The siting of WTSs has been implicated as being systematically biased against low-income and minority communities, for various reasons. NEJAC’s approach has been to acknowledge this issue and, in response, to develop principles for the siting and operating of these facilities on a consensus basis with a wide range of stakeholders. Its recommendations range from “regulatory actions and the development of a best practices manual to immediate actions in the communities suffering from the clustering and disproportionate siting of WTSs, WTSs in close proximity to residential uses, and the unsafe operation of WTSs.”²⁸

The second is the development of a “public participation model,” which describes core values, principles, and a checklist to follow for public participation efforts.²⁹ Barriers to public participation and ways of overcoming these barriers are also identified in EPA’s guidance for incorporating environmental justice into the NEPA process.

²⁸ *A Regulatory Strategy For Siting And Operating Waste Transfer Stations: A Response to a Recurring Environmental Justice Circumstance: The Siting of Waste Transfer Stations in Low-Income Communities and Communities of Color.* EPA 500-R-00-001 (March 2000). <http://es.epa.gov/oeca/main/ej/nejac/wts/index.html>.

²⁹ <http://es.epa.gov/oeca/main/ej/nejacpub.html>.

■ 4.11 Environmental Justice in Transportation Planning: Unresolved Issues

While state DOTs and MPOs have taken a number of important steps to improve the manner in which issues of environmental justice are addressed during system and project-level planning, these interviews at the same time identified a number of unresolved issues that are relevant to the structuring of efforts to address environmental justice as well as the interpretation of findings. There is no simple answer to the questions raised by these issues, and yet they are significant enough that they were raised as concerns by a number of the agencies interviewed. Many of these issues may be candidates for further investigation and research with respect to their implications for environmental justice analysis.

Representation of low-income and minority communities. The establishment of advisory committees that include stakeholder representation has been a successful means in some areas for obtaining input from minority and low-income communities. Yet other areas have struggled with the question of how to recruit appropriate “representation.” Who can represent a “community?” Are elected officials the best means? Can staff of a social service agency adequately represent the concerns of the low-income people that they serve? How are individuals identified who can represent the concerns of a broader community? Recruiting an advisory committee requires an in-depth knowledge of the community on the part of agency staff, and also requires specific, targeted recruitment efforts rather than just a blanket call for participants.

Special treatment versus equal treatment. Addressing the needs of low-income and minority communities does not mean ignoring the needs of other communities. Some DOTs and MPOs noted that they have *not* made special efforts to address environmental justice because they believe their current planning procedures adequately address the needs of all communities, *including* minority and low-income communities.³⁰ These agencies espouse a philosophy of “equal” treatment. Nevertheless, agencies that have made special efforts to address environmental justice needs and concerns are not necessarily acting at the expense of other communities. For example, many efforts to reach out to low-income and minority communities have been undertaken because of specific cultural or socioeconomic barriers to participation in these communities. In such cases, “special” treatment may also be viewed as “equal” treatment because it is helping to ensure that the concerns of all communities are being heard and addressed.

Historical and structural inequities in transportation planning. Concerns have been expressed in Atlanta, Boston, and other metropolitan areas by minority advocates that transportation planning historically has systematically failed to consider minority community needs because these communities have not had representation on or access to decision-making bodies (such as the MPO board). The extent to which this lack of access

³⁰ These agencies typically have made special efforts to *document* existing practices, however, to show that Federal requirements are being satisfied.

has been intentional versus unintentional, and the degree to which recent actions have alleviated this situation is not entirely clear. However, concerns continue to exist among some minority advocates that past planning decisions have led to inequities in the present situation that need to be rectified. Questions are being asked about the structure and manner in MPOs, transit agencies, and even state DOTs are governed, and the placement of environmental justice responsibilities within these organizations.

Differences in issues and needs among population groups. Two distinct geographic issues have been raised in transportation-related environmental justice analyses. The first has to do with equity in the *spatial* distribution of transportation benefits and burdens for groups that are geographically clustered. The second has to do with addressing special transportation needs of *geographically dispersed* population groups such as the elderly and mobility-limited populations who either can not afford a car or are unable to drive and thus may be mobility-limited. The difference between issues and needs by population group, as shown in Table 4.4, is particularly relevant given the question of whether to broaden an environmental justice analysis beyond just low-income and minority populations. The transportation needs, and relevant performance measures, analysis techniques and outreach strategies for elderly and disabled populations – which are not likely to be concentrated spatially – are fundamentally different than those for minority and low-income “communities” which tend to be defined more on a spatial basis. Appropriate public participation and outreach strategies also are different.

Table 4.4 Issues and Needs by Population Group

Population Group	Potential Spatial Inequities?	Provisions of Special Needs Services?
Minority	Yes – If disproportionate impacts exist in the location of transportation facilities or services based on minority composition of neighborhood	No
Low-Income	Yes – If disproportionate impacts exist in the location of transportation facilities or services, based on income composition of neighborhood	Yes – for people who cannot afford a vehicle
Elderly	No	Yes – for those unable to drive
Disabled	No	Yes – for those unable to drive

Role of community impact assessment in environmental justice. Related to the question of spatial versus non-spatial impacts is the question of whether a community impact assessment (CIA) framework is adequate for addressing environmental justice issues. Designed to develop a sound understanding of the social and economic environment of a

community, a CIA integrates technical analyses with an intensive program of public involvement activities that provides input for developing a community profile, defining project alternatives, evaluating potential impacts, and identifying potential mitigation strategies. A community impact assessment normally is carried out in conjunction with a project-level environmental impact analysis.

Some agencies are addressing environmental justice by building upon and expanding their existing CIA procedures. Other agencies have adopted or are developing non-CIA-based approaches that they believe fulfill the requirements of environmental justice. While CIA addresses many issues associated with environmental justice, there also are important differences. Thus, while CIA can serve as a foundation upon which to build for purposes of addressing environmental justice, a CIA in its traditional form, by itself, may not be sufficient.

CIA, by its very definition, is based on working with geographically based communities; a CIA traditionally does not directly address special needs of geographically dispersed populations such as the elderly and disabled. In addition, community impact assessments traditionally have not been conducted in support of systems-level transportation planning efforts, although Florida is now attempting to integrate CIA into their MPO and statewide transportation planning processes. Also, CIA generally does not address issues associated with the denial or delay of benefits for populations protected under Title VI of the Civil Rights Act of 1964, building instead on the requirements of Section 109(h) of Title 23, U.S.C.

A commonly expressed fear is that incorporating improved analyses of potential issues of environmental justice will lengthen an already long transportation planning and project development process and create additional opportunities for community opposition. This fear, however, is not supported by the interviews conducted for this project. Regardless of whether a CIA or non CIA based approach was utilized as the basis for the assessment of environmental justice, contacts in California, North Carolina, Ohio, and elsewhere concluded that addressing environmental justice and related community issues constitutes good planning, with the result that delays are reduced and the goals of environmental streamlining are achieved.

Consideration of secondary and cumulative effects. The majority of attention is being devoted to assessing the direct benefits and burdens of a proposed transportation project, plan, or program. The potential secondary and cumulative impacts of transportation and community investment decisions are receiving considerably less emphasis. At the same time, many of the concerns expressed by community groups relate to the cumulative effects of past highway and public transportation decisions. Looking into the future, consideration of secondary and cumulative impacts involves issues such as the use of land resources and the location of employment opportunities relative to the places of residence for low-income and minority populations. The Council on Environmental Quality defines cumulative effects as, “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future

actions regardless of what agency or person undertakes such other actions.”³¹ While transportation agencies acknowledge the importance of these secondary and cumulative impacts, they feel that existing planning analysis approaches and tools are not well designed to address these kinds of longer-term indirect effects. More importantly, they feel that in many ways these issues are beyond their ability to control or even influence.

Addressing issues of public health. Transportation-related health effects associated with ozone, fine particulate matter, and air toxics increasingly are being raised as an issue if environmental justice in the public consideration of transportation investments. The question is the degree to which low-income and minority populations are disproportionately affected in terms of different kinds of medical conditions, and the role that transportation sources may have in contributing to these differential effects. Effects of highway proximity on the incidence of asthma attacks and lung cancer frequently are cited, with the South Coast Air Quality Management District’s *Multiple Air Toxics Exposures Study (MATES-II)* frequently referenced as a source. A number of studies report that increases in mortality and morbidity can be associated with small particles derived from combustion of fossil fuels. Concerns, though, have been raised about currently available health effect studies, and the degree to which existing results should be relied upon is not yet entirely clear. The Health Effects Institute reports that, “much additional epidemiologic and toxicologic research is still needed to account for how both short-term and (especially) long-term exposure to PM and other pollutants affects the human cardiovascular and respiratory systems and to identify which physical and chemical features of PM are relevant to its toxicity.”³²

Transportation agencies traditionally have not directly addressed health-related aspects of air pollution; the issues are extremely complex; important areas of uncertainty remain; and yet agency staff are now being asked to address these questions in an informed and responsible manner. Additional research, combined with the synthesis and interpretation of existing research results, would contribute to improved assessments of air quality as part of broader analyses of environmental justice.

Future distributions of population. The demographics of a neighborhood can change dramatically over the time horizon of a 20-year long-range transportation plan. Some neighborhoods may gentrify while racial and ethnic groups may shift their locations. Furthermore, the transportation project itself may affect the characteristics of a neighborhood. A new rail transit station may cause a neighborhood to gentrify, thus displacing the low-income people the service was meant to serve. Conversely, new investment adjacent to or near a residential neighborhood may cause property values to decline and result in lower-income households moving in. Because it is difficult or impossible to accurately

³¹ The Council on Environmental Quality’s January 1997 report, *Considering Cumulative Effects Under the National Environmental Policy Act*, can be accessed on the Internet at <http://ceq.eh.doe.gov/nepa/ccenepa/ccenepa.htm>. Another useful document is NCHRP Report 403, *Guidance for Estimating the Indirect Effects of Proposed Transportation Projects*, National Academy Press, Washington, D.C., 1998.

³² Health Effects Institute, *Airborne Particles and health: HEI Epidemiologic Evidence*, HEI Perspectives, Charlestown, Massachusetts, June 2001.

predict these changes, environmental justice analyses typically assume the locations of population groups to be fixed. Yet, while a project or plan may be adopted with one understanding of the distribution of benefits and burdens, the actual distribution 20 years in the future may turn out to be quite different. Transportation agencies feel they do not have the analytical capabilities necessary to forecast changes in the residential location of minority and low-income populations.

The uses and misuses of quantitative analysis. Concern has been expressed by advocacy groups in the San Francisco Bay Area and elsewhere that planning agencies are undertaking technical analyses to quantify impacts with the intention of “proving” that there is no discrimination, or that such analyses are being manipulated (through the choice of performance measures, scale of analysis, etc.) to obtain the desired results. Conversely, frustration has been expressed by some planning agencies that advocacy groups insist at looking at different measures until one or more measures can be found that “show” a discriminatory pattern. The risk of quantitative analysis, therefore, is that many different measures can be developed, with different conclusions drawn depending on which measure is examined. Yet quantitative measures can be helpful, if used properly, in developing an improved understanding on the part of all interests of the degree to which disproportionate impacts truly exist. Addressing this problem requires planners and stakeholders to work cooperatively in agreeing on the measures they feel are most relevant and useful, while at the same time recognizing the limitations of any one particular measure.

A closely related issue is the adequacy of existing data sources to support the kinds of environmental justice analyses that may be desired by community interests as well as by the agency itself. Existing data, including but not limited to traditional four-step travel demand modeling systems, are useful in examining a number of potentially important issues related to environmental justice, but at the same time may not be entirely satisfactory. The important concerns to many environmental justice communities often are highly localized, involving such things as the condition and existence of sidewalks, the availability of bus shelters, the hours of bus operations, and the ability to easily travel to neighborhood activity centers. Regional travel models, their underlying databases, and other information systems maintained by state DOTs and MPOs, though, typically are not designed to support impact analyses at this level of local detail. In conducting systems planning level analyses of environmental justice, the challenge therefore becomes how to integrate local information and concerns into the framework of a larger regional analysis.

Dealing with multiple time horizons. Since planning activities can cover a timeframe extending up to 20 or more years in the future, some agencies are unsure how to address potential inequities that may arise but be limited in time. For example, while an environmental justice analysis supporting an RTP may show no disparate effects, a three-year TIP which is a subset of this RTP may contain a set of projects and expenditures that is not as equally distributed among geographic areas or population groups. Also, since projects are constrained spatially (i.e., a project to address corridor congestion tends to focus on that corridor), any single project may have unequal effects for different population groups. Some agencies are wondering how to address short-term inequities when a longer-term investment program does not indicate similar inequities.

In addition, there may be temporal patterns in the distribution of benefits and burdens stemming from historical patterns of when infrastructure was developed as well as from current patterns of growth. In any given time period, therefore, one area may have few needs while another has more substantial needs. Relevant questions in this case are: 1) is the *baseline* distribution of transportation services measured in absolute terms (as opposed to the incremental investment) equitable?; and 2) over the *long* term, is the investment in different areas adequate and consistent with their population and related transportation needs (including operations and maintenance as well as capital expenditures)?

Relationships between project development activities and systems-level planning. An issue raised by a number of interviewees is a too-frequent “disconnect” between project development and system-level planning. Some agencies stated that such a disconnect hampers efforts to address environmental justice, as well as to address other environmental and community impacts. This disconnect may result from a number of factors:

1. At the state level, different departments and staff typically are responsible for project development and system planning. Project development activities frequently are guided by explicit guidance material that specifies the type of analysis, considerations, tools to use, etc. In contrast, similar explicit guidelines typically do not exist for system-level planning, so it may be more difficult to systematically incorporate an analysis of environmental justice into a policy-oriented statewide system-level process.
2. At the metropolitan level, MPOs typically are responsible for system-level planning while the state DOT or local jurisdictions are responsible for project development. Most MPOs have only a limited ability to require project sponsors to follow a set technical or public involvement process to address environmental justice. Most MPOs also have only a limited ability to require project sponsors to assess a project’s effects on regional goals and objectives as listed in the RTP, although some MPOs have been effective at requiring such an analysis for purposes of project funding in the TIP.
3. Long-range planning, by its very nature, tends to deal with larger scale regional issues (e.g., what are regional levels of accessibility? How do speeds by functional class vary across the region?). Project development efforts, in contrast, tend to focus on more direct and smaller scale impacts. There are inherent differences in the types of issues (and associated measures, data, tools, etc.) that are relevant in each of these stages of transportation planning.

Addressing the relationship between systems-level planning and project development requires that a number of questions be addressed. Does consideration of environmental justice at the systems level mean that it is addressed at the project level? If there are cumulative impacts that are not simply the additive impacts of specific projects, how is project selection and development affected by knowing these broader impacts? How can the development of specific projects be directly linked to the goals set forth in a long-range transportation plan? What is the most effective process for agencies to collaborate on linking planning and project development? These are questions with implications that extend beyond environmental justice analysis.

5.0 Other Analytical Approaches

Considerable work is ongoing to develop and implement improved analytical capabilities directly related to environmental justice. While in many cases these methods have not yet been directly applied by state DOTs and MPOs for environmental justice analyses, the methodologies nonetheless are readily available and routinely used for other analysis purposes. This section summarizes information on a selected number of these methods. These include use of data from the Year 2000 Census of the Population, GIS-based visualization and analysis techniques, spatial disaggregation and analysis (as opposed to GIS mapping or display) methodologies, FHWA's Surface Transportation Efficiency Analysis Model (STEAM), and the use microsimulation modeling techniques (such as household-level forecasting).

The section concludes with summaries of two ongoing projects directly related to environmental justice. One is a joint FHWA, FTA, Atlanta Regional Commission, and Georgia DOT project examining the distribution of transportation-related benefits and burdens within the Atlanta metropolitan area. The other is the two-year NCHRP Project 8-41, *Effective Methods for Environmental Justice Analysis*, which began in the spring of 2001.

■ 5.1 The 2000 Census

The 2000 Census data, while bearing many similarities to previous years' Census data, provides important differences as well as additions relevant to environmental justice analysis. Characteristics and uses of the 2000 Census data, as well as differences compared to the 1990 data, are described in Appendix B. Some of the most noteworthy changes include:

- Respondents were allowed to select and identify more than one race. Guidance issued by the Office of Management and Budget (OMB Bulletin No. 00-02) requires that race should be reported for five single race categories, four double race categories, and additional categories for which at least one percent of the population falls. The Census data will include six 'single race' tabulations as well as 57 categories for those who marked 'more than one race.'
- In addition to the standard tabulations, the Census Bureau also will allow users to access tables through the Internet via a portal called the American FactFinder (AFF). Using the AFF, custom tables can be developed for an area without depending on a standard package.

- The new Census Transportation Planning Package (CTPP) will include a flow table consisting of minority journey-to-work trips by origin and destination for minority populations. This will allow the analysis of spatial commuting patterns by minority populations. The proposed CTPP 2000 standard tabulations will contain approximately 30 other tables that can be used to support analysis of environmental justice.

The expected timeframe for availability of the 2000 Census data is as follows:

- The redistricting file (PL-94-171) provides race and ethnic origin data at the geographic detail of Census block. It is the first decennial Census product to be released, and was distributed during the spring of 2001.
- Summary File 1 (SF 1) will contain population data such as age, sex, race, and household data such as household size, race of the householder, presence of children, and household composition at the block level. SF 1 was available for all states as of September 2001.
- Summary File 3 (SF 3) will contain sample data from the long form, weighted to represent the total population. Most of the tabulations will be in two-way tables (e.g., race of household by income), at the level of the block group or Census tract. SF 3 should be available between June and September of 2002.
- The Census Transportation Planning Package (CTPP) will contain tabulations by place of residence (Part 1), place of work (Part 2), and for flows between home and work (Part 3), at the TAZ level. The residence portion (Part 1) of the CTPP package currently is scheduled to be released between October and December of 2002, with the release of Parts 2 and 3 planned for the period February to April of 2003.

Even before the full 2000 CTPP is released, information from the redistricting and SF 1 files can be incorporated into a regional transportation planning analysis. For example, an estimate of TAZ-level year 2000 population by race and ethnicity can be developed by overlaying 2000 Census block group data on TAZs. If desired, separate race/ethnicity and income group trip tables could be developed by combining data from the Year 2000 redistricting file, currently available travel demand model data sets, and the 1990 CTPP.

■ 5.2 GIS-Based Visualization and Analysis

Geographic information systems (GIS) are designed to combine and analyze layers of information about a place or location. Most, if not all, of the variables considered in an environmental justice analysis have a spatial component. Because of this, GIS is extremely well suited for analysis of the distribution of benefits and burdens. GIS technologies are now being used throughout the world by a diverse group of technicians from all different disciplines. Historically, demographers and planners have used GIS as a tool to store, manipulate, and display data. However, GIS can be implemented as a modeling, decision-making, and general spatial statistical analysis tool as well. GIS is unique among

computer-based analysis tools for several reasons: First, GIS allows geo-referenced variables and data from diverse sources and scales to be overlaid and viewed so a more complete picture can be developed of a geographic area. Secondly, GIS allows aggregation and disaggregation of data to different scales so analysis can be done at an appropriate scale or at multiple scales allowing more robust results. Finally, GIS, by its very nature, is a tool that facilitates mapping and visualization.

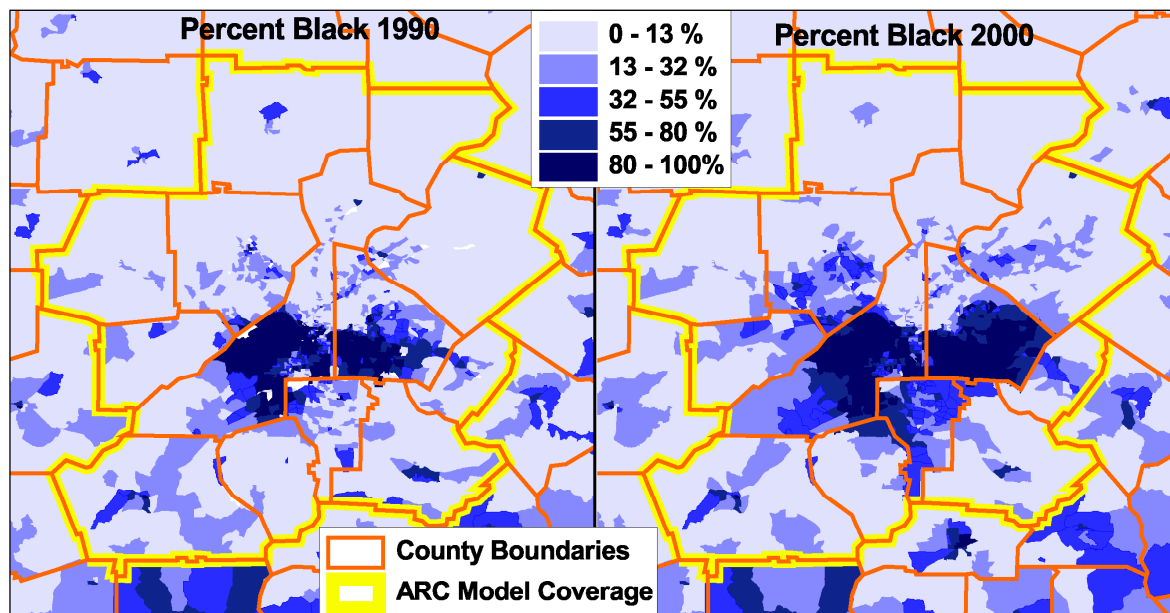
Most commonly, GIS is used for querying spatial databases to find locations that fit criteria, mapping demographics, displaying trends or historical data, displaying assets like transportation infrastructure, visualizing areas and points of capital investment, as well as processing points, polygons (areal features), and lines to find numeric descriptors of data that then can be used in spatial statistical analysis.

Spatial statistical analysis is the description of patterns in space with mathematics and statistics. This type of analysis allows geographic patterns and trends to be numerically described. The following descriptions and examples illustrate specific kinds of spatial analysis related to environmental justice that is facilitated by the use of GIS.

- **Mapping and Visualization.** Maps almost always are an important first step in an analysis. Sometimes they reveal patterns that wouldn't be nearly as obvious in numeric or statistical charts. They allow hypotheses to be made, and then provide visual back up of any results and statistical testing that is done on the hypotheses. Much can be learned about a problem or situation simply by viewing the variable(s) over space. Simple choropleth, or graduated color, maps of 2000 racial characteristics by block group compared to 1990 racial characteristics by block group, can be an important initial analysis tool (Figure 5.1). It is very easy for the human eye to pick up differences in spatial patterns when they are displayed on a map. This method is a good way of demonstrating how environmental justice status can change over time. Transportation networks and infrastructure remained relatively unchanged from 1990 to 2000 while patterns of minority settlement appear vastly changed on these maps.

Slightly more complex maps can be developed that combine different types or dimensions of information into a single visual display. For the Atlanta Benefits and Burdens project, information from the CTPP journey-to-work data was extracted, formatted for use in ESRI's ArcView, and processed to find the most common journey-to-work flows in the study area. The largest flows were displayed on maps as lines with graduated line widths to represent the magnitude of the commuter flows. In addition to the desire line maps, a pie chart was displayed on the origin district of each major flow depicting the distribution of mode split for the journey to work. These maps, thus, communicate three important dimensions of travel patterns – origin/destination, volume, and means of travel – in a single visual display.

Figure 5.1 Population by Census Blockgroup
Atlanta Metropolitan Area



- **Buffer Analysis.** When evaluating a transportation project, it is often important to be able to summarize what will be impacted within a certain distance of the project. For example, as part of the Boston area's Silverline project, the MBTA project team analyzed the economic level of the residential population and the number of jobs within half-mile radius buffers around the proposed Silverline boarding points. First, the locations of the boarding points were mapped as a layer in the GIS. Then, half-mile radius buffers were constructed around each boarding point. Next, the demographic data were collected at the smallest scale possible and joined to geographic boundary layers in the GIS. Specifically, an extract of the Census of Population and Housing 1990 Summary Tape File 3A (Source: United States Department of Commerce. Bureau of the Census) was used that included variables about poverty and household income at the block group level and data on number of workers at the TAZ level that was created by Boston's Central Transportation Planning Staff (CTPS). Since neither TAZ boundaries nor block group boundaries nest neatly in the circular buffer rings, a script was applied to each boundary that returned what proportion of the boundary fell within the buffers. Then, the proportions were applied to the demographic data and summed for each buffer. The results could be reported to the MBTA and FTA as approximate numbers of low-income people living or working within a half-mile of the boarding points.
- **Surface Mapping.** Consider that the outcomes of a transportation project are a surface in space, with peaks where positive outcomes occur and valleys where negative outcomes occur. For environmental justice to exist, the valleys should not be positively correlated to the spatial distribution of lower-income and minority communities.

Surface maps of demographic variables can be made and then subtracted from the outcome map on a grid cell basis. The resulting surface would be bumpy and show no discernable pattern if no correlation existed. On the other hand, if the resulting surface were flat, it could be concluded that there is a correlation between outcomes and demographics. For example, if a surface of percent minority population is subtracted from a surface of access to transit stops – where peaks in the first surface represent areas of high minority concentration and peaks in the second represent areas of high transit access – then the resulting surface would be flat if high percent minority correlated to high transit access.

- **Spatial Linear Models.** Simple spatial econometric and regression models can be used to test for environmental justice. For example, a regression model could be developed relating the amount of transportation benefit from a project (expressed as change in accessibility, travel time savings, etc.) to the percentage of minority population in a Census tract, TAZ, or other spatial unit of analysis. A model could be constructed to predict transportation access as a function of different demographic characteristics. The error in the model also can be examined geographically. Every linear model is expected to have error – but in a good spatial regression model, that error would be evenly distributed through space. If the error from the model results in a spatial pattern, there is likely some additional spatial variable that explains the variation in the dependent variable.

GIS is not required to construct a spatial linear model, but it can facilitate the analysis. GIS can be used to aggregate data to the scale at which the model is operating, to map the results of the model, to map the error or residuals of the model, and to group or cluster the geographic entities which behave similarly in the model. For example, a spatial linear model was built in Atlanta to examine the geographic distribution of vehicle ownership. It was found that the variables, percent black, percent low-income, and average household size have a statistically significant explanatory relationship with the dependent variable: average vehicles per household. Results showed that holding the other variables (income and average household size) constant, as the percent black increases vehicles per household decreases. Similarly, as percent low-income population increases, vehicles per household decreases, holding percent black constant. Conversely, as average household size increases so to does vehicles per household. The analysis was done at the Census block group level but could be done at any scale.

- **Spatial Autocorrelation Tests for Phenomena.** Spatial phenomena can be tested for spatial autocorrelation. Spatial autocorrelation means that like values are clustered geographically. Typically, if spatial autocorrelation exists, inequity also exists. For example, if transit stops are spatially autocorrelated, that means that transit stops are clustered and the areas where there isn't a cluster of transit stops are not receiving the same level of transit service. Tests to see if positive outcomes of the transportation plan or project are spatially autocorrelated can be done in a GIS setting to help determine the proportionality in the distribution of benefits and burdens.

- **Spatial Indices – Index of Dissimilarity.** For comparability purposes, it is important to be able to describe patterns or distributions with numbers. The field of spatial statistics seeks to do just this. There are many simple statistics that can be calculated to describe the location, centrality, and dispersion of a spatially distributed variable. The most simple of these is probably a population weighted centroid. Population weighted centroids were computed to describe how the distribution of the black population in Atlanta has changed since 1980. As expected, the population weighted centroid of the black population has moved away from the central city since 1980.

Another set of statistics are used to describe the dispersion of a variable. The Nearest Neighbor Statistic can be used to calculate how clustered or spread out a population is. The numeric Nearest Neighbor Statistic allows description of a pattern to be clustered, random or regularly spaced. This statistic is useful when calculated for many sets of data across time so the results can show historical trends.

There also are many statistical indices that measure or compare the spatial patterns between variables. One of these that is very useful in environmental justice is the Index of Dissimilarity. This index is also sometimes referred to as the Segregation Index. This index measures the degree to which two spatial variables are distributed differently within a specified area.¹ The index of dissimilarity can be used to calculate if the spatial distribution of non-minorities and the spatial distribution of minorities are similar or dissimilar, and thus help to assess the degree to which transportation needs are being met by existing and proposed services. Data on the number of non-minorities and the number of minorities would need to be gathered at a geographic scale smaller than a county (preferably a scale that allows a significant number of entities within the county so statistical significance can be determined.) For example, if there are at least 20 TAZs in a county, the TAZ level would be an appropriate scale at which to collect data on number of non-minority population and number of minority residential population. This index was calculated for each county in Georgia. It was known that the percentage of population that is black in one particular county increased substantially between 1990 and 2000. However, that does not indicate that at a smaller scale, the population within the county necessarily is becoming less segregated. The Index of Dissimilarity compared the percentage of the black population in each block group to the percentage of the white population in each block group. The results of the analysis showed that although a larger percentage of the county's population is black,

¹ The index of dissimilarity formula is applied as follows:

$$\text{Index of Dissimilarity} = 100 * (.5 * \sum |x - y|)$$

Where x = the percentage of the county's non-minority population in the TAZ; and

Y = the percentage of the county's minority population in the TAZ.

Sum for all TAZs, divide by two, and multiply by 100. The index can vary from zero to 100. An index of zero reflects a perfect similarity between the distributions of minorities and the distribution of non-minorities. Conversely, an index approaching 100 reflects a large dissimilarity between the two populations and means that within the county, the minority block group is clustered and not evenly spread out.

the county is not more integrated. In fact, segregation at the block group scale has increased since 1990.

This kind of analysis should be calculated at different scales. For example, data could be collected at the county-level and the index could be calculated for the state or data could be collected at the census block level and calculated for the TAZ. GIS could be used to automate the calculation indices like these at multiple scales.

■ 5.3 Spatial Disaggregation

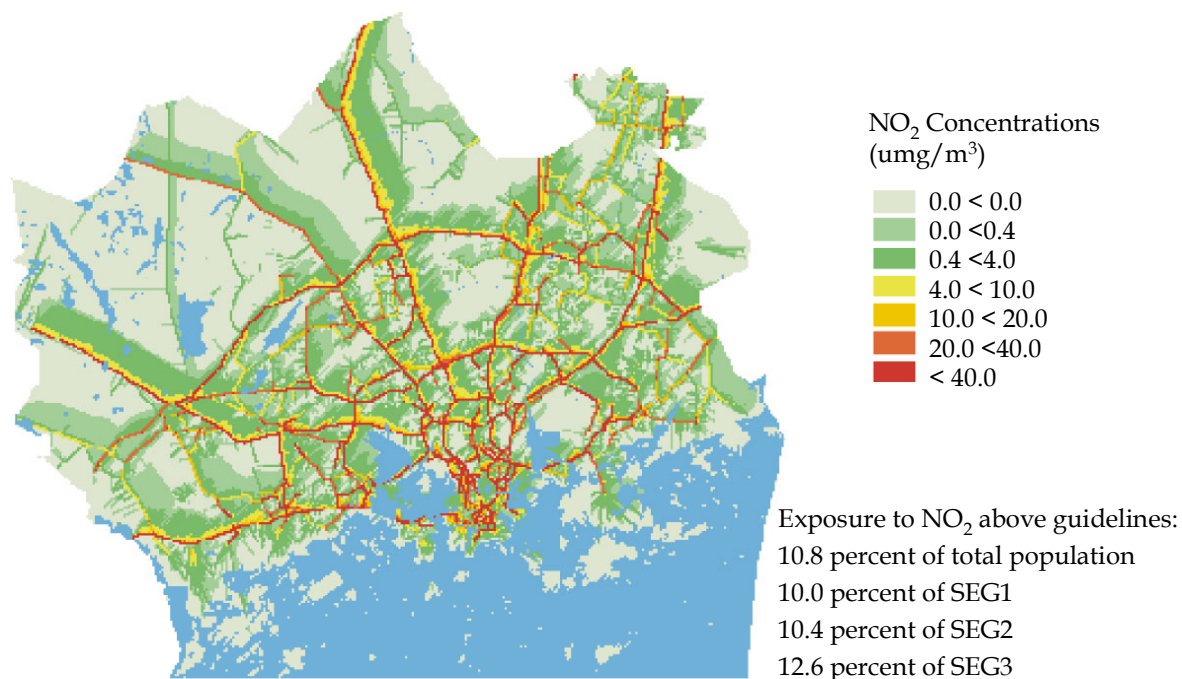
GIS-based spatial disaggregation techniques can be used to disaggregate population and impact data in order to better estimate the distribution of impacts by population group. For example, a GIS raster module can be used to disaggregate zone-based population data and network-based impact data to grid cells. This allows impacts calculated for different types of spatial units to be more precisely overlaid on population data. For example, emissions from a transportation network can be assigned to the grid cells corresponding to the network, and then overlaid with population data that is assigned from Census tracts to the corresponding grid cells.

This approach was demonstrated in the System for Planning and Research in Towns and Cities for Urban Sustainability (SPARTACUS) project undertaken in three European cities: Helsinki, Naples, and Bilbao. Raster-based data disaggregation also has been applied in the Salt Lake City, Utah metropolitan area, although impacts were not analyzed by socio-economic group.² SPARTACUS is based on an underlying “engine” that combines the integrated transportation-land use model MEPLAN with a GIS Raster module to calculate and display 100-meter grid cell micro-scale indicators. For example, emissions and noise dispersion models were used within SPARTACUS to calculate the impacts resulting from the transportation network. In the Helsinki, Finland analysis, it was found that about 29 percent of the metropolitan population would feel disturbed by traffic noise in the peak hour under the baseline transportation scenario (Figure 5.2). This percentage does not vary significantly by population group.

While the SPARTACUS project admittedly was a large-scale modeling project having substantial data and resource requirements, it does indicate that large amounts of data can be aggregated down to a small number of indicator values and illustrates approaches for quantifying the equity and social justice implications of alternative scenarios. While MEPLAN, in particular, may require some data that may not be readily available in all U.S. urban areas, the GIS-based analysis of emissions and noise exposure can be applied independently of the land use model.

² The SPARTACUS and Salt Lake City projects are documented in FHWA’s Toolbox for Regional Policy Analysis, <http://www.fhwa.dot.gov/environment/plngtool.htm>.

**Figure 5.2 SPARTACUS Traffic Noise Levels for the
Helsinki Metropolitan Region**



■ 5.4 Surface Transportation Efficiency Analysis Model (STEAM)

STEAM (Surface Transportation Efficiency Analysis Model) is a software tool created by the Federal Highway Administration for analyzing the user and non-user benefits of multimodal transportation investments. STEAM utilizes travel demand model data (networks and trip tables) to compare two alternative scenarios. It then calculates the difference in user benefits (travel time and out-of-pocket costs), accident costs, environmental impacts, and other measures between the two scenarios. The first version of STEAM has been applied to project and regional analyses in metropolitan areas such as New York, Portland, OR, and Cairo, Egypt.³

An updated version of STEAM, Version 2.0, can produce results either for an entire region or by user-defined districts, which makes it particularly suitable for applications in which

³ Information on the STEAM model is available at <http://www.fhwa.dot.gov/steam/>.

the distribution of benefits and burdens is a concern. These user-defined districts, for example, may be aggregations of traffic analysis zones with high concentrations of low-income or minority populations. Travel time, operating, out-of-pocket costs, and accident costs borne by resident trip-makers, or by all users whose trips originate in a particular district, can be reported in this fashion.

STEAM 2.0 also provides district-level accessibility analyses. Accessibility may be defined as the percentage of the population in a particular district that can attain potential employment destinations within a particular travel time. Up to seven such thresholds may be defined by the user. Accessibility also may be defined from an employer's perspective, in terms of the number of potential regional employees that are within a certain travel time of an employment district. These results are reported in absolute numbers as well as a percentage of the total number of persons residing in the region, or the total number of available jobs. STEAM 2.0 was released by FHWA in June 2001.

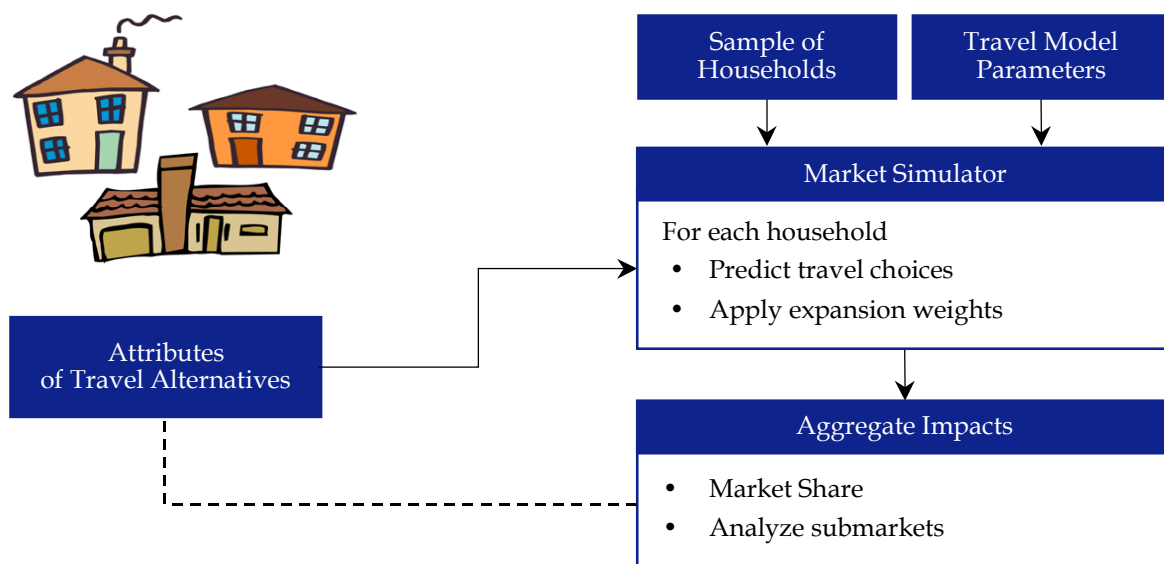
■ 5.5 Household Microsimulation Modeling

The majority of current travel demand models are based on the concept of traffic analysis zones, or TAZs. To develop an aggregate estimate of either current- or future-year conditions, a set of relatively homogeneous traffic analysis zones are defined. Each TAZ then is characterized by a set of average conditions, and aggregated into an estimate for the larger geographic region being modeled.

Household sample enumeration represents an alternative aggregation approach based on actual household, individual, and vehicle characteristics rather than the traditional aggregate TAZ (Figure 5.3). Use of a household sample enumeration of microsimulation technique maximizes the advantages of disaggregate travel demand models, particularly the newer activity-based models.

Microsimulation travel modeling techniques forecast travel by modeling a sample of either individuals or households that represent a larger population group. The benefit of this modeling approach for analyzing the distribution of impacts is that travel patterns, and therefore the travel benefits of transportation improvements, can be tracked across any population characteristic that is included in the sample of persons modeled. Historically, this has been done by income-level, since income is commonly used to predict travel behavior. The characteristics of the sample, however, easily can be broadened to include characteristics of race and ethnicity as well as other variables that may be of interest.

Figure 5.3 Forecasting by Random Sample Household Enumeration



Transportation examples of household microsimulation include:

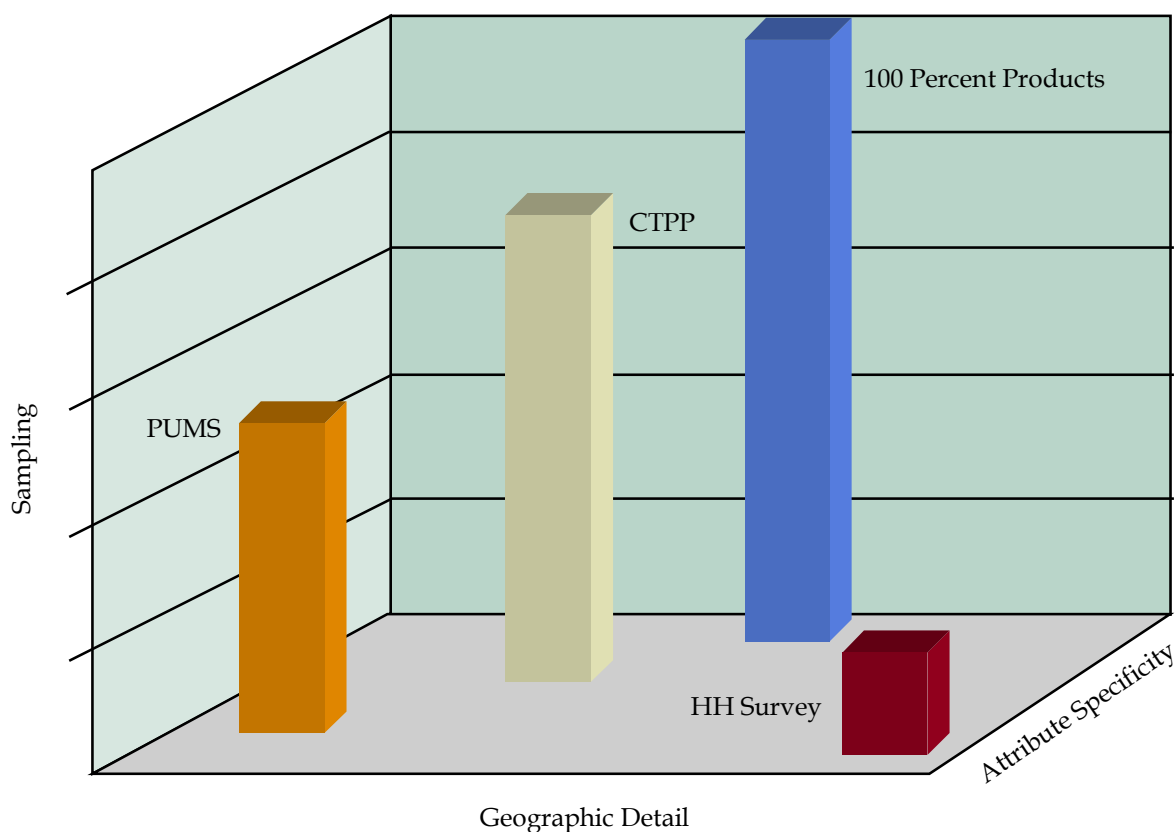
- The STEP model, a sample enumeration-based travel forecasting approach. STEP has been applied in a number of cities, primarily to analyze the impacts of travel demand management policies. It was recently applied in the Baltimore metropolitan region to analyze the distribution of impacts of alternative regional transportation investments.⁴
- A travel model has been developed for the city and county of San Francisco using a sample enumeration approach. The model was developed specifically with the intent of tracking travel and benefits by race, income, and other characteristics (Cambridge Systematics, Inc., 2000).
- The new generation of activity-based travel demand models also generally rely on sample enumeration, thus allowing benefits to be tracked by user characteristic. In an activity-based model, travel decisions become part of a broader activity scheduling process based on modeling the demand for activities rather than merely trips. An

⁴ Initially applied in 1975 by Cambridge Systematics, Inc. for the now Department of Energy, this modeling approach subsequently was adapted by EPA for use in transportation air quality analyses and by the San Francisco Bay Area Metropolitan Transportation Commission (MTC) as an adjunct to their four-step travel demand modeling system. STEP was then widely applied by Harvey, Deakin, and Skabardonis in a number of urban areas to examine the impacts of transportation pricing and other demand management strategies. Most recently, STEP has been incorporated by Caliper Corp. as a free add-in to TransCAD 3.6. It was this version that was used for the Baltimore analysis.

activity-based model was recently developed for the Portland, Oregon region and was used in NCHRP Project 8-33 to assess travel impacts associated with land use, transit, telecommuting, and pricing policies.

In applying household sample microsimulation, a choice is to use either the household travel survey sample or a larger synthetic sample generally created from the Public Use Microdata Sample (PUMS) of the U.S. Census of the Population. PUMS represents five percent of all housing units, and contains individual records from the Census long form. While PUMS represents a smaller sample than the CTPP and other Census products, it provides greater detail in terms of the attributes covered. It is this greater specificity that makes PUMS attractive for use in microsimulation travel modeling (Figure 5.4).

Figure 5.4 Comparison of Different Data Sources



A “synthetic” sample is composed of a hypothetical set of people or households with characteristics that as a whole match those of a larger population group. The advantage of using a synthetic sample is that a larger sample can be generated. In Portland for example, a 1994 household survey was conducted consisting of 4,451 households. In contrast, a synthetic sample of approximately 120,000 persons and associated households was generated based on use of the PUMS dataset. The decision was made to use the larger synthetic sample in order to generate data that would be sufficient to support a statistically reliable

trip-table for use in running traffic assignments. The majority of the NCHRP 8-33 policy analyses, though, were run using 10 percent of this full synthetic sample, or approximately 12,000 persons since traffic assignments were not run for each alternative policy scenario examined. The TRANSIMS model also can be characterized as being a household microsimulation model and utilizes a “Population Synthesizer” routine to generate a synthetic population of households, individuals, and vehicles. In the Portland application of TRANSIMS, enough households are being defined so as not to have to rely on the use of expansion factors.

■ 5.6 Assessment of Transportation Benefits and Burdens in Atlanta

A project is being conducted cooperatively by FHWA, FTA, the Atlanta Regional Commission (ARC), and the Georgia DOT to analyze the distribution of benefits and burdens of the transportation system in Atlanta. The results demonstrate analytical techniques that can be applied at a regional scale. Measures are stratified by geographic area and facility to determine relative conditions by residential location and by low-income and racial/ethnic population segments served. The immediate emphasis is on base year conditions. Subsequent analyses will be conducted by ARC to examine the distribution of benefits and burdens in future years associated with an update of the Regional Transportation Plan.

Work is being performed in conjunction with both a Technical Committee and a policy-level Review Panel. The Technical Committee consists of staff representatives from each of the region’s transportation agencies plus selected civic group members from the Review Panel. The focus of these presentations and discussions, though, is on the particular technical methods, data, and measures of impact being used to determine the distribution of benefits and burdens. In contrast, the membership of the Review Panel, while including the transportation agencies, is made up primarily of civic and environmental groups. A key is proving to be the overlapping membership between the two groups. This is providing a continuity of the discussion between these two groups while preserving the respective emphasis on technical and policy-level considerations. This also means that both groups are exposed to the concerns of the full diversity of the project’s participants.

An unusual feature of the Atlanta work is that the initial phase involved the development of a history of the growth of the Atlanta metropolitan area over the past 50 years. Based on secondary sources supplemented by a limited number of interviews, the history begins with a chronology of major events occurring in this development, and then examines the principal factors that have influenced development patterns. Important factors addressed include the effects of highway and transit investments as well as racial attitudes, housing and urban redevelopment policy, zoning, public school policies, dispersal of employment opportunities, and the institutional structure for decision-making. As such, the history provides a qualitative assessment of the interrelationships among transportation, economic

development, environmental quality, and social policy; and is helping to create a positive dialog among the participating groups. While this style of history traditionally has not been undertaken as part of the transportation planning process, it is proving to be an integral component of documenting current year base case conditions against which new transportation plans, programs, and projects can be evaluated.

A second important aspect of the Atlanta work is that short-term 1990 to 2000 trends are being examined to identify important changes in demographic, employment, and travel patterns by race and ethnicity. For example, the Census 2000 redistricting data permit changes in residential location to be easily compared using simple GIS displays. Important employment-related questions include how the distribution of jobs by type and location has changed during the 1990s, and the characteristics of workers by workplace location, including race/ethnicity, household income, and vehicle availability. The examination of base-condition travel patterns includes a determination of trip destinations and travel modes that are most important for low-income and for various racial and ethnic population groups.

GIS display and analytical techniques are being used extensively in all phases of the Atlanta work, including assessing the manner in which benefits and burdens are distributed. The following transportation benefits are being analyzed:

- The **distribution of transportation improvements** during the 1990s, and in particular, the locations of road widening projects, projects with right-of-way impacts, and landscaping projects.
- **Proximity** of transportation facilities and services to various population groups, including rail stations, bus routes, and bicycle paths.
- **Accessibility** of people to jobs, including the percentage of regional employment accessible within 30 minutes from each TAZ, and 30-minute auto and transit travel time contours from major employment centers.
- **Congestion levels** on the highway and transit systems, and how these vary by time-of-day and location across the region.
- **Maintenance** of the transportation system, and how pavement and bridge conditions vary by geographic area.

Six major types of burdens are being examined:

1. **Accident** exposure, using Georgia Office of Public Safety motor vehicle accident databases. The frequency and severity of motor vehicle, bicycle, and pedestrian accidents are being analyzed by geographic area and compared with population and vehicle-miles of travel in each area to assess relative risk.
2. The **locations of transportation-related maintenance facilities** are being examined to assess whether there are important differences in the siting of such facilities among population segments.

3. **Mobile source emissions** are being estimated using pollutant emission estimates for each link in the transportation network, and aggregated by TAZ. Air quality monitoring data for ozone also are being evaluated.
4. **Noise** impacts are being examined by looking at the proximity of noise barriers along limited-access highways to determine if differences exist by characteristics of the adjacent population.
5. **Right-of-way “takings”** for highway and transit improvements during the 1990s are identified by project and community.
6. **Transportation costs** are being assessed by population group, including out-of-pocket costs by mode for both work and non-work travel.

A particularly noteworthy aspect of the Atlanta analysis is the manner in which 1990 CTPP data were used to examine work trip travel patterns by population segment. Workers were divided into 16 segments according to the various combinations of mode (auto and transit), household income (low and high), race/ethnicity (majority and minority), and household vehicle availability (zero or one-plus). Tables of worker characteristic by residence (CTPP Part 1), by workplace (CTPP Part 2), and by residence-workplace combination (CTPP Part 8)⁵ were combined using a Fratar iterative proportional fitting process to estimate work-trip tables for each of the 16 population segments. Mode shares, travel times, and travel patterns then were compared by population segment. One interesting finding of this analysis was that transit mode shares are consistently higher for “minority” workers (defined as non-whites or Hispanics) than for “majority” workers, even independent of household income, vehicle availability, and location of residence or workplace.

This study also attempted to apply the segmented 1990 CTPP trip tables in conjunction with the ARC model year 2000 work-trip tables to estimate year 2000 trip tables by population segment. Specifically, for each cell in the TAZ origin-destination matrix, the year 2000 ARC trips would be distributed across population segments in proportion to the distribution of 1990 CTPP trips for that cell. This would allow travel times and accessibility to be compared by population segment for current and future year network and land use conditions.⁶ In practice, however, this approach encountered problems and turned out not to be workable. With a 948-TAZ system, there are nearly a million cells in the TAZ origin-destination matrix. For transit trips, most of the cells contain zero trips, and many contain only a small number. Also, the cells with zero trips in the CTPP-derived matrices did not closely correspond to the zero-value cells in the ARC estimated trip matrices. Thus, for nearly 90 percent of the ARC transit trips and over 50 percent of the ARC auto

⁵ Part 8 of the 1990 CTPP, which was not widely distributed, contains worker flows at the TAZ level for major metropolitan areas. Tables include worker flows by mode and household income, and worker flows by mode and vehicles available.

⁶ This approach assumes, of course, that population by segment remains distributed in the future in the same way as it was distributed in 1990. While it would have been desirable to use more recent data for this analysis, the 2000 CTPP had not been released as of the time of this study.

trips, there was no corresponding CTPP data to break out these trips by population segment. This is a result of limitations in both the CTPP data, which is a one-of-six sample, and in ARC's four-step model system, which is designed to estimate link-level flows rather than to analyze precise origin/destination travel patterns by population subgroup at a detailed level of geography.

■ 5.7 NCHRP Project 8-41

Building in part on the results of this Project 8-36 review, NCHRP Project 8-41, *Effective Methods for Environmental Justice Assessment*, is examining the use of community impact assessment and other related methods, and improving on them, to provide a foundation for environmental justice analysis. The project is expected to be completed by March 2003, and is being conducted by URS Corporation in cooperation with Dr. David Forkenbrock, Director of the University of Iowa's Public Policy Center. The objective of the research is to identify and develop processes, procedures, and techniques for integrating environmental justice considerations in transportation systems planning and decision-making at the statewide, regional, and metropolitan levels. The research is focusing on existing community impact assessment methods and will build upon adaptations and extensions of these methods as a means of conducting environmental justice analyses at the systems, corridor, and project levels of transportation planning and development.

Appendix A

*Quantitative Measures for Assessing the Distribution of
Transportation Benefits*

Quantitative Measures for Assessing the Distribution of Transportation Benefits

■ Introduction

This appendix describes a number of quantitative measures that have been applied to examine the distribution of transportation benefits. Most have been applied at the metropolitan level, although some also have been applied to measure project-level or statewide program benefits.

Many of the measures described have been applied to date only on an experimental basis. The fact that a given method is described does not constitute an endorsement of the method by either the report authors or the agency(ies) that have applied the method. Also, some agencies may have revised or updated their procedures subsequent to this writing, so the information contained in this appendix may not reflect current practice.

Table A.1 List of Benefits

Accessibility	<ul style="list-style-type: none">• To Employment• To Activities
Travel Times	<ul style="list-style-type: none">• To Jobs• To Activity Centers• By Trip Type• Travel Time Savings
Transit Service	<ul style="list-style-type: none">• Availability• Level-of-Service
Transportation Investments	<ul style="list-style-type: none">• Users Benefiting• Proximity
Infrastructure Conditions	

Table A.2 Accessibility to Employment

Type of Measure	Employment
Variations:	<ul style="list-style-type: none"> • Number of jobs within X minutes by mode • Gravity-type accessibility index by mode
Where Applied:	<ul style="list-style-type: none"> • Atlanta, GA; Chicago, IL; Columbus, OH; Milwaukee, WI; San Francisco, CA; Washington, D.C.; Seattle, WA
Context of Application:	<ul style="list-style-type: none"> • Regional transportation plan (Atlanta, Chicago, Columbus, Milwaukee, San Francisco, Washington); Transit project EIS (Seattle)
Calculation Method:	<ul style="list-style-type: none"> • TAZs are defined corresponding to different population groups. The total number of jobs accessible within X minutes is calculated for each neighborhood/TAZ. This number is then weighted by the population of the TAZ to calculate an average number of “jobs accessible within X minutes.” The weighted accessibility is compared across TAZs for the different population groups.
Specific Comparisons:	<ul style="list-style-type: none"> • San Francisco: Does RTP project alternative improve conditions for disadvantaged neighborhoods, compared to no-project alternative? Are disadvantaged neighborhoods better off or worse off than non-disadvantaged neighborhoods under the RTP project alternative? • Seattle: How does the percentage of total benefits (increase in jobs accessible) accruing to minority populations compare to the percentage of total population that is minority? • Washington: How does the percentage of population in each population group experiencing an increase or decrease in accessibility compare to the percentage of total population experiencing an increase or decrease in accessibility? (For black, Asian, white, and Hispanic TAZs; also for low-income versus non-low-income TAZs). • Atlanta: How does accessibility for the lowest income group compare for the 2000, 2025 no-build, and 2025 RTP scenarios? • Chicago – How does the median number of jobs accessible within X minutes (by mode) compare to the percent of the TAZ that is in a given population group (e.g., up to 10 percent Black, 10 to 20 percent Black, etc.)? Accessibility by percent minority population is measured to all jobs; accessibility by percent low-income population is measured to entry-level jobs.
Data Requirements:	<ul style="list-style-type: none"> • Regional travel model data – travel times by origin-destination pair and mode; population and employment by TAZ.

Table A.3 Accessibility to Activities

Type of Measure	Activities
Variations:	<ul style="list-style-type: none"> • Average number of defined opportunities within X minutes travel time • Percent of population within X minutes of a college, hospital, major retail destination
Where Applied:	<ul style="list-style-type: none"> • Columbus, OH; Milwaukee, WI
Context of Application:	<ul style="list-style-type: none"> • Regional transportation plan
Calculation Method:	<ul style="list-style-type: none"> • Columbus: The number of home-based shopping and home-based other opportunities within X minutes of each TAZ is calculated by mode, from travel model data. The regional average number of opportunities is then estimated by population group, by weighting the opportunities for each TAZ by the size of the population group in the TAZ.
Specific Comparisons:	<ul style="list-style-type: none"> • Columbus: 1995 base versus 2020 base, 2020 TIP, and 2020 LRP; for all, minority, poverty, transportation-disabled, and zero-car households – displayed with line graphs
Data Requirements:	<ul style="list-style-type: none"> • Regional travel model data – travel times by origin-destination pair and mode; employment by type and population by TAZ

Table A.4 Travel Time to Jobs

Type of Measure	Jobs
Variations:	<ul style="list-style-type: none"> • Average or distribution of travel times for work trips
Where Applied:	<ul style="list-style-type: none"> • Atlanta, GA; Baltimore, MD
Context of Application:	<ul style="list-style-type: none"> • Regional transportation plan
Calculation Method:	<ul style="list-style-type: none"> • Baltimore: STEP microsimulation model is used to estimate work-trip travel times by mode and income-level (race or other personal/household characteristics could also be done). • Atlanta: Home-based work trip congested travel times are calculated using the regional travel model by income group.
Specific Comparisons:	<ul style="list-style-type: none"> • Baltimore: Percent of workers with travel times less than X minutes, by income group, mode, etc.; for base year and forecast year. • Atlanta: Average HBW travel times for the lowest income group under 2000, 2025 no-build, and 2025 RTP conditions.
Data Requirements:	<ul style="list-style-type: none"> • Baltimore: Zone-to-zone travel times and travel costs from regional travel model data; population and demographic data by TAZ; census PUMS data, calibrated models for STEP application (defaults available). • Atlanta: Regional travel model zone-to-zone travel times by income group.

Table A.5 Travel Time to Activity Centers

Type of Measure	Activity Centers
Variations:	<ul style="list-style-type: none"> • Average travel times to regional activity centers
Where Applied:	<ul style="list-style-type: none"> • Atlanta, GA; Raleigh, NC; San Antonio, TX
Context of Application:	<ul style="list-style-type: none"> • Regional transportation plan
Calculation Method:	<ul style="list-style-type: none"> • San Antonio: Destination zones of regional significance (employment centers, etc.) are identified. Travel times are computed from selected neighborhoods/TAZs to each destination zone, and averaged across minority versus non-minority TAZs. • Atlanta: travel time comparisons for two sample areas to suburban employment centers.
Specific Comparisons:	<ul style="list-style-type: none"> • San Antonio: Average travel time to each activity center, by minority and non-minority TAZs, and overall average travel time for each group (by auto and transit). • Atlanta: Travel times for 2000, 2025 no-build, and 2025 RTP conditions.
Data Requirements:	<ul style="list-style-type: none"> • Regional travel model data – travel times by origin-destination pair and mode; population and demographic data by TAZ.

Table A.6 Travel Time by Trip Type

Type of Measure	Trip Type
Variations:	<ul style="list-style-type: none"> • Average travel times by trip type
Where Applied:	<ul style="list-style-type: none"> • Columbus, OH
Context of Application:	<ul style="list-style-type: none"> • Regional transportation plan
Calculation Method:	<ul style="list-style-type: none"> • Zone-to-zone travel times are calculated by trip type (work, home-based shopping, home-based other, all home-based trips). The total number of trips by type for each zone-to-zone pair is proportioned by the percentage of population group in the origin zone (minority, poverty, etc.) The average travel time is then computed by population group, by weighting the travel time for each zone-to-zone pair by the size of the population group in the origin zone.
Specific Comparisons:	<ul style="list-style-type: none"> • Average travel time by trip type and mode for each population group (minority, poverty, transportation-disabled, zero-car households).
Data Requirements:	<ul style="list-style-type: none"> • Regional travel model data – travel times by origin-destination pair and mode; population and demographic data by TAZ.

Table A.7 Travel Time Savings

Type of Measure	Savings
Variation:	<ul style="list-style-type: none"> • Travel time savings by population group
Where Applied:	<ul style="list-style-type: none"> • Seattle, WA
Context of Application:	<ul style="list-style-type: none"> • Transit project EIS
Calculation Method:	<ul style="list-style-type: none"> • Average travel time savings due to the project are calculated for each station area using the transit agency's ridership model. These savings are then assigned to population groups, based on demographic data for each station area (i.e., if 40 percent of station area is minority, the minority group is assigned 40 percent of total travel time savings accruing to trips originating in that station area). Cumulative travel time savings are then calculated for minorities, low-income people, and the entire population served. The percentages of total travel time savings accruing to minority and low-income populations are then calculated.
Specific Comparisons:	<ul style="list-style-type: none"> • Percent of benefits accruing to minority and low-income populations, compared to total percent of minority and low-income populations in transit agency's service area. • Significance criteria are also applied. For example, if 38 percent of travel time savings accrue to minorities, this is estimated to be significant if it is at least one standard deviation greater than the mean percent minority population in study area neighborhoods (in this case, 34 percent).
Data Requirements:	<ul style="list-style-type: none"> • Transit ridership model; census demographic data

Table A.8 Transit Service Availability

Type of Measure	Availability
Variations:	<ul style="list-style-type: none"> Percent of population within X miles of bus route or transit station Counties with transit service provided
Where Applied:	<ul style="list-style-type: none"> Boston, MA; Seattle, WA; Georgia
Context of Application:	<ul style="list-style-type: none"> Transit project EIS; statewide plan
Calculation Method:	<ul style="list-style-type: none"> Boston, Seattle – The total population within radius X (typically one-quarter to one-half mile) of bus routes or transit stops is estimated by using GIS to draw a buffer around each route or stop. The total population in each group (minority, low-income, etc.) in the same area is estimated in the same manner. Total population with transit access by group is compared to total regional population for each group, to estimate the percentage of each population group with transit access. Georgia – The provision of transit service is evaluated for all counties in the state.
Specific Comparisons:	<ul style="list-style-type: none"> Boston, Seattle – Percent of population in station areas that is minority (low-income) versus percent of study area or regional population that is minority (low-income). Georgia – Provision of transit service is compared for “EJ” versus “non-EJ” counties.
Data Requirements:	<ul style="list-style-type: none"> Locations of transit stops; population characteristics by TAZ.

Table A.9 Transit Service Level-of-Service

Type of Measure	Level-of-Service
Variations:	<ul style="list-style-type: none"> Percent of population with quality of transit service X
Where Applied:	<ul style="list-style-type: none"> Boston, MA; Chicago, IL
Context of Application:	<ul style="list-style-type: none"> Regional transportation plan
Calculation Method:	<ul style="list-style-type: none"> The presence/level of transit service is identified by TAZ, by overlaying a transit network with a TAZ map. TAZs are characterized by population group (e.g., percent minority). Level of transit service is compared across population groups.
Specific Comparisons:	<ul style="list-style-type: none"> Chicago – Frequency and density of transit service in zones with high proportions of minorities, compared to average frequency and density of service for all zones. Boston – Percent of population in TAZs with level-of-service X; compared for minority versus non-minority, low-income versus non-low-income TAZs. Level-of-service variables include frequency, load factors, percent of buses with air conditioning, average age of vehicles
Data Requirements:	<ul style="list-style-type: none"> Population by TAZ; GIS transit network with level-of-service variables

Table A.10 Users Benefiting from Transportation Investments

Type of Measure:	Users Benefiting
Variations:	<ul style="list-style-type: none"> Characteristics of trip-makers using new or improved transportation facilities
Where Applied:	<ul style="list-style-type: none"> Northern New Jersey, Atlanta (both proposed)
Context of Application:	<ul style="list-style-type: none"> TIP (New Jersey), RTP (Atlanta)
Calculation Method:	<ul style="list-style-type: none"> A “select link” analysis is performed which identifies the origins and destinations of all trips using a particular link of the transportation network. The population characteristics of the origin zones are identified and compared with the population characteristics of the region as a whole.
Specific Comparisons:	<ul style="list-style-type: none"> Percent of project benefits (usage) accruing to different population groups, compared to percent of total population by population group.
Data Requirements:	<ul style="list-style-type: none"> Travel model with “select link” capabilities; population characteristics by TAZ

Table A.11 Proximity to Transportation Investments

Type of Measure:	Proximity
Variations:	<ul style="list-style-type: none"> Characteristics of people living near new or improved transportation facilities
Where Applied:	<ul style="list-style-type: none"> Ohio; Indianapolis MPO (proposed)
Context of Application:	<ul style="list-style-type: none"> STIP (Ohio); TIP and LRP (Indianapolis)
Calculation Method:	<ul style="list-style-type: none"> Overlay projects in TIP or LRP with population data. Assume that communities receive benefits in proportion to proximity to projects or by dollar amount spent.
Specific Comparisons:	<ul style="list-style-type: none"> Proportion of state or regional projects (dollars) in EJ areas versus proportion of state or regional population in EJ areas
Data Requirements:	<ul style="list-style-type: none"> GIS data on population characteristics by area, planned/programmed projects

Table A.12 Infrastructure Conditions

Type of Measure	Infrastructure Conditions
Variations:	<ul style="list-style-type: none"> Roadway and bridge conditions
Where Applied:	<ul style="list-style-type: none"> Boston, MA; Georgia
Context of Application:	<ul style="list-style-type: none"> LRP (Boston); statewide plan (Georgia)
Calculation Method:	<ul style="list-style-type: none"> Overlay bridges by condition rating with EJ versus non-EJ communities.
Specific Comparisons:	<ul style="list-style-type: none"> Boston: Proportion of bridges that are structurally or functionally deficient in low-income versus non-low-income census tracts. Georgia: Bridge and pavement conditions were compared for EJ versus non-EJ counties.
Data Requirements:	<ul style="list-style-type: none"> GIS data on population characteristics by area, bridge, and pavement condition ratings.

Appendix B

*The Decennial Census as a Source of Data for the
Analysis of Environmental Justice*

The Decennial Census as a Source of Data for the Analysis of Environmental Justice

■ Introduction

The Census of Population and Housing (Decennial Census) is one of the most important sources of demographic and socioeconomic data to support an analysis of environmental justice.¹ Once a decade, during the first week in April, personnel from the Census Bureau count all the housing units and people across the United States. The information collected from the Census is disseminated in a variety of ways depending on purpose, geographic unit of reporting, the questionnaire used to collect the information (short form or long form), avoidance of individual disclosure, and end-user requirements.

Because of the scope of the Census, the wide area of coverage, and large sample size, the Decennial Census is a very important source of demographic data that can advantageously be used to identify emerging transportation planning concerns, especially those related to environmental justice. This appendix addresses products of the year 2000 Decennial Census and their application to the analysis of environmental justice.

The appendix is divided into three sections. To use the information collected from the Census, the user needs to understand **basic Census concepts**. Accordingly, the first section defines data collection approaches, units of geography, data concepts, availability, and mapping issues. The section is designed to help provide an introductory tour of the Census, along with notes on how and what data to use for analysis of environmental justice. The second section provides detailed information on some key Census Bureau **reporting products**. The final section then provides an introductory exploration of **data sources** other than the Decennial Census that can be used to supplement information from the Census.

■ Census Concepts

This section provides an overview of Census concepts relative to environmental justice analysis. To use the information from the Census effectively, the user needs to determine:

¹ The information contained in this appendix is based on material contained on various Census Bureau web sites.

1. Is the data (or package) based on data from the short form or the long form?
2. What is the geographic detail at which the data are reported?
3. When will the data be available?
4. How can these data be supplemented with other sources of data?

Short Form Versus Long Form Data

Five out of six people across the country receive the Census short form. This form contains basic information on individuals and housing. For example, the 2000 short form included only seven subjects: name, sex, age, relationship, ethnic origin, race, and housing tenure (whether home is owned or rented).

One out of six people (17 percent of households) receive the Census long form. This questionnaire includes 52 questions covering topics such as educational level, income, ancestry, housing conditions, commuting patterns, disability, veteran status, and employment.

In general, if the desire is to look for complete counts of all people or housing units at the block level, the smallest unit of Census geography, releases that are packaged from the short form should be used. Examples where information from the short form may be needed include neighborhood-planning analysis to find relative distributions of minority population groups, or to find relative population distributions in a rural location. Important releases that use short form data include the Census Bureau redistricting file (PL-94-171 file) and the Summary Files 1, 2, and 4 (SF 1, SF 2, and SF 4).

At a somewhat higher geographic level (block groups and Census tracts), information from the long form can be used. For example, if the desire is to investigate specific travel-related issues or ascertain telephone availability by race to conduct a telephone survey, only the Census Bureau released long form data can be used. The important packages containing long form data include Summary File 3 (SF 3) and the Census Transportation Planning Package (CTPP).

Geographic Detail

The Census Bureau uses a hierarchy of “geography” to report data. Key geography delineations include (in the increasing order of size) Census blocks, Census block groups, Census tracts, Traffic Analysis Zones (comparable in size to block groups in urban areas and tracts in rural areas), voting districts, places, counties, states, and the nation.

Census blocks are the smallest area of Census geography, normally bounded by streets or other prominent features. They may be as small as a city block bounded by four streets, or may be as large as 100 square miles in rural areas. Blocks are basic units and building blocks of the Census Bureau geographic hierarchy. Blocks are used to report only selected population counts obtained from the Census short form.

Block groups consist of a set of Census blocks identified by the same Census first digit as the next higher hierarchy, the tract. **Tracts** are statistical areas containing, on average, roughly 4,000 people. Counties and equivalent areas are subdivided into Census tracts. Most of the information collected from the long form are reported at the block group or tract level.

Traffic Analysis Zones (TAZ) are a new unit of geography in the 2000 Census, and will be included as part of the Census Transportation Planning Package. TAZs have been defined collaboratively by MPOs working with the Census Bureau through the TAZ-UP program. While TAZs have been defined for over 1,400 counties, not all areas of the country have defined TAZs as a separate unit of geography for Census reporting.

Voting districts are areas such as election districts, wards, or precincts identified by states. **Places** are typically cities (in urban areas) or minor civil divisions (such as townships) in rural areas.

The Census Bureau periodically releases digital files called **TIGER/Line**. The TIGER/Line files are a digital database of geographic features, such as roads, railroads, rivers, lakes, political boundaries, and Census statistical boundaries covering the entire United States.

For 2000, the Census Bureau released a version of TIGER/Line 2000 in early 2001 to accompany the PL-94-171 redistricting data. This file contains the final TAZ layer for all organizations that participated in the TAZ-UP program. However, this initial file did not contain Zip Code Tabulation Areas (polygon areas derived from post office zip codes) and did not include the new address ranges obtained in 2000. A second version of Census 2000 TIGER/Line files containing this updated information was released in April 2001.

Mapping and GIS Overlays

TIGER/Line can be used along with the other Census packages to develop complete GIS databases for every area in the United States. TIGER/Line files are easy to convert to GIS files in almost all commercially available software.

Most of the key Census tables useful for an environmental justice analysis are available at the tract, block group, and TAZ level. Each area, therefore, can be examined in a GIS environment. For example, key household information such as income, race, presence of elderly population, vehicle ownership, and physically handicapped status can be overlaid with travel-related information (such as travel time) to analyze the benefits and impacts to minority tracts or block groups.

If an agency has other sources of information, new data layers easily can be brought into the GIS environment, and overlaid on top of the Census information. For example, transit availability can be mapped over area characteristics obtained from the Census and by using several thematic maps, a visual inspection of population groups benefiting from transit can be obtained. More complex analyses, such as creating buffers, and examining corridor characteristics also can be performed with standard GIS software packages. A

significant advantage of using Census data is that they allow for precise spatial analysis at small levels of geographic detail.

Mapping specific “area” characteristics can be used as a powerful visual communication tool to convey planning concepts to neighborhood advisory committees, a key requirement for environmental justice.

Data Availability

When Will Data be Available?

The Census Bureau processes short form data first and then the long form data. Packages containing the short form data are released first, followed by the long form data. Table B.1, shows the relative dates of release, along with the lowest level of geography for key packages containing the short and the long form data. Table B.5, located at the end of this appendix, provides a detailed listing of all standard Census products.

Table B.1 Key Census 2000 Products

Short Form Data Products (Contents = Race, Basic housing counts)			Long Form Data Products (Contents = age, income, occupation, mobility, industry, commute, and vehicle ownership)		
Release Date	File	Lowest Level Geography	Release Date	File	Lowest Level Geography
Data is available as of April 2001	Census 2000 Redistricting Data File (PL-94-171)	Blocks	June – September 2002	Summary File 3 (SF 3)	Block Groups
Data available for all states as of September 2001.	Summary File 1 (SF 1)	Blocks	Fall 2002 - Spring 2003	Census Transportation Planning Package	Transportation Analysis Zones (TAZ)

Source: U.S. Census Bureau, Population Division, Decennial Programs Coordination Branch.

How to Look for Specific Tables in a Census Package

The Census divides tables broadly into *person tables* and *household tables*. Person tables can be defined for all workers, all persons, persons over 18 (called a “Universe” in the Census packages). Once the package and table type are identified, it is relatively easy to go through the data dictionaries to locate the exact table. For example, if a planner is looking for a table containing household counts by poverty status and mode used for work, the likely package would be the Census Transportation Planning Package. The likely table would be a residence end table containing household counts.

What Release to Use and When?

If an agency desires to do some early analysis with basic racial and ethnicity data, the redistricting file provides this capability. If basic data (one-way, two-way, or three-way tables) containing detailed income, physically handicapped status, or elderly status are the variables needed, the Summary File 3 (SF 3) or the Census Transportation Planning Package (CTPP) are required. If detailed journey-to-work flow information or travel-related information by place-of-work are required, then the CTPP is the only choice. More detailed information on package content is provided in the following section.

In addition to the standard tabulations, the Census Bureau also will allow users to make custom tables through the Internet via a portal called the American FactFinder (AFF). Using the AFF, specific tables can be defined for an area without depending on any standard package.²

■ **Decennial Census Products**

The Census Bureau disseminates information collected from the Decennial Census through several packages. Each package or release is meant for a specific purpose. For example, the redistricting file (PL-94-171) is released primarily for the purposes of election redistricting, and it is required by law that the Census Bureau should release 100 percent counts of the population within one year following the date of collection. In 1990, there were five packages that contained information at lower levels of geography:³

- PL-94-171 Redistricting data;
- Summary Tape File 1;
- Summary Sample Tape File 3;
- Subject Summary Tape Files; and
- Census Transportation Planning Package (CTPP).

² The Internet site is <http://factfinder.Census.gov/>.

³ Summary File 2 and 4 also represent major Census reporting packages. Summary File 2 (SF 2) contains 47 detailed tables focusing on age, sex, households, families, and occupied housing units for the total population. These tables are repeated for 249 detailed population groups. Summary File 4 (SF 4) contains population and housing characteristics iterated for many detailed race and Hispanic or Latino categories, American Indian and Alaska Native tribes, and ancestry groups. While SF 2 and SF 4 contain more detailed race and ancestry information, the higher-level reporting contained in SF 1 and SF 3 is expected to be sufficient for most analyses of environmental justice.

PL-94-171 Redistricting Data

Congress passed Public Law (PL) 94-171 in 1975 offering states the opportunity to receive population totals for election precincts and similar areas. From 1990 onwards, states have been receiving population data by race at the block level to support redistricting. The PL-94-171 file is based on a 100 percent sample (the Census short form) and contains the most detailed information on the location of the total population by race and ethnic origin, and on population over the age of 18 (voting population) by race and ethnic origin.⁴

The PL-94-171 file is important because it is one of the first products released after the Decennial Census. The data for 2000 were released by April 2001 and accompanied by software to access the data. The file contains:

1. Six “single race” tabulations namely African Americans, American Indian/Alaska Native, Native Hawaiian and other Pacific Islander, Asian, White, and some other race; and
2. 57 combinations for those that marked “more than one” of the six race categories.

Implications of “More Than One Race”

Environmental justice requires “all impacted minority groups” to be identified as a first step in the analysis. A memorandum issued by the Office of Management and Budget (OMB Bulletin No. 00-02) requires that for those that marked more than one race, if one of the categories is a minority category, then that person should be included as a minority. For people that marked more than two races, the most adversely impacted community among the three should be treated as their race. However, analyses conducted by the Census Bureau show the numbers of people that marked more than two races to be a very small proportion of the total population.

For those organizations that defined TAZs for TIGER 2000, a TAZ field is included in the redistricting file so that users can aggregate blocks into TAZ summaries. This is an improvement over the 1990 package since it allows locally developed TAZ level information to be easily overlaid with the PL-94-171 data.

The PL-94-171 data constitute an important source of information that can be immediately used in transportation planning to support an environmental justice analysis. Although the Census Bureau provides far less data at lower geography levels (such as block groups), the PL-94-171 file contains extensive data on race and ethnicity. The data can be used to analyze the concentrations of minority population groups. Since the data are

⁴ Agencies can get a copy of the software and the data via the Internet or their local State Data Center contact. For more information on the redistricting program, visit the Census Bureau web site at: <http://www.Census.gov/clo/www/redistricting.html>. Instructions for transferring the redistricting data to a GIS are provided at: <http://www.fhwa.dot.gov/planning/census/pl2gis.htm>.

released at the block level, precise spatial disaggregation can be performed, which in turn can help with analyzing the impacts of transportation related projects on different groups.

Strengths of PL-94-171 File

1. It is the first file released (April 1, 2001 is the legal deadline for the Census Bureau);
2. A great amount of geographic detail is retained; and
3. It contains the greatest detail on race and ethnic origin.

Weaknesses of PL-94-171 File

The file does not contain information on households or other characteristics such as income, physical mobility status, and age which are desirable in fully defining minority groups for environmental justice purposes.

Summary File 1 (Summary Tape File 1 in 1990)

The Summary File 1 (SF 1) contains data from the short form and includes population counts by age, race, sex, marital status, ethnic origin, household type, and household relationship.⁵

In the 1990 file, population items were cross-tabulated by age, race, ethnic origin, or sex. Housing items included occupancy/vacancy status, tenure, units in structure, contract rent, meals included in rent, value, and number of rooms in housing unit.

For 2000, the state-by-state release of “Summary File 1” (SF 1) was completed by the Census Bureau between June and September 2001.

SF 1 contains the 100 percent data, which is the information compiled from the questions asked of all people and about every housing unit. Population items reported include sex, age, race, ethnicity, household relationship and group quarters. Housing items include occupancy status, vacancy status and tenure (owner occupied or renter occupied).

There are 171 population tables (identified with a “P”) and 56 housing tables (identified with an “H”) available at the geographic detail of Census Blocks. In addition there are 59 population tables with detailed race and ethnic origin available at the geographic detail of Census Tracts (identified with a “PCT”) for a total of 286 tables.

⁵ The FHWA portal on Census issues contains information on SF 1 data. Procedures to convert the data to a GIS, and aggregate the block data to Traffic Analysis Zones are also provided. For more, please visit: <http://www.fhwa.dot.gov/planning/Census/sf1.htm>.

For major race and Hispanic or Latino groups, there are 14 population tables and four housing tables shown down to the block level, and four population tables shown down to the Census tract level.

Strengths of SF 1

1. The data are released between June and September 2001, a year earlier than long form data;
2. The data contain at least basic information on housing units as opposed to the PL-94-171 file; and
3. The data are available at the block level.

Weaknesses of SF 1

Important information for environmental justice such as income, physically handicapped status, and commute characteristics (essentially long form characteristics) are not available.

Sample Summary File 3 (Summary Tape File 3 in 1990)

The Summary File 3 (SF 3) contains long form sample data weighted to represent the total population. In addition, the file contains 100 percent counts and unweighted sample counts for total persons and total housing units. Most of the tabulations in the 1990 STF3 were two-way tables. For example, some of the race tabulations in the 1990 STF3 included:

- **Table P86.** Age of householder(7) by household income in 1989(9) – Universe: Households;
- **Table P87A.** Race of householder(1) by age of householder(7) by household income in 1989(9) – Universe: White households;
- **Table P87B.** Race of householder(1) by age of householder(7) by household income in 1989(9) – Universe: Black households;
- **Table P87C.** Race of householder(1) by age of householder(7) by household income in 1989(9) – Universe: American Indian, Eskimo, or Aleut households;
- **Table P87D.** Race of householder(1) by age of householder(7) by household income in 1989(9) – Universe: Asian and Pacific Islander household;
- **Table P87E.** Race of householder(1) by age of householder(7) by household income in 1989(9) – Universe: Other race households; and
- **Table P88.** Age of householder(7) by household income in 1989(9) – Universe: Households with householder of ethnic origin.

Population items covered by the 1990 STF3 relevant to environmental justice analysis include: age, mobility limitation status, ancestry, occupation, citizenship, place of birth, class of worker, place of work, educational attainment, poverty status, ethnic origin, sex, household type and relations, travel time to work, income in 1989, urban and rural population, industry, veteran/military status, language spoken at home, work disability status, marital status, work status in 1989, means of transportation to work, and workers in family in 1989.

Relevant housing items in the 1990 STF3 include: age of householder, race of householder, ethnic origin of householder, telephone availability, vehicles available, selected monthly owner costs, condominium status, tenure, units in structure, housing units, value of housing unit, mortgage status, occupancy status, and rent.

A draft of the SF 3 specifications for 2000 are available at the Census Bureau State Data Center (SDC) web site (http://www.sdcbidc.iupui.edu/Census_2000/census_2000.html). SF 3 is expected to be released from June to September of 2002. The residence information for the Census Transportation Planning Package is expected to be released between October and December of 2002, immediately following the SF 3. This package will contain most of the important long form information useful for transportation planning applications.

Strengths of SF 3

1. The SF 3 contains additional information to support an analysis of environmental justice;
2. Cross tabulations such as race and income can help in developing more complete definitions of environmental justice populations; and
3. In association with SF 1, the SF 3 package can be used to effectively support all types of micro-area analysis.

Weaknesses of SF 3

1. The data are released two years after collection;
2. The lowest level of geographic detail is at the block group. This is inherently true of all packages derived from the sample or long form questionnaire; and
3. The SF 3 contains few three-way tabulations.

Subject Summary Tape Files

Additional subject summary tabulations (SSTF) were provided by the Census Bureau in 1990. In 2000, the user will be allowed to make custom tables by using the American Fact Finder portal. The 1990 tabulations of interest are:

- The foreign-born population in the United States (SSTF01);
- Persons of ethnic origin in the United States (SSTF03);
- Characteristics of adults with work disabilities, mobility limitations, or self-care limitations (SSTF04);
- The Asian and Pacific Islander population in the United States (SSTF05);
- Education in the United States (SSTF06) and employment status, work experience, and veteran status (SSTF12);
- Metropolitan housing characteristics (SSTF07);
- Housing of the elderly (SSTF08);
- Housing characteristics of new units (SSTF09);
- Mobile homes (SSTF10);
- Employment status, work experience, and veteran status (SSTF12);
- Characteristics of American Indians by tribe and language (SSTF13);
- Occupation by industry: 1990 (SSTF14);
- Geographic mobility in the United States (SSTF15);
- Poverty areas in the United States (SSTF17);
- The older population of the United States (SSTF19);
- Journey to work (SSTF20);
- Characteristics of the black population (SSTF21); and
- Earnings by occupation and education (SSTF22).

Census Transportation Planning Package

The Census Transportation Planning Package (CTPP) is a set of special tabulations derived from the Decennial Census designed specifically for transportation planning. CTPP contains tabulations by place of residence (Part 1), place of work (Part 2), and for

flows between home and work (Part 3).⁶ The level of aggregation used is the Traffic Analysis Zone for those counties that have a TAZ layer defined in TIGER/Line. For other metropolitan areas, the lowest level of geography is the tract or block group, depending on the choice of the local MPO. The CTPP is part of the third tier of data products released by the Census Bureau and is expected to be released between late 2002 and early 2003.

The 1990 CTPP contained several tabulations useful for an environmental justice analysis. Tables B.2 and B.3 are extracts from the data dictionary of the 1990 CTPP.

Table B.2 Residence End (Part 1)

Table	
1-5	Universe: Persons; Ethnic Origin(3) by Race(4)
1-9	Mobility limitation status(3) by age(11) Universe: Persons 16 years and over
1-10	Mobility limitation status(3) by employment status(6) Universe: Persons 16 years and over
1-24	Ethnic origin(3) by race(4) by means of transportation to work(11). Universe: Workers 16 years and over
1-44	Mobility limitation status(3) by means of transportation to work(11) Universe: Workers 16 years and over

Table B.3 Work End (Part 2)

Table	
2-1	Ethnic origin(3) by race(4) by means of transportation to work(11) Universe: Workers 16 years and over

The proposed CTPP 2000 standard tabulations contain roughly 30 tables useful for an environmental justice analysis. A significant addition is the introduction of a flow table in Part 3 consisting of minority population flows by origin and destination. Another

⁶ To obtain a full listing of the proposed CTPP tabulations, call the CTPP 2000 hotline at (202) 366-5000 or visit the TRB Census Data Subcommittee web page at: <http://www.trbcensus.com>.

important feature of the CTPP is that it contains tabulations both by work and home end. Moreover, the tabulations at the work end are “mirrored” by tabulations at the home end. “Mirrored” tables enable CTPP users to estimate the flow of workers from their place of residence to their place of work by household and worker characteristics. With techniques such as Fratar or Iterative Proportional Fitting (IPF), users can estimate worker flow tables that will not be included in the CTPP 2000 standard tabulations.

The CTPP, combined with SF 3 and SF 1, is a powerful tool to develop significant data capabilities needed for an environmental justice analysis. Worker flows between residence and workplace and the workers’ household characteristics and travel behavior are reported in the 10 tables in this group and provide information on household income, household vehicle availability, and their mode of travel to work. The CTPP also contains many tables (both at the residence and the work end) with poverty, elderly, and disability status; and race and ethnic origin combined with income. In addition, there are many three-way tables specifically designed with the analysis of environmental justice as an objective. A few small four-way tables also are included.

The cross-tabulations of race by income, race by occupation, and race by industry are very powerful tools to derive indices and develop estimates of most significantly impacted population groups. These cross-tabulations, in turn, can assist in classifying households based on characteristics such as poverty tracts or delineating areas needing transit access. For example, geographic areas dependent on transit can be defined using a table in CTPP with household counts of the following four cross tabulated characteristics:

- Poverty Status (income less than 100 percent, between 100 and 150 percent, or greater than 150 percent of poverty threshold)⁷;
- Race (White, Black, other);
- Ethnic origin; and
- Mode (SOV, carpool, transit, etc.).

Strengths of the CTPP

1. Tabulations at the work end are provided;
2. Minority status population group worker flows are tabulated by origin and destination;
3. Along with SF 1 and SF 3, CTPP completes the information that can be derived from the Census standard products;

⁷ A listing of poverty tracts is contained at the Census Bureau web site, <http://www.Census.gov/geo/www/tractez.html>.

4. The new CTPP design specifically considers environmental justice analysis requirements; and
5. The CTPP can be used at a tract level, place level, county level, or even for statewide analyses.

Weaknesses of the CTPP

1. The work end and flow tabulations of CTPP will not be available until the spring of 2003; and
2. The tabulations contain fewer categories (e.g., race is divided into only four categories for Parts 1 and 2). This was done to increase the number of cross tabulated variables. The package needs to be used in conjunction with SF 1 and SF 3 to draw the maximum benefits. For the Part 3 origin and destination flow reporting, all minority population groups are combined into a single category because of the potentially small sample sizes associated with many of the individual cells.

■ **Other Sources of Demographic Data**

Although the Decennial Census is the most important source of information for reliable data on race, ethnicity, income, age, and physically handicapped status, it only provides a snapshot across time. To obtain data on a non-Census year, it is necessary to rely on a combination of estimation techniques based on the use of Census data and information from other survey and data sources. This subsection provides an introduction to five potential supplementary data sources:

- American Community Survey;
- American Housing Survey;
- Current Population Survey;
- Nationwide Personal Transportation Survey; and
- Other Commercial Sources.

American Community Survey

The American Community Survey (ACS) is a continuous survey performed by the Census Bureau. The ACS data constitute a paradigm shift from a “snapshot” approach to one of

continuous collection across time.⁸ When implemented fully, it will provide information on demographic, economic, and housing profiles of America's communities every year. The ACS has the same questionnaire content as the Decennial long form and is expected to replace the long form in 2010. Between 1999 and 2001, the ACS was conducted in 31 sites to compare ACS results with those from the Census 2000 long form. Full implementation of the ACS is planned to begin in 2003 for every county in the country, and will achieve the same one-in-six sample size as the Census long form.

Table B.4 lists data availability for different areas. The ACS data from the test sites are available as of the middle of July 2001. The earliest data from the fully implemented ACS are expected to be available in 2004 for areas having a population greater than 65,000.

Table B.4 Availability of American Community Survey Data

Area Characteristics	Expected Release Date of ACS Data	What Will Be Released?
Population greater than or equal to 65,000	2004	Yearly data
Population between 20,000 and 65,000	2006	Three-year average
Population below 20,000 (e.g., Census tracts or block groups)	2008	Five-year average

The Bureau of Transportation Statistics in 1996, conducted a study entitled *Implications of Continuous Measurement for the Uses of Census Data in Transportation Planning*. This report presents the findings of an expert panel on the utility of data obtained from continuous measurement for transportation planning.⁹ The report found that a change from the traditional long form to continuous measurement can significantly affect how state and metropolitan transportation planners use Decennial Census data. The continuous measurement process, however, is a new process, and the results need to be compared and evaluated against those from the conventional Census.

⁸ Additional information on the American Community Survey is available at the Census Bureau web site, <http://www.Census.gov/acs/www>.

⁹ A copy of this report and a discussion on the American Community Survey from a transportation perspective can be accessed at <http://www.trbcensus.com/acs/>.

American Housing Survey

The American Housing Survey (AHS) collects data on the nation's housing.¹⁰ The AHS consists of a national sample of 55,000 households, collected every year. The AHS also samples 47 selected metropolitan areas once every four years. The sample size for each area is 4,800 households. Though the AHS is primarily designed to collect data on the nation's housing stock, the survey also contains several questions relating to race, income, household size, vehicle ownership, and journey to work. The survey is conducted by the Census Bureau for the Department of Housing and Urban Development (HUD). The AHS returns to the same housing units each time to gather data. While the sample size for the AHS is relatively small, the data can be used to develop inter-censal estimates at a county level. Moreover, data from two or three surveys can be combined and weighted with population estimates to obtain estimates at a tract level.

Current Population Survey

The Current Population Survey (CPS) is a joint venture of the Census Bureau and the Bureau of Labor Statistics (BLS). The survey has been conducted for more than 50 years. The sample size for the survey is expected to increase to 99,000 households nationwide in the near future.¹¹

The sample is scientifically selected to represent the civilian non-institutional population. Respondents are interviewed to obtain information about the employment status of each member of the household 15 years of age and older. Published data, however, focus on those ages 16 and over. Although the CPS is designed primarily to collect up-to-date information for states, it can be used in conjunction with other Census-related products to develop estimates at lower level geographies.

Estimates obtained from the CPS include employment, unemployment, earnings, hours of work, and other indicators. These are available by a variety of demographic characteristics including age, sex, race, marital status, and educational attainment. They also are available by occupation, industry, and class of worker. Supplemental questions often are added to the regular CPS questionnaire to produce estimates on a variety of topics including school enrollment, income, previous work experience, health, employee benefits, and work schedules.

Since the sample size for both the CPS and AHS are very small, the data from these surveys need to be combined and weighted with the Decennial Census data to obtain estimates of various characteristics not collected in the Decennial Census. Several methods

¹⁰The Census Bureau web site provides comprehensive information on the American Housing Survey, <http://www.Census.gov/hhes/www/ahs.html>.

¹¹More information on the Current Population Survey is available at the following web site: <http://www.bls.Census.gov/cps/cpsmain.htm>.

can be used to weight the Census data. Methods commonly used to iterate the data include Iterative Proportional Fitting (IPF) and Bayesian techniques.

Nationwide Personal Transportation Survey

The Nationwide Personal Transportation Survey (NPTS), now renamed as the National Household Transportation Survey (NHTS), provides a periodic snapshot of daily travel from a sample of 25,000 U.S. households. The data provided by the NHTS covers all trips made by all household members, by all modes and trip purposes, in a single travel day. First collected in 1969, subsequent rounds of data were collected in 1977, 1983, 1990, and 1995. A new round of NHTS data collection currently is underway with results expected to be available in December 2002.

The survey includes questions similar to those in the Decennial Census about the respondent's "usual" journey to work. This permits comparison of how people interpret the question about their "usual" mode to work with how they actually travel to work on a specific survey day.

A few organizations and states purchase add-on samples of the NPTS to use in place of a local household travel survey for regional travel forecasting purposes. Because the NPTS contains information on non-work modes, the data can be weighted with the CTPP data and used to analyze all types of travel characteristics of all special population groups.

Other Commercial Sources

Data from the Decennial Census provides information for a specific day once every 10 years. More current data, however, often are desirable for an environmental justice analysis. Several other Census Bureau surveys and other federal government surveys can be combined to produce updated estimates at small areas of geography, as indicated in the previous subsections. The American Community Survey is expected to be particularly helpful in this regard when it become fully operational. In addition, Claritas Corporation continuously updates the Census data at the block group level and releases an updated dataset every year.

Table B.5 Timeline for Standard Census Products¹

Release Date² (Dates in this column refer to the first medium of release.)	100-Percent Data Products	Lowest Level Geography	Media
Released March 2001	Census 2000 Redistricting Data Summary File State population counts for race and Hispanic or Latino categories	Blocks	Internet, CD-ROM, DVD
Released May – June 2001	Demographic Profile Selected population and housing characteristics in a single table (Census tract is the lowest geography on Internet: June – September 2001)	Places	Internet, CD-ROM/DVD (available w/ Summary File 1), paper
Released May 2001	Census 2000 Housing Unit Counts	Places	Internet
Released May – June 2001	Congressional District Demographic Profile Same as Profile (described above) but for Congressional Districts	Congressional Districts of the 106 th Congress	Internet, CD-ROM/DVD (available w/ Summary File 1), paper
Released June 2001	Race and Hispanic or Latino Summary File	Places	Internet (FTP only), CD-ROM
States: June – September 2001	Summary File 1 (SF 1): • Population counts for 63 race categories and Hispanic or Latino.	Blocks	Internet, CD-ROM, DVD
Advance national: November – December 2001	• Population counts for many detailed race and Hispanic or Latino categories, and American Indian and Alaska Native tribes.	Census tracts	
Final national: May – June 2002	• Selected population and housing characteristics [Urban/rural data are on the final national file; this is the only difference from the advance national file]	Blocks/Census tracts	

¹ Source: U.S. Census. Population Division, Decennial Programs Coordination Branch, July 13, 2001.

² CTPP is expected to be released between fall 2002 and spring 2003.

Table B.5 Timeline for Standard Census Products¹ (continued)

Release Date (Dates in this column refer to the first medium of release.)	100-Percent Data Products	Lowest Level Geography	Media
<i>States:</i> September - December 2001 <i>Advance national:</i> March - April 2002 <i>Final national:</i> June - July 2002	Summary File 2 (SF 2): Population and housing characteristics iterated for many detailed race and Hispanic or Latino categories, and American Indian and Alaska Native tribes [Urban/rural data are on the final national file; this is the only difference from the advance national file]	Census tracts	Internet, CD-ROM, DVD
<i>States:</i> March 7, 2001 - December 2001 <i>National:</i> November 2001 - April 2002	Quick Tables Table shells with population and housing characteristics where the user can specify a geographic area and a population group	Census tracts	Internet, CD-ROM/DVD (available w/ Summary File 1)
<i>States:</i> March 7, 2001 - January 2002 <i>National:</i> December 2001 - August 2002	Geographic Comparison Tables Population and housing characteristics for a list of geographic areas (e.g., all counties in a state)	Places	Internet, CD-ROM/DVD (available w/ Summary File 1)
April 2002	Advanced Query Function <ul style="list-style-type: none"> • User specifies contents of tabulations from full microdata file • Includes safeguards against disclosure of identifying information about individuals and housing units 	User defined down to block groups	Internet
January - November 2002	Summary Population and Housing Characteristics (PHC-1)	Places	Internet, paper (printed report)
2003	Population and Housing Unit Totals (PHC-3)	Places	Internet, paper (printed report with selected historical counts)

¹ Source: U.S. Census. Population Division, Decennial Programs Coordination Branch, July 13, 2001.

² CTPP is expected to be released between fall 2002 and spring 2003.

Table B.5 Timeline for Standard Census Products¹ (continued)

Release Date (Dates in this column refer to the first medium of release.)	100-Percent Data Products	Lowest Level Geography	Media
March - May 2002	Demographic Profile Demographic, social, economic, and housing characteristics presented in three separate tables (Census tract is the lowest geography on Internet: June - September 2002)	Places	Internet, CD-ROM/DVD (available w/Summary File 3), paper
March - May 2002	Congressional District Demographic Profile Demographic, social, economic, and housing characteristics presented in three separate tables for Congressional Districts only	Congressional Districts of the 106 th Congress	Internet, CD-ROM/DVD (available w/Summary File 3), paper
June - September 2002	Summary File 3 (SF 3): <ul style="list-style-type: none"> Population counts for ancestry groups... Selected population and housing characteristics 	Census tracts Block groups/ Census tracts	Internet, CD-ROM, DVD
October 2002 - February 2003	Summary File 4 (SF 4): Population and housing characteristics iterated for many detailed race and Hispanic or Latino categories, American Indian and Alaska Native tribes, and ancestry groups	Census tracts	Internet, CD-ROM, DVD
June 2002 - February 2003	Quick Tables Table shells with population and housing characteristics where the user can specify a geographic area and a population group	Census tracts	Internet, CD-ROM/DVD (available w/ Summary File 3)
July 2002 - March 2003	Geographic Comparison Tables Population and housing characteristics for a list of geographic areas (e.g., all counties in a state)	Places	Internet, CD-ROM/DVD (available w/ Summary File 3)

¹ Source: U.S. Census. Population Division, Decennial Programs Coordination Branch, July 13, 2001.

² CTPP is expected to be released between fall 2002 and spring 2003.

Table B.5 Timeline for Standard Census Products¹ (continued)

Release Date (Dates in this column refer to the first medium of release.)	100-Percent Data Products	Lowest Level Geography	Media
For 1-percent sample: 2002	Public Use Microdata Sample (PUMS) Files	Super Public Use Microdata Areas	CD-ROM, DVD
For 5-percent sample: 2003	<ul style="list-style-type: none"> 1-percent sample (information for the nation and states, as well as substate areas where appropriate). 5-percent sample (information for state and sub-state areas). 	(Super- PUMAs) of 400,000+ PUMAs of 100,000+	
October 2002	Advanced Query Function <ul style="list-style-type: none"> User specifies contents of tabulations from full microdata file Includes safeguards against disclosure of identifying information about individuals and housing units 	User defined down to census tracts	Internet
2003	Summary Social, Economic, and Housing Characteristics (PHC-2)	Places	Internet, paper (printed report)
2003	Congressional District Data Summary File 100 percent and sample data for the redistricted 108 th Congress	Census tracts within Congressional Districts	Internet, CD-ROM, DVD

¹ Source: U.S. Census. Population Division, Decennial Programs Coordination Branch, July 13, 2001.

² CTPP is expected to be released between fall 2002 and spring 2003.