Literature Review and State of the Art in Environmental Justice

The Puget Sound Regional Council reviewed a number of reports and articles of peer agencies and research organizations to understand the “state of the practice” nationally among Metropolitan Planning Organizations (MPOs) and planning organizations in addressing Environmental Justice (EJ) issues in their planning efforts, transportation plans and improvement programs. This review was initiated during the preparation of the 2005-2007 Regional Transportation Improvement Program (TIP), and was intended to assist in the selection of methodologies to be used in the EJ portion of that document. The review focused on 25 EJ-related studies conducted by transportation planning agencies, with an emphasis on MPOs and Councils of Governments (COGs).

Federal and state documents provide general guidance on EJ methodologies that might be used by regional planning agencies. For example, Technical Methods to Support Analysis of Environmental Justice Issues, prepared by the National Cooperative Highway Research Program in 2002, defines terms and legal issues surrounding EJ and reviews common methods used by agencies nationally in addressing them. The report states:

MPOs… 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.  

Several other Federal and state transportation agencies have published overviews of EJ methods used in transportation planning. FHWA has published Environmental Justice: What You Should Know (2003), a 27-page pamphlet that discusses the involvement of the public in transportation planning. Washington State Department of Transportation (WSDOT) has produced a similar document, The Environmental Procedures Manual (2003). Both make broad suggestions regarding EJ approaches: focusing on the identification of EJ communities, and the use of public involvement methods such as public meetings and interviews.

The Transportation Research Board’s (TRB) report Effective Methods for Environmental Justice Assessment (2004) provides a wide-ranging examination of possible approaches to EJ in transportation planning. It identified some 13 issues (such as air quality, water quality and drainage, safety and community cohesion, among others) associated with transportation projects and suggests possible methods of addressing them. The report also suggests methods for identifying protected populations using demographic data such as Census data. These methods were employed by the Regional Council in its Environmental Justice Demographic Profile, prepared using 2000 Census data in October 2003.

In addition to the literature review, the Regional Council conducted a survey of EJ methods used by other planning agencies. This survey included the EJ components of the Metropolitan Transportation Plans (MTPs) of eight of the Council’s peer MPOs: Atlanta Regional

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Commission, the Metropolitan Transportation Commission (the San Francisco Bay Area MPO), Boston Metropolitan Planning Organization, the Denver Regional Council of Governments, the Metropolitan Planning Organization for the Miami Urbanized Area, The Maricopa Association of Governments (the Phoenix, Arizona MPO), Portland Metro, and the San Diego Association of Governments. This survey focused on MTPs for several reasons: A) they are major documents mandated by the Federal government and are thus produced by all MPOs, and B) PSRC will soon embark on an update of its MTP and will include an EJ analysis in the preparation of that document. As such, an understanding of analogous efforts on the part of peer regions might be useful.

Few agencies have approached EJ and Title VI issues exactly the same way. For example, an agency that has employed extensive use of accessibility analysis might lag behind others in its public involvement efforts. This section highlights some approaches being taken by other agencies across the country.

In addition to minorities and low-income households, some of PSRC’s peer agencies include elderly, disabled, and zero car households in their definition of EJ communities of concern. One agency that has included these groups in its EJ program is the Mid-Ohio Regional Planning Commission. For the purposes of this report, PSRC focuses on those groups specifically identified in Executive Order 12898.

Methods commonly used to address environmental justice issues can be classified into three groups:

**GIS and Overlay Analysis.** Analyses using Geographic Information Systems (GIS) were used to some extent in almost all the study reports reviewed in the literature, and were most frequently used to identify the locations of populations of concern. This method was used in 16 out of 21 EJ study reports by MPOs, and was the method used in the PSRC’s EJ analysis for Destination 2030, Regional Demographic Profile, and the EJ analysis for the 2005-2007 TIP. Geographic Census data is first used to identify neighborhoods that surpass a given threshold proportion of low income or minority households. This threshold is usually defined as the regional proportion of low income or minority households. In most studies of this type the TIP or MTP projects were then overlaid upon the EJ neighborhood map so that comparisons could be made between the distributions of projects across the two community types (EJ vs. non-EJ).

Many of the MTPs examined in the peer region survey incorporated GIS or Overlay Analysis in their approaches to EJ issues. PSRC employed this type of study in the EJ components of Destination 2030, the 2005-2007 TIP and the Environmental Justice Demographic Profile.

**Accessibility Analysis.** This methodology usually uses a travel demand model to forecast changes in communities’ access to jobs or other activity centers. As such, it is a quantitative method of measuring benefits and burdens for different socio-economic groups resulting from a project, transportation program, or plan. Although the notions of benefits and burdens can often be difficult to define, Cambridge Systematics, Inc. (2002) includes the following measures of benefit for environmental justice:

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- 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.  

The Cambridge Systematics report (2002) goes on to state, measures of burden are often seen by MPOs as more difficult to address at a regional level than are measures of benefit:

While it has been most common... 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.

Accessibility analysis measures accessibility or travel times to jobs or to other activity centers, and does not address the other measures of benefit listed above or to assess burdens. Accessibility might be defined in any of several ways, such as the average travel time to a resource or the number of resources within X minutes from a household. Resources may be defined as jobs, shopping facilities, an airport, etc. When engaging in this type of analysis it is important to attain consensus among stakeholders regarding the definitions of accessibility. Accessibilities are calculated through travel demand modeling, using input scenarios reflecting the region before and after the implementation of an individual transportation project or a more comprehensive transportation plan. Changes in accessibility can then be examined on a Traffic Analysis Zone (TAZ) or census block group basis, and can thus be compared between EJ/non-EJ communities. Some advantages to this method are that it involves a precise definition of benefits and burdens. That is, an increase in accessibility is normally regarded as a benefit, and a decrease as a burden. It also measures benefits and burdens equally across all areas, and is replicable. The disadvantage of these definitions is that they may not reflect the real needs or concerns of a given community.

One method that a few of PSRC’s peer MPOs have used to address EJ considerations in their transportation planning is the use of accessibility analysis. Of the eight peer regions reviewed, the Boston, Bay Area, and San Diego MPOs modeled plan-related changes in accessibilities for EJ areas. Little discussion was found in these studies regarding the definitions of benefits and burdens. An increase in accessibility was seen as a benefit, and decrease as a burden. This was concisely stated in the Bay Area’s Metropolitan Transportation Commission MTP: “Mobility and accessibility are the main benefits conferred by the Regional Transportation Plan.” In these analyses, access to resources is modeled and mapped first for a base year, typically the one contemporaneous to the study. Future years can then be compared against the base year, allowing assessments to be made as to changes in EJ communities’ accessibilities.

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Accessibility analysis is an attractive method for EJ analysis because it involves a precise definition of benefits – improvements in a neighborhood’s accessibility to jobs and other important destinations – and provides a method of measuring those benefits. For example, the peer regions using this type of analysis defined accessibility variously as the number of jobs accessible within a given travel of a person’s home, and the average travel time to major regional facilities such as hospitals and higher education facilities. This kind of analysis has not been implemented to date by PSRC due to resource constraints and issues regarding the configuration of the input data to the agency’s travel demand model, but might be included in the agency’s EJ program at some date in the future.

Public Participation and Outreach. Public participation is used frequently in community needs assessments to whether needs of an affected community are being met or impacted by projects of policies. Public participation is frequently recognized as one of the most thorough methods of community needs identification, since it can allow affected communities to define the concepts of benefits and burdens for themselves. These issues are summarized in FHWA’s Environmental Justice: What You Should Know:

[Community members’] participation can provide valuable input and assist in validating information obtained from secondary sources such as U.S. Census Bureau data. They can play an integral role in identifying issues and concerns of their communities, cataloging community resources and past actions affecting their quality of life, suggesting project alternatives, and negotiating avoidance, minimization, mitigation, and enhancements.  

Many MPOs have used public participation and outreach to meet their goals of environmental justice. The Association of Bay Area Governments, for example, convened an Environmental Justice Advisory Group to assist in the development of their EJ program. This advisory group assisted in the construction of the agency’s MTP and helped develop a strategy to engage individual minority and low-income communities. The Boston Metropolitan Planning Organization convened a similar group, the Environmental Justice Committee, which was intended to provide advice and guidance to the MPO over a long-term horizon. In addition to helping develop the long-term EJ strategy for the agency, this committee provided assistance in the evaluation of mobility and equity in the regional transportation system. Based on the documents reviewed, only a minority of peer regions – roughly 25 percent – used direct public participation in their approach to EJ.

Public outreach efforts may also take the form of focus groups, meetings with the public or with community leaders, or written or telephone surveys. Each public outreach methods has relative strengths and weaknesses (see chart below). Focus groups and meetings with community leaders can provide a cohesive, detailed picture of a community’s concerns, but it is important that those consulted are trusted within their communities and that their views and opinions are largely reflective thereof. Open meetings with the public might be used in communities in which

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there are few accessible community leaders. Public outreach also has the benefit of serving as both an information gathering tool and an outreach method in areas where relationships between planning agencies and the public have been strained or are not well-established.

Advantages and Disadvantages of Public Outreach/Input Methods

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<thead>
<tr>
<th>Methodology</th>
<th>Represents Population</th>
<th>Ability to Probe</th>
<th>Ability to address language issues</th>
<th>Cost</th>
<th>Completion Time</th>
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<tr>
<td>Telephone survey</td>
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<td>medium</td>
<td>high</td>
<td>fast</td>
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<tr>
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<tr>
<td>Automated IVR phone survey</td>
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<tr>
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<tr>
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The annotated bibliography at the end of this compendium describes the individual documents summarized in the literature review.
Annotated Bibliography – Environmental Justice Literature Review

Akron Area Metropolitan Transportation Study. 2003. *Transportation Improvement Program, Fiscal Years 2004 – 2007, Appendix D, Environmental Justice Scan*: This addressed EJ differently with respect to transit and highways. Regarding transit, EJ communities were identified through census data as any block group with greater than the regional average of minority or low income households. The percentage of population within each EJ category was then calculated and was compared to the percentage of population served by transit. No definition of “service” is provided. The section of the report on highway-related EJ simply suggests that project sponsors address EJ concerns in the project development process.

American Planning Association Journal. 1999. *Environmental Justice in Transportation Planning*. American Planning Association, Chicago, IL. This report describes a quantitative EJ analysis project conducted in Waterloo, Iowa. It treats EJ differently from most of the other reports reviewed in that it addressed air quality and noise effects only. It is relatively detailed in its description of the modeling process for both these effects.

Association of Bay Area Governments, *Environmental Justice Report for the 2001 RTP*. This details the public involvement strategy used in the RTP. An Environmental Justice Advisory Group was convened to review and assist planners in the construction of the RTP. A Demographic Profile was constructed, with emphasis on populations defined by race, income, and vehicle availability. Quantitative analysis of the RTP was conducted using the travel model to assess the benefits of the plan with respect to EJ communities.

Atlanta Regional Commission, *EJ Issue Paper for RTP 2030*. This describes formation of their EJ Demographic Profile. Claims this profile will guide project selection for the Regional Transportation Plan. Outlines a public involvement approach. Describes an “Environmental Justice Planning Team” to “provide guidance and feedback, develop recommendations, increase the value of participation and provide outreach to the public on current and future issues related to transportation, air quality and growth in the region.”

Boston MPO, *RTP Appendix B: Environmental Justice-Related Documents*. This provides a very detailed demographic profile in which each neighborhood with an EJ population is described. These descriptions provide spatial boundaries, percentage minority, and income ranges, as well as detailed descriptions of the transit service available. This document also describes analytical steps taken in the development of the RTP to assess the social equity in the plan. These steps center on accessibility and mobility measures derived from a regional travel model.

Boston MPO, *Memo report of EJ tasks accomplished, 2003*. The agency convened an Environmental Justice Committee, intended to provide advice and guidance to the MPO over the long term. It had two specific goals: 1) guide the MPO’s analysis of equity in the current and planned transportation network, and 2) inform the MPO on the needs and concerns of EJ communities. Goal 1 was accomplished through quantitative
analysis with the travel model, and Goal 2 was accomplished in coordination with representatives of known Environmental Justice communities in the area.

**Cambridge Systematics, Inc.** 2002. *Technical Methods to Support Analysis of Environmental Justice Issues*. Transportation Research Board, National Research Council. Washington, DC: National Academy Press. This very detailed report suggests many of the quantitative approaches to EJ assessment that are found in the project reports, below. It describes various measures of benefits, chiefly in the realm of accessibility indexes as calculated in a travel demand model. It also proposes GIS overlay methods that might be used to assess EJ issues surrounding transit and other TIP projects. It suggests that measures of burden are best evaluated at the project level.

**Center for Housing Policy.** 2005. *Paycheck to Paycheck: Wages and the Cost of Housing in America*. National Housing Conference. Washington, DC. This online database details the required yearly income to obtain a home loan in 183 American metropolitan areas and compares those incomes with the incomes of 63 low- to moderate- income occupations. The study demonstrates that the rise in housing prices is not being matched by wage increases for low- and moderate-income jobs, leaving home ownership out of reach for a growing sector of the American workforce. It can be accessed at http://www.nhc.org/chp/p2p/.

**Charlotte County - Punta Gorda Metropolitan Planning Organization.** *Community Impact Assessment Methods During the Long Range Planning Process*: This paper describes an implementation of a public involvement process. First, a census-based GIS method was used to identify EJ neighborhoods. Outreach was then done to reach individuals and agencies within those communities and to get their feedback on the Regional Long Range Plan.

**Denver Council of Governments, Metro Vision 2025 Interim Regional Transportation Plan.** Describes the regional demographic profile, as constructed from Census data.

**Eastgate, Ohio Council of Governments, TIP – Highway:** Identified 24 EJ communities and assessed the effects of individual TIP projects located within them. For each project, a determination was made as to how the project would affect the neighborhood in each of twenty different measures: air quality, noise, green space, etc. Each variable was determined to be a) an improvement, b) not changed, or c) adversely changed.

**Eastgate, Ohio Council of Governments, TIP – Transit:** This report defines an area served by transit to be any census tract within ¾ mile from a transit route. It then compares the population served by transit in EJ tracts vs. that in non-EJ tracts. No conclusions are drawn from these numbers.
Federal Highway Administration, *FHWA Actions to address Environmental Justice in Minority Populations and Low-Income Populations*: This short paper provides definitions of Low-Income, Minority populations, etc. It directs FHWA managers and staff to take certain factors into account when evaluating the effects of projects. It does not provide guidance on analytical methods to use in a regional or aggregate-scale evaluation of EJ effects of a transportation plan or program.

Federal Highway Administration – Washington Office, *Environmental Justice – What you should know*: Largely oriented toward policy and public involvement issues, with some attention paid to data analysis questions. Suggests methods to use in engaging public agencies and individuals during the planning process. Specifies that in the identification of EJ communities by block group or census tract, minority populations should be aggregated, i.e. if Black persons constitute 20 percent of the block group and Asians comprise 15 percent, then the total of 35 percent should be used for the minority percentage. This paper also suggests a simple overlay analysis of EJ: “Once the project study area is determined, identify all census tracts/blocks that overlap it” (p. 12).

Houston-Galveston Area Council, 2004-2005 *Unified Working Program*: This study examined the RTP-related changes in average travel time for home-based work trips and home-based non-work trips among EJ communities and non-EJ communities. It was based solely on the results from a travel demand model.

Maricopa Association of Governments, *Regional Transportation Plan*. This plan addresses EJ through two methods: a demographic profile of the region’s EJ communities and an overlay analysis of planned projects on that profile. It is essentially the same form of analysis recently performed by the PSRC as part of the TIP.

Maricopa Association of Governments, *The East-West Mobility Study*. This is a component of the Regional Transportation Plan. EJ component addressed by a demographic profile document and a series of public meetings to incorporate public involvement aspects in the decision process.

Metro (Portland, Oregon) *South Corridor I-205/Portland Mall Project Appendix C: Environmental Justice Compliance*. This outlines the treatment of EJ for this major transportation project. It includes two major components: a public involvement component and a GIS-based analysis of EJ neighborhoods affected by the project.

Metropolitan Transportation Commission, *2001 RTP Equity Analysis and EJ Report*: A travel demand model-based analysis. This predicted the change produced by the RTP in the numbers of jobs within 15, 30, and 45 minutes of home by SOV and transit trips. Changes were then compared between EJ communities and non-EJ communities.
Miami-Dade Metropolitan Planning Organization, *Title VI Review*. This documents the efforts the MPO has made to comply with Title VI. It is largely based on public involvement and contains little to no quantitative analysis.

Miami-Dade, *Miami-Dade Transportation Plan for the Year 2025*. This essentially declares in the LRTP that Environmental Justice will be addressed by default, as a by-product of other goals of the plan (Preserve community cohesion, provide equitable and environmentally just travel facilities and services, etc.).

Mid-Ohio Regional Planning Commission, *TIP EJ Technical Analysis (Appendix G)*: A well-presented report, focusing on a travel model-based analysis method. This article provides details of roughly fifteen travel time-based measures of accessibility. It first identifies EJ communities as traffic zones with greater than the regional average of minority, low income, elderly, disabled, or zero car households. It then compares the changes in predicted accessibility measures to be brought on as a result of the TIP.

Multinational Monitor. 2001. *Payday Profiteers: Payday Lenders Target the Working Poor*. Multinational Monitor. Washington, DC. This article discusses the vulnerability associated with living from paycheck to paycheck, and the practices of predatory lending institutions that reap tremendous profits when the working poor – who have few or no other sources of credit – turn to them for to pay for an unexpected expense. The study found that a payday loan that cannot be immediately repaid can accrue up to 2000% interest over the course of a year - $4,000 interest on a $200 loan.


Ohio Kentucky Indiana Regional Council of Governments. 2003. *Fiscal Years 2004 – 2007 Transportation Improvement Program*. Cincinnati, OH: This outlined a public involvement approach to EJ. It describes a checklist which was used in the project scoring process for the TIP. This checklist was produced by an EJ Advisory Committee.

Richmond, VA Regional Planning Commission, *Memo RE: EJ in TIP*: This describes a simple overlay approach. EJ communities are identified through census data as any block group with greater than the regional average of minority or low income households. Projects are then overlain with the EJ communities, and summarized by project type. No buffer distances are discussed or alluded to.

San Diego Association of Governments, *Regional Comprehensive Plan 2030*. This describes in detail changes in the built environment that would benefit EJ communities. It does
not outline public involvement strategies or analysis methods to use in monitoring EJ communities, although it does use Census data to define EJ neighborhoods and recommends that monitoring should take place. The planned transportation network was modeled with travel modeling software, and changes in accessibilities between the base year and 2030 (with full implementation of the RTP) were calculated and summarized for EJ and Non-EJ communities.

Southeast Michigan Council of Governments, Using GIS To Monitor the Spatial Location and Distribution of Impacts From Project Investments: EJ communities were identified as any block group with greater than the regional average of minority or low income households. TIP projects were then mapped and buffered by 300 feet. The proportion of buffers that fell within EJ communities was then compared against the proportion of regional population in a given EJ category (low income or minority). This analysis was further broken down by project type. Roadway capacity projects were assessed via a travel time-based accessibility index, which was calculated through the agency’s travel demand model.

University of California, Berkeley, Environmental Justice and Transportation: A Citizen’s Handbook: This is largely focused on public involvement and policy issues, but also has a short section on quantitative data analysis. This section is very generic, and does not describe methods. It points out that projects should be evaluated on a case-by-case basis, and notes that aggregate analyses may obscure some effects that would be more apparent in a finer-grained analysis.