Small Metropolitan Areas

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The context of transportation planning has changed dramatically since passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) and the Clean Air Act Amendments (CAAA). In addition to the need to satisfy specific requirements for comprehensive statewide and metropolitan planning, governments at the state and local levels are faced with a changed decision-making environment. Along with an increased emphasis on performance-based planning and restricted funds for both planning and projects, the most significant change for smaller areas has been the relationship between transportation investment decisions and growth management policies (*1*).

The 1994 conference on the use of decennial census data in transportation planning outlined changes to the planning process mandated by ISTEA and CAAA, but actual changes run much deeper than the response to the ISTEA policy initiative. The need for new policies is itself a reaction to significant changes in residential and workplace location, the changing nature of urban areas, the level of technology, and growing awareness and concern for the efficient allocation of public funds and control of transportation externalities. These changes and concerns are reflected in a planning agenda that includes demand management, carpool facility planning, transit planning, air-quality management, and congestion and management systems (*2*).

The 1994 conference sought to explore the role census data could and would play in the new planning environment. Census products, especially the 1990 Census Transportation Planning Package (CTPP), were considered to be an extraordinary step forward in terms of the quality and availability of data for planners at all levels of government. Yet, at the time of the last conference, relatively few jurisdictions were actively using the 1990 data. Cervero listed specific applications for the data that ranged from multimodal analysis and transit service analysis and planning to transportation demand management (*3*). A survey by Meyer and Mazur indicates that trend analysis, model development, and validation and corridor development would likely be key areas where census data would be applied (*1*). Although most agreed that census data in general, and the CTPP in particular, would provide one of the only consistent and reliable sources of data for the transportation planning process for smaller areas, it remained unclear exactly how that data would be applied. Since that time, statewide

planning agencies and metropolitan planning organizations (MPOs) have demonstrated a wide variety of applications and uses for available census data.

Some concerns were also presented at the last conference. These spanned the range from the accuracy of census data to the future needs of transportation planners. Could the census continue to supply the current level of data, or would the level decrease because of shrinking resources and rising costs? Also, although vast improvement in transportation-planning-related census data was recognized and lauded, there was a call for still further improvement in the content, quality, and timing (*2*). A discussion of data quality included concerns about wording of the journey-to-work (JTW) questions and accuracy of geocoding workplace data. Asking about the "usual" mode of travel is thought to understate occasional use of transit to work. Geocoding inaccuracies are allegedly due to lack of reliance on local knowledge. The JTW trip is seen as crucial to fulfilling the mandates of ISTEA and CAAA, but effective planning over the long term requires understanding the character of a wide range of trip types. Participants at all levels in the planning process insist that there is a need for data for nonwork trips—trips for shopping, school, and recreation—and trip chaining. The demand for better data is driven by a need to understand the fundamental shifts in transportation behavior caused by the changing urban landscape. Effective planning for the future is impossible without understanding today's patterns of growth and behavior. What impact will temporal adjustments in commuting hours have on regional transportation systems? How will specific policies, such as an urban growth boundary, affect residential and workplace locational preferences and commuting patterns? Will the widening income gap change the nature and location of public infrastructure investment? Responding to these questions exposes the weakness of too much reliance on the JTW data from the census. Lawton contends that the JTW data are inadequate but could be vastly improved with more cooperation between the Census Bureau and local MPOs and councils of government (COGs) (*4*). Quackenbush, although noting the value of census transportation data in validating and calibrating travel models, echoes the concern that current census data are insufficient (*5*). Finally, Wickstrom cites a wide range of applications for decennial census data, especially as a base data set, and reviews the importance of local travel surveys to provide adequate information for the travel modeler (*6*).

Attention to the level of available technology is another essential element in planning for future data needs. During the last conference it was predicted that most statewide planning would shortly be based on a strong modeling framework (*1*). This is happening. New technology that allows for the linking of geographic information systems (GIS) and more traditional transportation modeling renews the call to look hard at the future of data needs and data delivery media and formats. At the same time, a note of caution should be sounded so that planning does not become too method driven. Further, because so many jurisdictions are applying census data in the planning process, there is a need for a published forum in which statewide planning agencies and local MPOs could share their findings and explore other creative methods of transportation analysis and planning.

Purpose

It is in this context that the role of census data in transportation planning today and in the future is considered again. Since the time of the last conference many agencies have new experience in applying census data using new technology and methods. The focus here is on how these experiences fit into the framework for improvement put forward at the last conference. Issues will be highlighted that seem most relevant to the data needs and uses of small MPOs. Experiences of various MPOs will be highlighted, and some of their concerns about data quality, the role of census data in planning for small MPOs, current data shortcomings, and future data needs will be raised.

This summary will

- Review the case studies submitted to this conference on the use of census data in transportation planning for small MPOs, especially the CTPP Statewide Element;

- Identify some of the common issues in terms of usefulness of the CTPP;
- Outline some of the major obstacles in the use of the CTPP;
- Provide examples of the type of analysis that can be done with the currently available data;
- Cover the strengths and weaknesses of the current format and availability of census data; and
- Review suggestions for improving both the quality and use of the data.

Case Studies

In preparation for the conference, several papers by local MPOs on their experience with census data in general and the CTPP in particular were reviewed. The organizations range in size from an MPO for the four-county area around Albany, New York, to small non-MPO cities in Northwest Oregon; their experiences vary widely. The applicable findings from each study follow. (Some of the case studies may be found in Volume 2.)

Association of Monterey Bay Area Governments

The Association of Monterey Bay Area Governments (AMBAG), a tri-county regional MPO, uses census data, both Summary Tape Files (STFs) and the CTPP, to recalibrate their regional travel demand model, which is based on CTPP traffic analysis zones (TAZs). Because they are an MPO and had previously defined the TAZs used in the CTPP, most of the data were pulled directly from the CTPP tables. The TAZs were originally designed to be used as building blocks for a regional model. AMBAG also aggregated block-level STF data to TAZ using a GIS for population and household information. (As suggested at the last conference, this level of sophistication is almost commonplace as GIS capability reaches more users.) AMBAG cites the inadequacy of local travel survey data because of lack of resources and funding and an inordinately small California Department of Transportation (Caltrans) survey sample size as reasons for primary dependence on census data in model development.

AMBAG used the CTPP Urban Element, which was received in late 1994. The richness of the CTPP cross-tabulations by TAZ allowed them to apply trip generation rates for a wide variety of trip types to households. In addition, CTPP data were essential to the modal-split portion of the modeling process because there was no alternative data source. AMBAG found the CTPP Urban Element to be highly reliable and useful and recommend expanding it to include

- Description of weekend travel behavior,
- All other trip purposes, and
- Survey information from a typical Wednesday, rather than any typical day, to account for randomness of working characteristics for each person [this is a common theme throughout most papers reviewed and reflects a concern outlined in the proceedings from 1994 (7)].

San Luis Obispo Council of Governments

The San Luis Obispo Council of Governments (SLOCOG), a single-county entity planning for seven cities within their jurisdiction, used census data primarily for the development of a Jobs–Housing Balance Project that was applied for a variety of purposes—to determine the effects on transportation of commute patterns and times and means of work-related travel. This project was done for both small metropolitan areas and the region as a whole. In order to accomplish their goals, SLOCOG broke the county down into planning area boundaries and then subdivided those into cities and census-defined places (CDPs); this breakdown allowed them to apply census data without substantially resorting it geographically. Where city

and CDP data were not available, tract and group-level data from STFs were aggregated to planning areas.

SLOCOG encountered some important concerns in using census data. The data were not always reliable or accurate when compared with local data sources. In addition, because San Luis Obispo County was not designated a Metropolitan Statistical Area (MSA) until 1992, the data for this area were not aggregated by TAZ, which greatly inhibited the ability to apply the CTPP. A review of all data sources used in this study shows that STF data were far more essential to SLOCOG than the CTPP. This situation is common for areas in which aggregation by TAZ is not available. Finally, there is a concern at SLOCOG about the updatability of their work; because it is based on decennial census data, it can only be updated at a wide time interval (D. Polley, Volume 2 of these proceedings).

Santa Barbara County Association of Governments

The Santa Barbara County Association of Governments (SBCAG), MPO for the county and multijurisdictional body for all areas in the Santa Barbara–Santa Maria–Lompoc MSA, used census data and other local sources to develop a regional growth forecast for 1994, which provides data on population, employment, and household growth for the region. This forecast was used as an input to traffic forecasts, regional transportation plans, air-quality plans, and housing demand projections. SBCAG used only the STF data in developing the baselines for their projections of household characteristics, and cited the census data as essential to the level of detail achieved in the process (*8*).

Rutland Regional Planning Commission

The Rutland Regional Planning Commission (RRPC), Rutland County, Vermont, is a regional transportation planning agency providing services to more than 27 predominantly rural municipalities. RRPC used census data in the development of a regional transportation plan based on existing and future conditions, which are based on a regional traffic forecasting model. RRPC cites extensive use of both STF and CTPP data. STF-3C is used for block-group-level sociodemographic data. The CTPP is used to gather JTW trip patterns by mode, town-to-town trip patterns, and calibration of their regional demand model. The census data in the CTPP were essential to the analysis that they conducted; no reasonable substitutes were currently available.

Because of the relatively high level of aggregation used for JTW trip origins and destinations, RRPC defined their TAZs to be coterminous with census block groups, owing to the availability of data at this level, which is a breakdown not available in the CTPP.

There was also a case in which the data were not reliable and had to be adjusted according to local data sources. This is a danger for smaller, rural regions where samples are small and census tabulations may not be representative of newer exurban commuting patterns (D.L. Pierce, Volume 2 of these proceedings).

Metropolitan Transportation Planning Organization for Gainesville Urbanized Area

The Metropolitan Transportation Planning Organization (MTPO) for the Gainesville Urbanized Area, which is coterminous with Alachua County, is responsible for developing a regional transportation plan. MTPO, in conjunction with the Florida Department of Transportation (FDOT), hired JHK & Associates to develop a countywide travel demand forecasting model to be used for long-range transportation planning for the Gainesville Urbanized Area. The CTPP was used primarily for model development and validation. MTPO was delayed at the beginning of the effort as staff waited for the release of Urban Element

Parts 1 and 2. Much of the area being analyzed was rural, and MTPO found that place-of-residence information was always not coded properly to TAZs in smaller incorporated areas. Larger incorporated areas reported no coding problems. Part 2, for place of work, was somewhat more reliable, although some recoding was still necessary. For example, more than half of the University of Florida employees were coded to a single TAZ—across the street from the university campus—and all of the 1,000 service and commercial workers were coded to Sorority Row. MTPO concluded that the CTPP was only marginally helpful for this portion of the project. The lengthy process of verifying and recoding data precluded any appreciable savings in time or money.

MTPO notes that census data were used to develop socioeconomic inputs for the travel demand model, although there was significant delay as they waited for the CTPP Urban Element Parts 1 and 2. The CTPP was also used to determine average automobile occupancy rates and trip length reasonableness and to compare the number of home-based work trip productions predicted by the model with a realistic base. Several TAZs were also aggregated, and this level of analysis was used with JTW information to compare zone-to-zone travel with the flows that their model generated.

MTPO has done extensive planning for bicycle and other modes of transit, and the CTPP has proven to be the only reliable external source of data that describes this kind of travel behavior. When compared with a locally developed data source, the mode share of bicycles described in the CTPP proved to be accurate.

The study concludes by noting that the CTPP was absolutely essential in developing the 2020 Transportation Plan for the Gainesville Urbanized Area. In some cases there was no local alternative data source. In addition, the use of the CTPP lent additional credence to the planning effort. MTPO cites census data as very helpful in convincing various oversight committees of the ability of the traffic demand model to predict traffic levels (W. Blanton, Volume 2 in these proceedings).

Capital District Transportation Committee

The Capital District Transportation Committee (CDTC), the MPO for a four-county urbanized area including the cities of Albany, Troy, and Schenectady, is a planning organization for a larger metropolitan region. The STF tabulations and the CTPP Urban Element were used extensively by the professional staff of the CDTC for

- JTW tabulations by municipal groups by mode and by vehicle occupancy,
- Vehicle occupancy information that was used to fine-tune a freeway queueing simulation,
- Identification of areas of households with no vehicles available as prime markets in which to concentrate bicycle and pedestrian accommodations, and
- Demographic information aggregated by TAZ and JTW data for calibrating a new mode-choice model.

As discussed by Poorman (Volume 2 of these proceedings), CDTC makes an important point with regard to the use of census data for each of the above applications: "A key ingredient to successful use of Census data is the integration of readily-available Census data with other data—household survey data, National Personal Travel Survey data, transit on-board survey data and other information. Census data alone cannot be expected to be sufficiently comprehensive to serve sophisticated analytical methods adequately."

In conclusion, timeliness is cited as being central to the needs of a complex planning process. CDTC also reports that census data are crucial to lending credibility to the planning process. The professional technical staff of the CDTC has the ability to use census data beyond the ability of many smaller planning organizations. For CDTC the CTPP does not stand alone but is an essential data ingredient (J.P. Poorman, Volume 2 of these proceedings).

Chicago Area Transportation Study

After a survey of nine small MPOs from around the state of Illinois, a stark contrast was found between Chicago and the other areas in the state. The findings from the survey are briefly summarized in Table 1; the full case study may be found elsewhere in these proceedings (Christopher et al., Volume 2). They indicate that the CTPP, although used, is not widely depended upon by smaller organizations for a variety of reasons, which will be discussed in the next section.

Common Issues

There are several recurrent issues in the case studies reviewed above. The issues can be divided into broad categories including uses and users of the various census products, timeliness, geocoding accuracy, level of aggregation, access to data and structure of CTPP products, and level of technology.

Uses of Products

It is important to begin any discussion of census data by drawing a sharp, clear distinction between the STF tabulations and the CTPP Statewide and Urban elements. The characteristics, abilities, and resources of users of each product are different enough to merit discussion. In most cases it is the larger MPOs that are in the best position to make use of each type of data; they have the necessary professional staff and experience working with data. They are more likely to have locally developed data sets that can be used in conjunction with census products. They have the ability to manipulate information available in the CTPP Urban Element. Smaller MPOs vary in the resources and capability to use data in each of the above categories. They are much less likely to have locally developed data and the resources necessary to mine census data for local applications.

Because ISTEA mandates statewide planning and states generally have more professional capacity and resources to develop and manipulate data, strong linkages between state departments of transportation (DOTs) and smaller MPOs should be developed. Two examples are drawn from the case studies just discussed. Both AMBAG in California and MTPO in Florida cite their reliance on the census as a result of either inordinately small sample sizes for their areas in a statewide survey or lack of recently developed local data. Historically, state

TABLE 1 Results from Selected MPOs (Christopher et al., Volume 2 of these proceedings)

MPO	Used the CTPP?	Census data necessary?	Census data essential?	Would same work have been done w/out Census data?
Bloomington-Normal	VERY LITTLE	YES	YES	NO
Champaign-Urbana	EXPLORATORY	YES	YES	NO
Davenport/ Rock Island-Moline	NO	YES	YES	?
Decatur	YES	YES	NO	?
Dubuque	NO	YES	YES	NO
Kankakee	YES	YES	YES	NO
Peoria	NO	YES	YES	NO
Rockford	NO	YES	NO	NO
Springfield	Very Little	?	?	?

DOTs have provided technical support for urban transportation planning in smaller cities; these roles and expectations need to be clarified in the ISTEA environment. Particularly, states and MPOs need to assess data requirements in terms of reliance on census JTW data in conjunction with state or locally collected travel survey data.

Timeliness

There are three main concerns regarding the timeliness of census data. The first is that census data are only available once every 10 years. For planning purposes, this means that any models or projections based on census data can only be updated at wide time intervals. Continuous measurement will change the time-line issue from decennial snapshots to a 5-year rolling average that will require modification to methodologies.

The second two concerns regarding timeliness raised in the case studies of small MPOs are related to the release of the various census products—STFs and the CTPP Statewide and Urban elements. The delayed release of the CTPP Urban Element leads many larger MPOs to seek or develop other resources, including locally developed travel survey data, using the STF as a sampling frame. Smaller MPOs often do not have the resources available to develop alternative sources of data. Although the Statewide Element can provide important descriptive information on place-to-place flows that are useful for internal to external MSA analysis, it is an underutilized data resource. Because STF data are available first and are crucial to the planning process, the Statewide Element has received little attention as a tool for effective transportation planning. Small MPOs consider the Statewide Element a poor substitute for the Urban Element and continue to wait rather than exploit the place-to-place data.

Geocoding Accuracy

The small-MPO case studies raised several important points with regard to the accuracy of the geocoding of the place-of-work data. The MTPO case, in Florida, where much of the place-of-residence and place-of-work data needed to be checked for accuracy and, in many cases, recoded, raises a flag of caution for users who lack extensive local knowledge or alternative data sources against which to check the accuracy of census data. Another example was raised by RRPC, in Vermont, where coding problems were found between a county in northwest Vermont and a town of the same name in central Vermont. Although all MPOs surveyed appear to agree that the census JTW information is crucial to the transportation planning process, it has also been indicated that secondary data sources against which census information can be checked for accuracy are also important. The need to check the data for accuracy is true for both place-of-residence and place-of-work tabulations. Experience in building models of small cities in Oregon has indicated that caution is warranted when using JTW data where geocoding problems are compounded by small sample sizes.

Level of Aggregation

The level of aggregation is closely related to geocoding accuracy. For smaller MPOs and statewide agencies, coding to a remainder-of-county level could be equivalent to inadequate geographic accuracy because the remainder-of-county level is not specific enough for effective transportation planning. The level of aggregation differs between the Statewide and the Urban elements. The Urban Element is suited directly to the transportation planning process because the level of aggregation has previously been defined by the MPO that will be using the data. AMBAG, the MPO for the Monterey Bay area, provides a good example. They designed their TAZs to be building blocks for a regional model. Once they received the CTPP Urban Element, it was simply a matter of extracting and using the data.

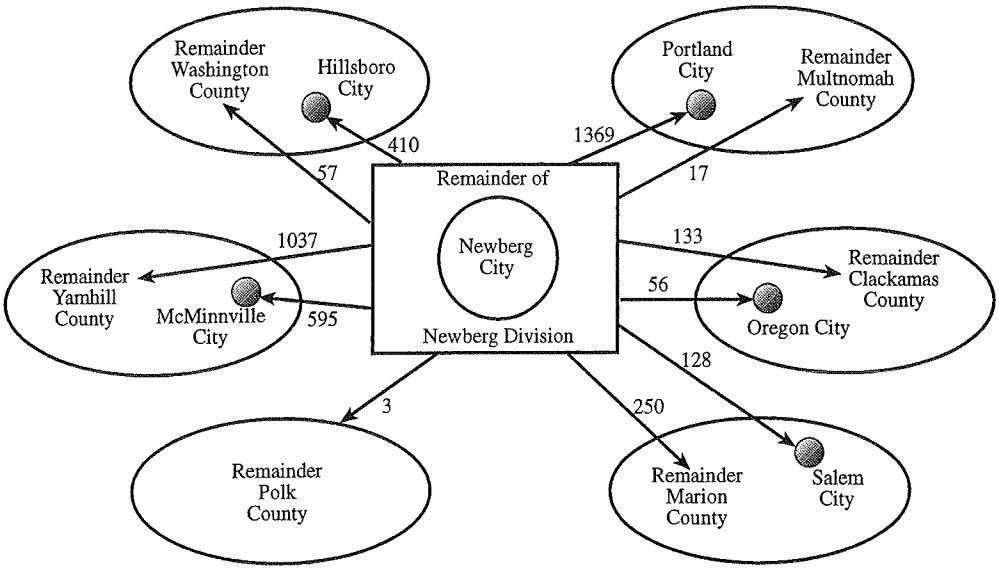

FIGURE 1 Journey to work by residence from Newberg, Oregon, to selected cities and counties (source: 1990 CTPP STCO/MCD/Place, JTW by Residence, Table CO1, All Trips).

The Statewide Element, on the other hand, is much more difficult to apply. Tabulations are available by place of work, place of residence, and JTW flows. Further, each is available at various levels of geography. For a small MPO the task of choosing an appropriate and useful level of data extraction could be daunting. In addition, JTW data flows are not equivalent in their level of geography by place of work and place of residence. Figures 1 and 2 illustrate this problem; both use the city of Newberg, Oregon, as an example. Figure 1, outgoing JTW trips by residence, shows the trips originating both in the city of Newberg and in the Newberg Minor Civil Division (MCD). The flows shown go to both specific places and remainders of counties. These flows constitute one aspect of JTW trips in Newberg. JTW trips bound

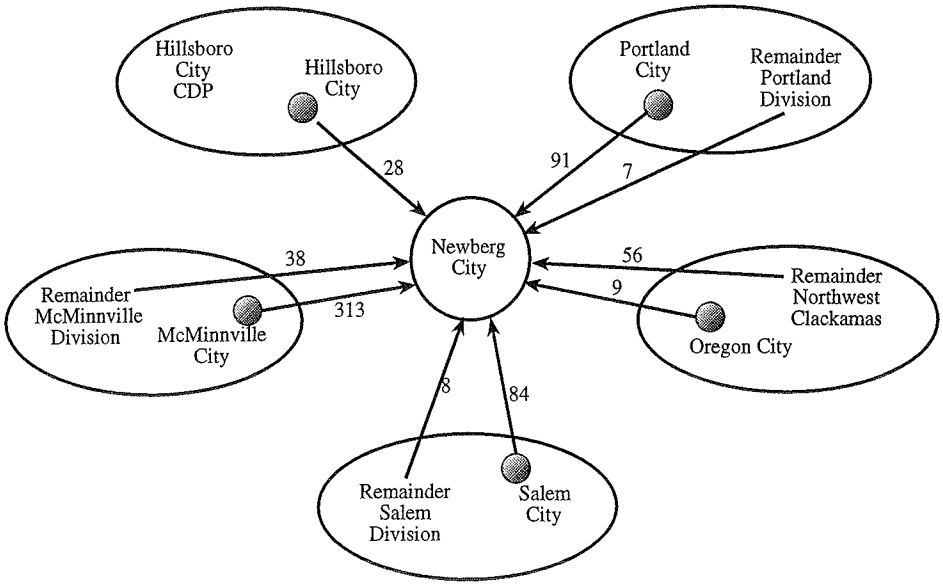

FIGURE 2 Journey to work by workplace to Newberg, Oregon, from selected MCDs and places (source: 1990 CTPP STCO/MCD/Place, JTW by Residence, Table CO1, All Trips).

for Newberg and the surrounding area provide the reverse commute. Figure 2, incoming JTW flows by workplace, however, shows how the coding of place-of-work data makes these flows asymmetrical. Because JTW trips by workplace are only aggregated to the place and remainder-of-county levels, only trips that are bound for Newberg (the place) can be considered in this portion of the analysis. Figure 2 shows JTW trips bound for Newberg (the place) only; any trips that are bound for the remainder of Newberg are allocated to the remainder-of-county level. The result is that users cannot extract symmetrical JTW data, which precludes accurate description of traffic flows for an area. The place of residence is not necessarily the same as the place of work.

The Statewide Element can still play an important role in the transportation planning process. MPOs and statewide planning agencies can extract descriptive information from the Statewide Element that will enhance the understanding of regional traffic behavior. Figure 3, a schematic representation of the I-5 Corridor in Oregon from the southern Willamette Valley to Portland, is a good example. Figure 3 does not cite any data directly, but it shows how data might be extracted from the CTPP and applied to develop a descriptive model of JTW traffic along a regional corridor and through several MSAs. The CTPP Statewide Element can be used to identify and priority rank cordon-line impacts and interregional trends for further exploration. A similar graphic could be developed for southbound interregional travel in the I-5 corridor.

Several other applications of the Statewide Element are worth mentioning. The Willamette Valley Council of Governments, in Salem, Oregon, reported using some of the Statewide Element tabulations to identify areas for transit, vanpooling, and carpooling programs. The Gainesville MPO used the Statewide Element data to identify areas of high pedestrian and bicycle usage and noted that no other data sources were available with this kind of informa-

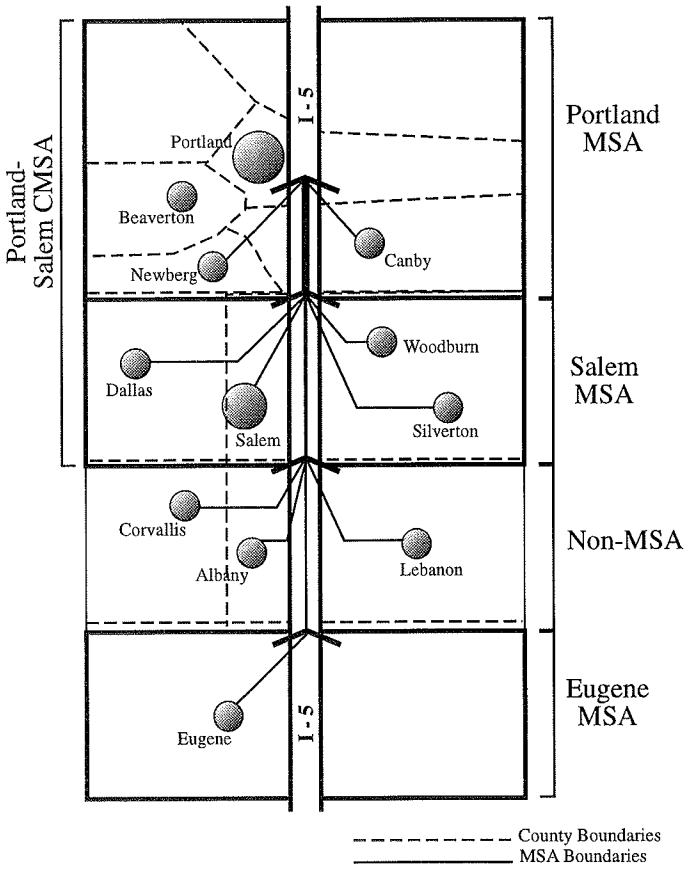

FIGURE 3 I-5 Corridor: counties, MSAs, and PMSA.

tion. The data allowed them to identify areas where infrastructure investment for pedestrian and bicycle facilities might be most efficient. Finally, JTW data from the Statewide Element provided the basis for directional allocation of trips generated using population, housing, and jobs data for small city development impact studies in Oregon. The ability to assess the flows to and from (internal-external trips) smaller cities proved to be essential to the modeling process. The CTPP was the only source of data for this information for smaller cities (from 2,500 to 10,000) in Oregon.

Experience with the CTPP in developing information for the analysis of smaller communities in Oregon and for entire corridors within the state also provides examples of difficulties with level of aggregation. Many of the smaller communities along rural corridors are too small (fewer than 2,500) to be tabulated. Although this does not prevent a serious problem when dealing with the JTW-by-residence information, which is aggregated to the next higher level, it is a major problem for the JTW-by-workplace data. The remainder-of-county aggregation for the JTW trips makes it extremely difficult to define corridors. The choice of including whole counties in the tabulation or excluding them is not a workable solution. Minor Civil Divisions (MCDs) are often workable for place of residence, but remainder-of-county for place of work is not. Another example is drawn from a smaller MPO surrounding Salem, Oregon. Within the MPO are many smaller communities that are too small to show up as a separate tabulation; this makes it difficult to use the CTPP Statewide Element for in-depth analysis.

Place-to-place flows can, however, be instructive. Figures 4 and 5, showing both directions of JTW flows—by residence and by workplace—are examples of how the CTPP Statewide Element might be applied by a smaller MPO. Figure 4, JTW by residence, shows three cities within the Salem, Oregon, MSA and three cities outside the MSA. For each city within the MSA, the total trips generated are shown in proportion to the external-MSA trips. The flows going to selected cities outside the MSA show both the absolute number of JTW trips from that city and the percentage of trips bound for external MSA locations that they represent. The data come from the STCO/MCD/Place level, Table CO1, all trips, and are pulled for JTW by both residence and workplace. Figure 5 shows the opposite flows—the percentage of trip ends within each city that arrive from outside the MSA and some absolute numbers from se-

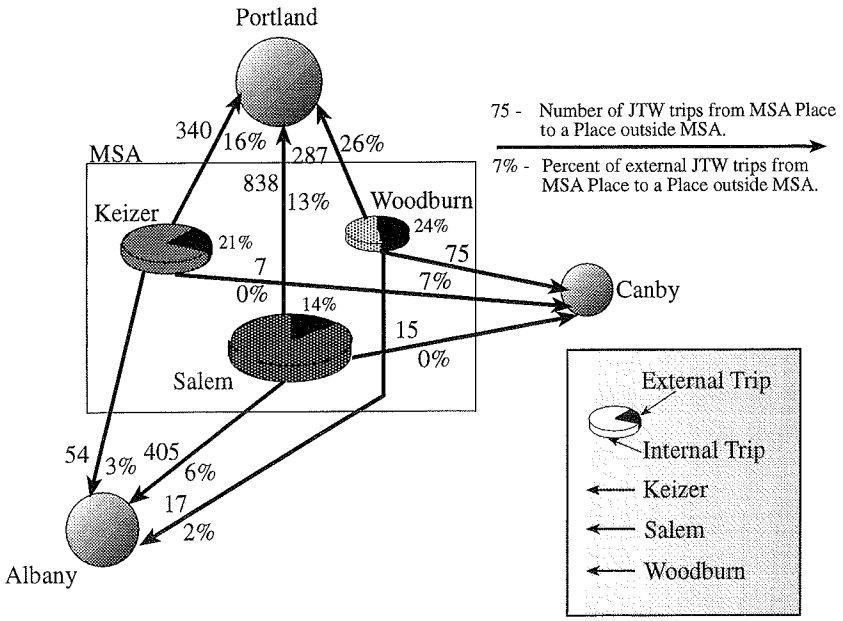

FIGURE 4 Journey to work by residence: all trips for selected cities in and around Marion and Polk counties (source: 1990 CTPP Statewide Element STCO/MCD/Place, JTW by Residence, Table CO1, All Trips).

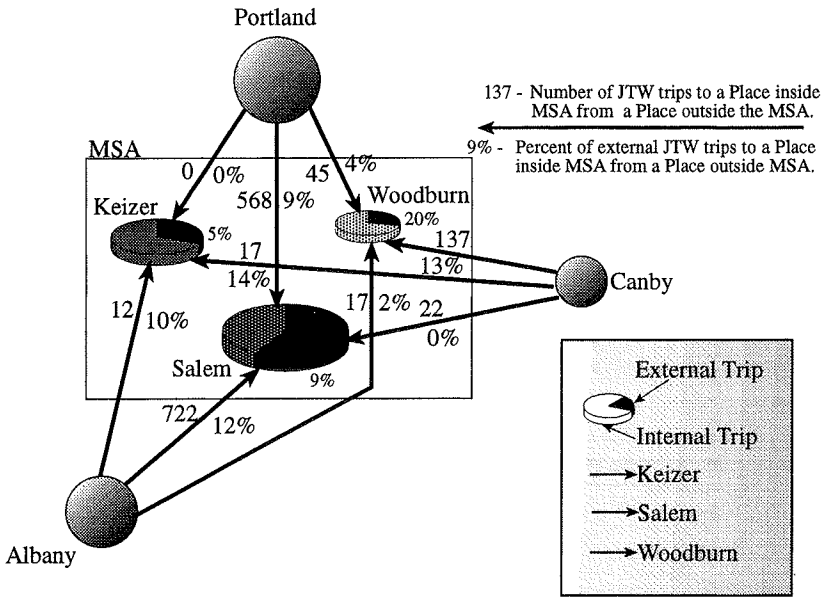

FIGURE 5 Journey to work by workplace: all trips for selected cities in and around Marion and Polk counties (source: 1990 CTPP Statewide Element STCO/MCD/Place, JTW by Residence, Table CO1, All Trips).

lected cities. Together they indicate the relative balance of trips to and from the places within the MSA. Further, if directional flows to and from each place or external region are aggregated, a picture of the overall impact of JTW trips at the cordon line can be estimated. Finally, it is important to note that although these examples present aggregate flows, corresponding demographic information is associated with each location. This depth and richness of data available in the CTPP can be tapped once aggregate flows are identified and understood.

Access to Data and Structure of CTPP Products

Conventional census data are rich in the depth of information about residents of places and census-defined areas, whereas the CTPP adds demographic information by place of work and flows by mode between place of residence and place of work. Working effectively with census data, however, has several important prerequisites. First, MPO staff must be aware of the potential of census data for transportation applications and analyses. Next they must learn how to access the data. These steps can be difficult in smaller MPOs. Because creative use of the CTPP is not well developed, there is no common knowledge base about what kinds of analyses are possible, what is realistic, and what can be useful (although this conference seeks to address these issues). At the same time there is a need for more publication of exemplary analyses aimed at smaller MPOs. By providing examples of the analyses, part of the long learning curve associated with the use of census data can be overcome.

A related topic is the structure of the CTPP product. As noted in the last conference proceedings, as more and more jurisdictions turn to modeling, there is a greater need for flexibility of data. The standardized format and levels of aggregation of the CTPP facilitate documentation and development of access tools but impose on users the need for considerable judgment as to aggregation, selectivity, and presentation.

Level of Technology

At the last conference the consensus of the group was that by 2004 the stage would be set for a less standardized product than the CTPP. "Many users foresee that a direct user-specified

'retail' tabulation approach will become typical, in which each state or MPO can specify its own tabular requirements via direct access communication with the Bureau of the Census" (2). This view appears to be correct. The stage is set for less emphasis on a standardized product and more tools for flexible access by users. Providing a more flexible product would make the census data more valuable. Although computing power has caught up with the large volume of CTPP data, users have not yet learned how to analyze the richness of the CTPP. The data contain too many anomalies that require judgment, such as missing data, to trust automated analysis.

FINDINGS

Small MPOs have not been effective users of the CTPP, though they use the conventional STF tabulations extensively. The STF data are used as the baseline for population forecasting, small-area allocations, and a frame for sample surveys. Use of the STF as the universe from which to sample for travel surveys is particularly important. Surprisingly, small MPOs have not made much use of the commuting flow and urban tabulations for census tracts and TAZs. Many of the small MPOs are not ready to work with the data; they have not taken the time and effort to overcome the learning curve by working with the place-to-place JTW tabulations of census-defined places over 2,500 in population. This is surprising because the place-to-place tabulation of work trips would seemingly be of use to small MPOs, experiencing as they do a larger proportion of work-trip commuters from outlying places than do larger MPOs. Experience in working with the statewide CTPP on CD-ROM would prepare smaller MPOs for working with the more detailed internal zone and tract flow and zone and tract place-of-work and place-of-residence tabulations in the Urban Element for which, in many cases, they are still waiting.

One reason small MPOs have not been effective users of the CTPP is because the data are not considered essential for the conventional urban transportation planning process. The CTPP does not supply trip generation rates by purpose, and household types can be obtained from the STFs. Although zone-to-zone commuting flows from the CTPP would seemingly be of use in trip distribution modeling, synthetic data can be generated by trip distribution models with trip-type, trip-length frequency distributions and screen-line traffic counts. Similarly, mode choice in small MPOs can be estimated using trip-end rather than trip-interchange models.

Although not essential for the conventional transportation modeling process, the CTPP enriches the understanding of commuting flows to the urban area from outlying communities. This is needed to understand better the composition of flows to and from the region at the cordon line. County-to-county commuting flows have typically filled this need, though the flow data at that level of aggregation are too coarse for serious laboratory analysis. The place-to-place flow data available in the statewide tabulation provide an adequate level of detail for analysis of commuting flows to and from an urban area. For clarity some of the minor flows have to be discarded so that the major-flow patterns are discernible. However, this type of analysis is suited more for qualitative use and not for data input to a more formal quantitative travel demand modeling process.

Because of the delay in releasing the urban CTPP tabulation on CD-ROM, small MPOs have postponed use of JTW data from the census and place a greater reliance on local data. At this point many small MPOs may find it not worth the bother of processing and analyzing the data if they consider them more of an enrichment than a necessity for the conventional urban transportation planning process. These data should be considered essential; a good understanding of commuting patterns should not be replaced by a pure modeling approach.

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