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MEASURING BENEFITS FOR RURAL TRANSIT SYSTEMS

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MEASURING BENEFITS FOR RURAL TRANSIT SYSTEMS

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16. Abstract

This research measures both user and non-user benefits from public transit systems in order to accurately measure total benefits of publicly provided transportation in rural areas. The contingent variation method (CVM) was used to measure the benefits of transit associated with two rural transportation systems in Washington State. The project consisted of two stages: conducting traditional focus groups to investigate the nature and extent of rural transit, and then administration of a CVM questionnaire to measure attitudes, perceptions and economic benefits from public transit services. This study provides a potential range and magnitudes of values from transit systems based on survey of area residents. Evidence form this study shows that there are potentially greater values to transit among household members than those reflected by the responses of a single household member.

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Executive Summary

While the qualitative benefits of transit are relatively well understood, quantifying the benefits of transit is still a developing methodology. Quantifying a comprehensive array of benefits to society from public transit may help justify the high cost of providing this service in rural areas. Public transit in rural areas provides opportunities for a range of rural residents for medical and social services, employment, recreation, training, and retraining opportunities. In addition, public transit can help rural businesses that face a shrinking customer and worker pool. A systematic method for quantifying the benefits of rural transit is needed.

This research measures both user and non-user benefits from public transit systems in order to accurately measure total benefits of publicly provided transportation in rural areas. The contingent valuation method (CVM), a non-market survey technique that has been successfully employed to measure nonuser economic values for environmental amenities, was used to measure the benefits of transit associated with two rural transportation systems in Washington State.

The first stage of this project involved conducting traditional focus groups to investigate the nature and extent of benefits to rural transit. These groups helped identify the critical issues and concerns relating to public transit in their area. Then, a short random telephone survey of citizens in these two regions was used to conduct a short survey as well as to recruit participants to participate in the longer CVM survey. This CVM questionnaire was administered to a total of 170 residents in both areas to measure attitudes, perceptions, and economic benefits from public transit services in each region.

This study provides a potential range and magnitude of values for transit systems based on a survey of area residents. A series of different valuation questions were asked in order to

measure user benefits and non-user benefits as well as broader community-level benefits. On average, respondents were willing to pay $9.30 per household per month for a local transit system that fit their needs. In order to estimate non-user benefits, respondents were asked how much they would be willing to pay for a transit system that they did not use; the mean value for household non-user benefits was $7.10 per month. When asked how much they would have to be compensated each month for giving up access to public transit, the average per household value was $45.42.

These household values were aggregated to the regional level for each transit system, producing a range of total benefits. These benefits could then be compared to the actual operating costs of the transit system. The typical practice in CVM studies is to elicit a value from a single representative of the household, and then aggregate that information using households as the unit of aggregation. Evidence from this study shows that there are potentially greater values to transit among household members than those reflected by the responses of a single household member.

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Introduction

The very nature of rural areas means that passenger needs are usually met by privately owned and operated personal vehicles. The growth in private automobiles has led to increased independence in rural areas for those who have access, physically and economically, to such vehicles. At the same time, it has also exacerbated the isolation of those dependent on such services as the overall demand for public transit has declined.

Those without access to transportation in isolated rural areas may find themselves unable to take advantage of social service programs, to receive adequate medical care, to participate in the work force, or in some other way to provide for their basic human needs. Individuals in this group include the frail elderly, youth below the driving age, the physically challenged, persons without cars, one-car families with two-car needs, those without valid driver's licenses, and people whose mental capacities do not allow them to drive. This group often lacks the political leverage that could bring public attention to their problem.

Demand for public transit in rural towns and areas differs from that in urban areas in that the demand is less efficiently located, thus more costly to service. The density of movement, with its attendant economies of size, is very low. A fixed route, fixed schedule service may be feasible in some rural towns and areas with sufficient population or coordinated demand patterns. However, a demand-responsive service may be the only cost-effective way to accommodate the small number of riders in sparsely populated areas.

Nearly all forms of travel, including public transit, receive government support in the form of financial subsidies, land allocation, and agency resources. The rationale for such support, from personal or institutional perspectives, relates consistently to its benefits which can be broadly classified as mobility and efficiency benefits. Mobility benefits result from increased travel options,

particularly for people who have mobility limitations or are without access to any form of alternative transportation (often in rural areas). Efficiency benefits result from savings that result when transit is used in place of less efficient modes.

Mobility benefits provided by transit include economic benefits to society, personal benefits to citizens, equity benefits for mobility-limited citizens, and option value benefits for those with mobility options. Publicly provided transportation provides access to jobs, education, job training and other public services. Transit provides access to shopping. It is a valuable amenity, serving to attract residents, employers, and employees. Senior citizens, in particular, need assurance that their mobility needs will be met as they become more dependent on others for transportation. Access to transit provides personal benefits including access to social and recreational activities, particularly for youth and senior citizens whose activities might otherwise be curtailed. Transit services provide equity benefits to those with limited mobility for whom a number of services and activities might otherwise be unavailable. Option value benefits include enhanced travel options for both nondrivers and drivers. Transit can serve as back-up transportation when personal automobiles are unavailable or when driving conditions are hazardous.

Efficiency benefits of transit services refers to decreased costs from efficiency gains. These savings can be a direct result of reduced user costs for individuals using transit services. Economic development benefits include an increase in shopping and use of other services due to easier, less expensive access, with more dollars from private travel savings available to spend on other items. Other indirect efficiency benefits include a reduction in traffic congestion, reduced roadway costs, less air pollution, safety improvements, and a reduction in demand for parking.

While the qualitative benefits of transit are relatively well understood, quantification of transit benefits is still a developing methodology. There is little research in this area, particularly

for rural transit. As reduced public transit eliminates opportunities for a range of rural residents for employment, recreation, training, and retraining opportunities, rural businesses face a shrinking customer and worker pool. Rural residents, particularly the frail elderly, youth below the driving age, the physically challenged, and low income families, are very sensitive to transit availability due to the fact that they often must travel considerable distances to access basic human services. These characteristics, combined with the low-density nature of rural transit, indicate some special benefits could be achieved in provision of transit in rural areas.

Background and Methods

Benefit-Cost Analysis (BCA), although widely used, is by no means universally accepted or uniformly applied in appraising transportation investment alternatives (Welsh and Williams, 1997). As defined by Seneca and Taussig (1984), BCA is defined as the systematic appraisal of all benefits and costs of a contemplated course of action in comparison to possible alternative actions. The action should only be taken if the sum of all expected benefits is greater than the sum of the expected costs. BCA was initially developed to evaluate the benefits and the costs associated with water resource development investments by the Federal Government. Before 1960's, much of the research on BCA and its application to water resource projects focused on using market information to provide estimates of the benefits of such projects. This viewpoint emphasized supply-side considerations of cost efficiency and the supply of private goods that would result from these project investments.

Due to increasing concerns over environmental quality from the general public in recent decades, researchers began to consider how water projects would affect both water quality and quantity as well as the demand for outdoor recreation (Hanley and Spash, 1993). Also during this

period, Krutilla (1967) advanced the notion that there is a demand for natural environmental amenities by individuals who would never use them (e.g. non-use or existence value). In both cases, information cannot be directly obtained by observing consumer behavior in an organized marketplace where prices can reflect the relative values of goods and services. As environmental agencies began to use BCA to evaluate the environmental consequences of government projects, techniques were needed to provide the information on natural resource valuation not found in market prices. Excluding these benefits results in a downward bias in the calculation of total project benefits. A number of techniques for measuring these qualitative changes and non-user benefits have been developed and are referred to as nonmarket valuation.

As the use of BCA in transportation decision making developed, there has also been a parallel recognition concerning the benefits that nonusers of a publicly provided transportation project investment can enjoy even though they may never use it. Ignoring these benefits results in an undervaluation of projects which reduces the likelihood that they will pass the BCA decision rule. This is especially true when considering transportation investments in rural areas where population is less dense and less efficiently located compared to urban areas.

This research measures both user and non-user benefits from public transit systems in order to accurately measure total benefits of publicly provided transportation in rural areas for use in BCA. Using a non-market survey technique that has been successfully employed to measure nonuser economic values for environmental amenities, both user and nonuser values associated with two rural transportation systems in Washington State were measured with the contingent valuation method. The body of this report is organized as follows: Section I discusses the problem of measuring the total benefits resulting from a transportation project; Section II provides an overview of the problem of nonmarket valuation in BCA and how the contingent valuation

method (CVM) has been used to measure nonmarket benefits; Section III describes the research design used to collect information for the two cases studies involving the Link System (Chelan and Douglas Counties) and the Clallum County Transit System; Section IV presents the results for the case studies and provides estimates of nonuser benefits of public transit for these rural counties; and Section V presents conclusions and recommendations on how to apply the methodology developed by this study to other rural counties in Washington.

Section I: Measuring the Total Benefits of Publicly Provided Transit in Rural Areas

The overall purpose of this research project is to develop a strategy to measure the total benefits of transit in rural areas, including both direct and indirect (or nonuser) benefits. The need to understand and quantify these benefits is important now that BCA is required under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). Since economic analysis is now part of the decision making process for transportation investments, it is important to understand how economics can be used to evaluate transit investments. Economists view most social problems in terms of allocating scarce resources between unlimited needs and desires. In order to help society determine what projects or programs to invest in, BCA was developed so that economic decision rules could be applied by policy makers to help decide which projects improve social welfare. Benefit-cost analysis is an economic valuation method used to identify and measure the economic benefits and costs of a project or program.

However, not all project inputs or outcomes have monetary values associated with them. Economic theory holds that, given appropriate conditions, market institutions will provide for an efficient allocation of goods and services. If markets are operating competitively, the price for a

good will reflect its social value. Knowing the price of a good, individual decision makers can then decide how to allocate their purchases among all available goods and services that will bring the greatest social benefit. Yet, there are many kinds of goods and services that are not traded in markets (i.e. environmental amenities or national defense). If they are not traded in markets, they have no prices; and without prices, incorporating these goods into the benefit-cost framework becomes difficult.

The use of a decision tool like BCA is problematic when considering transportation investments in rural areas. Rural areas have low population densities that are difficult to serve efficiently with public transit. Given the costs to serve a small population spread across a rural county, transportation investments in rural areas would have difficulty passing the BCA criterion.

While the growth in private automobiles has led to increased independence in rural areas for those who have access, physically and economically, to such vehicles, it has exacerbated the isolation of those dependent on such services as the overall demand for public transit has declined. Those without access to transportation in isolated rural areas may find themselves unable to take advantage of social service programs, to receive adequate medical care, to participate in the work force, or in some other way to provide for their basic human needs. This group includes the frail elderly, youth below the driving age, the physically challenged, persons without cars, one-car families with two-car needs, those without valid driver's licenses, and people whose mental capacities do not allow them to drive. This group often lacks the political leverage that could bring public attention to their problem.

Given the characteristics of these demographic groups, it has been suggested that there are other social benefits to public transit that are not reflected in benefit estimates based solely on those who use public transit. Litman (?) has suggested that public transit benefits be divided into

two broad categories: mobility benefits and efficiency benefits. Mobility benefits derive from increased travel options leading to increased travel, particularly for people who have little access to transportation (like in rural areas). Part of benefits resulting from increased mobility include:

(1) economic benefits due to improved individual access to education, jobs, and public services which avoids social problems and provides labor for local businesses;

(2) personal mobility benefits gained by users from increased access to travel, including economic and career benefits from schooling, social and recreational activities, and interaction with society;

(3) equity benefits to non-drivers who receive the same opportunities to participate in jobs and education like drivers; and

(4) option value benefits to drivers as they have the option to drive their vehicles or use public transit instead.

The second broad category, efficiency benefits, is a result of the decline in total motor vehicle use. This produces a number of benefits that include:

(1) user cost reduction benefits;

(2) economic development benefits when transportation expenditures are spent on transit development projects in local communities;

(3) benefits from reduced traffic congestion (travel time savings);

(4) parking cost savings both to individuals who use transit instead of a personal vehicle, and to society which does not have to spend resources to maintain or increase available parking;

(5) safety improvement benefits from reduced personal vehicle traffic;

(6) reduced roadway costs due to decreased personal vehicle traffic;

(7) reduced land requirements for roadways due to decreased personal vehicle traffic; and

(8) reduced air and water pollution due to decreased personal vehicle traffic.

While these benefits conceptually exist, their contribution to the total benefits resulting from a transportation investment cannot be incorporated by simply observing the behavior of users or potential users of the newly provided transit investment. In the past, such benefits were either largely ignored or were considered separately from the economic analysis. In their book on transportation investment principles, Wohl and Hendrickson (1984) recognized that while the direct benefits to transit users form most of the economic benefits from public transit investments, there were other categories of benefits that could be considered. They noted that transportation investments could serve other social objectives, including redistribution of income from richer members of society to lower income members, reduction in air pollution emissions resulting from public transit, and an increase in the number of lives saved resulting from public transit. If other social objectives are important for policy makers, then the project analysis should not rely solely on measuring the net economic benefit (BCA). Various transit investment alternatives and how each affects non-monetary social objectives of concern should be examined to determine which alternative best meets all the policy objectives (both economic and non-economic) considered important to policy makers.

Another external benefit recognized by Wohl and Hendrickson is an insurance value that individuals may have for public transit since it provides a back-up mode of transportation (similiar to the notion of option value discussed above). However, these authors felt that in the long run, this value is probably zero for non-users of the transit system since there were other private transit alternatives there are widely available. One could argue that this may be true for urban areas but not for rural areas where there are little or no private transit options available.

Implicit in Wohl and Hendrickson's discussion of these broader social benefits is a recognition that some desirable policy objectives cannot be evaluated on an economic basis.

However, the purpose behind the use of BCA is to place monetary values on all possible outcomes from a proposed project. If many outcomes of a policy action do not have economic values associated with them, then BCA cannot be an appropriate decision tool. Yet, as Litman notes, there is increasing awareness that examination of the benefits to users and potential users of a proposed transit project provides only a narrow measure of the benefits to public transit since it does not capture any of the broader individual and social benefits resulting from public transit investments. This problem mirrors the sort of measurement problems encountered in environmental economics: the problem of non-market valuation. Problems of this nature are considered examples of market failure.

Market failure occurs when there are violations or exceptions to the characteristics of an ideal market. Typically, the usual exceptions are either the non-existence of an organized market or inefficient prices (e.g. prices from a monopolistic market). There are two major sources of market failure where CVM can be used to supply value information. These include:

1. The lack of a well-defined and enforceable system of private property rights. This is true for many environmental amenities. Since no one owns the resource, no one can bring it to a market; and without a market, no price can be associated with it. If ownership of a resource is not well defined, there is no one to prevent individuals from benefiting from the use of a resource. This would lead to the overuse of resources, even to the point of degradation. An example of this is the "Tragedy of the Commons." A common pasture used for grazing by a community of herdsman will suffer from overuse and congestion because no one has any incentive to control entry and prevent overgrazing. Individuals acting in their own self-interest would attempt to exploit all the benefits of the resource before others do the same.

2. Another source of market failure comes from public goods. A public good has two characteristics. First, it is nonexclusive in that once it is provided, it is freely available for all to consume in equal amounts. Second, it is non-rivaled in that one individual's consumption of the good does not reduce the amount available to any other individual to consume. Markets cannot allocate these goods because no individual economic agent can

use prices to exclude others from using the resource. Without prices, there is no incentive to use the resource efficiently. An example is National Public Radio channels; the managers can exhort listeners to send them money, but they cannot exclude those who refuse.

The mobility benefits and efficiency benefits resulting from public transit are examples of public goods; most public transit systems produce benefits that, once they are provided, are available to all. To overcome the lack of price information on these goods, there are nonmarket valuation techniques that attempt to provide economic values for nonmarket goods that can be used in benefit-cost analysis. One such technique is the Contingent Valuation Method (CVM). This method uses surveys (face-to-face, telephone, or mail surveys) to measure preferences for a nonmarket good by determining how much an individual would be willing to pay if, in fact, there did exist a market where these goods could be traded.

Section II. The Use of CVM For Nonmarket Valuation

Intrepretation of Value Information

There are several advantages of using CVM to measure non-market values. First, it provides the theoretically correct economic measures needed for BCA directly by eliciting either a willingness-to-pay (WTP) value for a change or a willingness to accept (WTA) benefit measure (Mitchell and Carson, 1989). WTP is the amount of money an agent would be willing to give up to obtain a change in the provision of a public good and still be as well off as before the change. WTA is the amount of money which would have to be given to an agent, with a specified entitlement or property right, to forgo a change and still be as well off as if the change has occurred. WTP implies the consumer must pay to get the change; WTA implies that the consumer is entitled to the change and must be compensated if the change is forgone.

Second, CVM values are made directly from respondents' judgements about how a change in the provision of a public good affects them. Theoretically, any situation that can be described on a questionnaire can then be used to elicit economic values from respondents.

Finally, CVM can measure all the various components of value, especially when uncertainty is present. In fact, CVM is the only technique that can provide a direct measure of nonuse benefits. An analyst conducting BCA must include all relevant benefits associated with a change in the provision of a public good. An analogous framework for identifying total value of environmental goods was developed by Randall (1992). In this framework, there are user benefits (all benefits resulting from direct, physical use), nonuser benefits (all benefits derived from the fact that the public good exists) and an option value (a premium an individual would pay to guarantee that the public good will be provided in the future). In Randall's framework, option value is not a separate category of value when uncertainty about the future provision of the public good is introduced. If you are measuring economic values before the change has taken place, all value components are ex ante values that already embody option value. But it should be noted that BCA is an ex ante analysis since it takes place before a change in the provision of the public good. Thus, CVM is also consistent with this analytical viewpoint underlying BCA.

Total value can be measured either directly and holistically (using only one value question to capture all the components of total benefit on a CVM survey), or by piecewise and sequential component valuation. The latter can be done with either (1) one CVM survey with a separate value questions for each benefit component, (2) separate CVM surveys for each value component, or (3) with values (except existence or nonuse values) gathered from other types of studies using travel cost or other hedonic methods. However, the use of sequential survey questions has been

shown to overstate total value (Randall, 1992). Also, the value of the various benefit components will differ depending on their placement in the questionnaire (sequence aggregation bias).

Given these problems, Mitchell and Carson (1989) suggest the use of a single valuation question to measure all the components of total benefit together. Research into the psychology of respondents in surveys suggests that respondents can make "holistic" judgements about value and that any further refinement required by the researcher is spurious. Just because the researcher wants a refined measure of value, and manages to get one from the respondent, does not mean it is legitimate; survey methodology is not sophisticated enough for such precision in measurement. They suggest the following strategy for separating nonuse values from total benefit values: Each respondent is asked a single total value question, and values from those who are nonusers of the resource are used as a lower bound.

Implementation of CVM

CVM employs survey techniques to obtain dollar amounts of individual WTP or WTA for change in the provision of public goods. It involves creating a hypothetical market where respondents have the opportunity to purchase the public good in question. The values obtained using CVM are contingent upon the hypothetical market defined. To utilize the responses in circumstances other than the defined market is invalid.

There are three basis parts to a CVM survey:

1. A detailed description of the good(s) being valued and the hypothetical circumstances under which it is made available to the respondent.

2. Questions which elicit the respondent's WTP or WTA for the good being valued. The choice of measure depends on the property rights associated with the good. If the respondent must buy the proposed change, then WTP is the theoretically correct measure. If the property right belongs to the respondent, then WTA is the theoretically correct welfare measure.

3. Questions concerning demographics, concerning the good in question, and the extent of personal use.

The literature on designing a CVM survey is voluminous and technical. The following list provides a brief summary of each of the main issues that researchers must face when designing and implementing such a survey (Bishop and Herberlin, 1993).

1. Definition of Population: This involves deciding whose values are relevant for the good under study. The great attraction for using CVM is that if the population is appropriately defined, a probability sample of the population will yield estimates of WTP that can be generalized to the whole population.

2. Product Definition: The public good to be valued must be appropriately defined and linked to the policy action being considered. The respondent must understand what it is that is being valued. Typically, visual aids may be supplied to assist the respondent in determining her/his WTP. However, this information must be simple and understandable to the survey respondent.

3. Private Goods versus Public Goods Market: It was first thought that the hypothetical market should try to resemble a private market when the ownership of the good is well-defined and the respondent is familiar with the good. Because of the nature of many environmental goods, political markets (in terms of a referendum) can be more appropriate if the maintenance of the good is paid for collectively (e.g. national parks).

4. Payment Vehicle Definition: This describes the method of payment. Examples include taxes, charitable contributions, and surcharges on electric bills. The key to remember here is to devise a payment vehicle that is neutral yet realistic. In some situations, people may not provide a willingness-to-pay response, not because they do not value the good, but because they may object to the particular payment vehicle used (e.g. rejecting the use of taxes to pay for improvements to an environmental good).

5. Alternative Ways to Ask Valuation Questions: There are four different types of WTP question formats: Bidding Games, Open-Ended Questions, Dichotomous Choice, and Contingent Ranking. Bids can only be used in face-to-face or telephone interviews for an interviewer is needed to guide the bidding. There is evidence that the starting point bid offered by the interviewer can influence the final WTP bid given by the respondent. The Open-ended Question format usually has a higher number of respondents stating that they cannot determine a value. The Dichotomous Choice format avoids requiring respondents to determine what their maximum WTP will be. This format allows the respondent to agree or disagree to pay predetermined "offer amounts" that have been selected at random, but span a wide range of possible values. The Contingent Ranking format has respondents

rank various combinations of environmental quality and WTP. Instead of valuing the public goods directly, these combinations are ranked in order of preference.

6. Use of WTP Versus WTA: Theoretically, if the respondent is entitled to a change (thus owns the property rights to the change) and must be compensated if the change is not obtained, WTA will be the appropriate question format. If the respondent must purchase the right to obtain a change, thus does not own the property rights to the change, WTP is the correct format for measuring benefits. However, measuring WTP and WTA is problematic, both in theory and in application. According to economic theory, both values should be the same (a rational person would pay for a good at the same level that they would need compensation to forgo it). In practice, studies have consistently shown that WTP is generally less than WTA.

   There are several explanations for this discrepancy. One explanation is that economic theory is incorrect, and people value gains differently then they value losses (prospect theory) relative to the status quo endowment of property rights. A second explanation may be that the discrepancies are a problem inherent with the CVM method. This implies there is something wrong with the measurement method rather than the theory. CVM studies deal with large, discrete changes and instant valuations. WTA formats may be too difficult to understand and not seem plausible to respondents. However, environmental studies using real transactions and payments (simulated market) instead of hypothetical payments (as in CVM) also resulted in WTA values greater than the values for WTP, so the difference cannot be attributed solely to the hypothetical nature of CVM. Finally, Hanemann has suggested that many environmental goods have no close substitutes, so there is a greater income effect if the good is taken away, which would be consistent with economic theory.

7. Supplementary Data Needs: All relevant socio-demographic data should be collected to help interpret WTP/WTA responses.

Validity of CVM and Sources of Bias

The major concern most economists have regarding CVM is whether the method produces values that approximate those of a well-functioning market. Economists deal with "revealed preferences" in which individual market choices are observed by the purchases that are made. Thus, the link between preferences and behavior can be observed. CVM involves linking attitudes (about the public good) with preferences about the provision of this good. The question is

whether attitudes can ultimately be linked to behavior. It has been theoretically illustrated (Samualson, 1959) that individuals will intentionally misrepresent their true preferences in order to enjoy the benefits of a public good without having to contribute to its provision (strategic behavior). This is because of the nature of a public good: once it is provided, it is available to all (nonexclusive). The act of enjoying the public good without paying for it is called freeriding. Because of this phenomenon, many economists have placed little faith in survey techniques to collect data on WTP. However, experiments that have tested for the presence of strategic behavior in individual decisions about paying for public goods show little evidence that strategic behavior exists (Boehm, 1982; Mitchell and Carson, 1989). Yet, the notion of strategic bias is theoretically consistent with how individuals behave according to economic theory.

Another criticism concerns the hypothetical nature of CVM value responses. The answer to a hypothetical question may or may not reflect the true value of the good to the respondent (hypothetical bias). Results of comparison studies between CVM and simulated market studies in which real transactions actually took place are ambiguous; there is not yet sufficient evidence that hypothetical bias is a major problem with CVM studies (Bishop and Heberlein, 1992).

Another concern with CVM is the lack of a comprehensive model for determining how respondents behave when answering surveys. There is evidence that shows that responses to a questionnaire given in different modes (face-to-face, telephone, or mail) will be distributed differently. However, all types of surveys are prone to a host of measurement problems.

Mitchell and Carson (1989) list four general sources of bias in CVM that the researcher should try to minimize in the study design:

(1) Use of a scenario that contains strong incentives for respondents to misrepresent their true WTP/WTA.

(2) Use of a scenario that contains strong incentives for respondents to improperly rely on elements of the scenario to help determine their WTP/WTA amounts.

(3) Misspecification of the scenario by incorrectly describing some aspect of it, or alternatively, by presenting a correct description in such a way that respondents perceive it incorrectly.

(4) Improper sampling design or execution, and improper benefit aggregation. Adjustments must be made to the benefit estimates to correct for biases of this type.

The Use of Nonmarket Valuation in Transportation Research

Since the 1980's, there has been increasing recognition by transportation researchers that the use of surveys can greatly enhance demand estimates for transportation choices (Bates, 1988). These survey techniques, referred to as "Stated Preference" methods, are a set of techniques that use survey responses from individuals about their preferences among a set of transportation choices. These responses are then used to determine the transit choices that maximize social welfare (Kroes and Sheldon, 1988). Therefore, analysis is based not on revealed preferences of actual travel choices, but on hypothetical choices from a survey. The main advantage of these methods is that they can be used to evaluate travel demand for hypothetical conditions. Stated Preference methods can easily evaluate qualitative changes in transportation services as well. However, these methods different from CVM in that CVM provides values for WTP/WTA directly.

Most of the Stated Preference techniques are based on experimental design procedures in which various combinations of transportation options (e.g. varying amounts of travel time, whether seats are available, the amount of fare to be charged) are evaluated by survey respondents (conjoint analysis). These methods have been used to evaluate a mix of different transportation problems (Kroes and Sheldon, 1988) including:

(1) passenger priorities for different qualitative characteristics of the transit system;

(2) estimating demand elasticities for fare changes, trip frequency changes, and travel time changes;

(3) route choice studies; and

(4) value of travel time studies (example: see Wardman, 1988).

One area of transportation research that has used CVM to directly measure the value of a policy change is transport safety. Referred to as the "willingness-to-pay" approach, it is used to obtain monetary values reflecting the preferences and wishes of the population affected by a transportation safety policy change (O'Reilly et. al., 1994). Using surveys, respondents are asked for the maximum payment they would make to obtain an improvement in travel safety. O'Reilly et. al (1994) used a combination of different methods to extend willingness-to-pay information on fatal road accidents to estimate willingness-to-pay for preventing non-fatal, serious road injuries. The research ultimately produced an economic value approximately three times greater than the values that were currently in use by England's Department of Transportation.

Another study using the willingness-to-pay approach evaluated safety programs for the London Underground Limited (Jones-Lee and Loomes, 1994). Given the limited resources available to improve safety, a survey was conducted to determine which safety improvements would bring about the greatest net social benefit given available funds. Jones-Lee and Loomes (1994) used focus groups of London residents to help provide a value for reducing the risk of death on the Underground relative to reductions in comparable risks on the roads. The results indicted that the value of preventing an underground fatality was approximately 1.2 million pounds (approximately $750,000).

Focus for This Study

This review of recent use of CVM in the transportation literature shows that the approach can be employed to measure benefits of transportation investments. In order to measure the broader social benefits resulting from the provision of public transit in a rural area, the following elements were incorporated into the design of the CVM questionnaire in this study. First, a public goods market is developed that uses taxes as a payment vehicle. This type of market accurately reflects the typical method of financing public transit. Because this study is exploratory in nature, an opened-ended question format was used to better elicit the potential values individuals might place on public transit. A conservative question design was used in which respondents were reminded that they could pay nothing if public transit does not benefit them. This hopefully reduced the incidence of respondents giving answers they felt the researchers wanted to hear. Follow-up questions were used to ensure that respondents understood the valuation scenarios.

In this study, we attempt to measure both direct and indirect benefits of transit in order to get a more holistic measure of transit's value to society. Direct benefits include benefits to users of the transit system as well as non-users. For example, a direct benefit to non-users might include transit use by another household member for whom they would otherwise have to provide a ride. Indirect benefits of a transit system include the impact of a transit system on area businesses and landlords, workers and tourists. Indirect benefits also include the impact of a transit system on a region's traffic, parking, pollution, and roads. Since most of these benefits are not traded in the marketplace, we attempt to place a dollar value on them by polling citizens on their value.

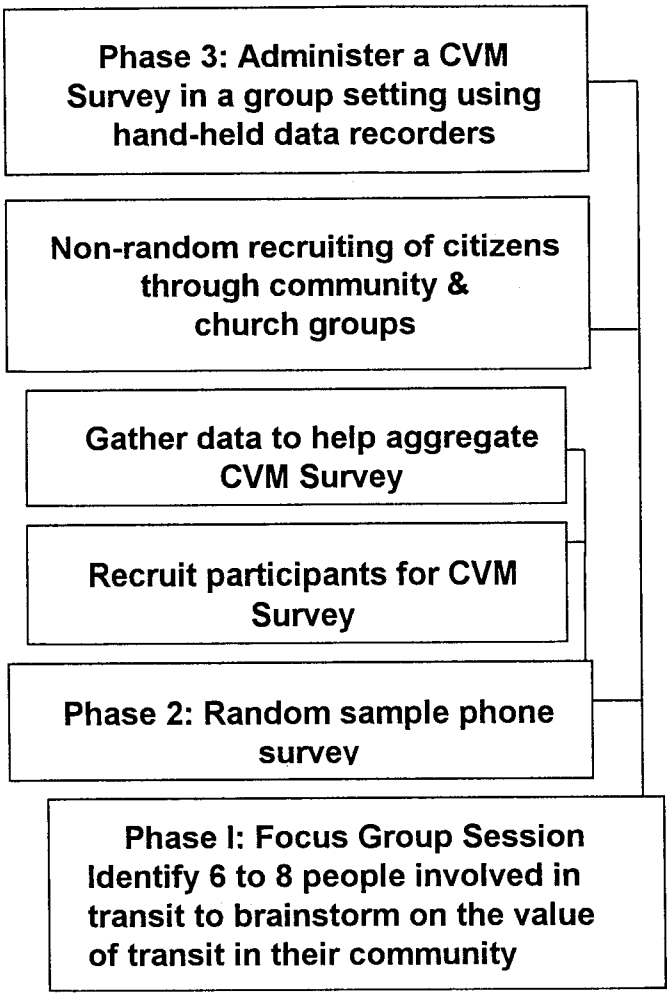

Figure 1. Research Design Schematic for CVM Survey

Section III: Research Design

Two regional transportation systems in Washington State, the LINK System in Chelan-Douglas counties and the Clallum County Transit System in Clallam County, were used as case studies. Data measuring the benefits of rural transit were collected at three different stages (see Figure 1). The first stage involved conducting traditional focus groups to investigate the nature and extent of benefits to rural transit. In the second stage, a randomly sample telephone survey was conducted in Chelan/Douglas and Clallum counties. Citizens in these two regionswere asked to participant in a panel on local transit issues. This phone survey also contained questions that provided useful information for aggregating data to be collected in the third phase. The third

phase involved administering a questionnaire to a panel of local residents measuring their attitudes, perceptions, and the economic benefits they receive from public transit services in their area. The panel included the randomly selected citizens recruited from the telephone survey as well as citizens recruited through local church and community groups.

Case Study Regional Transit Systems

Clallam Transit System (CTS) in Clallam County has 14 fixed routes, including two intercity routes, six urban routes, and six rural routes (three in eastern Clallam County and three in western Clallam County). Several of these fixed routes deliver passengers to two ferry operators within the county. In addition, CTS services the air terminal in the county, the public schools, and Peninsula College. CTS also provides connections to transit systems in Jefferson and Grays Harbor counties. Para-transit services to the elderly and persons with disabilities are provided by a private, non-profit operator. Transit services were begun in early 1980 for eastern Clallam County and early 1984 for western Clallam County. Ridership and population statistics are presented in Table 1.

LINK Transit operates in Chelan and Douglas counties. There are 17 fixed routes, three point deviation (also known as route deviation) routes, and paratransit services. Seasonal transit services are provided to the ski area and the county fair. Ridesharing and vanpool programs are offered as well. LINK provides services to regional and municipal airports as well as the Lake Chelan Ferry. Bus service is also provided to the Amtrak and Greyhound depots in Wenatchee. LINK has routes that pass by all of the public schools in the area as well as Wenatchee Valley College. LINK began operations in December of 1991. Its major funding source is a sales tax that was created specifically for providing a fare-free regional transit system. Table 1 above shows ridership statistics for this transit system. Proportionately, more youth and adult commuters and

fewer mobility-limited individuals use this system compared to the CTS.

Table 1: Comparison of 1995 Ridership Data and Population by Case Study Counties

Transit System/ Population by Subgroup	Riders/Year	1995 Population	Average Rides/Person/Year
Chelan-Douglas:			
Youth (<18)	619,576	22,090	28
Regular (18-59)	873,337	41,532	21
Senior (60+)	147,642	14,833	10
Mobility Limited (ages 16-64)	49,042	702	70
TOTAL	1,689,597	78,455	22
Clallam:			
Youth (<19)	260,841	14,606	18
Regular riders (ages 16-64)	308,652	32,636	9
Elderly (65+)	106,492	11,528	9
Mobility Limited (ages 16-64)	101,246	813	125
TOTAL	777,231	56,464	14

Traditional Focus Groups

A focus group consists of a small group of people, led by a moderator, that engages in an in-depth conversation on a particular topic. The group moderator follows a set script that takes the group through the research questions. Group discussions such as these are a standard practice for identifying community perceptions and attitudes that can assist in designing a CVM questionnaire. The purpose of these small group discussions was to gain an understanding of the attitudes and perceived benefits of public transit to local residents. In addition, researchers attempted to measure the magnitude of the economic value of transit services to nonusers of the

system. Joan Giese (Ph.D. in marketing), a professional focus group moderator, was hired to conduct the groups. The scripts used for both sessions are found in Appendix A.

To initiate this stage, a test focus group was conducted in Pullman, Washington, on February 8, 1999, to help revise the script and identify issues that would be relevant in understanding transportation issues in a rural community. The first formal focus group session was conducted in Port Angeles on February 18, 1999 and the second was held in Wenatchee on February 24, 1999. Six to eight participants chosen from the membership of citizens advisory councils for each transit authority were recruited for the focus group sessions. Over 80 percent of the group participants were not users of the transit system.

Clallam County Transit System Responses

The community-wide benefits from public transit described by members of this focus group fell into three main categories. The first category includes all the direct benefits of transit services, including an inexpensive, safe, reliable and convenient mode of transportation that provides access to urban centers, to higher education, and to health services for residents. Social benefits of transit services were also mentioned, as the transit system provides access to activities as well as an opportunity to socialize while riding. Environmental benefits of transit services included a reduction in pollution and congestion, including parking congestion. Participants mentioned that tourists benefit from transit services, especially during special events, and that people move away from areas without public transit.

Clallam County focus group participants were asked to describe the users of transit in their area. Lower income citizens rely heavily on transit services, as do the senior citizens. Disabled citizens are also major users of transit services. Students, both college as well as public and private grade school students, use the transit system. Others who use the transit services include various

service providers, workers at the correction center, and fishermen who need a one-way ride back to their vehicle. During bad weather, residents who normally drive may choose to ride on the transit system.

The Clallam County focus group participants also named categories of residents who do not use transit services in the their area. These included those with irregular schedules, higher income individuals, people who prefer the freedom of their own vehicles, and those living far from transit stops. They also mentioned that some citizens may be worried about the safety of park and ride lots. Participant mentioned that some non-users may simply be unfamiliar with the routes and schedules of the transit services.

Chelan-Douglas System Responses

Focus group participants in the LINK service area listed a number of community-wide benefits from public transit. These included direct benefits of a reliable, convenient system that provides mobility to citizens for accessing jobs, medical care, and other activities. Participants mentioned that the regional transit system provides an economic link to other communities like Chelan and Leavenworth, giving area businesses a larger pool of potential employees and shoppers. They felt that transit services reduce the demand for parking and provide transportation when roads are congested due to tourism. Finally, participants mentioned that LINK provides services for special events including access to the ski area.

Focus group participants in this area were asked to name the users of transit in their area. Users included students participating in after-school activities, senior citizens, disabled citizens, tourists, and workers. When asked to describe those residents who do not use transit services, participants mentioned those with multiple destinations and those who need the flexibility provided by a private vehicle.

Common Findings

Group participants in both sessions felt strongly that their area needed public transit and that it made a substantial difference in their quality of life. Participants had a difficult time placing a dollar value on the benefits of transit on an annual basis. Respondents indicated that the amount was actually fairly substantial and they would need more time to reflect on an actual amount. Both groups emphasized that public transit was a binding force in their areas and that, without transit services, smaller communities would become isolated from the flow of economic activity of the larger towns. Group participants were unanimous that public transit benefitted everyone.

The focus group discussions were vital for developing the questionnaire for the panel groups. A more complete picture of the benefits of transit accruing to both users and non-users of transit services in each region was obtained from these small sessions with informed participants. More importantly, researchers learned that the valuation questions needed to be refined in order to make them easier to answer. A shorter, monthly payment format was developed in order to make the valuation scenario similar to other types of public utility payments. To obtain a more complete valuation perspective from respondents at the next research stage, both willingness-to-pay and willingness-to-accept valuation questions were developed.

TellBack Panel Groups

The final stage of the project involved conducting a survey with a panel of area residents in each region under study. The survey was designed to obtain information on attitudes and preferences on public transit issues as well as a measure of the benefits that transit provides to both users and non-users. Separate sessions were held with residents of the areas surrounding Port Angeles and Wenatchee, Washington. The Wenatchee session was held on March 17, 1999, and

the Port Angeles session was held on March 25, 1999. There was an afternoon and an evening session held at both locations. The Wenatchee session had a total of 81 participants while the Port Angeles session had 89 participants, a total of 170 participants overall. All participants received $25 for attending the session.

Tell-Back Inc. of Spokane, Washington was hired to conduct the two sessions and collect the data. Tell-Back has developed a computerized data collection system where session participants use a hand-held dialer to enter their responses. A structured questionnaire is read to the group by the moderator, but the group can add or modify a question at any time. The questionnaire contained approximately 120 questions and took slightly over an hour and fifteen minutes to complete. The use of a panel of paid respondents was considered more likely to produce useable results and to be less burdensome to participants in that they are being compensated for their time and effort to attend the sessions. All responses are anonymous since they are recorded blind into the computer. This type of forum retains some of the flexibility of traditional focus groups, in that participants are free to voice their opinions, while it collects hard data from structured questions which can be used for quantitative analysis.

A variety of approaches was used to recruit participants for the sessions. First, a list of randomly drawn names from the telephone directory was purchased from Survey Sampling, Inc of Westport, CT. The Social and Economic Sciences Research Center at Washington State University was hired to recruit participants from this list. Along with the recruiting script, a small survey (approximately 20 questions) was included to collect information about preferences and use of public transit. The proportion of users to non-users from this general population survey was later used in developing an aggregate estimate of the benefits of rural transit for the Wenatchee and Port Angeles areas. The results from the telephone survey are presented later in this section.

Overall, there were 54 session participants that were randomly selected through the telephone survey.

Past experience and associated literature dealing with recruiting for panel groups of this sort has shown that there can be a large number of no-shows. In order to gather enough participants and obtain a broad spectrum of area residents, Tell-Back recruited session participants from a variety of local churches and service organizations including a Presbyterian church, a Lutheran church, the YWCA, a Highway Patrol service group, the local Chamber of Commerce, a homeless shelter, local political parties, and from recommendations of citizen advisory council members. The remaining 116 participants were selected through this process. This mixed strategy of recruitment does not result in a scientific randomly drawn sample; therefore, the power to draw inferences from the entire panel group to the general population in the pilot study areas is noticeably limited. However, given the exploratory nature of this research, the information serves to provide a range of potential economic values associated with rural transit in these case studies of the Wenatchee and Port Angeles areas.

Section IV: Study Results

Phone Survey Results

As part of the recruiting process for the Tell-back survey, a short random-sample telephone survey was conducted. In addition to requesting participation in the Tell-back survey, questions were asked regarding transit usage as well as attitudes and perceptions of public transit in the respondent's household. Areas of Chelan and Douglas counties in which the fare-free LINK transit system operates were represented by 175 respondents. Another 112 residents in Clallam

County participated in the random sample phone survey. These surveys were performed by the Social and Economic Sciences Research Center at Washington State University in March of 1999.

In order to be eligible to participate in the survey, the individual answering the phone needed to be 18 years of age or older and a resident of the survey area for the last two years. This short survey contained a total of 15 questions. First, respondents were asked the number of vehicles available to members of their household. Then, a series of questions were posed on usage of the transit system in their region by members of their household, including a break-down by broad age groups. The final eight questions in the survey quizzed respondents on their reasons for not using the transit system in their region. The basis for many of the questions in this survey had been provided by participants in the focus groups conducted prior to the telephone survey in each region. The complete script and detailed response characteristics are presented in Appendix A.

The number of motor vehicles available to household members was similar across regions. One percent of households in each region had no vehicles available to them, while just under 25% of respondents in both regions had just one vehicle. The majority of households had two vehicles available to them, with 37% in the Chelan-Douglas region (CD) in this category, and 46% of the households in Clallam County (CC). More households in CD had three or more vehicles (39%) than in CC (28%).

Transit usage was slightly more common for households in CD. In this region, 31% of the households use transit services, compared to 23% of households in CC. One member used transit services in 23% of the households in CD, compared to 17% in CC. Two or more members of the household used transit services in 7% of the households in CD and 5% of those in CC.

Several questions were asked regarding ridership frequency by age group for each household. One or more youth riders, 18 years old or younger, were present in 35% of the

surveyed households in CD and 27% of the households in CC. In CD, 45% of the households had one or more member in the adult age group (19 to 64 years old) using transit services, while 47% of the households in CC had one or more household members in this age group. Thirty-six percent of the households in CD had one or more household members using transit services in the elderly age group (age 65 or older), while 31% of the households in CC had one or more riders in this age group. Ridership is proportionately higher in CD compared to CC for youth and the elderly. Perhaps the fact that the CD system is free encourages more ridership by those who are less likely to have disposable income. These age groups are more likely to need publicly provided transportation as well.

Ridership frequency was the next topic in the survey. Eleven percent of the respondents in CD reported that household members used transit services once a day or more, while 8% of respondents in CC fell in this category. Approximately a quarter of the respondents in both survey regions reported that household members used transit services 1 or 2 days per week. In CD, just over half of the households reported using transit services 1 or 2 days per month, while 31% of the households in CC reported this frequency of transit usage. Paratransit (dial-a-ride type services) usage was more common for respondents in CD compared to CC, with a quarter of household in CD using either paratransit services exclusively or both bus and paratransit services, compared to 16% in CC.

The final group of questions asked respondents about potential reasons for not using transit services in their region. The reason with the highest frequency of affirmative responses was that respondents preferred the convenience of their own car (91% of those in CD and 86% of those in CC). The majority of respondents (77% in CD and 85% in CC) did not feel that the complexity of bus schedules and routing caused them to not use transit services. Respondents in CD and CC

generally did not feel that the timing of bus routes was a reason for non-usage (62% in CD and 63% in CC). Nearly a third of the respondents in CC stated that the location of bus stops was a reason for not using transit services, while just 15% of those in CD found the location of bus stops to be barrier. Over 85% of the respondents in both regions did not feel that a lack of seating or shelter at bus stops caused them to not use transit services. Most of the respondents did not find concerns over personal safety at bus stops to be a barrier to transit usage (93% of the respondents from CC and 82% of those from CD). Over a third of the respondents in CD stated that unfamiliarity with riding the bus was a barrier to transit usage, while less than a quarter of those in CC found this reason to be a barrier.

The purpose of this short survey was primarily for recruiting individuals to the Tell-Back survey. However, since the opportunity to pose questions to a randomly-selected sample of households was available, a concise set of useful questions was developed. The proportion of the population in a transit service region using these services is a very helpful statistic for forecasting purposes. Perceived barriers to transit usage provide additional useful information for improving transit services. Random samples of the general population are very expensive and not frequently available for transit planning purposes. The information from this telephone survey was useful for developing questions in the Tell-Back survey and should also be of interest to both regional policy makers.

Tell-Back Panel Group Results

The rest of this discussion will focus on the analysis of the economic valuation questions from the contingent valuation section of the survey. As noted by Loomis (1987), the ultimate use of CVM value information in BCA is to provide an estimate of the aggregate benefits of a change in quantity of a public good that reflects the total economic benefit to the general population.

Information taken from a sample of respondents that is representative of the target population is generalized to provide these aggregate estimates of benefits. It should be emphasized that the sample (TellBack group participants) is not a scientific sample, defined as a randomly selected sample in which all the target population has an equal chance of being selected. Rather, it is a convenience sample, with participants recruited through a number of community groups including area churches and the YMCA. The sample does contain a subgroup of participants that were recruited by a random phone call. Given this, the representativeness of any aggregate benefit based on the TellBack sample group is not known with certainty. Therefore, a range of benefit estimates is provided to give an indication of the potential benefits that result from the provision of public transit in the case studies of Clallum and Chelan/Douglas counties.

In order to have the respondents consider the broader benefits provided by their public transit system and to corroborate the responses, a series of different valuation questions were asked. Definitions of the economic valuation variables as well as the overall mean responses are provided in Table 2. First, participants were asked to imagine a local transit system that more closely reflected their idea of an efficient transit system. This question is an attempt to prevent any protest bidding in which respondents refuse to acknowledge any benefits because of some irritation with the current system. When respondents were asked if they could imagine such a transit system (V1), 38 percent said "no", 45 percent said "probably" and 29 percent said "definitely." Respondents were then asked to how much they would be willing to pay each month to have this modified system (V2). With this hypothetical scenario, the fare structure for each system would remain the same (no fare is charged for riding LINK). Any money the respondents agree to pay is above any fares currently charged (Clallum County Transit only).

Table 2: Overall Survey Means and Standard Deviation for Economic Valuation (WTP and WTA) Variables

Economic Variables	Variable Definition	Mean	Std. Dev.
V2	WTP per month for a modified transit system in which any minor irritants that trouble the respondent have been removed.	$9.30	10.93
V3	WTP per month for a modified transit system which the respondent did not use.	$7.10	10.14
V4	WTP per month for the present transit sytem.	$7.06	10.85
V5	WTP per month for a fare free system (Port Angeles only).	$14.17	16.07
V9	WTA per month if public transit were no longer provided.	$45.42	40.48

The second valuation question asks respondents how much they would be willing to pay to have this modified system, even if they would never ride it (V3). This question can be considered more of a "pure" measure of the broad community level benefits for public transit since users are told that their use of the modified system would be prohibited.

The third valuation question asks respondents to place a value on the public transit system that currently exists (V4). Again, the amount paid is in addition to any current fares. Clallum County respondents were asked an additional question (V5) regarding what they would be willing to pay to get a fare free bus system. The final valuation question (V9) asks respondents how much they would need to be compensated each month for giving up access to public transit. This is a willingness-to-accept compensation question, whereas all other valuation questions are in the willingness-to-pay format. Table 2 also summarizes the mean values for the various valuation questions. The average monthly value placed on the modified transit system (minor irritants

removed) is $9.30 (V2); the average monthly mean value a modified system that the participant could not use is $7.10 (V3); the monthly mean value for the current system is $7.06 (V4); the monthly mean value to get a fare free bus system (Clallum County only) is $14.17 (V5); and the combined monthly mean value for receiving compensation to forgo transit is $45.42 (V9).

Mean values for the valuation questions for selected subgroups are presented in Table 3. The first two rows differentiate between respondents who attended the session with someone else in their household (D14) and those who were the only representatives from their household. The third and fourth rows differentiate means by region. Users are separated from nonusers in the fifth and sixth rows, and those who were selected at random are grouped separately from those who were selected by some other means in the seventh and eighth rows. All the group means were subjected to the Duncan's mean comparison test to determine if there were any statistical differences in means between each group. The tests indicated that respondents who had at least one transit user in the household were significantly more likely to pay greater amounts across all the valuation questions. The only other comparison in which the differences were statistically significant occurred in the responses to the willingness-to-accept payment valuation (V9) by random versus non-random selection. The randomly selected respondents would accept, on average, $34 per month as compensation whereas all other respondents would accept an average of $51 per month. This result indicates that the non-randomly selected participants place a greater value on transit services than the randomly selected group.

Table 3: Mean Values (dollars per month) for Economic Valuation (WTP and WTA) Variables By Four Subgroups

	V2	V3	V4	V5	V9
More than one person attending Tell-Back session from the same household	8.34	6.21	5.36	12.93	36.60
Only one person attending Tell-Back session from the same household	9.82	7.57	7.90	15.01	49.41
Chelan-Douglas (LINK) region (81 participants)	9.47	6.73	6.90	NA	42.88
Clallam County region (89 participants)	9.15	7.44	7.20	14.17	47.74
Transit users (80 participants overall)	12.53	10.03	9.79	19.5	62.36
Transit nonusers (90 participants overall)	6.43[1]	4.50[1]	4.63[1]	9.81[1]	30.37[1]
Randomly selected participants (54 overall)	8.13	5.10	6.02	11.27	33.98
Non-randomly selected participants (116 overall)	9.85	8.03	7.54	15.37	50.75[1]

[1] Subgroup means for these variables were significantly different based on a Duncan's Test of group means. (Groupings are indicated by background shading/non-shading by row.)

The group comparisons do indicate that users of the transit system place a higher value on transit, a result that agrees with a priori expectations. Users have a greater sense of all the range of benefits that transit provides, besides the fact that they are direct consumers. Therefore, it would be reasonable to use these group means, as different values, to represent the respective proportions of the population that are users. These means can be used to generalize to the total population to get the aggregate benefit of having public transit. An estimate of the proportion of users to nonusers was obtained in the recruiting telephone survey reported earlier. For Clallum County, users of the transit system make up 24 percent of the population; in Chelan/Douglas counties, users are 31 percent of the population. The number of users that participated in the TellBack groups is higher at 47 percent. Therefore, users are over-represented in this convenience

sample. This provides additional justification to use the separate sample means of users and nonusers when aggregating benefits to the population as a whole.

Data needed to aggregate the sample mean responses to the general populations of the respective study areas includes the number of households and the population of the case study areas (Table 4). There are an estimated 33,913 households in the Link service area. Based on the results from the WSU recruiting survey, thirty-one percent of households in this area have at least one user (10,513 households). For Clallum County, 24 percent of the household had at least one user (6,561 households). The household percentages were also used to estimate the population of users (18,986 for the Link area and 11,855 for Clallum County) although it is probably a more conservative estimate than the actual population percentage.

Using the population and household proportions and applying the mean value responses provide the basis for the calculations in Table 5. As an example, the aggregate benefits for the LINK service area using (1) the mean values of users and nonusers for V2, and (2) the number of user and nonuser households, are calculated as follows:

10,513 (User Household)	X	$150.33 (annual WTP by users)	=$1,580,419 Total User WTP
23,400 (Nonuser Households)	X	$77.16 (annual WTP by nonusers)	=$1,805,554 Total nonuser WTP
Total User WTP	+	Total Nonuser WTP	=$3,385,973 Total WTP

All of the other aggregated household benefits in Table 5 are calculated in the same manner.

Table 4: Table of Demographic Characteristics[1]

Location	Total Number of Households	Total Number of User/Nonuser Households	Total Population (age 20 and over)	Population of users/nonusers (age 20 and over)
Link Service Area (Chelan/Douglas counties)	33,913	10,513 users (31%) 23,400 nonusers (69%)	61,246	18,986 (users) (31%) 42,260 nonusers (69%)
Clallum County	27,336	6,561 users (24%) 20,775 nonusers (76%)	49,395	11,855 users (24%) 37,540 nonusers (76%)

[1] The number of households used here is an estimate based on adjusting the 1990 Census estimate by the rate of growth of the population age 20 or above from 1990 to 1998 (State of Washington Office of Financial Management). The Link service area does not cover all of Chelan/Douglas counties, so the household number (and also the population number) was decreased by seven percent to accurately reflect total households and total population for this area. The calculations used to determine the number of user and nonuser households is based on the self-reported use or nonuse of transit from the WSU recruiting survey. The percentages of users for each area is 24 percent for Clallum County and 31 percent for Chelan/Douglas counties.

Similarly, aggregated estimates of the benefits are also derived using the population (age 20 and over) estimates of users and nonusers within the LINK service area and Clallum County (see Table 4). Given that a convenience sample was used to collect data, the sampling process was not focused on obtaining value information on a household basis as is typically done in CVM studies. Some panel participants came to the session with another household member (see first two rows of Table 3). However, the mean values of these participants, although lower than participants who came alone, were not significantly different. This provides evidence that it might be more appropriate to aggregate using population as the unit of aggregation. It should be emphasized here that because of the tremendous uncertainty associated with using this type of sample, the "true" aggregate benefit probably lies somewhere between the household aggregated benefits and the

population aggregated benefits. Therefore, values are expressed as ranges rather than point estimates.

Of these various valuation questions, those that could be considered most consistent with BCA are questions V2 (the modified transit system) and V3 (the modified transit system where use is restricted). These questions ask the respondent to consider a hypothetical change in the current transit system, and thus they are ex ante (before the fact) values, which is consistent with BCA. Question V2 is a measure of the total annual benefits of having public transit. As shown in Table 5, the range of annual benefits associated with V2 are $3.4 million (household aggregate benefit) to $6.1 million (population aggregate benefit) for LINK, and $2.6 million (household aggregate benefit) to $4.7 million (population aggregate benefit)

Table 5: Annual Aggregated Values For Transit By Region and By Variable

Variable	Annual WTP	Aggregate Annual WTP by Household	Aggregate Annual WTP by Population
Mean of Stated WTP (users and nonusers) from V2	User: $150.33 Nonuser: $ 77.16	$3,385,973 (LINK) $2,589,314 (Clallum)	$6,114,947 (LINK) $4,678,748 (Clallum)
Mean of Stated WTP (users and nonuser) from V3	User: $120.36 Nonuser: $ 54.00	$2,528,945 (LINK) $1,911,532 (Clallum)	$4,567,195 (LINK) $3,454,028 (Clallum)
Mean of Stated WTP (users and nonusers) from V4	User: $117.48 Nonuser: $ 55.56	$2,535,171 (LINK) $1,925,045 (Clallum)	$4,578,441 (LINK) $3,478,447 (Clallum)
Mean of Stated WTP (users and nonusers) from V5	User: $234 Nonuser: $117.72	$3,980,907 (Clallum)	$7,193,279 (Clallum)
Mean of Stated WTA (users and nonusers) from V9	User: $748.32 Nonuser $364.44	$16,394,984 (LINK) $12,840,969 (Clallum)	$29,608,838 (LINK) $22,552,412 (Clallum)

for Clallum County (remembering that this is an aggregated payment above any fares users are already paying). Question V3 is a measure of the broader community level benefits resulting from transit, separate from any benefits resulting from direct use. The range of annual benefits associated with V3 is $2.5 million (household aggregate benefit) to $4.6 million (population aggregate benefit) for LINK, and $1.9 million (household aggregate benefit) to $3.5 million (population aggregate benefit).

Question V4 (the value of the current system) and V5 (the value of having a fare-free bus system in Clallum County) represent values of the current transit. The range of annual where USE is defined as user or nonuser of the transit system (1=user, 0=nonuser), a represents variables reflecting attitudes and preferences concerning public transit, and d is the socio-demographic variables of the participants. Independent variables in the various WTP/WTA (V2, V3, V4, V5, and V9) models are defined in Table 6 and the Tobit models that were estimated are presented in Table 7. Three independent variables, USE (user or nonuser), D6 (household income for 1998), and V11 (altruistic motives for paying for public transit), were included in all of the WTP/WTA models because of their potential importance in explaining the level of the WTP/WTA expressed. It is assumed that the WTP/WTA variables follow a censored normal distribution. It should be noted that, unlike OLS parameter estimates, the estimated parameters from the Tobit model are not directly interpretable. However, the signs on these coefficients and the corresponding chi-squared test statistics indicate the direction of the relationship (positive or negative) on WTP/WTA and benefits associated with V4 is from $2.5 million (household aggregate benefit) to $4.6 million (population aggregate benefit) for LINK and from $1.9 million (household aggregate benefit) to $3.5 million (population aggregate benefit) for Clallum County. The Clallum County participants were also asked how much they would pay to get a fare-free bus system (V5) with the annual

benefit ranging between $3.9 million (household aggregate benefit) and $7.2 million (population aggregate benefit).

Statistical Analysis of Survey Responses

A statistical limitation to using the stated WTP/WTA responses from the survey exists because TellBack participants are free to express a zero value. This means that the WTP data is censored (restricted) to values of zero and above. This type of data is problematic for the typical statistical procedures that assume a normal distribution, such as ordinary least squares regression (OLS). In order to more accurately test for relationships underlying willingness to pay for public

Table 6: Definitions for Independent Variables

Independent Variables	Variable Definitions
USER	How many people in your household currently use any of the transportation services provided by LINK/Clallum County? (0=no one, 1=one or more) (base on responses to B4)
GROUP	How were you recruited to this meeting? (0=random call from WSU, 1=all other methods) (based on responses to D13)
D5	How long have you lived in your current residence? (0=up to 5 years, 1=5 to 15 years, 2=15 to 25 years, 3=over 25 years)
D6	What is your gross annual income? (0=below $15,000, 1=$15,000-$29,999; 2=$30,000-$44,999, 3=$45,000-$59,999; 4=$60,000 and over; 5=No Answer)
D9	Do you own or operate a business in Chelan or Douglas/Clallum Counties? (0=No; 1=Yes)
D14	Someone else from household attending session? (0=No; 1=Yes)
B2	In your household, at what age do your children begin to drive on a regular basis? (0=no children; 1=under age 16; 2=age 16; 3=age 17; 4=age 18; 5=over age 18)
B5	How many people in your household age 18 years or younger currently use Public Transit? (0=zero, 1=one; 2=two; 3=three; 4=four; 5=five or more)
RY2	I don't have enough cars for everyone in the household. (1=much less; 2=less; 3=about the same; 4=more; 5=much more)
L1	How important is road construction and maintenance? (1=slightly important; 2=somewhat important; 3=important; 4=very important; 5=extremely important)
L3	How important is medical and health services in local area? (1=slightly important; 2=somewhat important; 3=important; 4=very important; 5=extremely important)

Table 6: Definitions for Independent Variables, cont.

Independent Variables	Variable Definitions
L5	How important is public transit? (1=slightly important; 2=somewhat important; 3=important; 4=very important; 5=extremely important)
E3	Increase number of rides given others outside of household? (1=zero; 2=slightly; 3=somewhat; 4=50/50;5=high; 6=definite)
E6	Primary walk or bike? (1=zero; 2=slightly; 3=somewhat; 4=50/50; 5=high; 6=definite)
BP4	It is backup transportation should a family member need it. (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree)
BP6	You believe it encourages tourism. (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree)
BP7	You believe buses reduce traffic and parking congestion? (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree)
BP8	You believe buses reduce air pollution since users are not driving? (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree)
BP10	It allows area to retain current elderly population. (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree)
BP13	My household has no need for public transit. (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree)
BP16	Transit systems are too expensive. (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree)
BP19	Willing to pay higher taxes for free bus system. (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree)
BP22	Ridership should be used to determine which routes to keep. (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree)
V11	In deciding to pay for transit, how important was the altruistic desire to provide transit to people outside of your family and frineds who may not be able to afford their own transportation? (1=slightly important; 2=somewhat important; 3=important; 4=very important; 5=extremely important)

Table 7: Results of Tobit Model

Variable	Dependent Variable: V2	Dependent Variable: V3	Dependent Variable: V4	Dependent Variable: V5	Dependent Variable: V9
Intercept	-1.59 (0.83)	6.43 (0.29)	-4.18 (0.37)	21.21 (0.069)	-21.87 (0.20)
USER	-9.58 (0.0001)	-6.67 (0.0009)	-5.62 (0.0086)	-5.56 (0.14)	-26.24 (0.0008)
GROUP					17.79 (0.0197)
D5	-2.32 (0.0207)	-2.09 (0.0428)			
D6	0.12 (0.348)	0.023 (0.87)	0.0016 (0.99)	0.309 (0.21)	-0.42 (0.37)
D9	5.07 (0.0561)				
D14			-4.93 (0.037)		
B2	1.83 (0.0305)	1.87 (0.0361)			
B5				-6.02 (0.079)	
RY2					-6.84 (0.0553)
L1	-1.83 (0.0192)				
L3	3.38 (0.010)				
L5					7.54 (0.0037)
E3					3.91 (0.0546)
E6				3.69 (0.0001)	
BP4					
BP6		-1.70 (0.0539)			
BP7					5.16 (0.0929)
BP8			-2.17 (0.022)		
BP10			1.61 (0.097)		
BP13				-5.52 (0.0032)	
BP16	-2.14 (0.0187)	-3.26 (0.001)			
BP19			1.40 (0.071)	3.07 (0.0040)	
BP22				-2.50 (0.046)	
V11	2.57 (0.0009)	3.59 (0.0001)	3.12 (0.0003)	0.86 (0.44)	5.42 (0.0421)
Pseudo R-squared	0.24	0.24	0.16	0.47	0.31
Predicted value	$7.99 N=169	$5.59 N=170	$4.97 N=169	$13.56 N=89	$39.38 N=170

transit, a Tobit regression model was run for each of the economic valuation questions. This estimation procedure is designed to provide estimations from data that is censored (contains zeros) and can produce more efficient estimates than OLS (Kennedy, 1985).

The general empirical model is of the following form:

$$WTP/WTA = f(USE, a, d)$$

where *USE* is defined as a user or nonuser of the transit system (1=user, 0=nonuser), *a* represents variables reflecting attitudes and preferences concerning public transit, and *d* is the socio-demographic variables of the participants. Independent variables in the various WTP/WTA models (V2, V3, V4, V5, and V9) are defined in Table 5 and the Tobit models that were estimated are presented in Table 6. Three independent variables, *USE* (user or nonuser), D6 (household income for 1998), and V11 (altruistic motives for paying for public transit), were included in all of the WTP/WTA models because of their potential importance in explaining the level of the WTP/WTA expressed. It is assumed that the WTP/WTA variables followed a censored normal distribution. It should be noted that, unlike OLS parameter estimates, the estimated parameters from the Tobit model are not directly interpretable. However, the signs on these coefficients and the corresponding chi-squared test statistics indicate the direction of the relationship (positive or negative) on WTP/WTA and whether the relationship is statistically significant. A negative sign indicates that the higher the participant rated the independent variable the smaller the WTP/WTA payment.

The most striking result of the Tobit models is that income was not a significant factor in explaining the WTP/WTA values in any of the models. The signs on the parameter estimates for income across the models are positive with the exception of V9 (WTA value). The negative value for V9 implies that the less income the participant made, the greater the compensation they would

require to forgo public transit. One variable that is a statistically significant predictor of WTP/WTA is the variable representing the altruistic desire to provide transit to others outside of family and friends who can not afford their own transit (V11). Except for the model for V5, the estimated coefficient is positive and strongly significant. Regarding V5 (paying to get a fare-free transit system in Clallum County), the estimated coefficient is positive but not significant, indicating that altruism was not a statistically significant factor in paying to get a free system. Another variable that is also a statistically significant predictor of WTP/WTA is USER, the variable representing whether the participant uses the transit system. Again, in every model except for V5, the coefficient is negative and strongly significant, indicating that nonusers would pay less for transit then users. For V5, this variable is not significant, which might indicate that a free system would be used by people who are currently nonusers and who would pay more to get fare-free service.

Various variables that were statistically significant at the 10 percent probability level or less are presented in Table 7. The relationships that negatively influence V2 (the value of the modified transit system) include: the greater the length of time in current residence (D5) the less was the participant's WTP; the more important road construction and maintenance (L1) is to the participant, the less is their WTP; and the more they disagreed that transit is too expensive, the greater is their WTP (BP16). The following characteristics positively influenced V2: participants who were not business owners (D9); participants whose children tended to be older before they began to drive (B2); and participants for whom health and medical care (L3) were very important.

For V3 (restricted use of the modified system), negative relationships include: the more the participant disagreed that transit encouraged tourism (BP6), the less they would pay for transit; and the more they disagreed that transit is too expensive, the greater is their WTP (BP16). The only

positive relationship for V3 is higher WTP values for participants whose children tended to be older before they began to drive (B2).

For V4 (the value of the current system), a negative relationship existed for participants who were the only ones from their household to attend the session (D14); they tended to pay less for the current system than participants who attended with another household member. A perverse negative result is revealed in that the more participants disagreed that buses reduce air pollution, the greater their WTP, which may represent a misunderstanding on the impact of buses on overall air quality. Positive relationships include the results that participants who tended to agree that transit helps retain current elderly population (BP10) also gave a higher WTP, and participants that tended to agree to pay higher taxes for a free bus system (BP19) also gave a higher WTP.

Regarding valuation of a fare-free bus system for Clallum County (V5), other variables that are negatively related to WTP include: participants who had less or no children 18 years or younger using transit (B5) tended to give a smaller WTP; participants who tended to agree that they had no need for transit (BP13) tended to give a smaller WTP; and participants that tended to disagree that ridership should be used to determine which routes to keep (BP22) also tended to gave a greater WTP amount. Positive relationships for V5 include: participants who would more likely walk or bike if transit was not available (E6) were WTP more for transit; and participants who tended to agree to pay higher taxes (BP19) had a greater WTP for a fare-free bus system.

The final valuation model in this study is the compensation that participants would have to be paid to forgo access to public transit (V9). A negative relationship was revealed for participants who indicated that not having enough cars was not much of a reason for why they use transit (RY2); these participants tended to state a higher WTA. This result may be an expression of the participant's demand to maintain transit as an option for times when their own vehicle may be

unavailable. Variables that are positively related to WTA include: participants that tended to place greater importance on public transit (L5) stated a higher WTA value; participants who would be more likely to give rides to others outside their household if transit was not available (E6) tended to state a higher WTA value (E3); participants who tended to agree that buses reduce traffic and parking congestion (BP7) also tended to state a higher WTA value; and finally, participants who were recruited to the sessions by a random phone call (GROUP) tended to have a higher WTA value.

The pseudo R-squared value in Table 7 measures the explanatory power of these models. It is obtained by taking the square of the correlation coefficient between the predicted values of WTP from the tobit model and the actual stated WTP value from the participant. This measure approximates the R squared measure associated with OLS.

Summary

The overall purpose of this project is to develop and test a methodology to measure the broader community-wide benefits from the provision of a public transit system in a rural county and to measure those benefits. The CVM approach commonly used to measure the benefits to changes in the provision of public goods was applied to two test areas in Washington State that currently have county-wide rural transit systems, LINK in Chelan and Douglas counties and Clallum Transit in Clallam County. Traditional focus groups were held in both areas to help provide information that could be used to design a CVM survey. A CVM questionnaire containing 128 questions was later administered to larger separate panels of residents from both areas to elicit how much transit might be worth to the community, even if the participants did not directly use the transit system.

A series of different valuation questions were asked in order to measure user benefits and non-user benefits as well as broader community-level benefits. On average, respondents were willing to pay $9.30 per household per month for a local transit system that fit their needs. For their present transit system, respondents were willing to pay an average of $7.06 per month, in addition to what they were already paying in the form of fares or sales taxes targeted for public transit. In order to estimate non-user benefits, respondents were asked how much they would be willing to pay for a transit system that they did not use; the mean value for household nonuser benefits was $7.10 per month. When asked how much they would have to be compensated each month for giving up access to public transit, the average per household value was $45.42.

Due to the statistical problem associated with responses equal to zero in the data, Tobit analysis was used to test significant relationships among the variables in the CVM questionnaire. The most striking result of this analysis was that income was not a significant factor in explaining the WTP/WTA values in any of the models. One variable that is a statistically significant predictor of WTP/WTA is the variable representing the altruistic desire to provide transit to others outside of family and friends who can not afford their own transit (V11). Except for the model for V5 (paying to get a fare-free transit system in Clallum County), the estimated coefficient is positive and strongly significant. Individuals who feel compassion for those lacking mobility have higher WTP/WTA for transit services.

Due to the nature of the sample selection method used to recruit the CVM questionnaire participants, the information collected should not be interpreted as definitive. This study did provide a potential range and magnitude of values on the benefits of having public transit as stated by area residents. The following ranges of aggregate benefits for the two study areas are based on multiplying average benefit values by the average number of households in the study area (lower

value) and by the average number of adults aged twenty and over (upper range). While some respondents were referring to a personal budget, others referred to a household budget. Regarding the broader community-wide benefits that public transit provides, specifically the benefits to nonusers of having a transit system (question V3), a possible range of benefits for the LINK system is $2.5 million to $4.6 million annually and the range for the Clallum County Transit System is $1.9 million to $3.4 million annually. A range of the possible total benefits from public transit including the value to users and nonusers as well as all other community-wide benefits is $3.4 million to $6.1 million annually for the LINK System while the range for Clallum County is $2.6 million to $4.7 million annually (above what users pay in fares). Based on the results of this study, the true aggregate benefit level is estimated to lie somewhere within these ranges.

In evaluating the use of CVM to measure the benefits of public transit, this experiment involving the case study areas of Chelan/Douglas and Clallum counties does appear to be successful. The CVM survey elicited values that provide internally consistent and reasonable information for a benefit-cost analysis of rural transportation projects. One important lesson resulting from this work involves the aggregation of benefits from the study sample to the larger population. The typical practice in CVM studies is to elicit a value from a single representative of the household, and then aggregate that information using households as the unit of aggregation. Evidence from this study shows that there are potentially greater values to transit among household members than those reflected by the responses of a single household member. Future work using CVM to measure transit benefits needs to develop alternative strategies to elicit transit values from household members to determine if the unit of aggregation should be households or population.

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Appendix A: Focus Group Scripts

Introduction

I would like to welcome you to our focus group on the benefits of transit in rural areas. By transit system, I am referring to all public transit in this area including fixed route systems (e.g. bus routes) and demand responsive systems (e.g. paratransit and any other services provided by state and local agencies). We are focusing on rural areas, both those with some sort of public transit and those with out public transit services, as the lack of public transit is problematic for the rural population for several reasons. With a relatively small rural population spread over a large area, it is difficult from an economic standpoint to provide public transit to this population group. Thus, these people can be underserved in terms of a variety of public services. They may be unable to work, shop, or visit as much as they would if they had some type of public transportation available to them. We would like to keep this group, rural residents, in mind as we proceed.

This project is sponsored by Washington State's Department of Transportation (DOT) and is proceeding in two phases. The first phase involves conducting discussion groups like this one with individuals who are concerned about transportation issues and how they affect the community. From this discussion group, we hope to determine the types of information we would need about both users and nonusers which would then be used to develop a questionnaire to be administered to a larger group. In the second phase of the research, the questionnaire will be administered to a group of about 100 people in order to collect data to help us measure the total benefits of rural transit to society. Our purpose is to find out more about the benefits people gain from having other forms of transit available to them besides a personal motor vehicle. I particularly want to focus on the benefits of having transit available, even for people who never use it. I will refer to this as a non-user benefit.

First, I would like to make some introductions. My name is Joan Giese - I am from WSU and I will be moderating the session. Also present is Doug Scott from the department of agricultural economics at WSU, who will be responsible for designing the survey. He here to assist me and to listen to the group discussion. Now I would like to go around the room and I'll let each of you introduce yourself to the group.

We would like to tape record the discussion for further evaluation. However, your participation in this group will remain confidential. Apart from the three of us, no one will know of your participation in this group. Any information with your name attached and the tape recording will be destroyed at the end of the project so please feel free to express your opinions without reservation. Rest rooms are available just down the hall. If there are no further questions, let's begin.

I. The Benefits of Transits to the Community

(1) First, what are your impressions about the quality of the transit system in your county?

Probe: What are the good things about the system you have now?

(2) Now, let's consider the benefits of public transit that accrue to the local residents. In your opinion, what are the benefits of having a transit system to the residents of Clallum County? [List of benefits provided by participants]

(**Note for Joan**: A community can benefit from a transit system because (1) it decreases transport costs to everyone by helping to reduce congestion and the time spent in transit; (2) it stimulates economic development by providing access to shopping or jobs at reduced costs, (3) it reduces traffic congestion; (4) it reduces the demand for parking; (5) it reduces roadway costs; (6) it frees resources that can be used to improve road safety; and (7) it reduces air pollution.)

Probe: Are these benefits enjoyed only by users of the system or are there benefits to having a transit system that are gained by those who do not use the system ? Are there any other types of benefit or service that non-users get from public transit that is not mentioned already?

(**Note for Joan**: One possible benefit is an option value: a driver has the option of not driving. Non-users also benefit form having transit as it reduces congestion and thus trip costs. Another non-use benefit accrues to household that would have to provide transportation to someone who

is currently using the transit system instead (e.g. picking up children after their activities; or taking an elderly person to the doctor).

Probe: Does the transit system help stimulate business activity? Do you know any business owners who feel that a good portion of their clientele rely on the transit system?

Probe: Does the transit help alleviate parking problems?

Probe: Has it helped improve access to health care?

Probe: Has it helped improve access to jobs?

(3) Are these benefits to the county significant enough that they should be measured and used to help appraise the value of a transit system?

II. Users and Non-Users of Transit in the Community

(4) Let's discuss the variety of people that use transit services in this area. If you were to describe users, who would they be?

Probe: What kind of trips do you think users are making on the transit system? Are they

(A) getting access to jobs/work

(B) access to educational opportunities

(C) access to health care

(D) making shopping trips or kinds of recreational trips

Probe: Could you characterize the extent that the users of the transit system rely on it? Is the transit system the primary mode of transport for certain types or groups of users?

Probe: What characteristics do you think non-user households have?

(5) One way to think about people who might be potential users of the system is to consider how you might change your own use of the transit system if you were in someone else's situation or if you lived in a different area. How would you use the transit system in different circumstances?

Probe: Can you think of ways to change the transit system that will provide service to individuals who could be potential users of the system?

(6) Now, getting closer to the focus of our discussion, please consider the situation in your community if it had no transit system. If the transit system was not available for people to use, what would the users of the system do as an alternative?

Probe: Would these users be forced to purchase their own vehicles? Would they rely on friends or family? Private cab services? Or some other?

Probe: What do you think would happen to the community? Would it affect the quality of life? How would it affect traffic congestion? How would it affect the maintenance and upkeep of roads?

(7) One issue that we are trying to address in this project is the lack of mobility for rural residents. Do you think it would be a good idea to provide some type of public transit for people living outside of the community? How could we place a value on having this type of transit available?

V. Measuring the Non-use Benefits of Transit

The problem of measuring non-use benefits is similar to the problem of trying to place a value on pristine, natural environments (like Yellowstone or Glacier National Parks) from people who will never use them. To get information on the benefits of natural environments from nonusers, surveys have been used to simulate a voting booth, much like a bond election. Survey respondents are asked to vote on whether to preserve the park or not. The survey then takes the next step of asking the respondent to place a dollar value that their household would pay to keep the park or area. The same approach could be used to measure the non-use value of transit.

(8) Do you think an approach like this will be able to provide the information needed to measure non-use benefits?

(9) Lets consider how much your household benefits from having a transit system. If you were asked to pay $50 a year to keep the current transit system (above what you already pay in taxes) , would you be willing to pay this amount?

Probe: Would you be willing to pay an extra $100 a year?

Probe: When deciding whether or not you would pay this money, what factors were you considering as you made your decision? (Were you considering income? The change in the number of trips you make with your car? Your tax bill?)

(10) Are there some negative aspects to the transit system that entered into this valuation? If so, what are they, and how did it affect your willingness to pay?

(11) If the current transit system were expanded to serve more people, would you place a greater value on the system, and what would this transit system be like?

(12) Do you have any alternative suggestions or methods that might provide an estimate?

(13) Is there some issue related to valuation of transit systems that you think is important?

(14) Our next phase of this project involves administering a questionnaire to a larger group. We would like your help in recruiting participants for this group. Participants will receive $25 for completing the survey after the group session. If you can think of anyone who would be interested in participating in this groups, can you let us know?

Closing Comments

Appendix B: Telephone Survey:
Transit Usage and Attitudes Toward Transit
Chelan, Douglas, and Clallam Counties

Appendix Table 1: Number of motor vehicles available to household by region

	Percent By Region	Number	Percent of Total
None			
Chelan-Douglas	1	2	1
Clallam	1	1	0
Total		3	1
One			
Chelan-Douglas	23	40	14
Clallam	24	27	9
Total		67	24
Two			
Chelan-Douglas	37	64	22
Clallam	46	51	18
Total		115	40
Three			
Chelan-Douglas	25	43	15
Clallam	18	20	7
Total		63	22
Four			
Chelan-Douglas	9	16	6
Clallam	5	6	2
Total		22	8
Five or more			
Chelan-Douglas	5	9	3
Clallam	5	6	2
Total		15	5

Q4: Number of people per household currently using public transit services

	Percent By Region	Number	Percent of Total
None			
Chelan-Douglas	69	121	42
Clallam	77	86	30
Total		207	72
One			
Chelan-Douglas	23	41	14
Clallam	17	19	7
Total		60	21
Two			
Chelan-Douglas	5	9	3
Clallam	4	5	2
Total		14	5
Three			
Chelan-Douglas	1	2	1
Clallam	1	1	0
Total		3	1
Five or more			
Chelan-Douglas	1	2	1
Clallam	0	1	0
Total			

Appendix Table 3: Number of people per household currently using public transit services that are 18 years old or less

	Percent By Region	Number	Percent of Total
None			
Chelan-Douglas	66	35	44
Clallam	73	19	24
Total		54	68
One			
Chelan-Douglas	23	12	15
Clallam	15	4	5
Total		16	20
Two			
Chelan-Douglas	6	3	4
Clallam	8	2	3
Total		5	6
Three			
Chelan-Douglas	2	1	1
Clallam	0	0	0
Total		1	
Five or more			
Chelan-Douglas	4	2	3
Clallam	4	1	1
Total		3	4

Appendix Table 4: Number of people per household currently using public transit services that are between 19 and 64 years old

None				
Chelan-Douglas		55	29	36.71
Clallam		54	14	17.72
Total			43	54.43
One				
Chelan-Douglas		32	17	22
Clallam		35	9	11
Total			26	33
Two				
Chelan-Douglas		9	5	6
Clallam		8	2	3
Total			7	9
Three				
Chelan-Douglas		4	2	3
Clallam		4	1	1
Total			3	4

Appendix Table 5: Number of people per household currently using public transit services that are 65 years old and over

	% by resp. for this county	% of total in survey	% by resp. for this county
None	64	43	64
Chelan-Douglas	69	23	69
Clallam		66	
Total			
One			
Chelan-Douglas	30	20	30
Clallam	23	8	23
Total		28	
Two			
Chelan-Douglas	6	4	6
Clallam	8	3	8
Total		6	

Appendix Table 6: Frequency of transit system usage per household			
More than once a day			
Chelan-Douglas	7	4	5
Clallam	8	2	3
Total		6	8
Once a day only			
Chelan-Douglas	4	2	3
Clallam	0	0	0
Total		2	0
1 or 2 days per week			
Chelan-Douglas	24	13	16
Clallam	23	6	8
Total		19	24
1 or 2 days per month			
Chelan-Douglas	52	28	35
Clallam	31	8	10
Total		36	45
Other			
Chelan-Douglas	13	7	9
Clallam	38	10	13
Total		17	21
Number of respondents for this question:			
Chelan-Douglas		54	
Clallam		26	
Total		80	
frequency missing: 207			

Appendix Table 7: Public transit usage by mode for each household

The bus system			
Chelan-Douglas	75	39	50
Clallam	85	22	28
Total		61	78
Paratransit system			
Chelan-Douglas	17	9	12
Clallam	12	3	4
Total		12	15
Both			
Chelan-Douglas	8	4	5
Clallam	4	1	1
Total		5	6
Number of respondents for this question:			
Chelan-Douglas		52	
Clallam		26	
Total		78	
frequency missing: 209			

Appendix Table 8: Reasons for not using transit: Prefer the convenience of private vehicle

	% by resp. for this county	Number of resp.	% of total in survey
Agree			
Chelan-Douglas	91	110	53
Clallam	86	73	35
Total		183	89
Disagree			
Chelan-Douglas	9	11	5
Clallam	14	12	6
Total		23	11
Total			
Chelan-Douglas		121	
Clallam		85	
Total		206	
frequency missing: 81			

Appendix Table 9: Reasons for not using transit: Bus schedules and routes are too complicated			
Agree			
Chelan-Douglas	23	23	13
Clallam	15	11	6
Total		34	20
Disagree			
Chelan-Douglas	77	76	44
Clallam	85	61	36
Total		137	80
Total			
Chelan-Douglas		99	
Clallam		72	
Total		171	
frequency missing: 116			

Appendix Table 10: Reasons for not using transit:

Timing of the bus routes is not convenient

Agree			
Chelan-Douglas	38	38	24
Clallam	37	22	14
Total		60	38
Disagree			
Chelan-Douglas	62	61	38
Clallam	63	38	24
Total		99	62
Total			
Chelan-Douglas		99	
Clallam		60	
Total		159	

frequency missing: 128

Appendix Table 11: Reasons for not using transit: Bus stops are not conveniently located			
Agree			
Chelan-Douglas	15	16	9
Clallam	32	24	13
Total		40	22
Disagree			
Chelan-Douglas	85	94	51
Clallam	68	50	27
Total		144	78
Total			
Chelan-Douglas		110	
Clallam		74	
Total		184	
frequency missing: 103			

Appendix Table 12: Reasons for not using transit: Bus stops are not sheltered and provide no seating			
Agree			
Chelan-Douglas	13	14	8
Clallam	14	10	6
Total		24	13
Disagree			
Chelan-Douglas	87	95	52
Clallam	86	62	34
Total		157	87
Total			
Chelan-Douglas		109	
Clallam		72	
Total		181	
frequency missing: 106			

Appendix Table 13: Reasons for not using transit: Concerned about personal safety at bus stops			
Agree			
Chelan-Douglas	18	21	11
Clallam	7	6	3
Total		27	14
Disagree			
Chelan-Douglas	82	95	48
Clallam	93	76	38
Total		171	86
Total			
Chelan-Douglas		116	
Clallam		82	
Total		198	
frequency missing: 89			

Appendix Table 14: Reasons for not using transit: Unfamiliar with riding the bus

	Number of resp.	% of total in survey	Chelan-Douglas vs. Clallam	% by resp. for this county
Agree				
Chelan-Douglas	42	21	68	36
Clallam	20	10	32	24
Total	62	31		
Disagree				
Chelan-Douglas	75	38	55	64
Clallam	62	31	45	76
Total	137	69		
Total				
Chelan-Douglas	117		59	
Clallam	82		41	
Total	199			
frequency missing: 88				

Appendix Table 15: Reasons for not using transit: Other reasons

	Number of resp.	% of total in survey	Chelan-Douglas vs. Clallam	% by resp. for this county
Yes				
Chelan-Douglas	56	27	69	47
Clallam	25	12	31	29
Total	81	39		
No				
Chelan-Douglas	64	31	51	53
Clallam	61	30	49	71
Total	125	61		
Total				
Chelan-Douglas	120		58	
Clallam	86		42	
Total	206			
frequency missing: 81				