Guidelines for Measuring Visitor Spending

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Economic impact analyses trace the flows of spending and related economic activity associated with some policy or action. To estimate the economic impacts of recreation and tourism activity, one must generally begin with an estimate of visitor spending associated with the policy or action. This spending is typically estimated via visitor surveys. Changes in visitor spending can then be applied to a model of the local economy to estimate "multiplier effects" (indirect and induced) or to convert spending changes to associated changes in income and employment.

Regional economic models in general and input-output models in particular have specific data requirements. When spending surveys are to be used in conjunction with an input-output model or regional economic multipliers, these requirements must be taken into account. Previous bulletins in this series have covered economic impact concepts (Stynes 1997) and methods (Stynes 1998). In this one the focus is how to measure visitor spending using survey methods. I first review some preliminary considerations in designing spending studies for an economic impact analysis. In the second section, I stress the importance of segmented approaches and suggest some useful segmentation strategies. The final section covers specific survey procedures and includes a sample survey instrument.

Preliminary Considerations

VISITATION DATA. A prerequisite to good spending estimates is good use information. A spending study should therefore begin with a clear understanding of what use information is available and its accuracy. Since total spending is usually estimated by multiplying the average spending per visitor times the number of visitors, one cannot estimate a change in total spending without first estimating the number of visitors affected by a given action. It is important that the units for which use is available are compatible with the unit of analysis for which spending is estimated in order to properly multiply the two figures. One often must include a few key questions in addition to the spending questions to convert between the units for use and spending. Party size and length of stay information are the most common variables for converting spending data to a per person, per party, per trip, or per night basis. Other survey variables can sometimes be useful in correcting for biases in the use data, e.g., when visitation data are not adjusted for multiple entries to a park, commercial traffic, or other problems. In estimating impacts of park visitor spending on a region around the park, length of stay in the region is more critical than length of stay in the park. If thought out in advance, these variables can be estimated as part of the spending survey.

THE STUDY REGION. An economic impact analysis requires the definition of a study region. The survey should measure spending that takes place within this region. Separating out spending within a local region is particularly important if visitors are on extended trips stopping in many places. Only the portion of trip spending that occurs within the given region generates local economic impacts. The region may be defined by a map or as a given radius from a destination site (e.g. report all spending that occurred within 30 miles of this site). In some situations you may want to separate spending at the particular site (be it a hotel, marina or state park) from spending off-site within the surrounding region. Regional economic models generally do not get any smaller than a single county, as economic data below the county level is limited.

TYPES OF SPENDING COVERED. There are three kinds of spending that generate impacts:

1. Trip spending by visitors
2. Durable goods purchases of visitors and households in the area
3. Government or organizational spending
    a. Construction and development
    b. Operations and maintenance

Each kind of spending will generally be measured separately, and in most situations only one type is of primary interest. Trip spending is most easily gathered in conjunction with on-site visitor surveys, durable goods purchases are best measured through household surveys or secondary sources, and construction and government or organizational purchases are generally acquired from internal records of the organization. There are, however,

situations where more than one type of spending may be part of an economic impact analysis. In these cases, one must be careful to avoid double counting of spending or confusion on the part of subjects being interviewed. For example campground fees paid to a government agency would be double counted if included in both visitor spending and agency operational expenses. Similarly, purchases of durable goods can be included as trip expenses if bought on a trip or as annual household purchases, but should not be counted twice.

SPENDING CATEGORIES. Spending should be measured within a set of clearly defined categories. Subjects provide more accurate and complete estimates of spending if spending is itemized within major categories. The categories serve to identify the kinds of spending that are relevant and should be reported. Also, well defined categories identify the kinds of products and services being purchased, and in turn the types of businesses receiving these sales. Identifying the sectors that receive the spending is critical to tying spending changes to a regional economic model. The type and number of spending categories will vary with the study purposes. For trip spending, we recommend the following minimum level of detail:

> lodging divided between campgrounds and motel/hotel
> food and beverages divided between restaurant meals and groceries
> transportation divided between auto/RV gas and oil, other auto-related expenses (repairs, parts, etc), and
>   public transportation where appropriate (air, rail, taxi,...)
> recreation and entertainment fees and admissions
> souvenirs, and other retail purchases

This amount of detail defines the key sectors directly impacted and facilitates bridging the spending data to sectors in a regional economic model. Retail purchases may be further broken down to yield more complete reports of spending or to tie more directly to production sectors of interest (e.g. sporting goods, film, clothing, books and maps, …).

UNITS OF ANALYSIS. The unit of analysis in recreation and tourism studies can vary based on the definition of the spending unit and the time period covered. Both visits and spending must be converted to a common unit before they can be combined to yield total spending. I recommend beginning with the visitor party day or night as the basic unit of analysis for spending studies. In many cases per day estimates of spending will be derived from per party trip estimates by dividing by the length of stay in the area.

Visitor hours or visitor days, if accumulated across parties as is done by some federal agencies, are not good units for examining spending. Eight visitors spending one hour at a park would have a very different spending pattern than one visitor for eight hours. Spending studies generally focus on spending within the region around a particular park or facility, so that the time spent at the particular park/facility is not as relevant as time spent in the region.

Operationally, the "party" is generally defined as all persons arriving in the same vehicle or staying together in the same room or campsite. A "trip" encompasses the time from when the party leaves their permanent home or in some cases some other temporary residence (seasonal home) until the time they return or otherwise terminate the given trip. In estimating impacts on a particular region, spending should be measured from when the visitor enters the region to when they leave, being careful to also include any pre-paid expenses that accrue to businesses in the region.

LOCAL VISITORS. In order to identify regional flows of dollars, it is important to separate residents of the designated region from non-residents (tourists or visitors). In a strict economic impact analysis, only non-resident spending in an area would be treated as "new dollars" to the region. The spending by local residents may not represent new spending if it otherwise would be spent somewhere else in the community. Separating local residents from tourists to the area can also be argued based on significant differences in their patterns of use and spending in the area. We also find that local users are frequently a significant source of bias in spending surveys due to typically lower response rates to spending surveys, errors in how locals are counted in visitation statistics, and sometimes arbitrary decisions about which spending is reported as "trip" spending. Seasonal residents must be handled carefully when distinguishing local visitors from non-residents of the area. In a general regional tourism analysis, seasonal residents will generally be an important tourist segment, while a study of visitors to a particular park may better treat seasonals like local residents. Both local visitors and seasonal residents are best handled by treating them as separate market segments that can then be included or omitted in the analysis, as the situation and problem dictates

Segmentation Strategies

There are a number of reasons why spending should be estimated for distinct subgroups of visitors (market segments). Individual segments are more clearly tied to particular management or marketing strategies. Disaggregating visitors into segments also makes it easier to track changes in spending that frequently are tied to a changing mix of visitors (e.g. day users vs overnight visitors). Spending profiles for narrowly defined segments are more easily validated (e.g., the average per day lodging expense for visitors in motels should be close to an average room rate for the area) and more readily generalized from one area to another. Also, segmenting visitors into groups with similar spending patterns can yield much more efficient sampling designs as sample sizes can be apportioned to obtain larger samples from sub-groups with higher spending (and hence higher variance). In many situations, a small percentage of visitors may account for the majority of spending. In these cases, simple random samples of visitors will yield inadequate samples to characterize the most important segments.

Segments can be defined in several distinct ways, but the important criteria are that the segments separate visitors with distinct spending patterns, are meaningful for marketing and management, and are hopefully identifiable from the available visitation statistics. We have found the following segmentations are most useful (Stynes and Propst 1992):

a) local residents vs visitors from outside the designated region,
b) overnight visitors vs day users, and
c) segments defined by the type of lodging (camping, motel, seasonal home, staying with a friend or
    relative).

Combining all three criteria, generally yields about five or six segments:

Local day users
Day users from outside the local area
Overnight visitors in campgrounds
Overnight visitors in motels, cabins, condos, B&B';s etc.
Overnight visitors in seasonal homes

If there are not many local residents staying overnight in campgrounds or motels, they can be lumped with nonresidents. Otherwise they can be included as a distinct segment. Visitors staying with friends and relatives in the area can also be added as a separate segment, if desired.

Visitors can also be segmented by type of transportation if significant numbers use other than private automobiles or recreation vehicles. For example, visitors arriving by air will have spending patterns quite different from auto travelers. After accounting for these key segmentation variables, one may further segment by recreation activity subgroups (e.g. boaters, anglers, hunters, downhill skiers, sightseers...), or socioeconomic groups. To carry through a segmented analysis; however, it must be possible to divide total use into the segments for which spending is estimated.

In a segmented analysis, total spending is estimated using the following basic formula:

$$S_j = N * \sum_{i=1}^{m} M_i * s_{ij} \quad (1)$$

where
S_j = total spending within the designated region in spending category j, j = 1,...J
N = total number of visitors
m = number of segments
M_i = segment i's share of total visits, I = 1,...m.
and s_{ij} = average spending of a member of segment i on spending category j
        (the s_{ij} vector is called a "spending profile" for the segment).

Equation (1) identifies the three key pieces of information to estimate spending:

1. **Total use/visitors affected (N)** - use information must come from good visitation records, a use prediction/demand model, or good judgment.

2. **Segment shares (M_i)**- as part of the use estimation procedures, visitors must be divided into different subgroups or segments. Registration records or a survey might identify origin of visitors by zipcode or county. Surveys or hotel/motel counts might identify the proportion of visitors staying overnight in the area. More detailed segment shares can be estimated in general visitor surveys. If evaluating a change in use, one must estimate the change in the number of visitors within each segment.

3. **Spending profiles by segment (s_{ij})**. Spending profiles must generally be estimated in surveys of visitors. By including the variables in the survey that define key segments, distinct spending profiles can be readily generated for each segment, given adequate sub-sample sizes. If use and segment share data are available for a given application, one can sometimes apply segment spending profiles that have been estimated for a similar site or region.

Errors in Visitor Spending Surveys

All of the usual sources of error in surveys must be considered when estimating spending via surveys. Accurate estimates of spending averages from sample surveys require reliable and valid measurements from a representative sample of the population. There are four general sources of errors in spending surveys:

1. Measurement error
2. Errors due to non-representative samples resulting from
      non-response bias
      biased sampling procedures
3. Sampling errors
4. Analysis and reporting errors

Measurement Error
Measurement error is the difference between the spending reported by subjects on the survey instrument and what they actually spent. Wording of spending questions as well as the survey format (diary Vs recall) and sequencing of questions can all influence the reliability and validity of the spending data gathered in surveys. The accuracy of spending data rests on a common understanding between the subject and researcher as to what spending should be reported and the subject's ability to accurately recall their spending and follow the survey instructions to record it .
The most common sources of measurement error in spending studies are recall and telescoping errors. Recall errors can be reduced by surveying subjects very close to when the spending takes place (typically when leaving the area or immediately after the trip) and having clear spending categories that help the respondent recall different expenses. Too many spending categories becomes cumbersome and may lead to double reporting for overlapping categories. Too few categories may cause the subject to omit spending on items that do not fit a given category. I find 6-12 spending categories is usually adequate. Spending categories should always be exhaustive and mutually exclusive .
Telescoping errors occur when the subject reports expenses that are not supposed to be included. For example, reporting expenses outside the study region, beyond the time frame defined, or even for a different trip. There are tradeoffs between different types of errors across the different survey approaches. For example, asking subjects to only report expenses in the previous 24 hours will reduce recall errors but generally increases telescoping errors. A difficult choice is whether to ask for expenses only for the respondent or for the entire party or perhaps a "spending unit". I generally favor obtaining expenses for the entire party, as this is usually the sampling unit. Generally one of the "heads" of the party pays for the majority of expenses on a trip and can estimate or ask for

expenses of other party members as needed. Obtaining expenses paid by an individual requires careful sampling within parties (particularly handling of children) and is more likely to lead to telescoping and double-reporting problems as different members of the party claim the same expenses.

We have generally measured spending by the entire party for the entire trip, while within the study region. It is sometimes useful to include a column for spending outside the region so that all expenses on the trip may be reported. This reduces a tendency to report the full trip expenses as occuring within the local region.

In designing the spending question one should try to specify the four standard "newspaper" questions:

What - What spending should be recorded?-- generally all spending in the study region during the trip.
Who - Whose spending? -- generally anyone in the party.
When? - Usually all spending from arrival in the area to departure (including pre-paid expenses and credit-card purchases).
Where? - All spending within the designated study region.

Errors Due to Unrepresentative Samples

To estimate the average spending for a particular population of visitors it is essential to have a sample that is representative of the population. Errors due to unrepresentative samples are very common, yet often difficult to detect if the study does not carefully define the study population, describe the sample and demonstrate that the sample is representative of this population. Any survey should begin with a clear definition of the study population. The sampling procedures should be designed to yield a representative sample of this population.

An important indicator of several common biases in survey samples is when the unit of analysis for spending computations is not the same as the survey sampling unit. When these are not the same, weighting procedures are generally called for to avoid a bias in sample. For example, if sampling parties camped at a given area by randomly choosing occupied sites (here the sampling unit = the party night), but estimating spending on a party trip basis (survey gathers all spending during the stay in the area), there will be a length of stay bias in the estimates unless cases are weighted inversely proportional to their length of stay. Those staying longer in the area will have a greater chance of being sampled and will also tend to have higher spending.

Non-representative samples can also result from different response rates among visitor subgroups that vary in their spending patterns. Local visitors and those not spending money tend to have much lower response rates to spending surveys, which will bias spending estimates upward if not corrected.

Segmented approaches can help reduce sampling biases. For example, it is easier to obtain a representative sample of campers or of visitors in motels than a representative sample of all visitors to an area. Campers may be sampled systematically in campgrounds and motel users in motels. One of the most common sources of bias in spending averages from surveys is an unrepresentative mix of visitor types (e.g. a higher percentage of overnight visitors in the sample than in the population). If the sampling procedures can obtain representative samples within each type, the appropriate mix of visitors can sometimes be estimated from other sources. We commonly employ a short on-site exit interview to determine the percentage of local visitors and the percentages of visitors staying in motels or campgrounds in the area. Selected subjects within each segment are then asked to complete a mailback spending survey. Biases in the mail sample due to differential sampling or response rates may be adjusted for using the on-site sample, which generally has a high completion rate. This procedure also permits the mailback procedure to over-sample groups that are more important or have larger variances in their spending.

Sampling errors.
 Like any sample survey, confidence intervals can and should be reported for spending estimates. These confidence intervals or sampling errors only capture the likelihood of obtaining a somewhat unrepresentative sample due to chance. They do not capture sampling bias, non-response bias or the other sources of error noted above. Sampling error is largely a function of sample size and the amount of variance in spending within the study population. Spending data tends to have very high variances, requiring fairly large sample sizes to obtain sampling errors less than 10% of the mean. Breaking visitors into segments with similar spending patterns significantly reduces the variance and permits more samples to be taken from those segments with higher variances.

Analysis Errors
 Many additional errors can occur during data entry and analysis of spending data. The reporting of data handling and spending information in recreation and tourism surveys is generally inadequate to assess the presence or magnitude of most of these kinds of errors. Spending questionnaires are often not fully completed. Results can

vary significantly depending on how blanks are handled. Should cases with blanks or missing values in the spending questions be discarded or treated as zeros?

Spending distributions are typically not very normal. Frequently they include a spike of observations at zero (visitors that spent nothing) and the nonzero values are skewed by a few large values that tend to distort the mean. These outliers are sometimes legitimate values and sometimes not. A careful examination of outliers should precede any analysis of spending data. Graphs of the spending distribution and reports of the variances can be quite helpful in interpreting the "averages".

Sampling Issues

For a segmented analysis, visitors surveys should be stratified by segment. The most efficient sampling design for estimating spending will apportion sample sizes across segments according to the expected variation in spending within each segment. There is, however, a tradeoff here if the same survey is used to estimate the proportion of visitors falling within each segment. Simple random samples are often needed to estimate segment shares, while disproportionate sampling across segments is often called for to efficiently estimate spending. A common situation is large numbers of visitors with low spending (local visitors and day users) and small numbers of visitors with relatively large spending. In this case, a simple random sample yields very good estimates of day user and local spending, but doesn't contain enough overnight visitors to adequately estimate their spending. If one targets overnight visitors for example, by sampling in motels and campgrounds, one can gather larger samples of the higher spending segments, but there may be no way to estimate the proportion these segments are of all visitors.

The solution is usually to employ distinct sampling designs to estimate average spending vs the proportion of visitors from each segment. If segment shares can be estimated from secondary sources, then the spending survey can be designed just to estimate spending profiles for each segment. If segment shares are not known, one can use a simple random sample to estimate segment shares and after screening for segment, gather spending information only from a sub-sample of each segment according to a quota system. Often distinct sampling frames may be used to more efficiently sample particular segments -e.g., sample overnight segments at their lodging (motel, campgrounds), boaters at a boat launch or marina, etc.

Visitor spending tends to have high variance if visitors are not segmented into more homogeneous subgroups. Unsegmented analyses therefore require large samples to assure reasonable confidence intervals around the spending averages. Difficulties in obtaining representative samples of tourists (e.g. typically lower response rates of locals and low spenders and often a length of stay bias when sampling on site) also argue for a segmented approach. Segments should be formed to group visitors with similar spending patterns, thus reducing the variance in spending averages and necessary sample size for individual segments. With narrowly defined segments, samples of 50-100 subjects per segment are often quite adequate (sampling errors of ten percent or less) to estimate spending.

SAMPLE QUESTIONNAIRE FOR ESTIMATING VISITOR SPENDING ON TRIPS

Please report all spending by you and other members of your party within 30 miles of this destination (See map). Include all spending for goods and services during your stay in the local area including pre-paid hotel deposits, and all other payments whether by cash, credit card, or check. Enter spending to the nearest dollar in each category below. Enter 0 (zero) if you did not spend any money in a particular category.

Spending category	*Spending in local area* by your party
Lodging	
Hotels, motels, cabins, B&B	_____
Campground fees	_____
Food and Beverages	
Restaurants and bars	_____
Groceries	_____
Transportation	
Gas and oil (auto, RV, boat, etc)	_____
Other auto expenses (repairs, parking, tolls, etc.)	_____
Airfares, Rail, Bus, Taxi, Car rental…	_____
Other Expenses	
Recreation and Entertainment fees	_____
Sporting goods	_____
Clothing	_____
Other goods (film, books, …)	_____
Other services (hair cuts, etc.)	_____

Some Tips and Variations on the Questionnaire Format and Survey Approach

1. Spending categories may be expanded or collapsed to suit the particular study. For example airfares, public transportation, car rentals, etc. should be listed as separate items if substantial numbers of visitors arrive by means other than their own automobiles and campers. A category for locally made arts, crafts, and agricultural products can be included to better capture local production. Appropriate spending categories may be added for studies of special activity groups such as boaters, downhill skiers, anglers, or hunters. One should have distinct categories for the major spending items and should separate items that will be assigned to distinct economic sectors, e.g. restaurant spending vs. groceries, and purchases of goods vs. services. More categories improve respondent recall, although too many becomes burdensome.

2. Separate columns may be added to obtain en route spending or at home spending. If separate analyses are planned for distinct regions, columns for specific locations can be included, although visitors often have difficulty identifying specific places where money was spent. Adding a second column for spending outside vs. inside the local region can sometimes avoid mis-reporting of spending outside the region of interest and give respondents a place to report all of their trip spending.

3. The local region should be defined to fit the region of interest, although compromises may be necessary to assure that respondents understand the definition of the region. For use with other economic data, the region should roughly coincide with one or more counties. Either a map or a "30 mile radius" type definition will usually work. We prefer the latter as visitors sometimes have difficulty interpreting a map.

4. The suggested format works best with on-site exit interviews and/or mailback surveys that are completed upon departure, shortly after leaving the area or after returning home. These approaches are best for obtaining a representative sample of trips, measuring all spending in the destination area, and minimizing recall errors.

    - Diary methods require that subjects be contacted upon arrival in the area and the instrument must be put into a diary format. There are numerous problems with implementing diary approaches, which explains why they are rarely used even though they appear to be an excellent way to obtain accurate spending information. The problem is that respondents do not typically record expenditures as they make them and the extra effort required to keep a diary tends to lower response rates.
    - Telephone surveys are usually not the best vehicle for gathering spending data. Phone surveys usually request data for the most recent trip. There will be greater recall errors as respondents are asked to remember spending for trips taken weeks or months before. An equally serious problem with such surveys is the tendency to report the longest or most significant trip instead of the most recent one. It is also difficult to itemize spending in categories over the phone without a list of categories in front of the respondent. A compromise is to deliver spending survey forms to households in advance and then use telephone interviews for subjects to report their responses off of the written form.
    - Another approach in on-site surveys is to ask for spending over the previous 24 hour period. This can reduce recall errors, but tends to introduce telescoping errors (reporting spending beyond 24 hours). One must also be careful to obtain a random sample of days within trips when using the 24 hour recall approach.

5. Some have attempted to measure spending of individuals rather than the entire party. If there are multiple spending units within the party, separate surveys may be completed by each group. Per person spending averages are somewhat problematic as it isn't always clear how children are handled. A party of four adults, two couples, or a couple with two children would have somewhat distinct spending patterns. Generally, if one samples visitor parties, compiling spending of all party members on a single survey seems to be the most straightforward approach. This works best for parties with a single head of the party or at least survey formats that allow party members to consult with one another in completing the questionnaire.

6. The types of spending to include in a spending survey depend on the intended uses of the results. In some cases, one may only be interested in certain categories of spending or be more interested in the type of business where the good was bought (gas station, grocery store or souvenir shop) vs. the commodity that was purchased. If spending figures are to be used in an economic impact analysis, then normally any purchase that would not otherwise have occurred in the destination region should be included. This would include major vehicle repairs or purchase of a new TV set. Anything a visitor from outside the region buys is normally considered "new money" to the region, while most purchases made by local residents are not included, as this money would likely have been spent in the region on something else. If one simply wants to document all spending associated with a given activity, then spending by locals can be included. We call this a significance analysis as contrasted with a strict impact analysis. Spending by local residents in the local area should normally be excluded when estimating economic impacts of tourism. The best way to do this is to identify locals as a separate visitor segment. Local visitor spending that would otherwise have occurred outside the region should be included (this is called import substitution). For example, if local visitors would go outside the region for recreation, if a given facility were closed, the associated spending would be included in assessing local impacts of such a closure.

7. Durable goods purchases pose some unique problems. Most tourism impact studies do not include tourist purchases of large durables, such as boats, recreation vehicles, and seasonal homes. These purchases are generally not associated with a particular trip, but are used on many trips. It is therefore difficult to attribute the purchase of a boat or RV to a particular visit or to opportunities provided by a particular agency or business. One can examine economic activity associated with durables in a comprehensive national study of the impacts of camping or boating, but should normally ignore durables in evaluating impacts of trips to particular destinations. In a strict economic impact analysis, one would include a purchase of a major durable item by a visitor, if that purchase would not otherwise have occurred in the region. However, most durables are purchased at home rather than at destinations, and even if purchased on a trip away from home, the durable was likely manufactured elsewhere, so that only the retail margin would accrue to the area where the durable good was bought. Some have attempted to include durables in local economic impact studies by assigning a share of the cost of the item to a particular trip or by applying a depreciation formula. These procedures are not appropriate for an economic impact analysis as they do not capture actual flows of money into a region.

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