BLM Economic Analyses Briefing Paper
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Executive Summary:
Recent critiques and scoping letters identify the need for credible economic analyses including 1) rigorous and objective economic analysis; 2) hard look at economic impacts; and 3) compliance with BLM's internal guidelines for socioeconomic analysis. Comments recommend that the analysis should:

- *Include analysis, graphs, and discussion of historic personal income trends—including non-labor sources of income.*
- *Address the indirect role public lands play in attracting knowledge-based businesses, service sector business, recreation and tourism business, and other entrepreneurs.*
- *Account for the economic importance of recreation, hunting, and fishing on public land.*
- *Consider the growing role of entrepreneurial businesses attracted by environmental amenities on public lands and assess the impacts of each alternative on those businesses.*
- *Address the economic importance of protecting public wildlands from resource extraction.*
- *Be based on estimates of economically recoverable resources, rather than technically recoverable resources. Specifically, the Reasonably Foreseeable Development (RFD) scenario should be based on economically recoverable amounts of oil and gas to avoid over estimating development potential and subsequent economic impacts.*
- *Reflect an accurate and realistic projection of jobs and income associated with the oil and gas development proposal.*
- *Include accurate and realistic estimates of gross and net revenues, i.e. net tax revenue from oil and gas production. The analysis should include environmental and community costs from oil and gas development.*
- *Consider both market and non-market costs and benefits.*
- *Include costs to communities associated with boom and bust cycles of oil and gas development.*
- *Account for environmental costs of oil and gas development including funding and staffing to ensure environmental monitoring and enforcement.*
- *Account for budget constraints and fiscal realities associated with each alternative.*
- *Comply with BLM's guidelines for socioeconomic analysis, as well as the relevant external standards that emerge from NEPA case law.*
- *Not assume that BLM AUMs are only a marginal input into ranching operations, and that a proportional reduction in them will result in a proportional reduction in the aggregate grazing economy.*

A preliminary BLM response to each issue is summarized below.

Background:

Three comprehensive critiques of BLM economic analyses of RMP/EISs have emerged since 2006. These include *Socio-Economic Framework for Public Land Management Planning: Indicators For the West's Economy*, The Wilderness Society, March 2006; *The Economic & Social Impacts of Oil and Gas Development*, The Wilderness Society, June 2006; and *Review of the Socioeconomic Analysis in the Draft Environmental Impact Statement prepared by the USDI-Bureau of Land Management Richfield Field Office*, Daniels, Burr, Gale, Godfrey, Keith, Krannich, and Reiter, Utah State University, October, 2006. These critiques identify the need for credible economic analyses, discuss economic analyses-related issues, recognize the importance of credible data, recommend techniques or methodologies for economic analyses, and assess indicators of economic impacts. The Wildness Society (TWS) intends to submit the *Socio-Economic Framework for Public Land Management Planning* as scoping comments for all upcoming BLM RMPs and *The Economic & Social Impacts of Oil and Gas Development* as scoping comments for all RMPs where oil and gas development is an issue (personal conversation, Michelle Haefele, TWS, 5/10/2007). BLM and FS economists met to assess how best to respond to the TWS critiques on May 9-10, 2007. Economists from TWS (Michelle Haefele, Ph.D., Mike Miller) and Colorado State University (Steve Davies, Ph.D., John Loomis, Ph.D.) joined the meeting on May 10.

Need for Credible Economic Analyses:

The three critiques identify similar needs for credible economic analyses. Relevant standards for reviewing the adequacy of economic analyses include 1) CEQ's requirement for rigorous and objective analysis, 2) the hard look doctrine that has emerged from case law related to the Administrative Procedures Act (APA), and 3) BLM's internal guidelines for socioeconomic analysis. Simply stated, the economic analyses should reflect professional integrity, including scientific integrity (40 CFR 1502.24).

Economic Analyses Issues, Recommendations for Analyses, and the possible response:

Summarized in italic below are the economic issues, recommendations for analyses, and observations and positions concerning each issue and recommendation. Following each issue is a BLM response.

1. *The socio-economic analysis should include analysis, graphs, and discussion of historic personal income trends—including non-labor sources of income (TWS, March 2006, TWS, June 2006).* Response: IMPLAN[1] allows the economist to

[1] **IMPLAN:** The IMPLAN Model is the most flexible, detailed and widely used input-output impact model system in the U.S. It provides users with the ability to define industries, economic relationships and projects to be analyzed. It can be customized for any county, region or state, and used to assess "multiplier effects" caused by increasing or decreasing spending in various parts of the economy. This can be used to

analyze income effects including labor and non-labor income (employee compensation, proprietor income, and other property income) for each alternative. See IMPLAN Study Area Report (Output, Value Added, and Employment). The Economic Profile System (EPS)[2] summarizes trends in personal income, proprietor income, non-labor income, and transfer payments that can be used to understand the context of income impacts. See pages 8-11 for a summary of long-term trends, importance of proprietors, wages and salaries vs. proprietors, proprietors' share of total income, non-labor share of total income, labor vs. non-labor income, components of transfer payments, trends in non-labor income by type, and components of transfer payments. While EPS is not a tool for impact analysis, it is useful for chapter 3 description of the affected environment to help provide context for impacts. General guidance concerning use of these methods is provided in BLM Course No. 1610-12, Social and Economic Aspects of Planning and FS/BLM Course No. 1610-11, Economic Impact Analysis for Planning and NEPA Applications. Based on analysis, it may appropriate to include graphs, discussion, and analysis in the AMS, Chapter 3 Affected Environment, and Chapter 4 Environmental Consequences.

2. *The analysis should address the indirect role public lands play in attracting knowledge-based businesses, service sector business, recreation and tourism business, and other entrepreneurs (TWS, March 2006).* Response: IMPLAN allows the economist to analyze employment and income effects for each of the 509 economic sectors for each alternative. See IMPLAN Study Area Report (Output, Value Added, and Employment). Services and professional sectors can be aggregated to show impacts by alternative. The Economic Profile System (EPS) summarizes long-term trends in employment and income by aggregated sector including professional and technical services. See pages 28-29. General guidance concerning use of these methods is provided in BLM Course No. 1610-12, Social and Economic Aspects of Planning and FS/BLM Course No. 1610-11, Economic Impact Analysis for Planning and NEPA Applications. Hedonic Pricing[3] analysis may also be an appropriate analysis for this issue. *Hedonic*

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assess the economic impacts of resource management decisions, facilities, industries, or changes in their level of activity in a given area.

The Forest Service in the mid-70s developed IMPLAN (IMpact analysis for PLANning) for community impact analysis. The current IMPLAN input-output database and model is maintained and sold by MIG, Inc. (Minnesota IMPLAN Group). Over 1,500 clients across the country use the IMPLAN model, making the results acceptable in inter-agency analysis. Typical applications of regional economic analyses are:

- Affected environment analysis
- Community diversity and dependency analysis
- Land use planning
- Strategic planning
- Policy analysis

[2] EPS: EPS draws upon a variety of federal databases to produce thorough and multi-faceted profiles of economic and demographic change over the past 30 years.

[3] **Hedonic Pricing Method** estimates economic values for ecosystem or environmental services that directly affect market prices of some other good. This is most commonly applied to variations in housing

Pricing Method estimates economic values for ecosystem or environmental services that directly affect market prices of some other good. This is most commonly applied to variations in housing prices that reflect the value of local environmental attributes.

3. *The analysis must account for the economic importance of recreation, hunting, and fishing on public land (TWS, March 2006, TWS, June 2006).* Response: Since unique economic sectors do not exist for tourism, recreation, hunting, and fishing, it is difficult to assess economic impacts from these uses with IMPLAN alone. However, use of Forest Economic Analysis Spreadsheet Tool (FEAST)[4] and IMPLAN together for each alternative allows economists to assess the economic impacts of resource management decisions that would affect these land uses. For economists to conduct a meaningful analysis appropriate resource data concerning the level and type of tourism, recreation, hunting, and fishing must be available from the resource specialist for each alternative. Without these anticipated use levels, there is no basis for an economic impact analysis. General guidance concerning use of IMPLAN and FEAST is provided in FS/BLM Course No. 1610-11, Economic Impact Analysis for Planning and NEPA Applications.
4. *Consider the growing role of entrepreneurial businesses attracted by environmental amenities on public lands and assess the impacts of each alternative on those businesses (TWS, March 2006).* Response: IMPLAN allows the economist to analyze proprietor income by sector and total proprietor income for each alternative. See IMPLAN Study Area Report (Output, Value Added, and Employment). The Economic Profile System (EPS) summarizes trends in proprietor income and number of proprietors that can be used to understand the context of impacts to proprietors. See EPS pages 8-9 for a summary of the importance of proprietors, wages and salaries vs. proprietors, and proprietors' share of total income. EPS also summarizes information about firms. This includes trends for firms by industry and firms by size (pages 16-18). While EPS is not a tool for impact analysis, it is useful for chapter 3 description of the affected environment to help provide context for impacts. In some cases it may help determine if environmental amenities on public lands is an issue as it relates to entrepreneurial businesses and attracting people and businesses. General guidance concerning use of these methods is provided in BLM Course No. 1610-12, Social and Economic Aspects of Planning and FS/BLM Course No. 1610-11,

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prices that reflect the value of local environmental attributes. It can be used to estimate economic benefits or costs associated with environmental quality and environmental amenities such as aesthetic views or proximity to recreational sites.

[4] **FEAST** is a modeling tool used to assist in the development of economic impacts. FEAST was designed to streamline data entry and preparation for the generation of economic impact tables that can be used in resource management planning and EISs. The goal for FEAST model is to assist both economists and planning specialists in completing economic impact analyses. FEAST uses a Microsoft Excel workbook as the interface between user inputs and data from an existing IMPLAN model. Individual worksheets contain the formulas that drive the FEAST model while visual basic for applications was used to create the FEAST menu bar and the macros (visual basic procedures and functions) that make FEAST operational.

Economic Impact Analysis for Planning and NEPA Applications. Hedonic Pricing analysis may also an appropriate analysis for this issue.

5. *Address the economic importance of protecting public wildlands from resource extraction (TWS, March 2006).* Response: This may be an issue that is appropriate to consider when developing alternatives, assessing the affected environment, and conducting economic impact analysis. The key to this issue is whether the kind, amount, and nature of land uses would change among the alternatives enough to cause demographic, economic, and social impacts. The BLM's reasonably foreseeable development (RFD) scenario and similar sets of assumptions for other resources and programs form the basis for the impact analysis. These data are used in the resource data entry form of FEAST and display impacts from IMPLAN in terms of employment, income, and contributions to the local economy. These impacts would be considered in terms of how they may affect population, age and gender, income distribution and housing, firms, commuting, economic stability, etc. EPS would provide the context to these secondary impacts. General guidance concerning use of these methods is provided in BLM Course No. 1610-12, Social and Economic Aspects of Planning and FS/BLM Course No. 1610-11, Economic Impact Analysis for Planning and NEPA Applications. Productivity Analysis[5] may also be an appropriate analysis method for this issue.
6. *Data sources were discussed (TWS, March 2006).* These include economic and demographic data, recreation data, data gaps and other issues. Response: No response necessary.
7. *Analyses of impacts from oil and gas development must be based on estimates of economically recoverable resources, rather than technically recoverable resources. Specifically, the Reasonably Foreseeable Development (RFD) scenario should be based on economically recoverable amounts of oil and gas to avoid over estimating development potential and subsequent economic impacts (TWS, June 2006).* Response: The RFD is the set of assumptions upon which the impact analysis is based. For meaningful economic analysis, the RFD should estimate economically recoverable reserves and address for each alternative the pace of development. This means the RFD should include the following estimates regarding total activity within the planning area and activity related to federal minerals: total number of wells drilled per year, total number of producing wells per year, average drilling costs, levels of production per year, acres leased per year, and commodity prices. General guidance concerning purpose, content, and use of RFD is available in the Interagency Reference Guide concerning Reasonably Foreseeable Development Scenarios and Cumulative Effects Analysis for Oil and Gas Activities on Federal Lands in the Greater Rocky Mountain Region, 2003.

[5] Productivity Methods, also referred to as net factor income or derived value method, estimates the economic value of ecosystem products or services that contribute to the production of commercially marketed goods. It is applied in cases where the products or services of an ecosystem are used, along with other inputs, to produce a marketed good. If a natural resource is a factor of production, then changes in the quality or quantity of the resource will change production costs, and/or productivity of other inputs. This in turn may affect price or quantity supplied of the final good. It may also affect the economic returns of inputs.

8. *The plan must reflect an accurate and realistic projection of jobs and income associated with the oil and gas development proposal. Don't rely exclusively on IMPLAN and other models based on economic base theory. Use EPS to provide a trend analysis of regional jobs and employment. (TWS, June 2006).* Response: IMPLAN is a valuable tool to help assess local economic impacts of each alternative. IMPLAN is commonly used to determine market activity associated with a change in final demand brought about by public land management decisions. IMPLAN is especially useful when combined with FEAST to predict economic impacts such as jobs and income from resource management decisions such as decisions concerning oil and gas development. However, it is critical that IMPLAN is based on reasonable and appropriate assumptions and is used correctly. It is also important that the IMPLAN user is knowledgeable and experienced in its use. It may also be appropriate to calibrate the model to more accurately reflect current local economic activities and conditions. Although IMPLAN is a static model, the operator can run the model as many times as necessary with changes in input to account for changing conditions to reflect changes among alternatives. In this way the analysis becomes more dynamic by using multiple runs based on varying inputs to reflect changing conditions. By comparison, EPS is a useful tool to provide trend analyses of local demographic, economic, and social conditions. These data are most valuable for describing the affected environment and providing context for impacts. EPS is of limited use for predicting impacts from resource management decisions. General guidance concerning use of these methods is provided in BLM Course No. 1610-12, Social and Economic Aspects of Planning and FS/BLM Course No.1610-11 Economic Impact Analysis for Planning and NEPA Applications.
9. *The analysis must include accurate and realistic estimates of gross and net revenues, i.e. net tax revenue from oil and gas production. The analysis should include environmental and community costs from oil and gas development (TWS, June 2006).* Response: Information concerning federal, state, and local tax laws and revenues should be gathered from BLM, state, county, and local sources. Total gross and net government revenues anticipated from each alternative would be based on tax laws and critical assumptions for each alternative such as estimated number of leased acres, estimated number of drilled and produced wells, estimated commodity prices, estimated levels of production, and number of employees during the exploration, development, and production stages of oil and gas operations. The analysis must also address the local community's ability to respond to changing needs for public services such as schools, medical care, garbage collection, municipal landfills, housing, and other infrastructure needs.
10. *The analysis should consider both market and non-market costs and benefits (TWS, June 2006).* Response: As mentioned above, the key to this issue is whether the kind, amount, and nature of land uses would change among the alternatives enough to cause demographic, economic, and social impacts. If so, several analytical methods are available to assess non-market costs and benefits associated with resource management issues raised during scoping. The *Productivity Method* estimates economic values for ecosystem products or services that contribute to the production of commercially marketed goods.

Hedonic Pricing Method estimates economic values for ecosystem or environmental services that directly affect market prices of some other good. This is most commonly applied to variations in housing prices that reflect the value of local environmental attributes. *Travel Cost Method* estimates economic values associated with ecosystems or sites that are used for recreation. It assumes that the value of a site is reflected in how much people are willing to pay to travel to visit the site. *Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods* estimate economic value based on costs of avoided damages resulting from lost ecosystem services, costs of replacing ecosystem services, or costs of providing substitute services. *Contingent Valuation Method* estimates the economic values for virtually any ecosystem or environmental service. It is the most widely used method for estimating non-use or "passive use" values. People state their willingness to pay for specific values/management based on a hypothetical scenario. *The Contingent Choice Method* estimates economic values for ecosystems or environmental services by asking people to make tradeoffs among sets of ecosystems or environmental services or characteristics. It does not ask for willingness to pay—this is inferred from the tradeoffs that include cost of an attribute. *Benefit Transfer Method* estimates economic values by transferring existing benefit estimates from studies already completed for another location or issue.

11. *The analysis should include costs to communities associated with boom and bust cycles of oil and gas development. The analysis should include effects on private landowners, increased costs to local governments, assess net benefits- not gross benefits, consider demand for public services and infrastructure needs, address economic instability, and plan for monitoring economic impacts when appropriate. (TWS, June 2006)* Response: Again, the key to this issue is whether the kind, amount, and nature of land uses would change among the alternatives enough to cause demographic, economic, and social impacts. If so, the underlying assumptions upon which the impact analysis is based could be developed during scoping and at the Economic Strategy Workshop. Additional information from resource specialists would also be used as a basis for impact analysis. *Hedonic Pricing Method* could be used to analyze variations in housing prices that reflect the changes in value of local environmental attributes as well as impacts from the boom and bust cycle such as the change in demand for public services and infrastructure needs. *Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods* could be used to estimate increased costs to local governments. FEAST/IMPLAN could be used to analyze economic stability.
12. *The analysis should account for environmental costs of oil and gas development including funding and staffing to ensure environmental monitoring and enforcement. Costs include water quantity and quality impacts, spacing and number of wells, pace of development, impacts on wildlife, pipelines, and roads (TWS, June 2006).* Response: Reasonable agency budget projections for each alternative are important to assess local economic impacts. Based on these budget projections, FEAST/IMPLAN can calculate the agency related contributions to the area economy in terms of employment and labor income (Tables F and G). *Hedonic Pricing Method* can be used to estimate economic values for ecosystem

or environmental services that directly affect market prices of some other good. *Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods* can be used to estimate economic value based on costs of impacts to water quality and quantity, wildlife habitat impacts,

13. *The analysis should account for budget constraints and fiscal realities associated with each alternative. Environmental mitigation costs, bonding requirements, and cost of enforcement must be estimated and considered (TWS, June 2006).* Here too, reasonable agency budget projections for each alternative are important to assess local economic impacts. Based on these budget projections, FEAST/IMPLAN can calculate the agency related contributions to the area economy in terms of employment and labor income (Tables F and G).
14. *Complying with the BLM's own guidelines for socioeconomic analysis, as well as the relevant external standards that emerge from NEPA case law, demand a thorough/data-driven approach. The standard of a "hard-look" and rigorous and objective analysis can only be attained if sufficient land use and resource information is available and used. The blend of NEPA and APA requirement is consistent with the predominant standards of judicial review of agency decisions. The key to judicial review is whether BLM use appropriate analytical techniques and data in their social and economic analysis. The benchmarks of rigorous and objective guide this review. If analytical techniques are well established, feasible, and broadly accessible, then their use would meet the broad test of rigorous. The use of data-driven techniques would be essential to meeting the test of objective analysis; without data, analysis cannot progress much beyond subjective speculation (Daniels, et al., 2006).* Response: Resource specialist data, financial data, and budget data that are necessary to run FEAST and IMPLAN should be identified at ID team meetings early in the RMP process. These data would be used to identify local economic impacts. Analytical methods to assess non-market costs and benefits, e.g. *Productivity Method, Hedonic Pricing Method, Travel Cost Method, Damage Cost Avoided, Replacement Cost, and Substitute Cost Methods, Contingent Valuation Method, Contingent Choice Method,* and *Benefit Transfer Method,* all have their own data requirements. All of these analytical methods are of little value without the appropriate essential data. These data would also need to be gathered early in the RMP process.
15. *The analysis of grazing economics should not assume that BLM AUMs are only a marginal input into ranching operations, and that a proportional reduction in them will result in a proportional reduction in the aggregate grazing economy (Daniels, et al., 2006).* Response: Permittees who experience changes in federal grazing privileges may restructure their existing operations by leasing other private pasture, feeding the livestock, reducing herd size, leasing their base property to other livestock producers, or running smaller numbers of other operator's livestock through a livestock control agreement. The effect on individual operators would be influenced by the changes in the operation and economic effects would vary among individual operators. Since grazing on BLM often provides a critical element of the livestock producer's matched complement of grazing, forage, and hay production; even a relatively small change in BLM

grazing use could have more than a proportional impact on the permittee's livestock operation.

The IMPLAN Site License and FOIA

- IMPLAN Software and IMPLAN Data: The IMPLAN county level economic datasets and IMPLAN Professional 2.0 software are commercial products available for purchase from the Minnesota IMPLAN Group (MIG, Inc., www.implan.com). The Inventory and Monitoring Institute (IMI), on behalf of the entire Forest Service, purchases an annual site license from MIG for the use of the IMPLAN software and datasets. The site license clearly states that both the data and software are copyrighted by MIG, Inc. and cannot be distributed to anyone outside of the Forest Service. A complete copy of the site license can be requested from the IMI (Susan Winter mailto:swinter@fs.fed.us) or from MIG, Inc. (mailto:info@implan.com). Any IMPLAN data from MIG and models derived from the data using MIG's software cannot therefore be released under FOIA requests. The data can be obtained from MIG and the models exactly replicated using MIG software.

- Forest Service data used in IMPLAN: The data used to *modify* or *replace* IMPLAN data, or information *added to* IMPLAN models is government data and subject to FOIA to the extent its use is not further restricted (e.g., by confidentiality laws). This suggests that changes to IMPLAN should be carefully documented (e.g., a "change file" should be created) so that government data obtained via FOIA could be used with purchased IMPLAN data/models to replicate the FS customized model.

- IMPLAN Reports: All reports generated by the IMPLAN software are copyrighted by MIG, Inc (see the upper left hand corner of any report) and MIG, Inc retains ownership of all information contained in those reports. Summary data are publishable in Agency reports, but the underlying data and models, including all reports, tables, and raw data are restricted from publication or dissemination as outlined in the database license agreement. The data in the IMPLAN reports are therefore clearly exempted from FOIA requests.

IMPLAN and your Planning Record

Background:

During the preparation of a forest plan revision, planning staffs are required to maintain a complete planning record. In the case of IMPLAN software and data, this requirement is superceded by the need to comply with copyright law and site license restrictions. The paragraphs below are designed to guide planning teams through determining what IMPLAN information developed during the planning process can become part of the planning record and what cannot.

IMPLAN:

IMPLAN is a system of software and databases produced by the Minnesota IMPLAN Group (MIG). Through an annual subscription, the USDA Forest Service (FS) holds a site license for the IMPLAN system. The FS uses IMPLAN to model and estimate the regional/local economic impacts of such things as forest plan revision alternatives, policy changes, and management decisions. Since the FS is using the software and data under site license, planners must be careful what information is publish in the Plan and contained in the planning record. Here are the basic rules;

- IMPLAN Software and IMPLAN Data: The IMPLAN county level economic datasets and IMPLAN Professional 2.0 software are commercial products available for purchase from the Minnesota IMPLAN Group (MIG, Inc., www.implan.com). The Inventory and Monitoring Institute (IMI), on behalf of the entire Forest Service, purchases an annual site license from MIG for the use of the IMPLAN software and datasets. The site license clearly states that both the data and software are copyrighted by MIG, Inc. and cannot be distributed to anyone outside of the Forest Service. Any original IMPLAN data from MIG and models derived from the data using MIG's software **cannot therefore be published in a Plan document or placed in the planning record**. If the public wishes to examine the details of how IMPLAN was used during the revision process, the planning record should contain sufficient detail that the interested parties can replicate the models exactly, using software and data purchased from MIG.

  Documents describing the Forest Service license agreement with MIG are available upon request by contacting:
  Susan Winter or Mike Niccolucci

- Forest Service data used in IMPLAN: The data used to *modify* or *replace* IMPLAN data, or information *added to* IMPLAN models is government data and **are publishable in Plan documents and the planning record**

to the extent its use is not further restricted (e.g., by confidentiality laws). This suggests that changes to IMPLAN should be carefully documented (e.g., a "change file" should be created) so that the public can use government data with purchased IMPLAN data/models to replicate the FS customized model.

- IMPLAN Reports: All reports generated by the IMPLAN software are copyrighted by MIG, Inc (see the upper left hand corner of any report) and MIG, Inc retains ownership of all information contained in those reports. Summarized data can be published in Agency reports, but the underlying data and models, including all reports, tables, and raw data are restricted from publication or dissemination as outlined in the database license agreement. All of the un-summarized data, including multipliers, printed in the IMPLAN reports are therefore clearly **not publishable in Plan documents and the planning record** and cannot be released to the public by the Forest Service.

THE WILDERNESS SOCIETY

ECOLOGY AND ECONOMICS
RESEARCH DEPARTMENT

THE ECONOMIC & SOCIAL IMPACTS OF OIL AND GAS DEVELOPMENT

June 2006

I. PURPOSE

This brief is submitted as part of the NEPA process for this public land oil and gas development proposal. It is intended to identify some of the socio-economic issues that must be analyzed as part of the NEPA process. We also offer methodologies to assist agencies responsible for analyzing the impacts of proposed land use decisions on communities and economies. These issues are particularly relevant in the Rocky Mountain West, where current land management priorities have shifted distinctly toward oil and gas extraction. For this reason our analyses and examples in his brief will center on the five states which have been the focus of the current oil and gas development: Colorado, Montana, New Mexico, Utah, and Wyoming.

In making land use decisions, federal agencies have an obligation under the National Environmental Policy Act (NEPA) to take a "hard look" at the environmental consequences of a proposed action, and the requisite analysis "must be appropriate to the action in question." This brief presents issues to be analyzed, and data and methods for use in the analysis of the impact of oil and gas development proposals on the social and economic health of Western communities. Federal agencies, the public and communities cannot evaluate the consequences of proposed decisions or determine how best to avoid or mitigate negative impacts without adequate data and analysis. Through the examination of the issues and potential costs described below, federal agencies can better fulfill their obligations to evaluate the direct, indirect, and cumulative impacts of oil and gas development on the communities adjacent to Western public lands.

II. INTRODUCTION

As an agency prepares a management plan or an Environmental Impact Statement for publicly owned lands, it must do a full and accurate accounting of the costs and benefits of each of the alternatives proposed, including both market and non-market values (Loomis, 1993). Historically, analyses by land management agencies of alternatives that emphasize resource extraction alternatives (oil and gas drilling, mining, timber) emphasized the benefits of extraction and ignored the costs. Failure to include all the costs of an oil and gas drilling proposal has two distorting influences on the decision making process. First, the alternatives that emphasize drilling appear more attractive than they actually are, and second, the opportunity costs of conservation-oriented alternatives will appear greater than they really are. Agency planners must provide a full accounting of the costs associated with extraction activities. Only when all the costs and benefits are fully accounted for can a truly informed assessment of the alternatives occur.

We have organized this paper to facilitate the identification of key issues related to oil and gas development on public lands, and the environmental, social, and economic impacts these decisions have on communities in the West. The first section discusses the need to examine economically recoverable resources, the need to correctly assess net benefits by accounting for all impacts and costs, and presents several potential impacts of oil and gas development that are either absent from, or incorrectly represented in, many federal agency oil and gas leasing analyses. We also provide examples of specific analyses or methods for improving the analysis. The next section presents our NEPA scoping comments which include specific costs and impacts that we feel must be analyzed in order to complete a thorough examination of land use plans. These analyses and

methods provide a necessary, but not sufficient, analysis of the impacts of oil and gas leasing on public lands and the adjacent communities. We formally request that the agency incorporate these analyses and methods into its planning for, and analysis of, land allocation decisions that lead to oil and gas leasing and drilling proposals and at the project level implementation phase.

III. CHARACTERIZING OIL AND GAS DEVELOPMENT POTENTIAL

A. Estimating the Economically Recoverable Volume of Oil and Gas

Technically recoverable oil and gas resources are the subset of the total resource base for which technology currently exists making extraction possible. This definition relies only on technological feasibility without regard to the cost of extraction or the prevailing prices. Economically recoverable oil and gas resources are the subset of technically recoverable resources that would be economic to produce.
Analyses of the benefits of oil and gas development must be made based on accurate and appropriate estimates of the resources that are economically recoverable.

As noted by LaTourrette, et al. (2002), economic constraints are, in most cases, the limiting factor on gas production in the Rocky Mountains, not environmental laws. The majority of undiscovered natural gas currently being proposed for exploitation in the Rocky Mountains are "unconventional" gases (continuous-type, tight sands gas, and coalbed methane). Economic recovery rates for unconventional oil and gas resources are lower than recovery rates for the conventional resources – reinforcing the need to base decisions on estimates of economically recoverable amounts of gas, not estimates of technically recoverable resources.

The Congressional Research Service (Corn, et al. 2001) and most, if not all, economists agree that the policy relevant opportunity cost of an environmental regulation is the economically recoverable amount of gas – not the technically recoverable amounts. It is inappropriate to base energy policy decisions solely on technically recoverable estimates. When economic criteria are considered, the estimates of oil and gas that are actually recoverable drop significantly from the initial estimates of technically recoverable resources (Attanasi 1998, LaTourrete et. al, 2002, 2003).

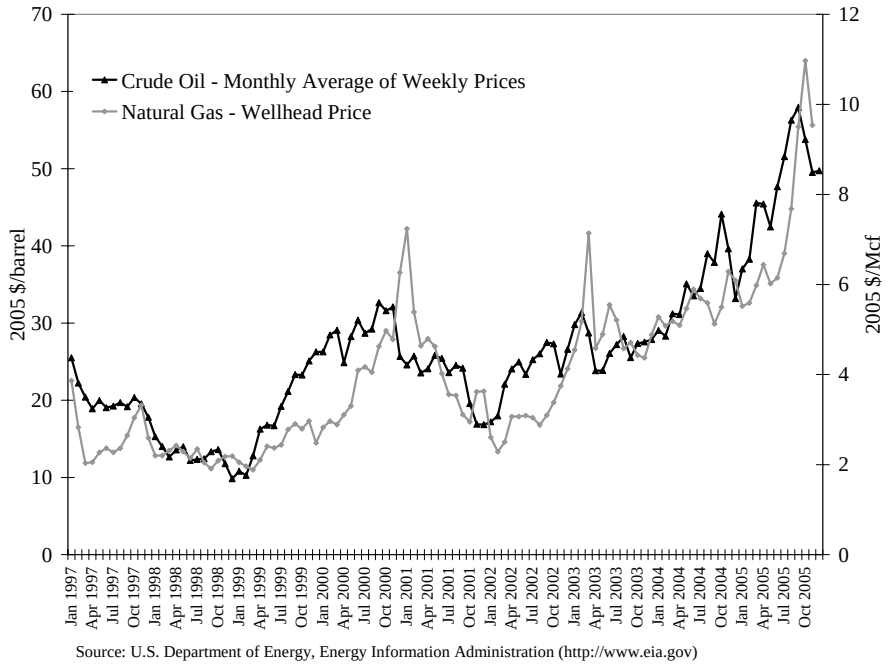
If economic factors are not considered, the opportunity costs of all forms of environmental protection will be overestimated. The agency will also likely overestimate the cost of lease stipulations, wilderness designation, and other protective measures if technically recoverable estimates are used. If the oil and/or gas are not economical to extract, there is no adverse impact on resource supplies from protecting wildlife, archeological sites, recreation sites and other public resources with leasing stipulations. Further, an EIS that relies on misleading economic information or fails to include all relevant costs in its economic analysis will violate NEPA, because it does not provide decision-makers and the public a valid realistic foundation on which to judge proposed projects.

Recent research by economists at The Wilderness Society indicates that the federal government's assessments of the oil and gas resources on public lands are flawed and consistently over-estimate the energy potential of these lands (Morton, et al. 2002, The Wilderness Society 2004a and b). The oil and gas industry also has a history of exaggerating the amount of gas recoverable and exaggerating the cost of protecting the environment. Rose (2001) states, "Since 1993, most oil companies have acknowledged that their geotechnical staffs persistently overestimate prospect reserves, commonly by about 30% to 80%." Rose goes on to say, "...over optimism is not limited to certain companies -- it appears to be a chronic industry shortcoming that has proved to be difficult to correct." The inherent upward bias in industry estimates of energy potential should eliminate them for use by public land agencies. Shanley et al. (2004), veterans of the oil and gas industry, reinforce this point for public land in the Rockies: "…it is likely that resource volumes are substantially overestimated, while the risks associated with finding and recovering those resources have most certainly been underestimated."

Exaggeration of the oil and gas resources by relying on technically recoverable estimates, distorts the analysis and increases risks to communities from false promises. For example, relying on estimates of technically recoverable resources will lead the agency to dramatically overestimate the number of new jobs that oil and gas drilling might create in a community. Basing decisions on technically recoverable estimates will exaggerate the potential tax revenues to the federal treasury, as well as state and local tax revenue. In addition, the potential spillover effects in the local economy from drilling will be exaggerated. Such exaggeration of the benefits of an oil and gas drilling project is an inappropriate distortion of the analysis of public land management alternatives and will lead to unrealistic expectations and possibly inappropriate support in local communities.

The agency should not rely exclusively on a deterministic, single value resource estimate due to the high risk and uncertainty with such estimates. According to Rose (2001), "Single-value estimates…predict an outcome that is possible, usually optimistic, and nearly always wrong." A better approach is to base estimates of gas and oil resources on a probabilistic range of values based on different levels of confidence. A probabilistic range of values more accurately portrays the risk and uncertainty inherent in industry estimates of undiscovered gas and oil resources. Reliance on a single value estimate does not comply with NEPA because it fails to use a range of values in order to fully consider the risk and uncertainty inherent in oil and gas estimates.

In addition to a range of probabilistic resource values, estimates of economically recoverable resources must be made based on a realistic range of prices in order to account for the uncertainty in forecasting future prices. Figure 1 shows historic prices for oil and gas in the U.S., and the potential volatility of these prices. To account for price uncertainty, USGS scientists use high and low price scenarios when estimating economically recoverable resources. We recommend a similar approach, including using USGS data for estimating undiscovered oil and gas resources



Source: U.S. Department of Energy, Energy Information Administration (http://www.eia.gov)

Figure 1. US Crude Oil and Natural Gas Prices

Many factors (flow rates, market price, drilling costs, etc.), not just environmental protection will influence whether resources are economic to produce, and economists make these assessments all the time. The price and costs assumptions used to estimate total production under each alternative must be critically examined

and made clear. To be specific, when estimating the amount of gas recoverable the price or price range that was assumed, and the costs of production that were assumed in the analysis must be spelled out. If a company cannot get the gas out of the ground at a cost less than the assumed wellhead price, then the opportunity costs of protecting the environment are zero. This is just basic economics. To comply with NEPA, all analyses of impacts must be based on estimates of economically recoverable resources.

Please review the RAND Corporation reports (LaTourette, et. al 2002, and 2003; Vidas et. al, 2003) detailing methods to estimate economically recoverable resources. We also request that the agency review Attanasi (1998) which describes methods used by the USGS to estimate economically recoverable resources for all the basins analyzed in the Energy Planning and Conservation Act's (EPCA) 2002 Assessment. It should be noted that the RAND analyses include some environmental cost, however, because they exclude non-market costs, USGS estimates are just the starting point to determine whether undiscovered gas is economically viable to extract. The RAND and USGS documents both demonstrate the feasibility of making estimates of economically recoverable resources and provide useful guidance on methodology.

NEPA requires a realistic assessment of economic impacts, and it is not realistic to assume that 100% of the technically recoverable oil and gas will ever be recovered The potential cost of protecting the environment and the possible benefits of drilling must all be based on estimates of economically recoverable resources. As the management plan and Reasonably Foreseeable Development scenario are developed, we formally request that they be based on economically recoverable amounts of oil and gas, not technically recoverable oil and gas.

B. Estimating the Employment and Income Benefits from Oil and Gas Development.

The IMPLAN model is an economic model often used by public land management agencies to project jobs and income from proposed actions. While the IMPLAN model can be useful as a tool to develop static analyses of the regional economy, the agency and local communities must be aware of the shortcomings and poor track record of the model as a predictive tool.

In general, models like IMPLAN are grounded in economic base theory, which makes the incorrect assumption that an economy is static (i.e. it does not change). IMPLAN models do not consider the impacts of many important variables that affect regional growth in many rural communities, especially in the West. Such as amenities as high quality hunting, fishing and recreational opportunities, open space, scenic beauty, clean air and clean water, a sense of community, and our overall high quality of life are not measured or accounted for in IMPLAN models. Many of these amenities are associated with attracting new migrants as well as retaining long-time residents.

Many residents of Western communities (both long-time and new) earn retirement and investment income. An analysis of economic trends will show that retirement and investment income is becoming increasingly important to rural economies of the West. A recent letter from 100 economists (Whitelaw, et al. 2003) reinforces the importance of non-labor income to the economy of the West. While it is technically possible, most IMPLAN models completely fail to consider the important economic role of retirement and investment in the economy of a community or region. A more accurate, dynamic, and complimentary approach requires planners to examine regional trends in jobs and income.

In a review of 23 studies that empirically tested the economic base hypothesis, Krikelas (1991) found only four that provided any evidence in support of economic base theory as a long run theory of economic growth -- a dismal track record. Despite dire predictions, history is replete with cases of communities and areas that lost their export base and continued as successful economies with their social capital intact. The local-serving sectors of the economy were the persistent ones, as new exports were substituted for the old. Tiebout (1956) recognized the shortcomings of the economic base theory when he wrote, "Without the ability to develop residentiary activities, the cost of development of export activities will be prohibitive." Krikelas (1992) concludes that economic base theory has severe limitations, especially for economic planning and policy

analysis. This is a conclusion that community leaders and land management officials and planners can no longer ignore, and one that should be incorporated into public land and community-level planning. As Haynes and Horne (1997) note:

> Where the economic base approach gets into trouble is when it is **used inappropriately as a tool for planning or predicting impacts** (emphasis added) of greater than one year in duration; a snapshot of current conditions tells little about the form a region's future economy may take.

Economists with both the Forest Service (Hoekstra, et. al 1990) and the Office of Technology Assessment (1992) concluded that while IMPLAN is useful for appraising the economic impacts of a management plan, the model is insufficient for evaluating the overall economic impacts for communities. And according to the OTA (1992), IMPLAN has an additional shortcoming for assessing community impacts: the economic data used to construct IMPLAN do not provide comparable details for all resource-based sectors of the economy. While economic data for oil and gas is classified as a separate manufacturing industry, recreation is scattered among a variety of industries generally classified in services and retail, with some in transportation. The ease of data acquisition for estimating oil and gas impacts combined with the difficulty of estimating the impacts of recreation and tourism underscores the potential bias favoring oil and gas development in IMPLAN modeling.

The 25th anniversary issue of the Journal of Regional Science includes an article by H.W. Richardson, a noted regional scientist, who believed that 40 years of research on economic base models "has done nothing to increase confidence in them." In addition, he concluded that it would be hard to "resist the conclusion that economic base models should be buried, and without prospects for resurrection" (Richardson, 1985). He is not alone. Many have suggested that economic base theories be abandoned in favor of other, more comprehensive theories of regional growth and development (Krikelas, 1992; Rasker, 1994; Power, 1995 and 1996). Many of these economists recommend analysis of regional trends in total personal income as a better way to understand where the local economy came from and where it is headed.

Our more specific concerns have to do with the technical assumptions used in most IMPLAN models. These questionable assumptions include: no changes in relative prices, no input substitution or technological change in the production processes, no labor mobility, no change in products or tastes, no regional migration, and no changes in state and local tax laws. The assumption of no labor mobility is particularly important for oil and gas drilling proposals, since it draws into question the issue of local versus non-local job creation. Workers are mobile, especially in the oil and gas industry as crews move from drill site to drill site. There is no guarantee that the oil and gas jobs projected by IMPLAN will be filled by local workers. And in fact, there is considerable evidence that workers in non-local crews fill most, if not all the direct jobs in oil and gas drilling.[1]

Another major assumption used by IMPLAN is the constant technology assumption. Most IMPLAN models, by failing to consider the downward impact of technology on job growth, will exaggerate the job potential from oil and gas drilling. Industries attempting to maximize profits seek to reduce production costs. One way to do this is to replace labor with technology resulting in fewer jobs. The downward trend in resource extraction jobs only becomes apparent if the agency completes a trend analysis showing changes in jobs and income over time.

Laitner, et. al (1998) cite Bureau of Labor Statistics (BLS) data which indicate that in 1988, oil and gas drilling generated about 1.72 jobs per million dollars of spending. By 1998 that number fell to 1.44 jobs per million dollars. Further, BLS (cited by Laitner et al.) estimates that the number of oil-gas jobs will fall to 0.71 jobs per million dollars of spending by 2008. This indicates that the direct jobs estimated with a static model like

[1] For example: "Where Will the Workers Come From?" Casper (WY) Star Tribune, 6 October 2005, and "Chinese Labor for Oil Drilling Eyed in Colo." United Press International, 11 July 2005 both discuss the origins of oil and gas workers in the Western U.S.

IMPLAN model will be much more than the number actually created from drilling. As a result of this failure to account for technology improvements, input-output models are well known to predict higher multiplier effects than are actually experienced (Hoffman and Fortmann, 1996). A review of government data confirms this downward trend: since 1987 output per worker in the oil and gas industry has been increasing (Figure 2). Investments in technology in the oil and gas industry have resulted in fewer and fewer workers required to drill each well and to produce natural gas and oil. The trends of technology replacing jobs in the oil and gas industry will continue.

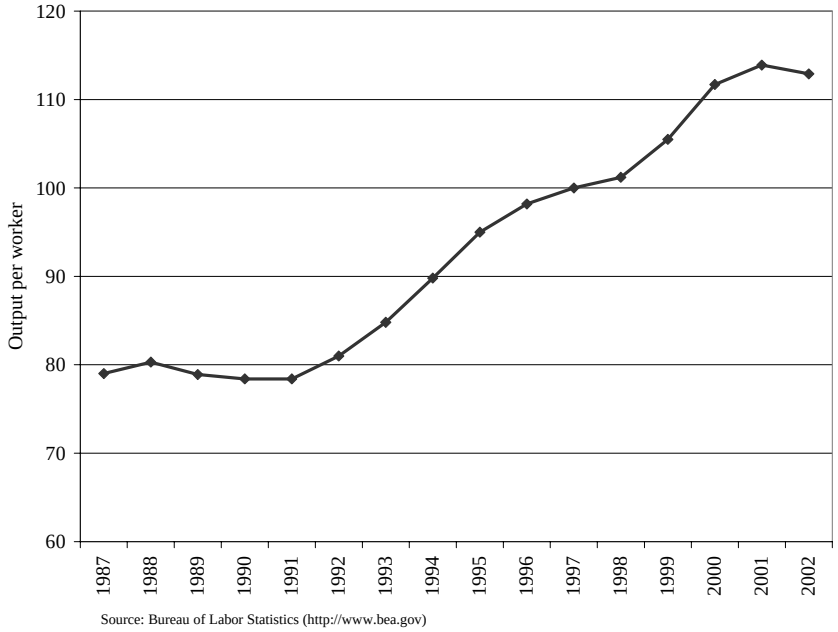


Figure 2. Labor Productivity in Oil and Gas Extraction

The concern over the accuracy of models like IMPLAN combined with concern over the use of these models for planning, suggests that it is not only inappropriate but a disservice to rural communities to rely on IMPLAN to estimate the economic impacts of public land management alternatives on rural communities.

We recommend that the agency stop relying on IMPLAN and other models derived from economic base theory.

If planners use IMPLAN, the model must account for non-labor income, as well as income from hunting, fishing, and recreation. If the agency uses IMPLAN, it must also account for the fact that most drilling is completed by non-local crews. If the agency uses IMPLAN, the analysis must account for increasing labor productivity and hence declining jobs per well drilled. We insist that the agency fully discuss the assumptions, the shortcomings, and the risk and uncertainty due to the poor track record of the IMPLAN model in planning efforts. We also request that all data and multipliers used to project local impacts be made public.

We also request that the agency complete a trend analysis of regional jobs and income – to provide a better and more complete understanding of their economic past and their economic future. We formally request and recommend that the agency analyze economic trends using the Economic Profile System model developed by the Sonoran Institute in cooperation with the Bureau of Land Management (available at http://www.sonoran.org).

C. Estimating Gross and Net Revenues from Oil and Gas Production

Oil and gas production results in revenues flowing to federal, state and local governments. To help make better informed decisions, the revenues must be estimated accurately and with full consideration of resource production over time (production curves) and all relevant tax laws.

Furthermore, oil and gas revenues, by themselves, only represent flows of **gross** revenue – while **net** revenue is the policy relevant metric that must be analyzed. In order to estimate the **net** revenues from oil and gas production, the associated costs must be fully accounted for in the analysis (see next section). The costs to local communities from drilling are real and have already been demonstrated to be significant (Western Organization of Resource Councils 1999, Darin 2000, Pedersen Planning Consultants 2001, Pinedale Anticline Working Group, 2005), must be accounted for in the analysis of net revenues from gas production.

1. Estimate revenues based on the realities of oil and gas production

As conventional oil and gas fields are developed, production is initially high, before gradually decreasing over time. Production is not linear. This declining production curve for gas and oil wells must be taken into account when estimating tax revenues based on the value of produced resources. In the case of conventional wells this means that communities might enjoy large initial revenues that will decline in later years. The decline in revenues leaves communities with a lower stream of income when the time comes to deal with increasing oil and gas cleanup and remediation costs.

In contrast with production from conventional gas, production of coalbed methane (an unconventional gas) is initially slow due to the “dewatering” phase that may last several years before production can begin. In coalbed methane areas local communities are more likely to experience significant increases in the costs to local governments early without the immediate benefit of corresponding increases in local tax revenues.

We request that the agency make realistic assessments of the likely production curves along with the expected rate of development and production for the type of resources to be produced, and that all estimates of local revenues be made on an annual basis which reflects the expected annual production.

2. Estimate revenues based on the realities of Federal, state, and local tax laws

Revenue estimates must also account for variations and exceptions in local tax structures rather than simply estimating the value of the total resource and multiplying by the current or average tax rate. For example, Montana's tax structure encourages exploration and development by taxing the first year of production at a lower rate. In Colorado, producers are able to deduct any local property taxes and ad valorem severances taxes paid from their state severance taxes. Other policies which may reduce overall revenues are lower tax rates for directional drilling and for wells that are considered "marginal" (that is, producing below some minimum daily amount). These exceptions and reductions in the actual taxes paid need to be accounted for and included in the analysis of potential public revenue estimates for oil and gas drilling proposals.

We request that the agency determine all applicable Federal, state and local tax laws (including exceptions and reductions) and that these laws and regulations be used to make realistic and accurate estimates of net tax revenues from oil and gas production. As discussed above, revenue estimates must be made based on economically recoverable resources rather than technically recoverable – and must include the environmental and community costs from drilling and production.

D. Include a full accounting of the hidden economic costs from oil and gas extraction

As discussed, oil and gas revenues, by themselves, only represent flows of **gross** revenue – while **net** revenue is the policy relevant metric that must be analyzed. In order to estimate the **net** revenues from oil and gas production, the associated costs must be fully accounted for in the analysis. Similarly, oil and gas jobs by

themselves, represent gross jobs. In order to estimate the net jobs associated with an alternative, the job losses associated with drilling must be accounted for.

In addition to market costs, economic analyses of recoverable gas must include a full accounting of non-market costs. After 35 years of research by academic and federal agency economists (Krutilla 1967, Krutilla and Fisher 1985, Peterson and Sorg 1987, Loomis and Richardson 2001), it is now possible to quantify non-market environmental costs that arise from development of natural resources (see Table 1). The BLM and the Forest Service should include a full accounting of non-market costs in the effects analysis required by the National Environmental Policy Act (NEPA) for leasing and drilling decisions (Morton et al. 2004). To assist the agency with this task, we have included in the table various methods for estimating these costs. Furthermore, while the details are beyond the scope of this brief, agency analyses should also include estimates of the non-market benefits associated with each alternative.

Table 1. Economic Costs of Mining and Oil and Gas Extraction

Cost Category	Description of Potential Cost	Methods for Estimating Cost
Direct use	Decline in quality of recreation including hunting, fishing, hiking, biking, horseback riding. Loss of productive land for grazing and farming	Travel cost method, contingent valuation surveys.
Community	Air, water and noise pollution negatively impacts quality of life for area residents with potential decline in the number of retirees and households with non-labor income, loss of an educated workforce, and negative impacts on non-recreation businesses. Decline in recreation visits and return visits negatively impacts recreation businesses. Socio-economic costs of boom and bust cycles.	Surveys of residents and businesses. Averting expenditure methods for estimating the costs of mitigating health and noise impacts. Change in recreation visitation, expenditures and business income. Documented migration patterns.
Science	Oil and gas extraction in roadless areas reduces the value of the area for study of natural ecosystems and as an experimental control for adaptive ecosystem management.	Change in management costs, loss of information from natural studies foregone.
Off-site	Air, water and noise pollution decrease the quality of recreation experiences for downstream and downwind visitors. Haze and drilling rigs in viewsheds reduce the quality of scenic landscapes, impacting activities like driving for pleasure, and other recreation activities and negatively impacts adjacent property values. Groundwater discharged can negatively impact adjacent habitat, property, and crop yields, while depleting aquifers and wells.	Contingent valuation surveys, hedonic pricing analysis of property values, preventative expenditures, well replacement costs, restoration and environmental mitigation costs, direct impact analysis of the change in crop yields and revenues.

Table 1. Economic Costs of Mining and Oil and Gas Extraction

Cost Category	Description of Potential Cost	Methods for Estimating Cost
Biodiversity	Air, water and noise pollution can negatively impact fish and wildlife species. Ground water discharge changes hydrological regimes with negative impacts on riparian areas and species. Road and drill site construction displaces wildlife and fragments wildlife habitat.	Replacement costs, restoration and environmental mitigation costs.
Ecosystem services	Discharging ground water negatively impacts aquifer recharge and wetland filtration services. Road and drill site construction increase erosion causing a decline in watershed protection services.	Change in productivity, replacement costs, increased water treatment costs for cities, preventative expenditures.
Passive use	Roads, drilling and pipelines in roadless areas results in the decline in passive use benefits for natural environments.	Contingent valuation surveys, opportunity costs of not utilizing future information about the health, safety, and environmental impacts of oil and gas drilling.

We request that the agency include both market and non-market costs and benefits in order to fully account for all the impacts of potential development.

E. Estimating the Socio-economic Costs to Communities from Oil and Gas Development

1. Increased costs to private land owners and residents

The current oil and gas boom has generated significant costs to communities in the West. Notably in Wyoming's Powder River Basin, the site of massive coalbed methane development. While this development has increased the fortunes of some, others are not faring as well (Pederson Planning Consultants 2001). Landowners in the Powder River Basin are spending thousands of dollars on attorneys in order to attempt to protect their property, often to no avail, as these areas have seen dramatic declines in property values. Other areas are also experiencing declines in private property values as the result of the accelerated oil and gas development. A recent study in La Plata County, Colorado found that coalbed methane wells there resulted in a decline in property values of 22 percent (BBC Research and Consulting 2001).

Residents' quality of life also suffers during accelerated oil and gas development. These costs must be accounted for in the analysis. In a survey of residents of Sublette County, Wyoming (one of the communities currently experiencing accelerated oil and gas development, McLeod et al. (1998) found that when asked why people chose to live in the area, most cited the scenery, recreation, lifestyle, and clean air and water over economic factors such as jobs or low taxes. Another more recent survey of Sublette County Wyoming (Porter et al. 2004) residents also found that many listed the quality of life and the beauty of the area among the assets they value. These results also pointed out an awareness among county residents of the need to diversify the economy, and that opportunities and settings for tourism and recreation are important economic assets. All of these amenities are diminished when oil and gas drilling increases in pace and scale. The loss of amenities and the economic impacts created by this loss must be acknowledged and accounted for in the analysis.

We formally request that the agency estimate the costs associated with oil and gas development to private landowners as part of the NEPA process.

2. Increased costs to local governments

Accelerated oil and gas development is often touted as a fiscal savior for struggling Western communities. However, the potential windfall is not without costs (Morton, et al. 2002). These include added strain on infrastructure, increased road maintenance costs, increased demand for public services such as hospitals and schools, increased need for emergency services (due both to increased population and an increase in the number of people working in more dangerous occupations such as those found in oil and gas extraction), and a host of less tangible costs due to the effects of a changing demographic and social makeup of the towns and communities.

Costs to boomtowns in the West include an increase in truck traffic resulting in increased road maintenance costs (Pinedale Anticline Working Group 2005, Craig Daily Press 2004, 2005). Increased traffic also results in dust from poorly constructed access roads which causes health problems for both humans and livestock, reduces the grass available for cattle, and negatively impacts air quality and visibility. Crime and other social problems intensify in boomtowns, with these areas seeing increases in larceny, traffic violations and accidents, destruction of private property, family violence, and child abuse. Oil and gas workers facing long shifts and time away from families often turn to drugs (High Country News 2005). All of these escalating problems increase the cost of emergency and social services for cities and counties. Boomtowns also often experience a shift in the labor force. Workers leave for oil and gas jobs, resulting in instability in the labor force and difficulty hiring public workers (e.g. policemen, firemen) at a time when the counties and cities are stretched thin to handle the increased workload (Pederson Planning Consultants 2001).

Gulliford (1989) examined the consequences of the boom and bust nature of oil and gas development. He chronicles the fortunes of Garfield County, Colorado before, during, and after the push to extract oil from oil shale in the late 1970's. Oil shale production proved to be uneconomical even at high prices. The companies who had planned to exploit the resources encouraged the communities in the area to make large investments in infrastructure to accommodate workers for the oil shale boom, and then abandoned them before any oil was produced, leaving overbuilt towns with large debt burdens. Before leaving the county however, the oil shale boom also resulted in an increase in social problems related to rapid population growth and the prospect of easy money.

These added costs due to rapid increases in oil and gas drilling are being experienced by the communities in the Pinedale Anticline area of Wyoming (Pinedale Anticline Working Group 2005). Emergency calls more than doubled between 2000 and 2003, while ambulance runs increased by 36% since oil and gas drilling has accelerated. Traffic and automobile accidents have also increased in conjunction with oil and gas drilling. One major intersection in Sublette County saw traffic rates nearly triple between 1995 and 2003. After declining in the mid 1990's, accident rates per capita increased 23% between 1999 and 2003, and this increase mirrors the increase in drilling rigs in the area (Pinedale Anticline Working Group, 2005).

Accelerated oil and gas development has left many counties and communities unable to pay for or finance the increase in public service costs or the cleanup cost after the bust. We have every reason to believe that similar costs and burdens will be placed on other communities where public and private land is threatened by oil and gas drilling. When estimating the benefits of an oil and gas development project the agency must show these benefits as net rather than gross. The increased public service and infrastructure costs associated with expedited oil and gas development must be fully accounted for as part of the NEPA process for the current push to develop oil and gas in the West.

3. Economic instability and a loss of economic diversity

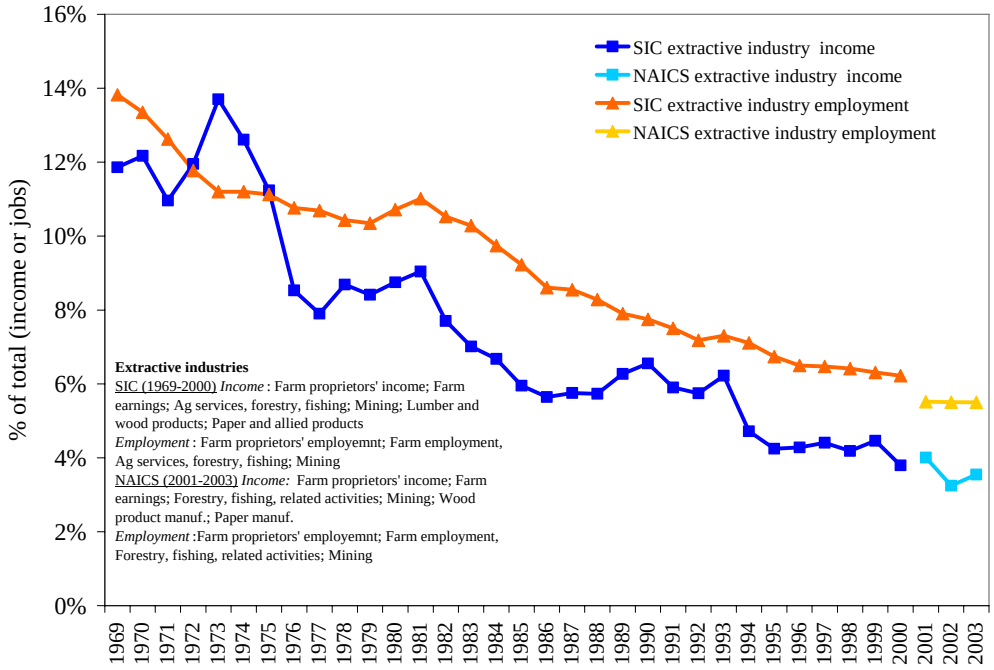
The agency should analyze and discuss the socio-economic costs associated with an historic emphasis on resource extraction, which has resulted in repetitious cycles of socio-economic distress for rural communities. When

an area is dependent upon only one or a few industries for most of its employment and income, there are often negative consequences, mostly stemming from fluctuations in the dominant industries. Limerick et al. (2002) describe Western resource-dependent communities this way:

> "In many towns, communities, settlements, and sub-regions of the West, everyone's fortune depended on the production and marketing of one commodity. Dependence on one commodity brought a particular kind of precariousness, instability, and vulnerability to external changes, whether of markets or climate. Farm towns, mining towns, cattle towns, and logging towns had no insulation from any problems that might strike the industries on which they relied."

Research has indicated that an emphasis on resource extraction results in inherently economically unstable communities. This instability in income and employment is usually a result of labor saving technological improvements and fluctuations in world resource markets -- macroeconomic forces completely outside local control. Such economic instability and lack of local control can be expected if agencies are successful promoting rapid oil and gas development. Communities have little control over the local economy because they have absolutely no control over global commodity prices. When prices drop, companies abandon wells, lay off workers, and leave the communities high and dry to suffer the economic and environmental consequences.

The extractive industries, including oil and gas development represent an ever smaller portion of the total jobs and income in the Rocky Mountain West (see Figure 3). This is true even during the current boom. The relative importance of these industries compared to expanding industries in the professional and service sectors and those which depend on non-labor income must be acknowledged in the NEPA and planning process for public land management.



Source: US Department of Commerce, Bureau of Economic Analysis (http://www.bea.doc.gov)
Note: The figure is based on SIC data for 1969-2000 and NAICS data for 2001-2003 in order to show the long-term trend. While not explicitly compatible, the two classification systems show similar trends for extractive industry income and employment and illustrate the general downward trend, even during the current oil and gas drilling boom in the Rockies.

Figure 3. Extractive Industry Income and Employment in the Rocky Mountain Region

Several studies have examined the problem of poverty in rural areas which are dependent on the extraction of only one or a few natural resources for most of their economic activity. As Freudenburg and

Gramling (1994) point out, “At the regional level, the highest levels of long-term poverty in the United States… tend to be found in the very places that were once the sites of thriving extractive industries…" They point out that the problem of poverty in these resource-dependent regions is not limited to the times of lower or zero production, but also occurs during the active operations of the extractive industry. Resource extractive workers find themselves in a vicious cycle of relatively high paying jobs with frequent layoffs and unemployment. This cycle is what Freudenburg (1992) calls the "intermittent positive reinforcement regime." While resource extractive workers develop high skills, such skills are not readily transferable to other jobs, and the workers become overspecialized (Freudenburg and Gramling, 1994). These areas attract resource extraction industries, often to the exclusion of other industries. Investment in education and job retraining is low because "the potential return on their investment in their education is either too low or too uncertain to justify sacrifice” (Humphrey et al. 1993). The resultant pattern of "rational under-investment" in the development of skills and other forms of human capital can result in reduced economic competitiveness in resource-dependent communities.

Economic instability is of concern to community leaders because if a local economy is unstable, economic development plans are more likely to fail. The economic instability created in the "boom and bust" economies associated with resource extraction increases the risk for capital investment in linked industries. As such, resource specialization and the resulting economic instability can prevent the formation of forward and backward economic linkages in the local and regional economy. After examining the less desirable aspects of the wood products industry Fortmann et al. (1989) concluded:

> Disincentives for stable employment, preferences for younger and cheaper labor that leave the less mobile and less trainable older worker out of work, cycles of market activity that carry with them high rates of unemployment, injury and illness rates and fatality rates that top all other employment categories are not attributes of a stabilizing industry, no matter how stability is defined.

Similar socio-economic patterns are associated with the oil and gas industry. Smith (1986), examining the boom and bust phenomenon in oil and gas extraction, points out that high prices for oil in the late 1970's led to an increase in drilling, but there was no corresponding increase in production during the same period. He speculates about the reason for this: “Drilling in some states may have been extended into marginal areas under very optimistic price expectations, and such operations had to be abandoned when prices were no longer adequate.” These sorts of activities lead to the classic boom and bust economic cycle typical of many rural resource-dependent areas. “Those states that showed the largest rate of growth in oil and gas extraction during 1972-81 tended to have the largest rate of decline in the post 1981 period.” There is every reason to expect that the current boom will eventually lead to a similar bust. See also Goldsmith (1992) and Guilliford (1989) for further research examining the socio-economic costs to communities associated with an economy focused on oil and gas drilling.

Continued emphasis on export activities, if left unchallenged, will only insure future cycles of socio-economic distress in rural communities in the West, especially in isolated Western communities The impacts on local economic diversity, the socio-economic risks to communities from cycles of boom and bust, as well as the economic instability associated with oil and gas development, must be analyzed and addressed as part of the NEPA process.

F. Estimate and Evaluate the Environmental Costs of Oil and Gas Development

The environmental costs of drilling include erosion, loss of wildlife and fish habitat, declines in the quality of recreational opportunities, proliferation of noxious weeds, and increased air and water pollution. These costs increase with the scale and speed of oil and gas operations. Environmental impacts can be mitigated with the implementation and enforcement of lease stipulations and monitoring of impacts throughout the project's life. Proper monitoring of the environmental impacts of oil and gas and other development programs require that accurate and complete data be collected and used.

1. Water Impacts

One of the major environmental costs associated with oil and gas drilling is increased water pollution. Oil and gas drilling will have impacts on the amount of water available for other uses and the displacement of large volumes of water - *quantity* impacts, as well as *quality* impacts resulting from the discharge of pollutants and from the increased levels of pollutants resulting indirectly from quantity changes.

a) Water quantity impacts

Accelerated drilling activity for coalbed methane is having profound real life impacts on many families and communities in the West. In order to release the natural gas from coal beds, enormous amounts of ground water must be pumped from coal aquifers to the surface. While all oil and gas operations result in produced water, the amount of water produced from individual coalbed methane wells is generally much higher than that from other types of oil and gas wells (USGS, 1995). Coalbed methane wells in Wyoming and Colorado discharge between 20,000 to 40,000 gallons per day per well (Darin, 2000). The disposal of the produced water not only affects the economics of development, but also poses serious environmental concerns.

The total amount of water discharged from CBM wells in Wyoming alone has skyrocketed in recent years, increasing from approximately 43.5 million gallons (134 acre feet) in 1990, to 18 billion gallons (56,000 acre feet) in 2005 (Wyoming Oil and Gas Conservation Commission, 2006). The discharging of 56,000 acre feet of water in the arid West is wasteful in the short-term (generally an acre-foot of water will supply a family of four for one year), and has potentially devastating economic impacts for affected communities in the long-term. Dewatering of deep aquifers may upset the hydrologic balance, eliminating or reducing the availability of this water for future agricultural and domestic uses, and impacting the recharge of shallow aquifers and surface water.

The discharge of ground water can deplete freshwater aquifers, lower the water table, and dry up the drinking and irrigation water wells of homeowners and agricultural users. The short-term economic costs include drilling new wells for current and future landowners, when successful wells can be found, and the costs of acquiring new water sources when they cannot. If the freshwater aquifers do not fully re-charge, the long-term economic costs to affected landowners, homeowners, communities, and states across the West could be severe, including the foregone opportunity (option value) to use aquifer water in the future. The expected costs of these damages must be accounted for in the analysis.

The discharge of tens of thousands of gallons of ground water transforms many streams that normally flow intermittently (only during spring runoff or after storms) into all-season streams. The influx of water has resulted in deep channel scouring, erosion, and increased sedimentation. Increased sedimentation in streams can negatively impact native fisheries. This in turn increases the financial costs for fishery restoration projects. The altered water flows from surface discharge of produced water will negatively impact thermal and flow regimes, and likely contribute to bank erosion and changes in riparian vegetation (Allan, 2002). Gore (2002) warned that the loss of habitat caused by increased water flows from discharged water at coalbed methane projects could eliminate up to 30 aquatic species within 20 years.

The discharge of water into intermittent stream channels damages native flora and fauna not adapted to year-round water and promotes the spread of noxious weeds such as Scotch burr and Canadian thistle. The change in native vegetation composition, combined with the increase in noxious weeds, negatively impacts threatened and endangered species and other wildlife, along with cattle production. The loss of native species and the spread of noxious weeds across the West has enormous economic costs to both public and private interests.

The landscape is also impacted from the retaining ponds or reservoirs constructed to store the water discharged from the drilling operation. The constructed earthen dams and retaining ponds destroy additional habitat and introduce artificial structures to the landscape. Habitat and homes on property near these reservoirs also face the potential risk of flooding from structural failure.

When proposing oil and gas development, the agency must fully examine and account for the risks and costs associated with water depletion, loss of native fisheries and fisheries restoration, the additional costs of noxious weed mitigation, and the costs associated with the building and potential failure of artificial water retention structures.

b) Water quality impacts

Trout Unlimited recently published a literature review of the impacts of oil and gas development and exploration on coldwater fisheries (Trout Unlimited, 2004). The findings of the report conclude that many of the studies reviewed "point towards confirmed deleterious effects caused by gas and oil exploration and development." One study found that the allowable discharge level in most states were far too high, 400 times that recommended by the EPA, and produced significant physical and toxic effects on trout in Wyoming. The Trout Unlimited study supports the conclusion that oil and gas development results in substantial negative effects on water and the wildlife that depends on it for survival.

The water discharged from oil and gas wells can be highly saline with a very high sodium absorption ratio (SAR) – a ratio that affects how water interacts with soil. Water with a high SAR can permanently change chemical composition of soils, reducing soil, air, and water permeability and thereby decreasing productivity of both native plants and irrigated crops.

Oil and gas drilling and production can also lead to increased sedimentation of water bodies, which in turn is harmful to aquatic species. According to Clement (2002), referring to proposed coalbed methane development in the Powder River Basin:

> "Increased sedimentation resulting from erosion of stream banks, overland flow, and road construction will likely impact aquatic organisms… Input of sediments to aquatic ecosystems is widely regarded as a major source of stream degradation in North America."

And finally, drilling for oil involves ecological risks and potential economic costs associated with blowouts -- the catastrophic surge of the highly pressurized fluid from the drill hole that can cause fires, loss of life and property, and the potential contamination of surface drinking water sources. To reduce the number of blowouts, rotary drilling operations typically inject a fluid of drilling muds into the drill hole in order to lubricate and cool the drill bit. While reducing the number of blowouts, the drilling fluids themselves create the risk of contamination of adjacent freshwater aquifers (Gauthier-Warinner, 2000). Recently, the New Mexico Oil Conservation Division (OCD) compiled and posted on its website information regarding groundwater impacts from leaks, spills and releases resulting from oil and gas operations. Although this data does not include all such impacts or all sources associated with oil and gas development and operations it illustrates the nature and extent of the potential for water contamination from oil and gas drilling. There are close to 1400 groundwater contamination instances in the OCD's database that are attributed to oil and gas activities.

We formally request that all of the potential impacts on and risks to water quality from oil and gas be fully analyzed and that the costs of these impacts be included in the NEPA analysis for oil and gas development.

2. Oil and Gas Footprint

Oil and gas drilling operations leave behind a large footprint on the landscape – a footprint that extends well beyond the several-acre drilling sites. Beginning with exploratory activities, large trucks with seismic surveying equipment crisscross the landscape using a crude system of roads. These roads are made to the lowest standards possible in order to minimize the financial costs of gathering geophysical information, with little consideration for wetlands, fragile soils, storm water runoff or critical habitat. Exploratory drilling operations then require more large trucks with drill rigs using a network of constructed roads to access drill sites. If the exploratory well is determined to have no potential for production, the well is plugged, but the landscape scars

remain. If producible resources are found more wells, along with the attendant roads and pipelines will follow. Depending on the agency with oversight, there is typically little enforcement or monitoring of environmental regulations. In addition, no surety bonds are required for restoration or clean up. All of these factors create a footprint that extends beyond the drill-pad and the costs associated with this extended zone of impacts must be accounted for in agency analyses of oil and gas development.

a) Well spacing and actual well numbers

States usually have general rules setting default minimum spacing requirements between producing wells. They are set to establish the maximum area of an oil or gas deposit that can be efficiently drained with one well. In most cases the operator can petition for a reduction in well spacing if they can show that such spacing changes will result in more efficient production. Well spacing limits apply to each formation, meaning that if formations overlap, more well pads may be established on the surface than might be indicated by the stated spacing limits. The spacing limits do not include dry holes, only producing wells.

When a well is drilled it is unknown whether it will eventually produce oil or gas, or whether it will be a dry hole. If the well has potential for production, the well is cased with pipe and cemented (in an attempt to prevent oil and gas from seeping into nearby aquifers), and the drilling rig is replaced by a well head or pump jack. Electric or gas powered motors are used to power the pumps that collect the gas at each well and to power the series of compressor stations that pressurize gas for pipeline transport from the wells to customers in distant markets (WORC, 1999). These compressors run 24-hours a day. Furthermore, additional wells are usually drilling in the immediate vicinity when a producing well is discovered. All of these activities create a cumulative impact on wildlife habitat, air quality, water quality, and noise levels that goes beyond the immediate footprint of development.

Many drill sites also involve the construction of sediment ponds and retention reservoirs to collect storm water drainage and store the ground water brought to the surface as a result of the drilling and extraction operation. Injection wells are sometimes used to dispose of the water produced and to enhance oil and gas recovery – an action that may necessitate additional drilling of up to hundreds of injection wells throughout the field (Gauthier-Warinner 2000). The ecological footprint not only extends across the landscape, it also penetrates to shallow aquifers as well as aquifers thousands of feet below the earth's surface.

Exploiting the gas in unconventional, tight sands deposits will require drilling a significant number of wells, as the distribution of these resources is not well understood. Extracting this tight sands gas may require 5 or 10 acre spacing, which has been proposed in the Jonah field in Wyoming. As noted by the USGS (1996), "…**land-use planners are not in a good position to determine the societal impacts of the drilling (density) that would be necessary if these continuous reservoirs of (tight) gas were exploited** (emphasis added)."

In order to estimate the full extent of surface disturbance, the agency must correctly account for potential decreases in spacing limits, success rates for both exploratory and development wells, and estimate the cumulative environmental and economic impact of all wells drilled and all well pads established on the surface. The agency must fully examine the environmental impacts from the footprint associated with oil and gas development and include the pipelines, roads, and other oil and gas infrastructure and the impacts on the landscape from this development.

We formally request that the agency provide an accurate estimate of the numbers of producing wells, dry holes, and injection wells. We request that the cumulative impacts of all wells and associated roads, pipelines and other infrastructure be analyzed fully as part of the NEPA process.

b) Pace of development

The pace at which an oil or gas field is developed will influence the extent of the oil and gas footprint. When drilling is phased to take place over a longer period of time, the impact of concurrent drilling operations

can be lessened, and dry holes and wells that stop producing can be reclaimed before beginning new well drilling. When drilling is pushed through in a short period of time the total area impacted is much larger. Rapid development also intensifies the socio-economic impacts which accompany drilling. More wells being drilled at once mean more workers moving into an area at the same time. If development is staged the community will be better able to absorb them, reducing the need for accelerated infrastructure upgrades. Phased development will also prevent the rapid economic swings associated with the boom and bust cycle typical of the oil and gas industry.

We formally request that the agency require phased development of oil and gas resources on public lands, and that the costs associated with rapid versus phased development be fully analyzed and compared as part of the NEPA process.

c) Impacts on wildlife

The impacts of oil and gas development extend beyond the footprint of development (Trombulak and Frissell 2000, Lyon and Christensen 2002, Lutz et al. 2003, WGFD 2004, Sawyer 2005). It is insufficient to simply indicate the percentage of the planning area that will be impacted by drilling. The analysis must estimate the percentage of critical wildlife habitat that will be directly and indirectly impacted. These estimates must include measures of the direct fragmentation of wildlife habitat, the indirect impacts, and not just the footprint. In addition to their direct effects (such as immediate landscape disturbance and habitat fragmentation), motorized routes also have negative impacts on wildlife such as noise, dust, air pollution, water pollution, erosion, and human presence that extend beyond the immediately disturbed area. Road densities as low as one percent or less of a given landscape can impact more than 99 percent of that landscape, leaving little undisturbed area in which wildlife can thrive. (Weller, et al., 2002; Hartley, et. al, 2003, Thomson, et. al, 2004; Thomson, et al., 2005).

Lease stipulations help protect wildlife but only if they are required and enforced, and data from the Bureau of Land Management and other sources indicate that they are not (GAO 2005). In the Rocky Mountain West, where hunting, fishing, and wildlife viewing generated $5.9 billion in revenue in 2001 (U.S. FWS and U.S. Census Bureau 2001). Drilling (and its direct impacts on wildlife and their habitat) has hidden economic costs in terms of lost revenues from license fees, equipment sales, and other related purchases. See Morton et al. (2002), Weller, et al,(2002), Hartley, et. a,(2003), Morton et al. (2004), Thomson, et. al, (2004,) and Thomson, et al (2005).

Wildlife habitat fragmentation results in both market and non-market costs. These costs must be analyzed as part of the NEPA process for oil and gas development.

d) Pipelines

In order to bring gas to market, thousands of miles of pipeline must be constructed – extending the impacts of gas drilling far from the actual drill site. There are currently more than 270,000 miles of gas transmission pipelines and another 952,000 miles of gas distribution lines. The cumulative costs and environmental impacts associated with pipeline construction must be included in the agency analysis – because drilling wells and building pipelines are connected actions.

The environmental costs associated with construction, maintenance, and repair of pipelines, as well as the costs of the habitat fragmentation due to pipelines must be examined as part of the NEPA process for and oil and gas development.

e) Roads

Oil and gas exploration also requires roads which increase ecological costs and invite cross-country travel and subsequent habitat damage. Oil and gas drilling and production often require daily vehicular trips to

monitor and maintain wells and pipelines. The increased traffic disrupts wildlife, may result in more road kill, and diminishes quality of life for local residents. Road construction degrades habitat and fragments travel corridors needed by wildlife species. Roads become conduits for non-native species that displace native species resulting in significant mitigation costs for taxpayers.

Proliferation of roads increases ORV use and thus the costs of the ecological and habitat damage associated with motorized recreation. Increased access and use by ORV-riders leads to increased ORV monitoring and enforcement costs. Roads, by providing access, may increase the frequency of human-caused fires. Humans caused sixty percent of all wildfires in the Rocky Mountains between 2001 and 2005 (National Interagency Fire Center, 2006). Furthermore, Forest Service statistics show that eighty-six percent of human-caused fires occurred in roaded areas (USDA Forest Service, 2000). Roads increase the damage to historical, cultural and archeological resources due to increased ease of access. Roads increase sediment deposits in streams resulting in reductions in fish habitat productivity. Roadless areas protect communities from sedimentation of water supplies and catastrophic events such as landslides.

The agency also needs to analyze the costs of road maintenance and restoration and compare these costs with the budgets available to complete the work. Each new mile of road added to the public lands transportation system competes for limited road maintenance funding. The Forest Service has a 10 billion dollar backlog of road maintenance projects and additional roads on public lands will only increase this backlog unless adequate funding is assured (Taxpayers for Common Sense, 2004).

The costs associated with the ecological damage due to oil and gas roads must be included in the analysis of plan alternatives involving oil and gas drilling and oil and gas projects. The agency must also include a detailed analysis of the costs associated with monitoring and enforcement of increased recreation use of expanded road mileage as part of the NEPA analysis. The costs for road maintenance must also be accounted for in the NEPA process.

G. Correctly Account for Budget Constraints and Fiscal Realities

1. Environmental mitigation costs must be estimated and included in NEPA analysis

The NEPA analysis should be based on reasonable budget expectations, which should be clearly stated. Successful organizations can rarely afford to ignore budgets when developing long-term plans. Without adequate funding, the mitigation plans and resource protection described in management plans will not be attainable. Rather than presenting the maximum production potential of public lands unconstrained by budgets, the agency should present the public with a more accurate picture of what can actually be accomplished given expected appropriations. Williams (1998) says, “policy is the effective result of ‘what is intended’ and ‘what actually happens.’” What actually happens will depend on the budge available to achieve what is intended.

The agency must include a fiscal analysis of each alternative's implementation and mitigation costs. We are especially concerned with a potential lack of analysis of the costs to mitigate the environmental consequences of each alternative. Ignoring budget constraints is completely unrealistic and somewhat deceiving to the public, because the ability to achieve the levels of resource protection and damage mitigation described in each alternative will depend on the agency's budget. While the budget available to manage the planning area should be considered constant across alternatives, the costs to implement each management alternative are not equal. For example, an alternative resulting in resource damage will require more money to mitigate this damage than a less damaging alternative. It makes no sense for taxpayers to subsidize a more damaging and costly alternative when a less damaging, less costly alternative is available. There is simply no justification for any assumption that funding will be sufficient to implement each alternative and that all resource damage will be fully mitigated – unless costs and budgets are fully analyzed.

According to a Council of Environmental Quality memorandum on NEPA requirements [cited in NEPA Compliance Manual, 2nd Edition (Freeman, et al. 1994)]:

> [T]o ensure that environmental effects of a proposed action are fairly assessed, the probability of the mitigation measure being implemented must also be discussed. Thus the EIS and the Record of Decision should indicate the likelihood that such measures will be adopted or enforced by the responsible agencies. (Section 1502.16(h), and 1505.2)

The "probability of mitigation measures being implemented" is directly related to how much the mitigation will cost and how those costs relate to the expected budget available. The U.S. General Accounting Office (1992) reviewed federal land management budgets and found that the funding received by public land management agencies has been significantly less than the budgets required to fully implement plans. The lower-than-planned budgets have prevented public agencies from producing many of the outputs projected in land management plans, and implementing mitigation measures promised in NEPA documents (Morton 1997).

2. Bonding requirements for industry must be estimated and included in NEPA analysis

As part of the fiscal analysis of the plan alternatives, the agency must also realistically assess the bonding needs for the oil and gas development proposed. Operators must be required to post adequate bonds to ensure that acceptable reclamation and remediation are conducted. Insufficient bonds will increase the costs of reclamation for taxpayers and/or reduce the likelihood that reclamation will be adequate.

In order to fully comply with NEPA, the agency must include an analysis of the costs of implementing each alternative, which includes the costs of the mitigation plans contained within each alternative. These costs must then be compared to the expected budget level to assess the probability of mitigation measures being fully implemented. The agency should therefore, as part of the NEPA process, include a reasonable budget limitation and evaluate a set of management alternatives that are constrained by that budget level. The agency must require adequate funding from oil and gas operators (in the form of reclamation bond) to insure that the reclamation is complete and adequate.

3.The cost of enforcement of environmental protection and mitigation requirements must be estimated and included in NEPA analysis

Additional costs are associated with the inability of agency enforcement staff to adequately inspect oil and gas wells and associated facilities for violations of applicable laws and to enforce requirements for protection and restoration of the area. A recent report by the Western Organization of Resource Councils (2005) found that:

- agency enforcement staff levels have not kept pace with the rapid expansion of oil and gas development;
- oil and gas wells and associated facilities are not inspected often enough;
- agency environmental compliance inspectors spend too much time on other activities;
- agencies take too few enforcement actions; and
- citizen complaints are often ignored.

The Government Accountability Office (2005) also found a similar lack of resources for monitoring and enforcement of oil and gas development and attributed this lack to an unbalanced emphasis on processing permits to drill. The resulting costs are evidenced in the impact on the ecosystem.

The agency must assess the adequacy of funding and staffing to achieve the required environmental and safety enforcement for an oil and gas development. If inadequate funding and/or staff resources might prevent thorough enforcement and monitoring, this needs to be made clear and the costs associated with the additional impacts must be analyzed as part of the NEPA process.

IV. Specific Recommendations for Analysis of Social and Economic Impacts of Oil and Gas Development

These recommendations are organized to correspond with the more detailed sections above. We formally request that the NEPA analysis fully reflect and account for the following scoping comments:

A. The agency must base analyses of the impacts of oil and gas development proposals on estimates of economically recoverable resources, rather than technically recoverable resources.

We formally request that the Reasonably Foreseeable Development scenario be based on economically recoverable amounts of oil and gas, not technically recoverable oil and gas.

We formally request that estimates of jobs and income and local and state revenues be based on economically recoverable amounts of oil and gas, not technically recoverable oil and gas.

B. The plan must reflect an accurate and realistic projection of jobs and income associated with the oil and gas development proposal.

We formally request that the agency stop relying on IMPLAN and other models derived from economic base theory.

If the agency planners use IMPLAN:

The agency must fully discuss the assumptions, the shortcomings, and the risk and uncertainty due to the poor track record of the IMPLAN model in planning efforts.

We request that all data and multipliers used in the socio-economic impact analysis, including those used in IMPLAN be made public.

The model must account for non-labor income, as well as income from hunting, fishing, and recreation.

The model must also account for the fact that most drilling is completed by non-local crews.

The analysis must account for increased labor productivity and hence declining jobs per well drilled.

The agency must also complete a trend analysis of regional jobs and income – to provide a better and more complete understanding of their economic past and their economic future.

We formally request and recommend that the agency rely on trend analysis of income and employment for the counties impacted using the Economic Profile System (EPS) developed by the Sonoran Institute in cooperation with the BLM (available at http://www.sonoran.org).

C. The agency must make accurate and realistic estimates of gross and net revenues.

We requests that the agency determine all applicable Federal, state and local tax laws (including exceptions and reductions) and that these laws and regulations be used to make realistic and accurate estimates of net tax revenues from oil and gas production.

Revenue estimates must be made based on economically recoverable resources rather than technically recoverable – and must include the environmental and community costs from drilling and production.

D. The agency must Include a full accounting of the hidden economic costs from oil and gas extraction.

We request that the agency include both market and non-market costs and benefits in order to fully account for all the impacts of potential development.

E. The agency must analyze and discuss the socio-economic costs to communities associated the boom and bust cycles of oil and gas development.

We formally request that the agency estimate the costs associated with oil and gas development to private landowners as part of the NEPA process.

When estimating the benefits of an oil and gas development project the agency must show these benefits as net benefits rather than gross benefits.

The increased public service and infrastructure costs associated with expedited oil and gas development must be fully accounted for as part of the NEPA process for the current push to develop oil and gas in the West.

The impacts on local economic diversity, the socio-economic risks to communities from cycles of boom and bust, as well as the economic instability associated with oil and gas development, must be analyzed and addressed as part of the NEPA process.

A thorough plan for monitoring the socio-economic impacts of oil and gas development must be developed and implemented as part of the NEPA process and the implementation of all development and non-development alternatives.

F. The agency must fully and correctly account for the environmental costs of oil and gas development.

Impacts on water resources must be analyzed and accounted for

When proposing oil and gas development, the agency must fully examine and account for the risks and costs associated with water depletion, loss of native fisheries and fisheries restoration, the additional costs of noxious week mitigation, and the costs associated with the building and potential failure of artificial water retention.

We formally request that the impacts on water quality from oil and gas be fully analyzed and the costs of these impacts included in the NEPA process for oil and gas development.

The full extent of the footprint of oil and gas development must be analyzed and accounted for in the NEPA process

We formally request that the agency provide an accurate estimate of the numbers of both producing wells and dry holes and that the impacts of these wells be analyzed fully as part of the NEPA process.

We formally request that the agency require phased development of oil and gas resources on public lands, and that the costs associated with rapid development be fully analyzed as part of the NEPA process.

Wildlife fragmentation results in both market and non-market costs. These costs must be analyzed as part of the NEPA process for oil and gas development.

The environmental costs associated with construction, maintenance, and repair of pipelines, as well as the costs of the habitat fragmentation pipelines cause must be examined as part of the NEPA process for and oil and gas development.

Roads

The agency must include a detailed analysis of the costs associated with increased road mileage as part of the NEPA analysis.

The costs for road maintenance must be accounted for in the NEPA process.

The additional ORV monitoring and enforcement costs associated with expanded road mileage must be included in the NEPA analysis.

The agency must make a realistic estimate of the probability for enforcement of existing environmental protection

F. The agency must fully and correctly account for the environmental costs of oil and gas development.

The agency must assess the adequacy of funding and staffing to achieve the required environmental and safety enforcement for an oil and gas development. If inadequate funding and/or staff resources might prevent thorough enforcement and monitoring, this needs to be made clear and the costs associated with the additional impacts must be analyzed as part of the NEPA process.

G. The agency must correctly account for budget constraints and fiscal realities.

In order to fully comply with NEPA, the agency must include an analysis of the costs of implementing each alternative, which includes the costs of the mitigation plans contained within each alternative.

These costs must then be compared to the expected budget level to assess the probability of mitigation measures being fully implemented.

The agency should therefore, as part of the NEPA process, include a reasonable budget limitation and evaluate a set of management alternatives that are constrained by that budget level.

As part of the fiscal analysis of the plan alternatives, the agency must realistically assess the bonding needs for the oil and gas development proposed. Operators must be required to post adequate bonds to ensure that acceptable reclamation and remediation are conducted.

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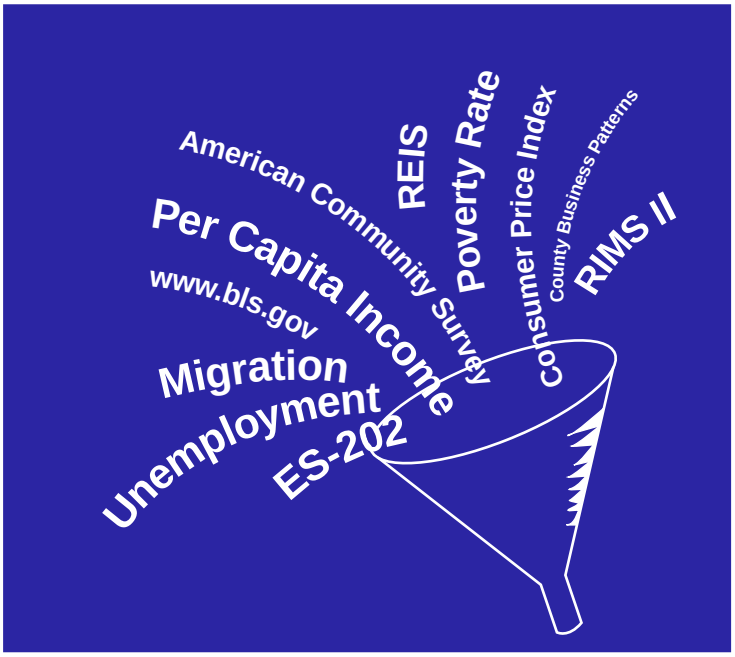
Socioeconomic Data for Understanding Your Regional Economy

A User's Guide

Joseph Cortright
Andrew Reamer

1998



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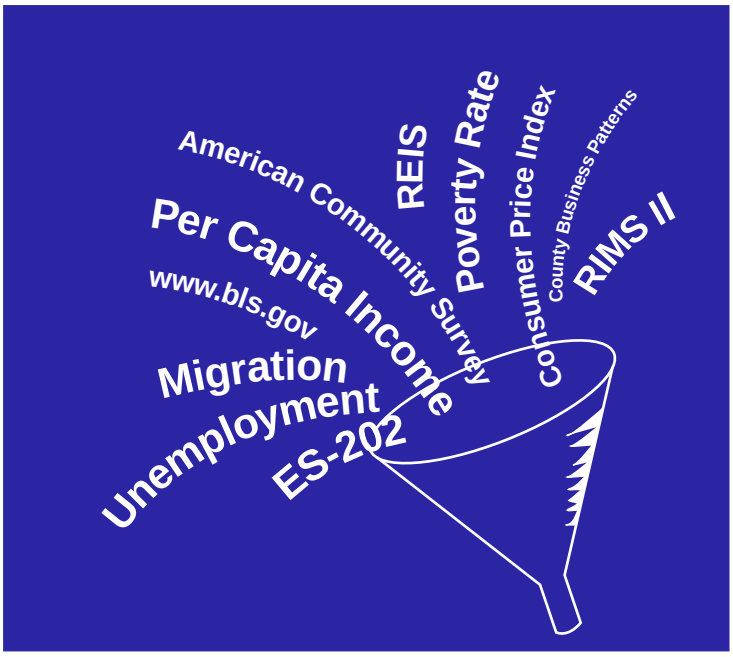

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Socioeconomic Data for Understanding Your Regional Economy: A User's Guide

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Socioeconomic Data for Understanding Your Regional Economy: A User's Guide

Introduction

Why a guide?

You work for a local economic development agency for a living. Or you look into the workings of the regional economies across your state for a university business research center. Or you are a graduate student wanting to get a handle on the how-to of regional economic analysis.

If your aim is to understand, explain or have some positive impact on a regional economy, you need to find, and make sense of, pertinent ***socioeconomic data***. As an economic development practitioner or researcher, your effectiveness is fairly limited unless you can frame what's going on in the economy, and your basic tool for framing is some level of data analysis. Anecdotes and stories from the field, while useful, can take you only so far.

Now if you have any experience in socioeconomic data analysis, you know that regional data come from a wide, wide array of sources. Most of these sources have some connection to the federal government, but the federal government is a very big place. Regional data are produced by the U.S. Bureau of the Census, your state labor market information agency (courtesy of funding by the U.S. Bureau of Labor Statistics), the U.S. Bureau of Economic Analysis, the National Science Foundation, and about 65 other federal agencies. Most of these agencies publish a number of data series, measuring various dimensions of economic activity and well-being. Then, of course, there are private data sources, some of which try to add value to the federal data, and some of which collect their own data and publish them, often at a hefty fee.

Knowing what data exist, where to find them, and what they mean can be a daunting task. The federal government's system for collecting, organizing, and publishing regional socioeconomic data is decentralized, complex, and idiosyncratic. The burden is on data users to find their way through the system. While help can be found, through State Data Centers and reference librarians, for example, the system is fairly intimidating to the uninitiated, and can be confusing even to those who have worked with it for years.

Of course, once you get the relevant data, you have to know what to do with them, how to transform rows and columns of statistics, often from several sources covering various time periods and differing geographies, into an integrated, meaningful picture of the dynamics of the regional economy of interest. While some graduate planning programs

teach their students the art of economic analysis, the large majority of economic development practitioners and researchers have not had the benefit of access to such instruction.

When it comes to the sources and uses of regional socioeconomic data, the fact is that most analysts are self-taught, perhaps with a little help from a more experienced person, if they're lucky. However the learning proceeds, it tends to be fairly informal. And, given the complexity of the federal data system and the lack of good sources of how-to, many would-be learners of the art of economic analysis are unable to get as far as they might like.

The Economic Development Administration (EDA) has a vital interest in aiding practitioners and researchers in understanding the sources and uses of regional socioeconomic data. EDA also has a significant interest in seeing that analysts have access to accurate, detailed, and timely data, particularly from the federal government. As a result, the agency awarded a grant to the authors to assess the extent to which the federal data system currently meets the needs of regional development analysts, and to provide analysts with information useful in helping them navigate the complexities of that system.[1] The result of this effort is two documents. The first, based on a nationwide survey and a series of focus groups and interviews, describes data user perceptions regarding the strengths and weaknesses of the current data system and provides recommendations for improvements.[2]

The second product is this *User's Guide*, drawn both from project findings and the authors' own experience. Its purpose is to help fill the information gaps described earlier – to provide the reader with an overview of the sources of data for measuring the health and structure of local economies, and to describe methods and best practices for analyzing and interpreting these data. The guide is not meant to be comprehensive in breadth and depth, as a textbook might. Rather, it seeks to provide a general grounding in sources and uses, and identify the resources on which the motivated data user might draw to continue moving up the professional learning curve.

Who should use this guide? What will it help you do?

This guide is designed for people who want to use readily available socioeconomic data to describe activities and trends in subnational economies, typically at a state, regional, or local level. Its intended audience is broad, and includes novices and the more experienced, researchers and development practitioners, public agency staff, and private sector consultants and market analysts. Various chapters should be useful to data users

[1] EDA's interest in awarding this grant stemmed from the findings of an EDA-sponsored study on the appropriate role of the federal government in economic development. See National Academy of Public Administration, *A Path to Smarter Economic Development* (Washington, DC: November 1996).

[2] Andrew Reamer and Joseph Cortright, *Assessment of Socioeconomic Data for Regional Economic Analysis*, January 1999. Copies are available from the Research and National Technical Assistance Division, Economic Development Administration, (202) 482-4085.

involved in a wide variety of analytic activities, including impact assessment, regional measurement, strategic planning, and program design.

A wealth of statistical information is available about economic activity for cities, counties, and states, much of it free or at very low cost. This guide helps you find the type of data you need through:

- describing the outlines of the regional data system, including the activities of key federal statistical agencies;
- providing useful descriptions of key data series covering important dimensions of socioeconomic activity; and
- pointing you to an array of data intermediaries ready and able to assist in finding the data you need.

Using the input of our project participants, the guide also offers a series of specific suggestions that you might use to improve the impact of your analytic efforts. We point out the work habits of effective analysts, recommend a number of data books and Web sites you might get to know, and point out some regularly occurring hazards in the process of data analysis.

Plan of the User's Guide

Though some readers may find the *User's Guide* a cover-to-cover page-turner, we've designed it to be used as a reference work, allowing you to move back and forth according to your interest and needs at the moment. To make sure that important information can be found promptly, we repeat references to essential resources in various sections.

The guide is divided into two parts. The first, composed of four chapters, covers the basics:

- Chapter One lays out foundation tools for obtaining and effectively using socioeconomic data. This discussion is primarily aimed at data novices, so if you're experienced and well-equipped you can skip this chapter.
- Chapter Two gives an overview of the U.S. system for producing regional socioeconomic data, and a quick tour of the various agencies and organizations responsible for gathering, compiling, and disseminating the data.
- Chapter Three describes key sources of regional data across eight dimensions of socioeconomic activity, such as employment and unemployment, income and earnings, and the cost of living. For each dimension, background regarding definitions and measurement

approaches are provided, then 3–6 data sources are discussed in terms of the type of geography covered, frequency of publication, method of collection, means to access, and point of contact.

- Chapter Four provides a list of data intermediaries which can help you find your way through the information jungle. Data intermediaries like Census Data Centers and state labor market information agencies can connect you to the disparate resources available, saving time and effort.

Part Two offers practical advice useful to a wide range of practitioners. The observations and suggestions presented are drawn directly from the experiences of a national sample of data users who participated in the EDA-sponsored project described earlier:

- Chapter Five distills the common and uncommon knowledge of analysts into a series of best practices.

- Chapter Six lists bookshelf basics – those statistical and information resources that economic analysts find valuable to have in their print and electronic libraries.

- Chapter Seven points out the best Web sites for socioeconomic data analysis.

- Chapter Eight describes the common pitfalls and frustrations that analysts confront in their day-to-day work.

- Chapter Nine offers an overview of some advanced techniques that analysts use to understand their local economies.

The appendices include lists of two key sets of contacts for each state, the lead agency of the Census State Data Center program, and the labor market information (LMI) agency. As we will suggest a number of times, these experts can be of great assistance in finding and making sense of the data you need.

As a complement to the *User's Guide*, we have prepared a Web site specifically designed as a resource for regional economic analysts. The site provides links to each of the major on-line sources of socioeconomic data referred to in this report, as well as links to dozens of other sources of more specialized information. You can find this Web page at http://www.econdata.net.

Part One: The Basics

Chapter 1
Tools of the Trade

In this chapter, we describe the tools that every analyst should have. The chapter primarily will be of interest to novice data users, so if you have some experience, you may want to skip ahead to the next chapter.

Most analysts employ a few basic tools to characterize the local economy using economic data. The data are out there. It's a matter of being properly equipped to find them, bring them home, and figure out what they mean. These key tools include:

- means to connect to data professionals;
- modest computing power;
- a working definition of your regional economy; and
- a few analytic techniques.

In addition to these basic tools, good analysts also carry around a healthy perspective on the limitations of data – what they can and can't tell you.

1.1 Tools for Connecting to Data Professionals

Chances are, you're not the first person who's given thought to assembling or analyzing data about the economy in your state or region. As others have tread this path before (or at least know the general terrain), it's best to take advantage of their efforts. Two of the most useful tools for doing so aren't very high tech at all – the telephone and the copying machine. We recommend that you call (or visit) your state labor market information (LMI) agency, your Census State Data Center, and the closest Federal Depository reference library. Getting to know these organizations and their data resources, and learning how to access those resources, is an important first step for those just starting out in the field of regional economic analysis. (In Appendices A and B, we provide information on how to contact your state's lead State Data Center and LMI agency. You can find the nearest Federal Depository library by calling the reference librarian in your local library or visiting http://www.access.gpo.gov/su_docs/libpro.html on the Web.)

1.2 Modest Computing Power

The advent of the personal computer has given data analysts vastly increased power to assemble and manipulate economic statistics. With the expansion of the World Wide Web, enormous amounts of data are available to anyone with the right hardware, software, and a little time. The critical tools are as follows:

- *Spreadsheet software*: Any competent spreadsheet software program such as Lotus 1-2-3, Quattro Pro, or Excel will do. All of these programs have sufficient statistical power and graphing capabilities for the work you'll need to do.

- *An Internet connection*: As we discuss below, access to the Internet is the best, and for some data sources the only, way to get the data you'll need on your local economy. A dial-up account with a local Internet Service Provider, a modest modem, and Web browser software should be all you need. Obviously, a faster connection is better, but nearly all of the data sets you're likely to need can be downloaded (with patience) with a 14.4K modem.

- *A CD-ROM drive*: Some of the most useful data series are now available on CD-ROM, a data delivery tool that can be more comprehensive and convenient than an Internet connection. Some data sources, such as private business directories, are available only on CD-ROM.

1.3 Working Definition of Your Regional Economy

Regional economic activity pays little attention to domestic political boundaries, crossing them at will. If you're interested in the well-being of residents of one political jurisdiction, like a city or a county, or some neighborhood or district within a political jurisdiction, chances are good that your area of interest is part of a larger regional economy. (Typically, we have found, it's difficult to describe anything smaller than a county, and more often a group of counties or a metropolitan area, as constituting a functioning economy.)

It's hard, and not particularly useful, to look at your particular area of interest without having some understanding of the workings of your regional economy and the place of your jurisdiction within that. To determine the boundaries of your economic region, you can work with the data professionals at the state LMI agency or Census State Data Center. You are then in a position to seek out data at both the regional and local level.

1.4 A Few Analytic Tools

> "Ninety-nine percent of the time the most powerful statistical technique I use is long division." (A national economic development consultant)

Once you get the data, you have to figure out what to do with them. As the above quote suggests, most analytic work does not require major league statistical analysis – least squares regression and the like. If you were good in high school math, you're in business.

But even if the math is not that advanced, how to prepare good analytic work is not immediately obvious. It is more art than science, and in more ways than one. You need to know which data are important, in light of your assignment, and which are not. There is a multitude of data out there, more every day courtesy of the Internet. You want to avoid being overwhelmed, and pick the wheat and avoid the chaff, so to speak. Chapter Three has been prepared to help you make good choices.

Moreover, you need to know how to analyze and organize from a wide and disparate variety of data sources to tell a coherent, internally consistent, truthful story about your economy, first to yourself, then to your audience. In economic analysis, story-telling is a critical art. Good analysis is not about collecting and organizing data and doing a show and tell. It is about analyzing data and integrating the findings to develop themes, patterns and conclusions that inform decision makers and other readers. The burden of making sense of the data should be on you, not your audience.

There are two types of knowledge in the world – explicit and tacit. ***Explicit*** knowledge can be very easily conveyed from one person to the next. Socioeconomic data are a great example of explicit knowledge – numbers are placed on a page or Web site, and we all can see them. In contrast, the development of ***tacit*** knowledge relies primarily on "learning by doing," and so is not easily conveyed by explicit means. For example, when you get down to it, how well one wields a paintbrush or hits a baseball is largely a function of innate skill and learning by doing. The art of regional economic analysis requires a base of tacit knowledge that includes a sense of knowing what data are important, how to analyze them, and how to piece together what you found into a coherent story. These skills can be enhanced by teaching, but they are mainly developed by doing.

Which brings us back to the analytic tools for doing, the paint brush and the baseball bat, as it were. In economic analysis, the two simplest tools are time series analysis and cross-sectional comparisons. ***Time series analysis***, as the name implies, involves plotting data trends over time for one or more geographic areas or other units (e.g., industries) of analysis. Visually, time series are usually shown in line graphs. Options for the nature of the plot include nominal data (i.e., the actual numbers), percentage change over time from some base year (e.g., where the base year figure is converted to 100), and the ratio between two figures (e.g., a state's per capita income as a percentage of the national figure). Time series analysis provides the basis for understanding how an economy is evolving over time, and in relation to other areas.

If time series tracks trends over time, ***cross-sectional analysis*** examines the distribution of one variable by other variables at one point in time. Typical visual tools include bar graphs and pie charts. Examples of cross-sectional analysis include the distribution of jobs by industry, of population by race, and of income by source. Cross-sectional analysis allows us to understand the structure of our economy. Time series and cross-sectional analyses can be combined, for example, using a line graph to look at the distribution of jobs by industry over time.

The ***location quotient*** is a tool one small step in the direction of analytic complexity. Location quotients are used to measure the extent to which the contribution of one subgroup of economic actors (e.g., an industry, occupational group) to a regional economy is greater or lesser than the contribution of that subgroup to a larger, reference economy (usually, the U.S.). For instance, let's say that the manufacturing sector provided 18.1 percent of all jobs in your region. The U.S. figure is 15.2 percent. So the location quotient is 1.19 (i.e., 18.1/15.2). When used to measure industry concentration, a location quotient is taken as a rough indicator of a region's competitiveness in that industry. The higher the location quotient, the greater the competitive advantage a region appears to have. Plotting location quotients over time for key industries in your economic base is one visual way to gauge changes in relative competitiveness.

You have to be a bit careful as you work with location quotients, as a rise or fall in a location quotient can be spurious. For example, if a region suffers a major job loss with the closure of a large employer that is not replaced, other economic base industries' share of total jobs (and their location quotients) would rise even if their employment is stable, because the total number of jobs (the denominator) has fallen. In this case, an apparent increase in competitiveness is in fact illusory.

Shift-share analysis is a means of attributing change in a region's economy (e.g., change in jobs or earnings) to various factors—change in the nation's economy, the particular industry mix in the region, and the competitiveness of the region's economic base industries compared to similar industries elsewhere. Shift-share analysis involves a substantial amount of long division, too much to lay out here. But straightforward explanations of the how-to of shift-share can be found in references cited at the end of this section.

Economic modeling is the next step up in complexity, a rather large step, and if you are a novice data user for whom this chapter is intended, you are better off hiring someone if you need modeling done. Modeling encompasses a variety of analytic approaches, such as ***input-output analysis*** and ***economic simulation***, that forecast how an economy would behave under certain circumstances. These circumstances may be a specific event in the regional economy (e.g., opening of a new mill, closure of an old one, building of a convention center), a particular type of policy intervention (e.g., change in the property tax rate), or macroeconomic in nature (e.g., shift in the prime rate). A nice summary of approaches to economic modeling can be found on the Web at http://www.edrgroup.com/B23.html.

If you want to educate yourself about tools for regional economic analysis, these resources offer a survey of the basic techniques:

- Bendavid-Val, Avrom, *Regional and Local Economic Analysis for Practitioners*, 4th edition (Praeger, 1991)
- Blair, John P., *Local Economic Development: Analysis and Practice* (Sage Publications, 1995)
- Blakely, Edward James, *Planning Local Economic Development: Theory and Practice*, 2nd edition (Sage Publications, 1994)

- Dandekar, Hemalata C., *Planner's Use of Information* (Planners Press, 1988)
- Hustedde, R., Shaffer, R, and Pulver, G., *Community Economic Analysis: A How To Manual* (Ames, IA: North Central Regional Center for Rural Development, Iowa State University, December 1993)
- McLean, Mary L., *Understanding Your Economy: Using Analysis to Guide Local Strategic Planning* (Planners Press, 1993)
- Richardson, Harry W., *Regional Economics* (University of Illinois Press, 1979)
- University of Minnesota's Economic Development Web site at http://www.hhh.umn.edu/Centers/SLP/edweb/ind_cook.htm

If you want to be adventurous, the following books provide in-depth information on advanced techniques:

- Burchell, Robert W., et al., *Development Impact Assessment Handbook* (Urban Land Institute, 1994)
- Davis, H. Craig, *Regional Economic Impact Analysis and Project Evaluation* (University of British Columbia, 1990)
- Treyz, George I., *Regional Economic Modeling : A Systematic Approach to Economic Forecasting and Policy Analysis* (Kluwer Academic Publishers, 1993)

We started this section by pointing out that regional economic analysis is indeed an art that stems in part from learning by doing. The prerequisite for being an artist is getting the right tools in your toolkit. The above resources will help you stock that toolkit.

While practice is indispensable to gaining proficiency in economic analysis, the move up the learning curve can be greatly speeded by the aid of a mentor, someone who can give suggestions about choosing the right data, using the analytic tools effectively, and telling a compelling story. If you are working in an organization, odds are good that a mentor is available. The large majority of experienced economic analysts are willing, they tell us, to be a mentor to others regarding the methods and techniques of data analysis.

1.5 Perspective – Knowing What Data Can and Cannot Tell You

However impressive the array of economic statistics appears, it is important to become aware of their limitations. First of all, economic statistics are necessarily ***retrospective***. Socioeconomic data describe past, rather than present, economic activity. Some economists liken setting policy using economic data to driving while looking through the rear view mirror.

Moreover, data measure our reality only ***imperfectly***. Despite the best efforts of statisticians and data agencies, almost every published data series is an estimate. Some data, like the population figures reported by the Decennial Census, are extremely

accurate; but at times even these are be adjusted for undercounting of some segments of the population. Most other socioeconomic data are based on sample surveys that inherently contain some amount of sampling error. While most data get published as a single point estimate (e.g., the unemployment rate), these estimates are actually the mid-point of a range of values within which analysts believe reality lies. In addition, many estimates contain non-sampling error—imperfections in the method for asking questions or gathering data that skew the results in some fashion.

The ***conceptual framework***, that is, the set of definitions, used by any data series will structure what those data can and cannot tell us. Data users need to become aware of any limitations. For example, the unemployment rate by itself cannot provide a complete picture of the employment situation, as it does not cover discouraged workers, those who have stopped looking for work.

As another example, the Standard Industrial Classification (SIC) system, the primary means for classifying jobs and earnings by industry, no longer reflects the nation's economic structure. The SIC code was developed at a time when manufacturing dominated the nation's industrial base. While the SIC code offers detailed classifications that remain appropriate for some industries, such as steel mills and breweries, it cannot provide similar detail and an integrated framework for service-producing industries, the importance of which has expanded significantly in recent decades. Under the SIC code, someone who writes a story for a newspaper is working in a manufacturing industry; someone who writes that story for a radio or television broadcast is a communications worker; and someone who writes the same story for a news syndicate is a business service worker. Because of these types of issues, the SIC code is being replaced by a new North American Industrial Classification System (NAICS) that gives due weight to the service-producing industries. However, historical data classified using the SIC code will not be reclassified using NAICS.

It's important to keep in mind that many statistical data are the ***by-products*** of information collected for other purposes. The breadth, detail, frequency, or accuracy of a data set may be limited or constrained by the framework within which the data are collected. For example, most of the data we have on income and employment are generated through laws that impose taxes (e.g., unemployment insurance, income) on these activities. As self-employed proprietors do not contribute to the unemployment insurance (UI) system, they are not counted in the ES-202 data generated by UI payments. The fact that data on exports comes from export declarations prepared for customs purposes imposes certain limitations on what those data can tell us.

Some important economic phenomena are ***not measured*** in a widespread and consistent manner. For example, at present there are no standard nationwide measures of worker skill levels or turnover.

Many economic phenomena are measured, but ***not for small areas***. The smaller your area of focus, the more sparse the data. In fact, data below the county level are very difficult to obtain. Of the three primary federal data agencies, only one, the Census Bureau, publishes subcounty socioeconomic data. And pickings are slim within Census. At

present, seekers of subcounty data have to rely almost exclusively on the Decennial Census, which reports for areas as small as census tracts and block groups. But the Decennial Census comes out only once every ten years, so timeliness is an issue.

There is cause for hope, however. The Census Bureau has begun publishing business establishment data by industry and zip code on CD-ROM. Moreover, the Census Bureau is in the midst of implementing the American Community Survey (ACS), an effort to carry out the Decennial Census "long form" survey on an annual basis. The publication of the ACS will be a terrific boon to analysts of small areas. But, they'll have to wait a while to use those data, which will be ready in the second half of the next decade.

Chapter 2
Data Sources: Where the Numbers Come From

In this section, we discuss the overall framework and history of the federal statistical system, the roles played by each of the three major federal statistical agencies, and other entities that produce socioeconomic data useful to regional analysts.

2.1 It Ain't Always Pretty, But It Works

To understand how to find data, it helps to know how the current arrangements for creating and disseminating data evolved. The federal statistical system is highly ***decentralized***, in contrast to arrangements found in most other developed countries. Over 70 different federal agencies collect, analyze, and disseminate data. This decentralized approach can be traced back to 1866-67, when the precursors to the present statistics units in the departments of Treasury, Agriculture, and Education were created by Congress. These were followed by the predecessor of the Bureau of Labor Statistics in 1884 and the Bureau of the Census in 1902.[3]

Government-sponsored efforts to examine the pros and cons of centralizing the statistical system have been carried out with regularity since 1903. In fact, studies have taken place in every decade in the 20th century, with the exception of the 1910s. While a coordinating mechanism was developed in the 1930s (and now exists as the Statistical Policy Branch of the Office of Management and Budget), centralization itself has never come to pass. Fears regarding the dangers of centralization, the investment of individual data agencies in the status quo, and inertia all have facilitated the continuation of the decentralized approach.

In our decentralized data system, collections of valuable regional socioeconomic data can be found across a large number of federal data agencies. Decentralization does have certain advantages – individual agencies can be more responsive to their particular base of data users and have some liberty to be creative and entrepreneurial and not need to adhere to some government-wide approach.

However, our particular decentralized system, with an ever-changing ad hoc structure and the lack of a central index of information, is not easy to work with. In fact, it's hard for most data users, even those that have been in the field for years, to fully understand what data series exist, where to find them, how they're collected, and how to make sense of data from three agencies that seem to measure the same thing (e.g., employment) and yield different sets of numbers.

[3] Historical information on the federal data system and individual agencies is taken from Janet L. Norwood, *Organizing to Count: Change in the Federal Statistical System* (Washington, DC: Urban Institute Press, 1995).

When we think of the federal data system, a number of images come to mind:

- ***Ad hoc design:*** The system is like an old mansion built just after the Civil War that your extended family has inherited from your great, great-grandparents. Every generation, each branch of the family has added its own wing and interior designs here, and replaced the furniture and the plumbing there. By the present, the house looks like this crazy Rube Goldberg contraption and only the people who have lived in it for a while know how it works, where the rooms are, and what they're for. But because enough people know the system, things function alright and it would be too much trouble and too expensive to tear the house down and build a well-integrated dwelling with a single architectural theme.

- ***Not easily knowable:*** The federal statistical system is like a large, dense tropical rainforest. No one has been through every part of the forest, every part of the forest is constantly changing anyway, there are no forest-wide maps that explain the flora and fauna in any detail, and there are no forest rangers. What you can find, and you have to find them on your own, are these grizzled guides who, through years of experience, know their part of the forest really well and can take you as far as the next valley, at which point they can tell you where the next guide lives, at least he used to live there, and they wish you good luck and Godspeed.

- ***Tell me again, which are the apples and which are the oranges?:*** For a regional data analyst, the variables of the greatest interest are likely to be income, population, employment, and unemployment. These variables are important to the federal government too, so much so that for a number of them, more than one statistical agency, and sometimes more than one unit of the same agency, produce their own data series. Not surprisingly, the data in each of these series differ, sometimes significantly, from one another; the results can be confusing to an analyst. Differing numbers come about in part because each series uses a distinct methodology, and usually there is a good reason to do so. For example, one series may use sampling as a means of getting an estimate out only a few weeks later, whereas another requires a year or two to gather and organize detailed data from the full universe. Moreover, differences between data series often occur because the definition of what is being measured varies from one data series and agency to the next. For example, the terms "employment" and "income" at the Bureau of Economic Analysis mean something different from what they mean at the Bureau of the Census and the Bureau of Labor Statistics. The burden is on the analyst to be aware of the definitions used by various data series, and know how to use these series in combination to come up with her or his own interpretation of reality.

If our federal data system has its frustrations, it does work. Much of the data you need to tell the story of your economy are available, affordable, and released in a timely manner. But to know where to go and how to interpret the data, you need to learn the ins and outs of the data system, in all its idiosyncrasies.

In our experience, the federal system for subnational data functions as well as it does because the large majority of the statistical agency staff are hard-working, dedicated people who care passionately about their particular corner of the data world. They try to do a good job in challenging circumstances, and most of the time they succeed.

In the next sections, we give an overview of the players in the federal statistical system, as well as important providers of nonfederal data. We begin by looking at the three federal statistical agencies with primary responsibilities for providing regional socioeconomic data – the Bureau of the Census, the Bureau of Labor Statistics (BLS), and the Bureau of Economic Analysis (BEA).

2.2 The Big Three

To a large extent, the data most frequently used by regional analysts are produced by Census, BLS and BEA. Each agency has a different focus, scope, and approach to its efforts.

- The primary function of the Census Bureau is to wade into the real world, surveys in hand, and count people (e.g., by age, race, and educational attainment), look at quality of life (e.g., housing, health, and crime), and measure economic activity (e.g., income, firms, jobs, and capital investment). More than any other statistical agency, the Census Bureau examines and describes the detailed patterns of American lives and businesses at every level of geography. For the most part, the Census Bureau does primary research, that is, its staff collect their own data rather than using data gathered by other (secondary) sources.

- The focus of BLS is right in its title, labor statistics. BLS measures people at work – how many, in what industries, and with what earnings and purchasing power. BLS also relies on primary data, but it utilizes the Census Bureau and state employment security agencies to do the collection and much of the analysis, following BLS guidelines.

- Unlike Census and BLS, BEA produces one big, complex, integrated data set. Think of BEA as our national economic accountant, reconciling the nation's disparate financial and economic data into a single set of balanced accounts that provides a comprehensive view of the nation's economic activity. Among the Big Three, BEA offers the widest view of economic activity, measuring variables (e.g., proprietorships, military employment) the other agencies do not. BEA relies almost entirely on secondary data

provided by agencies throughout the federal government, including Census and BLS.

Census Bureau

The Census Bureau, part of the Department of Commerce, is the largest federal statistical agency. For fiscal year (FY) 1998, Census had an overall budget of approximately $895 million, over a fifth of which came from reimbursement from other federal agencies or the private sector. In that year, about half of the Bureau's direct funding went towards preparation for the 2000 Census. For FY1999, the budget will jump to about $1.4 billion, of which $860 million will be for the 2000 Census.

It may surprise you to know that there was no permanent Census Bureau until 1902. The Decennial Census is the only data collection effort called for by the U.S. Constitution. Data for the early Decennial Censuses were gathered by U.S. marshals; in the 19th century, that job was transferred to the statistical agencies of state governments. In 1902, Congress created a permanent Census Bureau to staff and carry out the Decennial Census, and also to collect and publish other data regarding the U.S. population and economy.

Three types of Census Bureau data series are of particular interest to regional economic analysts – population, business activity, and housing. ***Population*** data series cover population size, personal characteristics (e.g., race, sex, age, educational attainment, occupation), and household characteristics (e.g., composition, income). Population data series include:

- Decennial Census of Population and Housing – the census of the entire U.S. population, carried out every ten years
- Population Estimates Program – an annual series of population estimates and projections, carried out in cooperation with states
- Small Area Income and Poverty Estimates Program – a periodic effort to model household income and poverty rates for counties
- Annual Demographic Survey of the Current Population Survey (CPS) – a survey of a sample of households that produces income and population characteristics data
- American Community Survey (ACS) – a soon-to-be nationwide monthly survey, with annually published results, using the Decennial Census long form

Business activity data series describe, by industry, the aggregate size of the industry (in terms of jobs or value of shipments, for example), the number of companies and establishments, and measures of various aspects of business operation (such as cost of raw materials, investments in building and equipment, and imports and exports). Key business activity data series include:

- Economic Census – a census of most U.S. businesses, carried out every five years
- County Business Patterns – an annual series of employment and wages by industry
- Annual Survey of Manufactures – a yearly profile of manufacturing industry activity
- Export statistics – export activity by location

Housing data series describe housing types, conditions, ownership, costs, occupancy, and other characteristics. Important housing data series from the Census Bureau include:

- Decennial Census of Population and Housing
- American Housing Survey – periodic survey of housing characteristics in specific metropolitan areas (conducted on behalf of the Department of Housing and Urban Development)
- Construction statistics – residential construction permits and valuation, and sales of one-family houses
- Housing vacancy and homeownership – annual survey producing rates of housing vacancy and homeownership

As an aid to data users, the Census Bureau regularly prepares data compendia that organize a wide variety of data series from Census and other sources. The most well-used compendium is the *Statistical Abstract of the United States*. Other Census compendia are organized at the geographic level and include *County and City Data Book*, *State and Metropolitan Area Data Book*, and *USA Counties*.

Census also provides a digital mapping database, called Topologically Integrated Geographic Encoding and Referencing (TIGER). The TIGER database contains geographic features such as roads, railroads, rivers, lakes, political boundaries, and census statistical boundaries, covering the entire United States.

Most of the Census data are available on-line, though the form of availability (text, spreadsheet, .html, or .pdf) will vary by data series. The Census Web site, like the federal data system as a whole, is organized on a somewhat ad hoc basis. Finding what you want can take a bit of time. A good place to begin is the A-Z index of Census Web sites, at http://www.census.gov/main/www/subjects.html. Many Census data series also can be purchased in CD-ROM format. The full list of Census data products can be viewed on-line at http://www.census.gov/mp/www/censtore.html.

Through a variety of mechanisms, Census offers outside data users access to its "microdata," that is, data on individual persons, households, and establishments, with proper protection for confidentiality. The Census Bureau sells CD-ROMs and computer tapes of Public Use Microdata Samples (PUMS) from the Decennial Census, the American Housing Survey, CPS, and the Survey of Income and Program Participation (SIPP). It also provides on-line access to these data. The Census Bureau has two units, the Center for Economic Studies and Statistics of U.S. Business, that provide analysis, on a reimbursable basis, of corporate and establishment microdata from the Economic

Census and the source file for County Business Patterns, respectively. These various microdata sources are discussed in more detail in Chapter 9.

Bureau of Labor Statistics

BLS, part of the Department of Labor, is the second largest provider of socioeconomic data in the U.S., after the Census Bureau. In FY1998, the agency's budget was approximately $403 million. A good portion of BLS funding is given to the Census Bureau to manage the Current Population Survey (which provides monthly labor force status data) and to state employment security agencies to collect and analyze employment data.

The organization that became the Bureau of Labor Statistics was created by Congress in 1884. Amazingly concise by today's standards, the 1888 language laying out the purpose of the agency remains in the U.S. Code, and is interesting to read in its entirety:

> The general design and duties of the Bureau of Labor Statistics shall be to acquire and diffuse among the people of the United States useful information on subjects connected with labor, in the most general and comprehensive sense of that word, and especially upon its relation to capital, the hours of labor, the earnings of laboring men and women, and the means of promoting their material, social, intellectual, and moral prosperity.

BLS provides three types of data series of interest to regional analysts – labor force status of persons (by place of residence), jobs and wages (by place of work), and prices and living conditions. ***Labor force*** data are prepared monthly through the Local Area Unemployment Statistics (LAUS) program and describe labor force participation, employment, unemployment, and unemployment rate.

Job and wage (place of work) data are available through a variety of BLS-sponsored programs, including:

- Covered Employment and Wages (ES-202) – a quarterly collection of job and wage data from all employers participating in state unemployment insurance (UI) programs
- Current Employment Statistics (CES) – through a monthly survey, an estimation of job levels and hourly wages, by industry
- Occupational Employment Statistics (OES) – through an annual survey, an estimation of number of positions and average hourly wage by occupation, by industry
- National Compensation Survey (NCS) – annual survey of regions to determine wage and benefit data by occupation, with regions surveyed on a rotating basis
- Mass Layoff Statistics – monthly and quarterly data on mass layoff events, separated workers, and persons filing UI claims, for states and areas

The two key BLS data series on ***prices and living conditions*** are:

- Consumer Price Index (CPI) – an index of changes in the cost of various categories of consumer items
- Consumer Expenditure Survey – average annual consumer expenditure data, by detailed type of goods and services

While the BLS Web site is somewhat easier to grasp and navigate than that for the Census, the BLS site does not provide on-line access to several key data series (including ES-202). As with the Census site, the form in which the BLS data are available depends on the program. For several programs (LAUS, CES, and CPI), data can be retrieved by specifying, in a series of steps, the type of data and specific region you want, and then retrieving the results as a .html file or spreadsheet file. Other series are offered in text format, and a small number are in Adobe Acrobat (.pdf) format. If you are not quite sure where to look on the BLS Web site, a good place to start is http://www.bls.gov/proghome.htm.

Unlike Census and BEA, BLS does not provide its data in a CD-ROM format. If you want a published data series that is not available on-line, you can order the print version by calling the Chicago regional office of BLS at (312) 353-1880.

Bureau of Economic Analysis

BEA is part of the Department of Commerce. In part because it has few primary data collection responsibilities, BEA is the smallest of the Big Three, with a FY1998 budget of approximately $51 million. While nearly all data collected by Census and BLS are available for use in subnational analysis, the same is not true at BEA. BEA is broken into four major units – national, industry, international, and regional accounts. Though work in one unit may inform that in another, the portion of the budget devoted to the collection and preparation of data that can be used for subnational analysis is significantly smaller than the whole.

BEA's role as the nation's economic accountant came about in the 1940s. The agency's approach was based on the national income and accounts framework developed by Simon Kuznets, who won the Nobel Prize for his work in 1971.

BEA has several major data products of value to regional economic analysts. The Regional Economic Information System (REIS) is the most comprehensive of the federal income and employment data series. REIS provides income data broken out by sources other than jobs earnings (including investment income and transfer payments) and job data beyond wage and salary jobs (including proprietorships and military employment). In producing REIS, BEA makes extensive use of data that are by-products of the administration of various federal and state programs, including unemployment insurance, Social Security, federal income taxes, veterans benefits, and military payroll.

BEA produces several other data products that reflect its role as the nation's economic accountant. These are useful to more sophisticated regional data users, and include:

- Regional Input-Output Modeling System (RIMS II) – output, earnings and employment multipliers by industry (471 detailed industries, 38 industry aggregations)
- Gross State Product (GSP) – estimates of gross state product and its components for two-digit SIC categories
- Foreign Direct Investment (FDI) – number, employment, payroll, and shipments or sales of foreign-owned U.S. establishments, by industry

Until recently, BEA prepared projections of employment, income, and GSP by state. However, this series recently has been discontinued, due to budget cuts.

The most efficient way to get the entire REIS database is to purchase the CD-ROM from BEA. In a boon to data users, the University of Virginia has a very user-friendly Web site that provides REIS data for individual geographic areas down to the county level (.html and spreadsheet format), at http://fisher.lib.Virginia.EDU/reis/.

To grasp what BEA offers on-line, and what it does not, you need to visit two Web pages, the first at http://www.bea.doc. gov/bea/uguide.htm#_1_25 and the second at http://www. bea.doc.gov/bea/dr1.htm. State REIS files can be downloaded in .zip format from the site. GSP data are available in text format on-line. FDI data are available in print only. RIMS II data must be purchased from BEA staff, who prepare a multiplier set for a specific geographic area on a purchase-order basis.

2.3 Significant Others

While the Big Three are the most important purveyors of regional socioeconomic data, by no means are they the only ones. A number of other federal agencies provide specialized regional data (e.g., concerning transportation and health). In addition, many state and local government agencies collect and make available data not collected through federal programs. Finally, numerous private-sector sources publish proprietary data series.

Other Federal Agencies

In FY1998, the combined budget for statistical activities across the federal government was $3.1 billion. Over 70 federal agencies have responsibility for collecting, analyzing, and publishing statistics. The efforts of many of these agencies can be relevant to regional data analysts with particular needs. One way to view who does what on the federal data scene is to visit the Web site maintained by the Federal Interagency Council

on Statistical Policy, at http://www.fedstats.gov/.[4] A sample of agencies with useful regional data series includes:

- Department of Agriculture, National Agricultural Statistics Service – data on farm activities and prices
- Department of Education, National Center for Education Statistics – data on educational programs, achievement, attainment, and spending
- Department of Energy, Energy Information Administration – state energy consumption profiles, and data on energy production and reserves
- Federal Financial Institutions Examination Council (FFIEC) – Community Reinvestment Act (CRA) regional reports on small business and small farm loans, and a National Information Center with information on individual banks
- Department of Housing and Urban Development – a database on American cities and suburbs, and an on-line library
- National Science Foundation, Division of Science Resources Studies – data on R&D expenditures and workforce, science and engineering education, and patent activity
- Small Business Administration – profile of each state's small business economy
- Department of Transportation, Bureau of Transportation Statistics – the National Transportation Data Archive, a central resource for transportation statistics
- Department of Treasury, Statistics of Income Division – annual individual income tax data for states and counties, and state-to-state and county-to-county migration data on a year-to-year basis

Each federal agency's approach to data access is determined independently. Many agencies have very sophisticated, user-friendly Web sites.

While the FedStats site is helpful, its list of links for subnational statistics is relatively short. Unfortunately, the federal government does not have a comprehensive, detailed index of what regional data are provided by what agencies, and how to access them. So we created our own index. Web links to various agencies that produce regional data can be found at the Web site associated with this guidebook.

[4] A more detailed, though less comprehensive, guide to federal data series is buried in Appendix B (pp. 290-301) of the *Census Catalog & Guide: 1997*, published by the Census Bureau (Washington, DC: Government Printing Office, July 1997). This section, entitled "Federal Statistical Reports by Agency," gives detailed summaries of various data series and reports from eight agencies other than Census (which is covered in great detail in the body of the catalog itself). However, the section does not focus on regional data per se, and is limited in the number of data sources covered. Still, it provides a useful overview of the work of those agencies included. You can download the document at in Adobe Acrobat (.pdf) format at http://www.census.gov/prod/www/abs/catalogs.html.

State and Local Government Agencies

State and local governments often undertake regular or one-time analytic efforts to fill in gaps in federal data series, meet statutory requirements, or address other needs. Such efforts may involve primary data collection (e.g., a population census), utilize existing data (e.g., sales tax records), or use existing federal and state data to model demographic or economic activity. The nature of these activities can best be determined by asking. A good place to start your inquiry is your lead State Data Center, listed in Appendix A.

Private Sources of Data

There is a multitude of private for-profit and nonprofit providers of regional socioeconomic data, many of which are listed at our Web site. The categories of private sector data series include demographic and consumer profiles, industry profiles, economic modeling, cost-of-living data, international trade data, and sector-specific data (e.g., real estate and construction, finance, tourism). Some of these data series are attempts to add value to federal and other secondary data through manipulation (e.g., reorganization, modeling). Others are the result of the independent collection and publication of primary data.

For regional economic analysis, these various nongovernmental data series can be useful adjuncts to, but not substitutes for, federal data. In our view and the view of respondents to our data users survey, the comprehensiveness, depth, trustworthiness, and regularity of federal data cannot be surpassed by the private sector. Moreover, while some nongovernmental data are available for free, most are relatively costly. After all, these organizations' data efforts are not supported by taxpayer dollars.

2.4 OK, It's Time to Put Your Boots On

At the beginning of this chapter, we compared the federal system for regional socioeconomic data to a dense, confusing forest. Continuing with the analogy, the aim of this book is to provide you with a guide to the trails, vistas, and precipices of that forest. Chapter One gives you suggestions for the provisions you want to pack on your trip. This chapter provides you with an overview of the terrain, like one of those pullout maps in the back of a guidebook. In Chapter Three, we take you on a hike through the forest itself. And Chapter Four gives you a list of suggestions for other guides you might want to use when you have a specific destination in mind. Let's hit the trail.

Chapter 3
Statistics for Analyzing Your Economy

3.1 Introduction – The Dimensions of Economic Activity and Well-Being

Having discussed how to use data and who produces data, it's time to move to the heart of the matter – the data themselves. Analysts wanting to gain an understanding of the workings of a local economy usually do so by developing a statistical grasp of various dimensions of economic activity and well-being. This chapter is structured around eight categories of socioeconomic data. In each category, we discuss key variables and definitions, and profile a number of valuable data series in terms of characteristics such as measures provided, level of geographic detail, frequency of release, and means of access.

We begin by reviewing the three most basic of socioeconomic data categories, the ones that almost all analysts work with:

- ***Demographics*** – population change (growth, decline), the components of population change (migration, births, deaths), and population characteristics (of which there are many, such as age, race, gender, and educational attainment)
- ***Employment and unemployment*** – numbers of jobs, by industry and occupation, and numbers of people who are employed, unemployed and looking for work, and unemployed and happy to be that way
- ***Income and earnings*** – annual income (from a variety of sources, including work, income, and transfer payments), and hourly wages by occupation

We then move beyond the basics to other categories of economic activity, including:

- ***Cost of living*** – change in the cost of living in one location over time, and comparisons of the cost of living in various locations at the same point in time
- ***Business operations*** – inputs (e.g., cost and types of materials and energy, capital expenditures) and outputs (e.g., value added, value of goods and services produced) of the key industries in an economy
- ***Foreign trade exports*** – level of exports in state and metro economies
- ***Economic resource base*** – the key building blocks for economic health, including research and development, education, and finance
- ***Quality of life*** – how well people live, in terms of housing, health status, and public safety

The Basics

3.2 Demographics

Understanding demographic trends in your region is valuable for several reasons. First, it's important to know your constituency in terms of basic characteristics such as age, sex, and race. Second, you can track the impacts of regional economic trends, such as the relation between job growth and net migration. Third, as a region's residents likely provide a large portion, if not the majority, of its labor force participants, it's helpful to know work-relevant attributes such as years of education.

We can divide demographic data for economic analysis into two categories. The first concerns ***population size and the components of change*** (migration, births, and deaths). The second category covers ***population characteristics*** such as age, race, gender, marital status, and educational attainment.

Population Size and Components of Change

The two primary sources of data on population size and components of change are the Population Estimates Program of the Bureau of the Census, and the agency (or university center) in your state responsible for demographic analysis. The Census Bureau does a good job of updating and making accessible annual population estimates for states and areas. Some state demographic analysts differ from the Census Bureau in methodological approach. It is worth talking to the analysts in your state to understand the whys and wherefores of their approach as compared to that of the Census Bureau.

Migration data provided by the Statistics of Income (SOI) Division of the Internal Revenue Service (IRS) can be a valuable adjunct to the Census Bureau estimates. While the Census Bureau estimates net domestic migration (in-migrants from other areas in the U.S. less out-migrants to other areas in the U.S.), the SOI Division can provide tables that show gross domestic migration (in-migration flow, out-migration flow) from county to county and state to state across the U.S. These tables are possible because the IRS has our tax returns, and can track changes of address from year to year.

For each data source listed below, we furnish a profile that includes measures provided, level of geographic detail, frequency of release, method of data collection, means of access to the data, and contacts for assistance.

1. Population Estimates Program, Bureau of the Census

   - Measures: Current population (as of July 1) and components of change, including births, deaths, net domestic migration, and net international migration
   - Geography: States, counties, metropolitan areas, places (population estimates only), and county subdivisions (population estimates only)
   - Frequency: Annual

- Method: Utilizes existing data series (such as vital statistics, federal tax returns, Medicare enrollment, and immigration) to update Decennial Census counts. Estimates developed through the Federal-State Cooperative Program for Population Estimates.
- Access: Population Estimates and Projections series (P25), available at http://www.census.gov/population/www/estimates/popest.html
- Assistance: Population Division, (301) 457-2422 or pop@census.gov

2. State governments

   Many state governments sponsor development of independent estimates of state and substate population and components of change. Often, such efforts are carried out at a state university or the state planning agency. To find state-generated demographic data, you can begin by checking with your lead State Data Center. (See list in Appendix A. Links and contact information also available at http://www.census.gov/sdc/www/sdctxt.html.)

3. Statistics of Income Program, Internal Revenue Service, Department of the Treasury

   - Measures: Year-to-year gross domestic migration flows (inflows, outflows)
   - Geography: County-to-county and state-to-state for entire U.S.
   - Frequency: Annual
   - Method: Uses Form 1040 returns to identify year-to-year address changes for taxpayers and their families
   - Access: Spreadsheet available for purchase, may be downloaded. For information, go to http://www.irs.ustreas.gov/prod/tax_stats/soi/soi_pub.html.
   - Assistance: Statistics of Income Division, (202) 874-0410

Characteristics of Population

The two primary federal sources of current data on population characteristics are the Population Estimates Program and Current Population Reports, both efforts of the Population Division of the Census Bureau. The Population Estimates Program provides annual estimates of population by age, sex, race, and Hispanic origin for all states and counties, and is easily accessible via the Web. Current Population Reports (report series P20) provides data on educational attainment for states and larger metro areas.

The Population Estimates Program works only with secondary data sources that are available for all localities across the country. Using the Decennial Census as the starting point, the Program makes annual adjustments on the basis of a variety of existing public records, such as vital records and tax returns, that collectively cover the entire U.S. population.

Current Population Reports data are drawn entirely from one source of primary data, the Current Population Survey (CPS). The CPS asks selected respondents a variety of questions not addressed in public records, such as marital and family status, educational attainment, and geographic mobility. The CPS sample, covering 50,000 households, is quite small compared to the U.S. population as a whole. Therefore, Current Population Reports publishes population characteristics data primarily for the nation and multi-state regions, with educational attainment being an exception.

A third, but usually out-of-date, source of data on population characteristics is the Decennial Census. The Decennial Census can provide more detail, both in terms of population characteristics and geography, than the two sources previously mentioned. Through the "long form" survey, it asks detailed questions, of the type asked by the CPS, of 17 percent of U.S. households (about 16 million households in 1990), which allows it to provide extensive small area coverage. However, as we know, Decennial Census data rapidly become out of date. These data are most useful in the second quarter of any decade, most recently from the release of the 1990 data (primarily in 1992) through 1994.

To address the issues mentioned above – lack of adequate detail in the annual series and the lack of timeliness of the Decennial Census – the Census Bureau is in the process of implementing the American Community Survey (ACS). The ACS is a monthly survey, with annual data publication, using the long form of the Decennial Census questionnaire. At full implementation, the ACS will achieve the same sample size as the Decennial Census – 17 percent of households. In 1996, the Census Bureau began to develop the ACS at four sites around the U.S., and has since added six more sites. By 2002, population characteristic estimates generated by the ACS will be available for all states and large metro areas; by 2008, estimates will be available for the smallest areas of the country. The Census Bureau is continually adding sites for the ACS. For those of you lucky enough to be in those areas, results are available on the ACS Web site.

You also might check if your state demographic agency independently produces population characteristic data. If it does, it is worth your while to understand its methodological approach compared to that of the Census Bureau.

1. Population Estimates Program, Bureau of the Census

- Measures: Population (as of July 1) by age, sex, race, Hispanic origin
- Geography: States, counties, places and minor civil divisions
- Frequency: Annual
- Method: Utilizes existing data series such as births, deaths, federal tax returns, Medicare enrollment, and immigration, to update Decennial Census counts. Estimates developed through the Federal-State Cooperative Program for Population Estimates.
- Access: Population Estimates and Projections series (P25), available at www.census.gov/population/www/estimates/popest.html
- Assistance: Population Division, (301) 457-2422 or pop@census.gov

2. Educational Attainment in the U.S., Current Population Reports (report series P20, Population Characteristics), Bureau of the Census

   - Measures: Population by educational attainment (percent with high school diploma, percent with bachelor's degree). For 25 largest states and 15 largest metro areas, educational attainment provided by age, sex, race and Hispanic origin.
   - Geography: States and metro areas
   - Frequency: Published reports provided annually, based on March data. However, metro tables in recent reports remain blank, awaiting recalculation based on new metro area definitions.
   - Method: Data collected in Annual Demographic Survey (CPS March supplement), through interviews with 50,000 households. The CPS is a joint effort of BLS and Census, and is carried out by Census.
   - Access: Recent annual reports can be downloaded at http://www.census.gov/prod/www/abs/ed-attn.html. Historical data (1940-93) can be obtained in print by ordering report P20-476 at (301) 457-4100.
   - Assistance: Current Population Survey, (301) 457-2422 or cpshelp@info.census.gov

3. Decennial Census, Bureau of the Census

   - Measures: Population by age, sex, ethnicity, race, marital and family status, veterans status, years of school completed, geographic mobility, journey to work, and other variables (as of April)
   - Geography: States, metro areas, counties, urbanized areas, cities, places, minor civil divisions, census tracts, zip codes, block groups, and other bounded areas
   - Frequency: Data collected in years ending in "0"
   - Method: Certain data through census of entire U.S. population ("short form"). Other data collected through survey ("long form") of one-sixth of households.
   - Access: For the 1990 Census, http://venus.census.gov/cdrom/lookup
   - Assistance: Population Division, (301) 457-2422 or pop@census.gov

4. American Community Survey, Bureau of the Census

   - Measures: Same variables as found above for Decennial Census
   - Geography: Eventually, the ACS will cover the same geographic areas as found above for the Decennial Census. The ACS is being implemented in four phases: demonstration period, 1996-1998 (ten sites); comparison sites, 1999-2001 (31 sites); national comparison sample, 2000-2002 (all states and geographic areas or population groups of 250,000 persons or more); and full implementation nationwide, 2003 and beyond. Full implementation for data collection in every

county is planned to start in 2003. By 2004, data will be available for all areas and population groups of 65,000 or more. For smaller areas, it will take two to five years to sample the same number of households as sampled in the Decennial Census. For small areas and population groups of 15,000 or less, it will take five years to accumulate a large enough sample to provide estimates with accuracy similar to the Decennial Census. Therefore, updated information for areas such as neighborhoods will be available starting in 2008 and every year thereafter.

- Frequency: Annual estimates to be provided for all states, cities, counties, metropolitan areas, and population groups of 65,000 persons or more. For smaller geographic areas, rolling multiyear estimate of characteristics to be provided annually.
- Method: Monthly mail survey with telephone follow-up. (No address will receive survey more than once in five years.) Detail on methodology available at http://www.census.gov/CMS/www/index_b.htm.
- Access: Regional data are available on-line as they are prepared. For currently available data, see http://www.census.gov/CMS/www/index_c.htm. ACS microdata will be available through CD-ROM and other media. See http://www.census.gov/CMS/www/index_a.htm for ACS updates.
- Assistance: (888) 456-7215 or ACS@Census.Gov

3.3 Employment and Unemployment

Employment data provide the foundation for any regional economic analysis. In large part, a region's economic activity and well-being are a function of the number and types of jobs available. Moreover, knowledge of trends in the distribution of jobs by industry, and the nature of that distribution relative to other areas, is critical to understanding a region's competitive advantages, or lack thereof, and prospects for future economic activity.

Employment data sources can be divided into two categories, differentiated by perspective. In the first category, data are by ***place of residence***, that is, where members of the labor force live. In the second, data are by ***place of work***, that is, where the jobs are physically located. Employment by place of residence can be differentiated from employment by place of work in that the former measures "employed persons" and the latter measures "jobs." One job can be full-time or part-time, and one employed person can hold down more than one job.

For any of several reasons, the number of employed persons in a region usually will not match the number of jobs. One person can have two or more jobs. Workers can live in one area and commute to work in another. Most place-of-work data series count only wage and salary jobs, not self-employed people. One of the skills of experienced data analysts is to be able to take employment data from various sources, and figure out a way to work with them to develop one consistent story about the region's economy.

Labor Force Status by Place of Residence

For labor force data by place of residence, the "universe" is the ***civilian noninstitutional population***, persons 16 years and older who are not in jail or chronic-care hospitals. This population is divided into those who are in the ***labor force*** and those who are not. The ratio between the labor force and the civilian noninstitutional population is the ***labor force participation rate***. The labor force is composed of those with a job, the ***employed***, and those without a job and actively looking for one, the ***unemployed***. Persons without a job and not looking for one are not considered to be in the labor force.

Labor force data are important indicators of regional economic performance. They tell us how quickly the labor force is growing, the extent to which people are able to find jobs, the extent to which people are dropping out of the labor force, and the characteristics of the people unable or not wanting to find work.

At present, we have one primary source of current employment data by place of residence, the Local Area Unemployment Statistics (LAUS) Program in the Bureau of Labor Statistics (BLS). The LAUS Program generates two related data series. The first is monthly estimates of labor force, employment and unemployment for states, labor market areas (LMAs), counties, and cities. This series, known to most users as "LAUS data," is prepared by state labor market information (LMI) agencies using BLS guidelines. Estimates are derived from some combination of four sources, depending on the geographic area – the CPS, unemployment insurance (UI) claim data, the Current Employment Statistics (CES) survey of establishments, and ES-202 data. (For these last two sources, see descriptions in section on jobs by place of work.) As estimates are based largely on samples and extrapolation, the estimates tend to be more reliable for the more populous areas.

The second data series, known as the Geographic Profile (GP), contains annual estimates of state and large metropolitan area labor force characteristics, many of which are not found in monthly LAUS data. These estimates are based only on the CPS, so they are not strictly compatible with the LAUS data. Estimates provided by the GP, but not LAUS, include civilian noninstitutional population (allowing the estimation of the labor force participation rate) and the distribution of the labor force by occupation, industry of employment, population characteristic (age, sex, race, and Hispanic origin), and full- and part-time work. GP data are contained in an annual print publication, *Geographic Profile of Employment and Unemployment.* While only those estimates that meet BLS standards for reliability are published in this document, the full set of data series used in the document's development are available on-line.

The Census Bureau, through the Decennial Census, provides detailed information about characteristics of the employed, unemployed, and those not in the labor force. Again, however, these data quickly become out of date. However, the emergence of the ACS should allow local analysts to gain valuable insights regarding characteristics by labor force status not available from current sources.

1. Monthly labor force estimates, Local Area Unemployment Statistics Program, Bureau of Labor Statistics, prepared by state LMI agencies

   - Measures: Labor force, employment, unemployment, and unemployment rate
   - Geography: All states, metropolitan statistical/primary metropolitan statistical areas, counties and county equivalents, cities of 25,000 population or more, and all cities and towns in New England
   - Frequency: Monthly estimates, with calendar year annual averages
   - Method: Estimates based on some combination of data from the CPS, UI claim data, the CES survey, and ES-202 data. Method varies by type of geographic area. Estimates developed through a federal-state cooperative program.
   - Access: From state LMI agencies (see Appendix B) and from BLS on-line at http://www.bls.gov/lauhome.htm
   - Assistance: State LMI agencies, or BLS LAUS Program at (202) 606-6392 or lausinfo@bls.gov

2. Geographic Profile, LAUS Program, Bureau of Labor Statistics

   - Measures: Civilian noninstitutional population; labor force participation rate; employment status of the civilian noninstitutional population by sex, age, race, Hispanic origin, occupation, industry, and hours worked
   - Geography: States, 50 large metropolitan areas, and 17 central cities
   - Frequency: Annual
   - Method: Derived from monthly CPS data
   - Access: Print publication (*Geographic Profile of Employment and Unemployment)* available from BLS at 312-353-1880 x0. FTP files available at ftp://ftp.bls.gov/pub/time.series/gp/.
   - Assistance: LAUS Program, (202) 606-6392 or lausinfo@bls.gov

3. Decennial Census and American Community Survey, Bureau of the Census

   - Measures: Characteristics of the population by labor force status, including sex, race, presence and age of children, hours worked, weeks worked, and class of worker
   - Geography: States, metro areas, counties, urbanized areas, cities, places, minor civil divisions, census tracts, zip codes, block groups, other bounded areas
   - Frequency: Census data published for years ending in "0." ACS data will be published annually, as described in section 3.2.
   - Method: Data derived from sample survey of U.S. population
   - Access: Data from the 1990 Census can be accessed at http://venus.census.gov/cdrom/lookup. As they become available, data from ACS can be accessed at http://www.census.gov/CMS/www/index_c.htm.
   - Assistance: For Decennial Census, the Population Division at (301) 457-2422 or pop@census.gov. For ACS, (888) 456-7215 or ACS@Census.Gov.

Employment by Place of Work

Employment data by place of work are very valuable as descriptors of economic performance and structure. Change in the overall number of jobs is a key measure of economic performance. Further, analyzed through tools such as time series and cross-sectional analysis and location quotients, job data are critical for understanding industry-specific job trends in a region's economic base, or traded sector. The traded sector is composed of those portions of the regional economy (e.g., manufacturing, tourism) that compete in markets that extend beyond the region itself and so generate the income that supports the non-traded portion of the economy (e.g., movie theatres, beauty salons). Review of trends in a region's economic structure allows analysts to understand the reasons for recent economic performance and decision makers to take actions that promote a strong traded sector.

The federal government provides four valuable sources of employment data by place of work:

- Regional Economic Information System (REIS) employment data, from the Bureau of Economic Analysis (BEA)
- Current Employment Statistics (CES) data (also known as BLS-790), provided through BLS and state LMI agencies
- Covered Employment and Wages (ES-202) data, also provided through the BLS and state LMI agencies
- County Business Patterns, from the Census Bureau

While each of these data sources measures the same phenomenon, generally speaking, they differ significantly from one another in many ways: type of jobs covered, industry sectors covered, level of geographic detail provided, level of industry detail provided, method of data collection, and frequency of release. Along each of these various dimensions, one source has a competitive advantage over the others. However, no source is the "best" for all occasions. Which ones you use depends on the nature of your needs. Often, analysts will use several in combination. One of the tricks of the analytic trade is to use data from these various sources to paint a consistent picture of regional job trends.

We can look at the relative strengths of the four sources of jobs data along the various dimensions identified above:

Breadth of jobs covered – The REIS employment series has the most comprehensive coverage of the four sources. REIS data encompass employment from all sources, including farming and nonfarming, military and civilian, proprietorships (self-employment) and wage and salary employment. CES and ES-202 cover nonfarm civilian wage and salary employment only. Because it draws on existing data sources, County Business Patterns has the most narrow coverage of all – nonfarm, private sector wage and salary workers, not including railroads.

Frequency and speed – Among the four sources, CES data are issued the most frequently (monthly) and with the least lag time between observation and publication (a matter of

weeks). On the other hand, ES-202 data (quarterly) are issued six-to-nine months after the period of observation; REIS state data (annual) come out about eight months after year's end, with metro and county data following eight months later; and County Business Patterns (annual) is published two years after the fact.

Sample size and accuracy – REIS, ES-202 and County Business Patterns each utilize establishment records that encompass the entire universe of their coverage, i.e., a 100 percent sample. So there is no sampling error; accuracy is a function of the accuracy of the records used. The ES-202 data are based on data provided with UI premium payments made by all employers. REIS relies entirely on administrative records collected by others, such as ES-202 and IRS data. County Business Patterns relies largely on a variety of Census Bureau-based establishment records.

Because each uses different records, ES-202 data can differ significantly from County Business Pattern data. For example, an establishment coded for one industry in ES-202 files can be coded for another in Census Bureau files. Moreover, while the REIS and the ES-202 data are annual averages, County Business Patterns data indicate employment levels for one week in mid-March.

The CES Program is the only one of the four series that uses a sampling approach, a monthly survey of a sample of over 390,000 establishments nationwide. The CES is specifically designed for speed, seeking to capture an image of employment patterns in near real time. While complete accuracy is consciously sacrificed for frequency and speed, CES estimates usually are quite well corroborated by the more extensive ES-202 data issued some time later. In fact, our survey of data users indicates that respondents think CES is only slightly less accurate than the three other sources.

Industry and geographic detail – Theoretically, ES-202 data provide the highest level of industry and geographic detail, up to four-digit SIC codes for any geographic area (including zip codes). We say theoretically, because getting at the data can, to use an economists' phrase, have high transaction costs. (See below for ES-202 access issues.)

County Business Patterns also provides up to four-digit detail, and through a relatively new CD-ROM product, at various levels of geography, down to the zip code level. But, other than for zip codes, it cannot provide data on the subcounty level, in contrast to ES-202 data.

CES, because it is based on a sample, cannot provide the same level of industry and geographic detail as the previous two data sources. CES covers states and metropolitan areas, primarily at the one- and two-digit industry level.

REIS has extensive geographic coverage (all states, metro areas, and counties), though at a low level of industry detail compared to the other data sources – two-digit at the state level, and one-digit at the metro and county level.

For decades, the U.S. government has published the Standard Industrial Classification (SIC) code, the set of detailed industry codes used to classify businesses by their principal products. Within the next few years this venerable, though increasingly dated,

classification system will be replaced by a new scheme designed to more accurately characterize contemporary economic activity. The new classification system is called the North American Industry Classification System (NAICS), and will also be used in Canada and Mexico. Unfortunately, historical data will not be reclassified from SIC to NAICS codes, so discerning time series trends will become more challenging.

Through the U.S. Government Printing Office at (202) 512-1800, you can buy a copy of the SIC Handbook and the new NAICS handbook (which provides a handy concordance of the NAICS and SIC codes). You can find information about NAICS at the Census Bureau Web site at: http://www.census.gov/epcd/www/naics.html.

Access – REIS, CES, and County Business Patterns are readily available on disk and on-line. Because the ES-202 data are so voluminous, and because of the time required to address confidentiality concerns, relatively few ES-202 data are available in print.[5] BLS does publish annual averages for four-digit industries by state, and some states publish data summaries (usually to the two-digit level) in print and on-line. Otherwise, data must be obtained through a specific request to a state LMI agency or BLS for a customized data run, typically for a fee. While some states (e.g., Colorado) are organized to provide relatively quick responses to ES-202 data requests, others (e.g., Indiana) are not.

In addition to the four sources described above, jobs data also are available in the Economic Census and the Annual Survey of Manufactures (ASM). However, these sources do not have the same level of comprehensiveness, detail, and/or timeliness as the other sources. (See section 3.6 for more detail.) Still, the Economic Census and the ASM can serve as useful complements in analyzing job trends for certain industries, areas and time periods.

1. Employment series, Regional Economic Information System, Bureau of Economic Analysis

    - Measures: Annual average employment by SIC industry (two-digit for states, one-digit for other areas). Two industry series provided at the state level – one for total employment (including civilian wage and salary workers, proprietors and military) and one for civilian and military wage and salary employees. Total employment by industry is provided for counties and metropolitan areas.
    - Geography: States, metropolitan areas, and counties
    - Frequency: Annual (time series provided, 1969 through latest year)

[5] BLS and state guidelines prohibit publication of data that would allow users to determine employment and wage levels for individual employers. The usual rule is that, to be published, a data cell must have at least three UI accounts, with no UI account providing 80 percent or more of jobs in the cell. Individual states can decide on more stringent nondisclosure criteria. Highly specific data requests, in terms of geography and industry, can require a high level of screening for nondisclosure. This process can be very labor intensive, and expensive. Hence one reason for the reluctance to publish large volumes of ES-202 data.

- Method: Data drawn from a variety of existing data series, including ES-202 and IRS data
- Access: Complete REIS data set can be ordered on CD-ROM from BEA at (800) 704-0415. REIS data series for all states can be downloaded from BEA at http://www.bea.doc. gov/bea/uguide.htm#_1_30. Data for individual states and areas can be found (in .html or .csv) at http://fisher.lib.Virginia.EDU/reis/.
- Assistance: Regional Economic Measurement Division, (202) 606-5360

2. Current Employment Statistics, Bureau of Labor Statistics and state LMI agencies

- Measures: Civilian nonagricultural wage and salary employment, and average hourly wage for production/nonsupervisory workers, by industry (typically one- and two-digit SIC code)
- Geography: States and most major metropolitan areas
- Frequency: Monthly, with annual averages
- Method: Survey of a sample of establishments, primarily through electronic means (touch-tone phone self-response, phone voice recognition, electronic data interchange), supplemented by mail and fax. Data collected and estimates developed through a federal-state cooperative program.
- Access: Time series for specific areas available on-line at http://www.bls.gov/790home.htm. CES data also available in BLS publications – on a monthly basis in *Employment and Earnings*, and in time series form in the periodic publication of *Employment, Hours, and Earnings, States and Areas*. State LMI agencies (see Appendix B) provide monthly reports; many agencies also provide data on Web.
- Assistance: State LMI agencies, or CES Program at (202) 606-6559 or data_sa@bls.gov

3. Covered Employment and Wages (ES-202), Bureau of Labor Statistics and state LMI agencies

- Measures: Establishments, workers, payroll, and average wage for establishments covered by state UI laws and the Unemployment Compensation for Federal Employees (UCFE) program. Data available up to the four-digit SIC level.
- Geography: States, metropolitan areas, labor market areas, and counties
- Frequency: Monthly data collected and published on a quarterly basis. Annual averages provided as well.
- Method: Employers provide data in the process of paying unemployment compensation premiums.
- Access: Summary ES-202 data available from state LMI agencies (see Appendix B), with detailed data possibly available, depending on the state. *Employment and Wages, Annual Averages* (single year, states only, at four-digit level) can be purchased from BLS at (312) 353-1880. Customized data runs (for states, metro areas, and counties) can be obtained from BLS at (202) 606-6567.

- Assistance: State LMI agencies, or ES-202 Program at (202) 606-6567 or 202_info@bls.gov

4. County Business Patterns, Bureau of the Census

- Measures: Wage and salary employment (mid-March pay period), annual payroll, and establishments by employment size category, up to four-digit SIC level. Covers all establishments except those in agriculture, railroad transportation, and government.
- Geography: States, metropolitan areas, counties, and zip codes
- Frequency: Annual
- Method: Data are extracted from the Census Bureau's Standard Statistical Establishment List (SSEL). SSEL data on multiestablishment firms come from the annual Company Organization Survey. SSEL data on single-establishment firms come from a variety of sources, including the ASM, Current Business Surveys, and administrative records of the IRS and the Social Security Administration.
- Access: Data for states, counties, metro areas, and zip codes available on CD-ROM at (301) 457-4100. Data for states and counties available in print and at http://www.census.gov/epcd/cbp/view/cbpview.html. Metro area data (at the 2-digit level) are available via fax from County Business Patterns staff on request.
- Assistance: County Business Patterns Division, (301) 457-2580 or cbp@census.gov.

Other: See section 3.6 for Economic Census and ASM.

3.4 Income and Earnings

In some sense, regional economic analysis is about money. At one level, we want to know about ***income*** trends – the standard of living people can afford, and the extent to which living standards vary from person to person. We are particularly interested in the extent to which people are living in poverty. More than any other type of data, income data tell us how we are doing economically.

Money has another level of data as well – ***earnings*** from work, usually by industry or occupation. For the purposes of regional economic strategy, we want to understand how well various industries pay, and how wages in one region compare to those for similar work elsewhere.

Income

Income has three sources – earnings from work, investments (yielding dividends, interest, and rent), and transfer payments (such as Social Security, pensions, and welfare). Income

data, which are by place of residence, can tell us how much regional income is generated in aggregate, per capita (aggregate income divided by population), and per household (aggregated income divided by households). Per capita income is often used as a proxy for a region's overall standard of living.

Sources of income data include one from BEA (the Regional Economic Information System), and several from the Census Bureau (Consumer Income series, Small Area Income and Poverty Estimates Program, Decennial Census, and American Community Survey).

You may suspect, correctly, that BEA and Census define income somewhat differently. BEA uses the concept of personal income, while Census uses the notion of money income. BEA's definition of personal income is consistent with its approach of taking a comprehensive view of economic activity. ***Personal income*** is defined by BEA as the current income received by persons from all sources minus their personal contributions for social insurance. Personal income includes both monetary income (including non-paycheck income such as employer contributions to pensions) and non-monetary income (such as food stamps and net rental value to owner-occupants of their homes). Disposable personal income is income available for spending or saving, and is defined as personal income less taxes. BEA's definition of "persons" is quite comprehensive, and includes not only individuals, but also nonprofit institutions that primarily serve individuals, private noninsured welfare funds, and private trust funds.

In contrast, ***money income*** as defined by Census covers only money income received by individuals (with no subtraction of social insurance contributions) and excludes non-cash benefits. Poverty rates are determined on the basis of money income and so do not reflect the fact that many low-income people receive non-cash benefits. The definition of poverty is fairly complex, and varies by type of household, but essentially the definition concerns the ability of a household to pay for housing and food. (For a discussion of the definition of poverty, see http://www.census.gov/hhes/income/defs/poverty.html.)

BEA and Census income series also differ significantly in terms of the unit and purpose of analysis. BEA personal income data are provided in aggregate and per capita, and aim to describe a region's overall level of income. Census money income series largely focus on household median income and poverty rates. The Census Bureau's use of the median, rather than the mean, and the poverty rate reflects its interest in giving a sense of the standard of living across households in an area. As they measure different aspects of a region's income, BEA and Census income data are complementary in combination.

At present, Census does not publish income data below the state level with the same frequency and detail as does BEA. The Consumer Income series, part of Current Population Reports and based on the Consumer Population Survey, does provide annual money income data by state. Census did publish annual estimates of money income for counties and cities, but that data series was discontinued some time ago. In its stead, Census developed the Small Area Income and Poverty Estimates Program, which prepares estimates on the basis of economic models that use a variety of secondary data sources. While very useful, income data under this program are issued only every few

years; the most recent data are from 1993. As we know, data from the Decennial Census are available only once a decade. As with other categories of socioeconomic data, the advent of the ACS will be a great boon to the availability of current small area income data, but full implementation of the ACS is some time away.

Income data provided by the SOI Division of the IRS can be a useful adjunct to BEA and Census data. The SOI Division provides summaries of adjusted gross income data for states and counties as provided by taxpayers on Form 1040. As might be expected, the IRS definition of adjusted gross income differs from the BEA and Census definitions of income.[6] While much of the IRS data are used by BEA in REIS, specific elements (such as use of the earned income tax credit) may be of interest for certain types of analysis.

1. Personal Income series, Regional Economic Information System, Bureau of Economic Analysis

    - Measures: Personal income by source, per capita income, and disposable per capita income
    - Geography: All measures available for states. Personal income and per capita income available for metropolitan areas and counties.
    - Frequency: Annual (time series provided, 1969 through latest year)
    - Method: Data drawn from a variety of existing data series, including ES-202 and IRS data
    - Access: Complete REIS data set can be ordered on CD-ROM from BEA at (800) 704-0415. REIS data series for all states can be downloaded from BEA at http://www.bea.doc.gov/bea/uguide.htm#_1_30. Data for individual states and areas can be found (in .html or .csv) at http://fisher.lib.Virginia.EDU/reis/.
    - Assistance: Regional Economic Measurement Division, (202) 606-5360

2. Consumer Income (P60) series, Current Population Reports, Bureau of the Census

    - Measures: Median household money income and persons living in poverty
    - Geography: States
    - Frequency: Annual
    - Method: Data collected through the March supplement of the CPS
    - Access: Median household money income available in *Money Income in the United States*, on-line at http://www.census.gov/hhes/www/income.html. Annual state poverty rates available in *Poverty in the United States*, on-line at http://www.census.gov/hhes/www/poverty.html.
    - Assistance: Housing and Household Economic Statistics Division, (301) 457-3242 or hhes-info@census.gov

[6] A more detailed comparison of the BEA, Census and IRS definitions of income can be found in the May 1998 issue of the *Survey of Current Business*, the monthly BEA publication. This comparison is available on-line at http://www.bea.doc.gov/bea/ar/0598rem/box4.htm.

3. Small Area Income and Poverty Estimates Program, Bureau of the Census

   - Measures: Median household money income and poverty rates
   - Geography: States and counties
   - Frequency: Every few years (1993 now available, 1995 and 1998 to be available)
   - Method: Small area estimates based on modeled relations between current income and poverty levels and income tax and program data available for counties and states for years following the Decennial Census
   - Access: Data available on-line at http://www.census.gov/hhes/www/saipe.html
   - Assistance: Small Area Income and Poverty Estimates Program, (301) 457-3182 or psiegel@census.gov

4. Decennial Census/American Community Survey, Bureau of the Census

   - Measures: Household, family, and per capita money income; poverty rates
   - Geography: States, metro areas, counties, urbanized areas, cities, places, minor civil divisions, census tracts, zip codes, block groups, and other bounded areas
   - Frequency: Decennial Census income data published for years ending in "9" (the calendar year prior to the taking of the census). ACS data to be published annually, as described in section 3.2.
   - Method: Data derived from sample survey of U.S. population
   - Access: Data from the 1990 Census can be accessed at http://venus.census.gov/cdrom/lookup. As they become available, data from ACS can be accessed at http://www.census.gov/CMS/www/index_c.htm.
   - Assistance: For Decennial Census, (301) 457-2422 or pop@census.gov. For ACS, (888) 456-7215 or ACS@Census.Gov.

5. Statistics of Income Division, Internal Revenue Service, Department of the Treasury

   - Measures: Adjusted gross income (total and selected sources), taxable income (by source), deductions (by type), total exemptions, tax liability, and earned income tax credit
   - Geography: States and counties
   - Frequency: Annual
   - Method: Data are obtained from personal income tax returns (Form 1040)
   - Access: Electronic files can be purchased. For details, see http://www.irs.ustreas.gov/prod/tax_stats/soi/soi_pub.html.
   - Assistance: Statistics of Income Division, (202) 874-0410

Employment Earnings

Employment earnings are the largest component of personal and money income. Earnings data by industry are available in two forms – total earnings and average earnings. Through time series, cross-sectional, and location quotient analyses of ***total earnings*** by industry, an analyst can see the contribution of each industry to a region's income, trends in the health of that industry over time, and the region's national and international competitiveness in that industry. Examining industrial structure in terms of jobs but not earnings can be misleading, as sectors with high-paying jobs contribute much more to regional income than they do to the job base (and vice versa for low-paying jobs). All jobs are not equal. As economic development in large part is about getting money into people's pockets, knowing how the money flows, or might flow, is key to effective analysis and strategy.

Total earnings by industry, for all or nearly all industries, are provided through three data series – REIS, ES-202 data, and County Business Patterns. Because ES-202 and REIS data come directly from employers and proprietors as a by-product of UI and income tax payments (with penalties for inaccuracy), data from these sources tends to be a little more reliable than those from County Business Patterns, which relies largely on Census surveys. ES-202 and County Business Patterns provide data to the four-digit level, while REIS data are at the two-digit level.

In addition to the three sources mentioned above, earnings data also are available in the Economic Census and the ASM. However, these sources do not have the same level of comprehensiveness, detail, and/or timeliness as the other sources. (See section 3.6 for more detail.) Still, the Economic Census and the ASM can serve as useful complements in analyzing earnings trends for certain industries, areas, and time periods.

Average earnings data (annual, weekly, and hourly) allow us to clearly see how well, or poorly, various jobs pay in comparison to other regional industries and the same industry in other regions. Understanding differences in pay levels, and the reasons for these differences, can help practitioners prepare appropriate and achievable industry-specific development strategies. Average pay is a rough proxy for the value added per job.[7] The rationale for the selection of target industries is often made on the basis of pay and value added levels. Average wage data also are available for certain occupations.

Average annual earnings are determined by taking total annual earnings and dividing by average annual number of jobs (both full- and part-time). Average weekly pay is derived by dividing the annual figure by 52 weeks. It is important to remember that annual and weekly pay figures do not distinguish between full- and part-time jobs. A low wage level (e.g., in retail) can in part reflect a high proportion of part-time workers.

[7] Value added is the price of goods and services sold less the cost of nonhuman inputs such as materials and depreciation of capital equipment. Value added accrues to workers through wages and owners through profits.

The only data source that explicitly gives annual and weekly average pay is the ES-202. An average annual earnings figure can be derived from REIS by dividing total earnings by average annual employment. However, keep in mind that the primary REIS income series covers both wage and salary workers and proprietors, so average earnings data derived from that series likely will not match data from the ES-202 series. You can also compute annual and weekly average pay using the Economic Census and the ASM. We don't recommend computing annual average pay from County Business Patterns because the payroll and jobs data are for different time periods – the payroll data are annual and quarterly, but the employment data are for one week in March.

Average hourly wages are derived directly from survey data, in which employers are specifically asked how much they pay their workers. Three BLS data series provide average hourly wage data, one by industry and two by occupation:

- The Current Employment Statistics (CES or BLS-790) series provides hourly wage data for nonsupervisory workers by industry. CES data come out monthly and speedily; the data are for states and metro areas.

- The National Compensation Survey (NCS) is an annual survey of hourly wages by occupation for a rotating list of 154 metro and nonmetro areas. The larger metro areas are surveyed each year; smaller metro areas and nonmetro areas rotate in and out of the list.

- The Occupational Employment Statistics (OES) series is an effort by BLS and state LMI agencies to gain a full picture of occupational structure by industry for the nation, states, and metro areas. The hourly wage data (by occupation and industry) is one product of this effort.

1. Personal Income series, Regional Economic Information System, Bureau of Economic Analysis

   - Measures: Annual place-of-work earnings by industry (including military) to two-digit SIC level. State-level series by industry and metro and county all-industry series available for all workers (including proprietors) and for wage and salary workers. Metro and county series by industry only available for all workers.
   - Other information – see section 3.4

2. Covered Employment and Wages (ES-202), Bureau of Labor Statistics and state LMI agencies

   - Measures: Total payroll, average annual wage, and average weekly wage, by industry (up to four-digit)
   - Other information – see section 3.3

3. County Business Patterns, Bureau of the Census

   - Measures: Annual and first quarter payroll by industry (up to four-digit)
   - Other information – see section 3.3

4. Current Employment Statistics, Bureau of Labor Statistics and state LMI agencies

   - Measures: Average hourly wage for production and nonsupervisory workers, by industry
   - Other information – see section 3.3

5. National Compensation Survey, Bureau of Labor Statistics

   - Measures: Average hourly wage (with percentile distributions), by occupation
   - Geography: 154 metropolitan and nonmetropolitan areas, on a rotating basis
   - Frequency: Annually, 30-35 large metro areas (over 560,000 residents) are surveyed. Smaller areas are surveyed on a less frequent basis.
   - Method: Data collected through a survey of 36,000 establishments nationwide
   - Access: Data from the NCS and a predecessor survey (Occupational Compensation Survey) are available at http://www.bls.gov/search/ocwc_s.asp
   - Assistance: Office of Compensation Levels and Trends, (202) 606-6220 or ocltinfo@bls.gov

6. Occupational Employment Statistics, Bureau of Labor Statistics and state LMI agencies

   - Measures: Employment, mean and median hourly wage data for over 750 occupations in over 400 nonagricultural industry classifications (two- and three-digit SIC level)
   - Geography: State and metro area
   - Frequency: Annual
   - Method: Annual mail survey of nonfarm establishments, carried out as a Federal-State cooperative effort
   - Access: Data by industry available through state LMI agency. All-industry data for states and areas available on-line at http://www.bls.gov/oes/oes_data.htm.
   - Assistance: Occupational Employment Statistics, (202) 606-6569 or oesinfo@bls.gov

Other: See section 3.6 for Economic Census and ASM.

Beyond the Basics

Having examined the basics of demographic, employment, and income and earnings data, we now can explore other categories of socioeconomic data. These include the cost of living, business operations, international trade, economic resource base, and quality of life. Depending on the structure of your local economy and the kind of study you're undertaking, you may want to look at one or more of these categories as part of your analysis. For each data source, the discussion below does not provide the same level of detail as that above, but gives you enough to get started.

3.5 Cost of Living

Cost of living can be measured in two ways—across time (rate of inflation) and across space. Looking at the ***rate of inflation*** in the local economy is useful in understanding the extent to which increases in personal income have kept pace with, or exceeded, the real cost of living. The primary source of inflation data is the Consumer Price Index (CPI) prepared by BLS. The CPI is provided for 26 metropolitan areas; multistate averages by city size (e.g., metro areas of over 1.5 million in population in the West) are also given. The CPI includes an overall price index and indices for specific components of consumer expenditures, e.g., housing, medical, and food.

Recently, there has been much controversy over the accuracy of the CPI. In response to these concerns, BLS has restructured the index in light of observations that consumers do change their consumption patterns in light of price increases. CPI data and explanations can be found at http://www.bls.gov/cpihome.htm.

For purposes of economic development, regional analysts often want ***multiarea comparisons of the current cost of living***. This is one type of data that the federal government does not offer. We have identified two on-line sources of comparative cost-of-living data: DataMasters at http://www.datamasters.com/cgi-bin/col.pl, and Salary Calculator at http://www2.homefair.com/calc/salcalc.html. The methodology for each source can be found at the respective sites.

A popular comparative cost-of-living index is that prepared quarterly by the American Chamber of Commerce Researchers Association (ACCRA). The ACCRA index is available only by subscription; however, it can often be found in public libraries or at Chambers of Commerce. The virtue of the ACCRA index is that it allows comparisons between regions on specific categories of expenditure such as housing and food. The perception exists, however, that the index's accuracy is uneven; as data are collected independently by each participating local chamber, the actual data collection methodology may differ from place to place.

3.6 Business Operations

Inputs And Outputs

After we get a handle on employment and income by industry for a region, we sometimes want to know more. Often it is useful to understand the nature of a regional industry's inputs (e.g., cost and type of materials, capital expenditures, and costs and types of energy) as well as outputs (e.g., quantity, value and destination of shipments, and value added). Such business operations data are provided by the Census Bureau through the Economic Census and the Annual Survey of Manufactures (ASM). The Economic Census, a full-blown census of U.S. business establishments, is carried out every five years for a wide variety of industries (e.g., Census of Manufactures, and Census of Service Industries), and provides some level of geographic detail. Unfortunately, it takes the Census Bureau several years to publish the data.

To address knowledge gaps between Economic Censuses, the Census Bureau carries out the ASM. The ASM provides a subset of the data available in the Census of Manufactures and for states only. The existence of an annual survey in manufacturing reflects the historical importance of that sector. Unfortunately, similar surveys do not exist for other sectors. For this section, we revert to our previous format, and provide more detail below.

1. Economic Census, Bureau of the Census

- Measures: Number of establishments (or companies); number of employees; payroll; measure of output (sales, receipts, revenue, value of shipments, or value of construction work done); and other data particular to industry (e.g., investment in plant and equipment)
- Industries covered: For 1997, mining, utilities, construction, manufacturing, wholesale trade, retail trade, transportation and warehousing, information, finance and insurance, real estate and rental and leasing, professional/ scientific/technical services, corporate management, administrative and support, waste management and remediation, educational services, health care and social assistance, arts/entertainment/recreation, accommodation and food services, and other services. (Sectors for 1992 are less comprehensive.) Data are also provided for enterprises, women-owned businesses, and minority-owned businesses. NAICS codes used for 1997 series.
- Geography: States, metro areas, counties, cities and places, and zip codes
- Frequency: Every five years (for years ending in "2" and "7")
- Method: Census of all known establishments in industry of focus
- Access: Detailed data on 1992 Economic Census can be obtained from the Census Bureau on CD-ROM or in print. Summary data can be obtained on-line; access information available at http://www.census.gov/econ/www/econ_cen.html. Special data runs provided by the Center for Economic Studies (see

http://www.census.gov/ces/ces.html for details). Data availability for 1997 Economic Census discussed at http://www.census.gov/epcd/www/econ97.html.

- Assistance: General information on Economic Census, (301) 457-4151 or econ@census.gov. Contacts for information specific to a particular industry census can be found at http://www.census.gov/epcd/www/ec97contacts.html.

2. Annual Survey of Manufactures, Bureau of the Census

- Measures: Employment, payroll, value added, cost of materials, value of shipments, new capital expenditures, for manufacturing establishments, up to three-digit SIC level
- Geography: States
- Frequency: Annual, except in years ending in "2" and "7" (for which the Census of Manufactures is published)
- Method: Mail survey of 55,000 manufacturing establishments (in larger firms) and administrative record information from 170,000 smaller, single-location establishments
- Access: Regional data are provided in *Annual Survey of Manufactures: Geographic Area Statistics*, available in print form and on CD-ROM. Detailed data not available on-line at present.
- Assistance: Manufacturing and Construction Division, (301) 457-4673 or mcd@census.gov

Also, federal data are available on certain industries that are not provided through the Economic Census. Other industry-specific sources worth exploring include:

- Energy Information Administration, Department of Energy
- National Agricultural Statistics Service, Department of Agriculture
- National Marine Fisheries Service, Department of Commerce
- National Transportation Data Archive, Department of Transportation

You can find links to these sources at our Web site, http://www.econdata.net.

Taxes as an Indicator of Local Business Activity

Most states have taxes on personal and corporate incomes, retail sales, and real property. Many states prepare useful annual tabulations of tax data that can be used to track economic activity at the substate – usually county-level. The quality and accessibility of these data often varies substantially from state to state, but practitioners report that when available they are among the most useful sources of information. Sales tax data can be used to identify retail trade centers, to identify "leakages" from local communities, and to track consumer spending, often on a month-by-month basis. In addition, many states have special taxes, such as room and occupancy taxes, that are useful for tracking specific industries, like tourism. As there is no comprehensive guide to this type of

information, you'll need to contact your state's Department of Revenue to find out what data are available.

3.7 Foreign Trade – Exports

International trade is an important component of many regional economies, particularly the export of goods and services to foreign countries. The federal government gathers detailed data on exports; some of these data are reported on a state-by-state and metro area basis.

Two principal data series track regional exports. The first is the exporter location (EL) series, which reports the volume of exports by state and metro area based on the location of the exporting firm. The second series is the origin of movement (OM) series, which reports exports based on the location of the firm that manufactured the product.

The data from the two series can differ to the extent the manufacturer is located in a different area than the shipper. Wheat grown in Montana may be exported from Oregon; airplanes manufactured in Kansas may be exported from Washington State, machinery manufactured in Ohio may be exported from New Jersey, and so on. Consequently, the OM and EL series paint different pictures of international trade.

Both the OM and EL series are compiled from the documents exporters file with the Department of Commerce when they ship goods overseas, called Shippers Export Declarations. These documents are designed for compliance with export laws, and not as data gathering instruments. There are some concerns about the quality of the export data, particularly the OM series. In many cases, the location information for the original manufacturer is missing or wrong, which means these statistics should be used with caution.

Both the OM and EL series data are available on-line:

- Annual state and metro EL data can be accessed from the Office of Trade and Economic Analysis, Department of Commerce at: http://www.ita.doc.gov/cgi-bin/otea_ctr?task=otea

- Monthly and annual EL and OM statistics for states can be accessed through examining the FT900 supplements at: http://www.census.gov/foreign-trade/www/press.html#supplement

In addition, adjusted quarterly state data for both the EL and OM series are available for purchase through the Massachusetts Institute for Social and Economic Research (MISER). These data are detailed by state, 2-digit SIC code, country, and value and weight by method of transportation. MISER, which is under contract with the Census Bureau, says it "improves unadjusted trade data from the Bureau by filling in missing industry and state information using an imputation algorithm." Discussion of MISER export data can be found on-line at http://www.umass.edu/miser/axes/statex.html.

3.8 Economic Resource Base

Each regional economy has a series of institutions that provide critical foundation resources for economic development, such as research and development (R&D) institutions, educational institutions, and financial institutions. Several federal agencies provide information on the regional economic resource base, including:

- Division of Science Resources Studies, National Science Foundation, for information on R&D activity at universities, federal laboratories, and corporations
- National Center for Education Statistics, Department of Education, for data on K-12 schools, colleges, and universities
- Federal Financial Institutions Examination Council National Information Center, for information on individual banks

You can find links to these sources at our Web site, http://www.econdata.net.

3.9 Quality of Life

Quality of life is measured by more than just income – money can't buy us love and many other things. So it can be useful to see how we are doing in terms of our ability to find housing, stay healthy, and keep out of harm's way. Federal agencies that provide quality-of-life data include:

- National Center for Health Statistics, Department of Health and Human Services
- Housing and Household Economic Statistics Division, Bureau of the Census, Department of Commerce – prepares the American Housing Survey, housing statistics from the Decennial Census, and an annual report on housing vacancy and homeownership
- Bureau of Justice Statistics, Department of Justice

You also can find links to these sources at http://www.econdata.net.

Chapter 4
Data Intermediaries: Guides in the Statistical Jungle

As Tom Sawyer observed in whitewashing the fence, the easiest way to get your work done is to find others who'll do it for you. One of the great strengths of the statistical system is the number of data experts and knowledgeable guides who work with the data on a daily basis. They can be of immeasurable help in locating and understanding socioeconomic data for your local economy.

4.1 Census Data/Information Centers

To facilitate access to its statistics, the Census Bureau sponsors three programs through which approximately 1,800 state and local organizations receive and disseminate Census data products:

- State Data Centers (SDCs) – make Census data and related services available to users.

- Business and Industry Data Centers (BIDCs) – complement the work of SDCs, and focus especially on economic data and assistance to businesses and economic development agencies in their respective states.

- Census Information Centers (CICs) – seek to disseminate Census data to special population groups, particularly those less likely to use SDC/BIDC participants.

Each state has an SDC program, and many have BIDC programs. In each state in which it operates, each program has a lead agency, one to six coordinating agencies, and a number of affiliates. For the most part, participating organizations are academic institutions, state planning agencies, and libraries.

Usually, these Census data centers have staff well-trained in the use of Census and other socioeconomic data. The centers often maintain complete collections of Census data series, from historical publications to CD-ROM versions of the latest data series. Census data centers are usually at the hub of networks of data users, so they also can refer you to other researchers and analysts tackling similar problems. To find the nearest data center, you can call your lead State Data Center (see Appendix A) or visit the State Data Center Web site at http://www.census.gov/sdc/www/sdctxt.html.

4.2 State Labor Market Information Agencies

As an element of the federal-state partnership to provide unemployment insurance and a state labor exchange, every state has a labor market information (LMI) agency that compiles, publishes, and analyzes a wide range of labor-related information. Chapter 3

described key data series prepared by the LMI agencies with guidance and funding from the Bureau of Labor Statistics (BLS).

Most LMI agencies also have a group of regional labor market economists, each of whom specializes in the economy of a particular substate area, usually a group of counties. Usually, the regional economists are quite knowledgeable about data available from the LMI agency and other sources. We have found it quite valuable to get to know these economists.

To help you gain access to the LMI data and economists, we've provided a list of LMI agency contacts in Appendix B (which also is available at http://www.bls.gov/ofolist.htm).

4.3 College and University Business and Economic Research Centers

In the majority of states, one or more colleges and universities operate research centers that compile data on and research the state economy. Typically, these centers prepare regular publications that analyze the current health and structure of the state economy and local economies within it, provide library and Web access to a variety of data sources, and serve as a valuable resource to data users within the state. Most of these centers are members of the Association for University Business and Economic Research (AUBER). Many are also part of the Census SDC/BIDC system. The AUBER Web page at http://www.auber.org/docs/mail1.htm provides contact information for business and economic research centers in 36 states.

4.4 BEA User Group

The Bureau of Economic Analysis (BEA) makes its regional estimates available through the BEA User Group, members of which include state agencies, universities, and Census Bureau SDCs (i.e., an amalgam of the intermediaries discussed in the previous three sections). BEA provides its estimates of income and employment for all States and counties to these organizations with the understanding that they will make the estimates readily available to data users. The User Group has its beginnings in the pre-Internet, pre-CD days; User Group members were the primary means of transmitting BEA regional data around the U.S. Among data intermediaries, members of the BEA User Group are more likely to be familiar with economic development issues than are non-members. The list of User Group members can be found at the AUBER Web site, http://www.auber.org/.

4.5 Federal Depository Libraries

The Census Bureau and other federal statistical agencies distribute their publications (and also their electronic products, like CDs) to local libraries throughout the nation. Many of these libraries have special government documents librarians who are familiar with the

broad range of sources of socioeconomic statistics. These librarians also can serve as knowledgeable guides to the resources that are available through the Internet, as well as some sources of commercial information.

Libraries that regularly receive federal statistical publications are members of the Federal Depository Library Program (1,400 libraries) or the Census Depository Library System (an additional 130 libraries). Not all libraries receive all publications, so it is important to call ahead to see if they have what you need. But even if they lack certain publications in hand, most libraries should be able to help you navigate the Internet to find needed data. The location of libraries in the Federal Depository Library Program can be found at http://www.access.gpo.gov/su_docs/libpro.html. Those in the Census Depository Library System can be found in Appendix B of the *Census Catalog & Guide: 1997*, which you can download from http://www.census.gov/prod/www/abs/catalogs.html.

4.6 Chambers of Commerce

In many communities, the local chamber of commerce has a research function, gathering data about the local economy. The economists and researchers who work for chambers of commerce across the country are members of the American Chamber of Commerce Researchers Association (ACCRA). ACCRA members are likely to be very conversant with a range of economic statistics about the local area. You can find out whether there are any members of ACCRA in your area by searching the ACCRA Web site at: http://www.accra.org/networking_comm/Search_criteria.cfm.

4.7 Data Agencies

Federal statistical agency personnel are an excellent, accessible source of information on data series produced by that agency. If you have a question about a particular data series, you can call the office that produced that series. Most federal statistical personnel are happy to give you assistance in their area of expertise (and usually are glad to know someone is interested in their work). In Chapter 3, we provided contact information for most of the data series discussed. Also, most federal statistical publications and Web sites identify the staff persons with expertise on individual data series.

Census and BLS provide another venue for examining statistical publications and getting technical assistance – regional offices. These offices have libraries filled with agency publications going back decades, and are an excellent means of finding historical data that are not available on-line. Regional office personnel are available to answer questions and provide information. Addresses and contact information for the 12 Census regional offices can be found at http://www.census.gov/field/www/ and for the eight BLS regional offices at http://www.bls.gov/regnhome.htm.

4.8 On-Line Guides

These days, some of the best data intermediaries are Web sites. A number of Web sites provide commentary and travel guides to the places on the Internet where you can find various types of data. We've listed many of these sites in Chapter 7, The Web's Twelve Best Sources for Economic Information. For beginners, we recommend University of Minnesota's Web page "Guide to On-Line Sources for Economic Development Information" and Oregon State University's Government Information Sharing Project.

Part Two: Lessons of Practice

Chapter 5
Ten Habits of Highly Effective Data Analysts

To appraise the effectiveness of the current regional socioeconomic data system, we contacted several hundred experienced data analysts. Through surveys, interviews, and focus groups, we discovered much about analysts' best practices and lessons learned. We've boiled these practices and lessons down to the following Ten Habits of Highly Effective Analysts:

5.1 Tap the Resources of the Web

The World Wide Web is revolutionizing access to socioeconomic data. Just a few years ago, the only ways to get data into your desktop computer were to tediously retype the tables from printed publications, purchase a disk, or buy data on computer tape and sift through it with a mainframe computer application program. Now, however, most federal data are available through the Web, and many series can be downloaded directly into computer spreadsheets for tabulation and analysis. Complete publications – like the *Statistical Abstract of the United States* and the *State and Metropolitan Area Data Book* – are also available on-line in the Adobe Acrobat (.pdf) format. Several Web sites, such as the Dismal Scientist, offer easy to use "front-ends" that let you make simple data queries, such as ranking all the states by average employment growth in the past year.

While the extent of resources on the Web is daunting, it's important to keep in mind that the availability of Web-based economic statistics is still in its infancy. Expect more and more statistical information to be made available over the Web in the years to come, and easier-to-use and more powerful tools for finding and analyzing just the data you need. Becoming proficient in using the Web to do socioeconomic data research is an essential skill of an effective data analyst.

5.2 Network with Your Peers

On its face, data analysis seems like a lonely occupation: a computer, a pile of statistics, and an analyst. In practice, our study of the experience of analysts shows that knowing how to communicate with and learn from peers is an essential skill for the effective data analyst. The majority of data analysts report that, to a large extent, they learned about data sources and analytical techniques through informal communication with their peers. Moreover, our research shows that analysts with the highest rated skill levels tend to be those who rate their satisfaction with opportunities for peer collaboration most highly.

Effective analysts find several ways to network with their peers. Much of the informal interaction with peers goes on in the office, of course, and you may be lucky enough to be in an organization that allows for such interaction. Also, networking occurs across organizations in the same area through the process of projects and meetings. Further, a number of professional organizations promote peer interchange among data analysts, through national conferences and local chapters. (We've included a list of such organizations in Appendix C.)

In addition, the Web itself is becoming a medium for the interchange of ideas and experiences, through discussion groups on economic development policy and on economic research. You can subscribe to electronic mailing lists and discussion groups, to stay up with current developments in professional practice on a real-time basis.

Networking, fundamentally, is a people skill, and some number-crunchers are better at it than others. You're on your own in this regard. However, we can say that you might find out how various professional organizations provide opportunities for networking as part of their activities, and take advantage of those options best suited to you. You can visit their Web sites (listed in Appendix C) to find out more about membership, activities, and services.

5.3 Equip Yourself with the Essential Data Sources

One of the best ways to become familiar with the range of available data, as well as quickly answer many questions that come out of the blue, is to have several essential data resources close at hand. In Chapter 6, we highlight a number of data reference books we think should be on every economic data analyst's bookshelf. These include data compendia such as *The Statistical Abstract of the United States*, annual data sets such as the Regional Economic Information System CD-ROM, and guides to statistical agency products and methodologies, such as the *Census Catalog & Guide*. Of course, you'll want to tailor your collection to your own needs and interests.

5.4 Tell Stories and Paint Pictures with Data

Our survey respondents emphasize that good presentation is critical to having an impact on decisions. The sad truth is that, while impressive and lengthy tables of numbers may be compelling to the analyst, they are seldom interesting (and are often unintelligible) to most audiences that read them. The burden of making sense of the data should be on the analyst, not the audience. As discussed in Chapter 1, effective data analysts know how to tell a coherent, internally consistent, truthful story about the economy, one that develops themes, patterns, and conclusions that inform decision makers and other readers. Simple summaries of trends and data, with compelling graphs and charts, are among the most effective means of communicating the information hidden within reams of data.

5.5 Utilize the Power of Basic Analytical Techniques

The enormous power of the personal computer can be seductive – it puts a range of statistical tools within the reach of every analyst. All major spreadsheet programs, for example, contain sophisticated regression functions. Tempting as it is to use the high-powered analytical techniques at one's disposal, the experience of practitioners is that the basic analytical tools, such as calculating averages, growth rates, and percent distributions, are the means of first resort in translating socioeconomic data into worthwhile information about a local economy. These junior high school math techniques allow analysts to quickly describe the outlines of economic activity, identify possible explanations for trends, and ascertain issues and opportunities to be addressed, and then transform these findings into effective stories for lay audiences.

Outside of academia, few analysts utilize advanced statistical techniques, which are valuable for focusing on high levels of economic detail and for addressing particular questions or hypotheses. Moreover, for a number of advanced techniques, such as economic modeling, sufficient data often do not exist, making the use of the technique problematic (or expensive, if primary data need to be collected). Even when data are available, advanced techniques can be time- and labor-intensive (that is, have high opportunity costs), and their conclusions may not be fully defensible.

In general, the lesson seems to be, don't lose the forest for the trees, that is, don't employ advanced statistical techniques until you've captured an overview of economic activity through the basic math approaches. And even then consider, as many analysts do, following up basic analysis, not with advanced techniques, but with primary research efforts, such as surveys and interviews, to fill in knowledge gaps.

5.6 Make Use of Data Intermediaries

Often, the hardest part of data analysis is finding your way through the jungle of possible sources of data to the one that can best answer your question. The enormous set of available resources, both in print and on the Web, are of little use if you can't find what you need. Fortunately, data intermediaries are available who know the lay of the land and who can help you find your way to the right data sources. Building relationships with your Census data center staff, the economists at your state labor market information agency, and the closest chamber of commerce with a research office can save you hours of frustration.

5.7 Think Regional

Citizens and decision makers often want data for very small geographic areas: my neighborhood, my district, my city. However, as discussed in Chapter 1, political boundaries seldom coincide with economic boundaries; workers, businesses, and consumers readily move across jurisdictions, taking their economic impacts with them. Experience shows that jurisdiction-specific economies are often best understood by first

looking at the regional patterns of economic activity, typically across a county or groups of counties. To be an effective analyst, it is vital to place economic activity in a particular neighborhood or area in the context of the health and functioning of the regional economy of which it is a part.

5.8 Prepare for the American Community Survey

Of course, even if you want up-to-date data on a district or neighborhood, you probably can't get it from the federal government anyway. Except for those rare moments when the last Decennial Census is relatively current, data below the city and county level are difficult to come by. The ten-year wait is the biggest complaint that data users have about the Decennial Census.

As discussed in Chapter 3, the Census Bureau is aiming to address the issue of Decennial Census timeliness by implementing the American Community Survey (ACS). The ACS is a monthly survey, with annual data publication, using the long form of the Decennial Census questionnaire to provide data on population, income, and housing. Once fully implemented, the ACS will have the potential to greatly expand our understanding of the year-to-year dynamics of our local economies, particularly the connections between economic activity, residents' economic well-being, and the components of population change.

At full implementation, the ACS will achieve the same sample size as the long form of the Decennial Census – 17 percent of households. However, the ACS will achieve this sample size over a five-year period – in any given year, it will survey fewer people than the Decennial Census. This isn't a particular problem for large geographic areas like states and metropolitan areas, where enough persons will be sampled to produce statistically valid results on an annual basis. But for smaller geographies, less populous counties, small cities, and census tracts and smaller units (any area with less than 65,000 people), one year's data won't be enough to generate a statistically valid estimate. For these smaller geographies, the ACS will average several years' worth of data to produce its estimates.

In another change from traditional practice, the ACS will report the confidence interval for data point estimates, so that analysts can more accurately interpret the results. Data users and policy makers will need to shift their thinking from a focus on point estimates to one of confidence intervals.

The Census Bureau began the ACS implementation process in 1996. By 2001, population characteristic estimates generated by the ACS will be available for all states and geographic areas and population groups with 250,000 or more in population. By 2008, estimates will be available for all areas of the country, regardless of population size.

For communities lucky enough to be an ACS test site, the available data are already being put to good use. Neighboring communities, we are told, are jealous and look forward to getting their own data.

Data analysts would do well to get ready for the coming of the ACS through taking a number of steps, including:

- learning about the ACS approach, methodology and data framework, by visiting the ACS Web site at http://www.census.gov/CMS/www/;
- checking with the Census Bureau at ACS@Census.Gov or (888) 456-7215 to see when data for your area or community will become available;
- thinking ahead about the types of analyses that will become possible once ACS data are available;
- calling local government agencies in one or more of the 1996-97 test sites (including Rockland County, New York; Houston, Texas; and Portland, Oregon) and asking how they use the data; and
- writing Congressional Representatives and Senators in support of the ACS, in order to ensure long-term funding by demonstrating that a constituency for the data exists.

5.9 Explore the Lesser Known Data Sources for Special Information

Regional data users tend to rely on the three major statistical agencies (the Census, the Bureau of Labor Statistics, and the Bureau of Economic Analysis) for most of their socioeconomic data needs. While these three agencies do have a broad and deep set of statistical data, effective data analysts also utilize a number of other federal agencies whose specialized data are useful in answering questions on particular topics. For example, if an analyst wants to analyze agriculture or the farm sector, the Economic Research Service of the Department of Agriculture is an invaluable source of information about farm sales, crop prices, international markets, farm income, and rural development. The National Center for Education Statistics has a wealth of detailed, state-by-state information on education spending, higher education programs, and educational attainment. The National Center for Health Statistics is a repository of information on health, disease, and demography. With over 70 federal agencies in the data business, the trick is to find the ones relevant to the particular issues of interest. To see an overview of data providers and series beyond the Big Three, we suggest going to our Web page of data links at http://www.econdata.net.

5.10 Work to Bolster the System

For gaining an understanding of our economic lives, federal data are invaluable and irreplaceable. For reasons of cost and legality, no single private organization can replicate the data work of the federal government in terms of breadth, reliability, and consistency.

Because of budget cuts over the last decade, federal statistical agencies face difficult choices in deciding which data series to keep and which to cut. In making these choices, agencies often have limited information about who uses the data and for what purposes. In this difficult budget environment, the only way to be sure that the data you need will

still be around (and even improved) in a few years is to be an informed and vocal consumer of statistics.

Moreover, the economy is changing and developing in ways that our current statistics don't fully capture. The lack of good information about worker skill levels, for example, seems to be a widespread concern. It is valuable to let statistical agencies know about the types of data series you would like to see brought into being.

For the health of our socioeconomic data system, it is critical to communicate with federal data agencies to let them know which data series you find useful, as well as your complaints and suggestions for improvement. You can send your message by using the e-mail addresses provided on the various data agency Web sites. It also doesn't hurt to let the consumers of your data (decision makers in the public and private sector) know that your analysis depends on (and could be improved by) better federal statistics.

Chapter 6
Bookshelf Basics for Economic Analysts

While the Internet is an extraordinarily important tool for gathering socioeconomic data, not all data are available through that means. Moreover, if you don't know what you are looking for, the Internet is not very helpful. Certain data sources and narrative guides are very valuable to have close at hand for easy reference. Here is a list of publications (and CDs) you should consider adding to your library, if you don't already have them.

6.1 Data Reference Books and CDs

Statistical Abstract of the United States: 1998

If you are building your reference library from scratch, begin here. The *Statistical Abstract* is a compendium of the most frequently used data series produced by the federal government, and includes data from all the major statistical agencies. The book is very helpful in getting a sense of the kinds of data the federal government produces. Chapter introductions provide key concepts and definitions. While the primary focus of the *Statistical Abstract* is national data, it has state and metro area breakouts of key data series. Though the *Abstract* is available on the Web in Adobe Acrobat (.pdf) format, at http://www.census.gov/prod/3/98pubs/98statab/cc98stab.htm, in our opinion, it's handy to have on a bookshelf or CD-ROM within arm's reach. You can order this publication from the U.S. Government Printing Office (GPO) at (202) 512-1800 or from National Technical Information Service (NTIS) at (800) 553-6847.

Regional Economic Information System

Maybe the best buy you can make in getting regional economic data is to spend $35 on the REIS CD-ROM issued annually by the Bureau of Economic Analysis (BEA). This single CD-ROM contains more than 25 years' worth of income and employment data for every county, metropolitan area, and state. Also, it is loaded with digital versions of much of the background information and reports that explain the methodology of BEA publications. While you can find much of the data contained in this CD-ROM on the Web, having the CD-ROM is the fastest, easiest way to track down data for any particular area. To order, call BEA at (800) 704-0415.

State and Metropolitan Area Data Book: 1997-98
USA Counties: 1996
County and City Data Book: 1994

The Census Bureau publishes three statistical compendia that focus on specific levels of subnational geography – the *State and Metropolitan Area Data Book, USA Counties*, and

County and City Data Book. As with the *Statistical Abstract*, these compendia bring together a wide variety of socioeconomic data from the Census Bureau and other federal and private data sources. Each of these sources is full of rankings by various categories, which can help you quickly compare your area to others. Each publication does carry state data (despite titles that might lead you to think otherwise). The *State and Metropolitan Area Data Book* covers 273 metro areas; *USA Counties* covers 3,100 counties; and the *County and City Data Book* covers the same number of counties, 1,100 cities, and 11,000 places. *USA Counties* actually is a compendium of compendia; available only on CD-ROM, the publication provides county data from all editions of *State and Metropolitan Area Data Book* and *County and City Data Book* since 1982, as well as data available to the time of publication. [8]

Unfortunately, the *State and Metro* book and the *County and City* book come out only every four to six years; there is no regular schedule. Moreover, as the data come from existing sources, they usually are one to two years behind the date on the cover of the compendium. The *USA Counties* CD-ROM came out for the first time in 1996. Even though the data may not be current, these compendia are an excellent way to understand the range of data available. With the help of the compendium, you can track more recent data.

These publications are available in print (except for *USA Counties)* and CD-ROM. Print publications can be ordered from the GPO at (202) 512-1800 and NTIS at (800) 553-6847. CD-ROMs can be ordered from the Census Bureau at (301) 457-4100. Also, the *State and Metropolitan Area Data Book* is available for download at http://www.census.gov/statab/www/smadb.html.

County Business Patterns

The Census Bureau's printed publication of *County Business Patterns* comes out annually, with one report for each state. In print, *County Business Patterns* provides state and county level information on private-sector nonagricultural establishments, employment, and payroll by four-digit SIC code, with establishments by employment-size class. The latest year available is 1996. You can purchase the print report for your state from the GPO at the above phone number or download it for free in Adobe Acrobat (.pdf) format at http://www.census.gov/ prod/www/abs/cbptotal.html.

[8] For those wanting to obtain a more comprehensive set of data specific to one or more counties, the Census Bureau provides customized CD-ROM compendia, under the name *CountyScope*, that gather data from over a dozen Census data series. These series include demographic and housing data from the 1990 Decennial Census (including the full set of PUMS records) down to the block and block group level; economic data from recent Economic Censuses (at the zip code level), County Business Patterns and ZIP Code Business Patterns data; a decade of Consolidated Federal Funds Reports (on federal expenditures and obligations); and geographic data from the Census Tract Street Index. The contents of *CountyScope* can be found at http://www.census.gov/ftp/pub/mp/www/rom/sumco.html. Cost is $400 for the first metro county ($300 for non-metro), and $100 for each additional metro county ($60 for non-metro). CDs can be ordered at (301) 457-4100.

Typing from printed publications or waiting for downloads from the Internet can be frustrating. You can get County Business Patterns data on CD and save the wait. The latest CD, with two year's worth of data for $150, can be ordered by phone at (301) 457-4100. You can also get a single year's worth of zip code level data (for 30,000 zip code areas) for $90. Remember, though, because of confidentiality restrictions, much of the detailed information at the zip code level is suppressed.

Your State's Covered Employment & Payrolls (ES-202) Annual Report

Each year, each state prepares an annual compilation of ES-202 data. (See Section 3.3 for a description of these data.) While the contents vary from state to state, these publications typically include highly detailed data on employment, payrolls, and numbers of firms (often by the four-digit level of SIC detail for the state), and frequently by the two-digit level of detail for counties. Some states also include a variety of historical tables and narrative analyses. Pricing and availability vary from state to state. For more information, contact your state LMI agency listed in Appendix B.

Economic Census, Geographic Area Series

Conducted once every five years (in years ending in “2” and “7”), the Economic Census is an invaluable source of detailed information about investment, productivity, sales, and other characteristics of business in almost every industrial sector. For the 1997 Economic Census, the following sectors are covered: mining, utilities, construction, manufacturing, wholesale trade, retail trade, transportation and warehousing, information, finance and insurance, real estate and rental and leasing, professional/scientific/technical services, corporate management, administrative and support, waste management and remediation, educational services, health care and social assistance, arts/entertainment/recreation, accommodation and food services, and other services.

For each specific sector, the Census Bureau publishes a Geographic Area Series (one report for each state), containing up to four-digit SIC data for states, metro areas, counties, and places. Unfortunately, the latest data available are from the 1992 Economic Census; the 1997 data should be available in 1999-2000. The CD-ROM of the entire Economic Census, or individual state reports for sectors of interest, can be ordered from the GPO or NTIS at the numbers above. Also, you can download state reports in .pdf format by going to http://www.census.gov/epcd/www/92results.html.

U.S. Industry and Trade Outlook

A one-time casualty of budget cuts, this publication has been resurrected by a partnership between the International Trade Administration and McGraw-Hill. Although most of the information in the book is national in scope, the *U.S. Industry and Trade Outlook* is an invaluable source of industry-by-industry analysis of recent trends in employment,

productivity, investment, and exports. Organized by major industry, each section contains information on world market share by nation, U.S. import and export position, total output and output by worker, as well as detailed data on recent trends and forecasts of future activity. Each subject area contains references including trade publications and industry associations, as well as contact information from Department of Commerce staff experts.

If you want to get a good handle on how an industry is performing, and some insights into the competitive situation U.S. producers face in the world economy, this is the resource to get. At $70 per copy, it is more expensive than the other publications listed here, but well worth it, in our opinion. Most of the chapters are authored by Commerce Department experts, with others written by McGraw-Hill staff and independent experts. You can order this publication by phone from the NTIS at (800) 553-6847. It's also available in bookstores. Much of the statistical information from the publication is accessible at www.ita.doc.gov/outlook. And, for reference, the full text of the 1994 version of the *Outlook* is available at gopher://gopher.umsl.edu/11/library/govdocs/usio94.

Digest of Education Statistics

Produced by the National Center for Education Statistics, an arm of the Department of Education, this helpful compilation provides data on educational institutions and programs, spending on schools and colleges, and educational attainment. A large number of data series are broken out on a state basis. This 530-page publication is available for free by calling (800) 424-1616, and is available for download at http://nces.ed.gov/pubs/digest97/.

Business Directory CDs

Often, it's useful to get the names and addresses of specific businesses in an area. A problem with many public records sources – like payroll tax records – is that they can't be used to generate identifiable information about individual firms. With the advent of CD-based business directories, it's easy to get basic information about almost any business, including firm name, street address, city, state, metro area, zip code, and SIC code. Inexpensive commercial business directories are available on CD. Many of these directories include latitude and longitude information about specific businesses, which are extremely useful for geographic information systems (GIS) and mapping applications. A representative list of products includes:

- *Listings Deluxe* by ProCD (see www.procd.com)
- *Phone Disc Business Pro* by Digital Directory Assistance (see www.phonedisc.com)
- *Phone Search USA* 4.0 by DeLorme (see www.delorme.com)

6.2 Narrative Guides to Data Products, Methodology, and Analysis

Census Catalog & Guide

It's difficult to comprehend just how much information the Census Bureau does generate. This thumb-indexed 340-page document provides descriptions of a wide selection of Census publications, CDs, computer tapes, and diskettes, and also pinpoints information available over the Web. The *Census Catalog & Guide* can save hours of trying to find which publication or electronic resource is most likely to have the data you need. Its appendix is a useful resource itself, providing lists of Census data centers, Federal Depository Libraries, and federal statistical agencies, and an overview of data publications of eight agencies other than Census.

The most recent full version of the document was published in 1997; an update was issued in 1998. You can order a copy of the catalog from the GPO at (202) 512-1800, or download it for free at http://www.census.gov/prod/www/abs/catalogs.html. The most up-to-date listing of Census products can be found on-line at CenStore, http://www.census.gov/mp/www/censtore.html.

BLS Handbook of Methods

The *BLS Handbook of Methods* provides detailed descriptions of the survey and statistical methods that the Bureau of Labor Statistics uses to compute everything from unemployment rates to the Consumer Price Index. It is a valuable resource for correctly interpreting very important, and often misunderstood, data series. The latest version was released in April 1997. You can get this publication on-line at www.bls.gov/opub/hom/homhome.htm or order the printed version from the GPO at (202) 512-1800.

BEA Catalog of Products

The Bureau of Economic Analysis annually produces a succinct guide to its data series and products – the *BEA Catalog of Products*. The *Catalog* is available from BEA at (202) 606-9900 and can be obtained on-line at www.bea.doc.gov/bea/uguide.htm.

Community Economic Analysis: A How To Manual

This book by Ronald Hustedde, Ron Shaffer, and Glen Pulver is a good introduction to many of the techniques of regional economic analysis. In a simple question-and-answer format, this publication explains how to use economic data to analyze your local economy. You can order a copy for $5.00 by calling the North Central Regional Center for Rural Development, Iowa State University at (515) 294-8321. The table of contents can be found at http://www.ag.iastate.edu/centers/rdev/comm.ec.analysis-cont.html.

Chapter 7
The Web's Twelve Best Sources for Regional Data

As evident throughout this guide, the World Wide Web has become a very important means for directly accessing a wide variety of socioeconomic data. A data input process that just four years ago required a trip to the library, a photocopy machine, and typing in data points one by one, now can be accomplished with a few clicks of the mouse.

Picking the best of anything can be a difficult and subjective chore. It's quite challenging when the subject is as vast and fast-changing as data sites on the World Wide Web. Our list is based on a combination of the highest vote-getters in our data users survey and our own experience. To make it simple, we had wanted to give you a list of the ten best, but, frankly, there are too many good sites to pass up, so we offer twelve. Below you will find the twelve sites that we think every regional economic analyst should know about.

These sites are divided into three major groups. The first group is made up of sites sponsored by the agencies that produce the data. If you know what you want, this is the direct route to the source. The second group contains sites that provide access to a range of data from a variety of sources. They have user-friendly interfaces and often provide helpful advice about how to use the data. The third group is made up of Web site directories, ones that offer an encyclopedic listing of what's available on the Web, with hyperlinks and a minimum of narrative. These sites provide you with the broadest view of Web data sites. If you are not sure what data exist on a certain topic and where to find them, check out these sites.

7.1 Statistical Agency Sites

When we polled socioeconomic data users about the sites they use most frequently, the sites of the Big Three federal statistical agencies accounted for half of the votes. These sites are useful not only because they can take you to popular and frequently used data series, but they include contact information, descriptions of the methodology used to produce the data series, and calendars of upcoming data releases. (See Chapter 3 for a more detailed discussion of the various data series described.)

Census Bureau

The Census Bureau site at http://www.census.gov will lead you to the full range of popular and obscure Census data series. The site has a comprehensive A-to-Z listing of data subjects, as well as an on-line search feature. Among the places you might visit are the following:

- The Decennial Census of Population and Housing, at http://www.census.gov/main/www/cen1990.html, is the most comprehensive source of data

about the nation's households. Through an easy-to-use lookup function, you can get a customized data printout on the characteristics of large and small areas, including demographics, occupation, journey to work, and economic status of families and households.

- The Economic Census, at http://www.census.gov/econ/www/econ_cen.html, is an invaluable source of detailed information about investment, productivity, sales, and other characteristics of business in almost every industrial sector. Collected and published for years ending "2" and "7," data are available by states, metro areas, counties, cities and places, and zip codes.

- The Population Estimates Program, at www.census.gov/population/www/estimates/popest.html, gives you current estimates of population, components of population change, and characteristics such age and race, for a full range of geographic levels.

Bureau of Labor Statistics

The Bureau of Labor Statistics (BLS), at http://www.stats.bls.gov, has a wealth of information available through its Web site, and through the Web sites of its partner state LMI agencies. The BLS Selective Access feature makes choosing and downloading data points by area quite straightforward. Three major BLS data series are especially valuable to analysts of regional economies:

- The Current Employment Statistics Program, at http://stats.bls.gov/790home.htm, provides monthly employment estimates by industry for states and metro areas.

- The Local Area Unemployment Statistics Program, at http://stats.bls.gov/lauhome.htm, prepares monthly labor force data for 6,700 areas around the U.S., including states, metro areas, counties, and cities of more than 25,000.

- The Consumer Price Index (CPI) Program, at http://www.bls.gov/cpihome.htm, gives an overall price index and indices for specific components of consumer expenditures, e.g., housing, medical, and food. The CPI is available for 26 metropolitan areas, and multistate averages by city size (e.g., metro areas of over 1.5 million in population in the West).

Bureau of Economic Analysis, Regional Accounts Data

The Bureau of Economic Analysis (BEA) makes its Gross State Product and Regional Economic Information System (REIS) files available through its Web site at

http://www.bea.doc.gov/bea/dr1.htm. You can also use this site to access BEA's national income account data and its publication of record, the *Survey of Current Business*.

Unfortunately, BEA does not make substate REIS files available on the Web. However, you can access these through the Government Information Sharing Project (Oregon State University) or the Geospatial and Statistical Data Center (University of Virginia), both described below.

7.2 Cross-Source Data Guides and Repositories

The sites in this group offer access to a range of data series from a variety of sources. They help data users find and download just the data they want, and some offer guidance on their use.

Guide to On-Line Sources for Economic Development Data, University of Minnesota

The University of Minnesota's State and Local Policy Program has developed an excellent site, at http://www.hhh.umn.edu/Centers/SLP/edweb/, to explain how to find and use economic data for economic development purposes. If you're just starting out to use economic data on the Web, this is a good place to begin. This site provides detailed, step-by-step instructions on how to find and use a variety of federal agency data, and has a very good list of Web links to state-specific data sources. The site also has step-by-step how-to instructions on calculating location quotients, shift-share analyses, and other methods of analyzing the data. Unlike the sites listed just below, this one does not have data on its own server – it gives you the link to the source site. In that sense, this site is a high value-added directory of Web data sites.

Government Information Sharing Project, Oregon State University

Oregon State University hosts the Government Information Sharing Project at http://govinfo.kerr.orst.edu/. The Government Information Sharing Project is one of the most straightforward and easy-to-use sites for accessing economic data. The site has a clickable map for zeroing in on the geographic are you are interested in and allows you to select and download data from the Economic Census, REIS, the *USA Counties* compendium, and the Decennial Census.

Geospatial and Statistical Data Center, University of Virginia

A data access service that complements to Oregon State site is offered by the Geospatial and Statistical Data Center at the University of Virginia at http://fisher.lib.Virginia.EDU/. This site enables you to download data from REIS, County Business Patterns (at the two-digit level), and the *County and City Data Book*.

Dismal Scientist

Despite the tongue-in-cheek name, this well-designed commercial Web site, at http://www.dismal.com/regions/regions.stm, is an excellent resource for analysts. Billing itself as the "best free lunch on the Web," Dismal Scientist provides an easy-to-use and frequently updated source of all kinds of economic data. The regional page enables you to easily produce state or metro-area rankings for dozens of socioeconomic variables such as job growth, unemployment, and migration. Also, this site is valuable for getting national data and linking to articles, analysis, and projections.

7.3 Data Directories

The sites listed in the previous sections can help you obtain the most frequently used (and by consensus, most useful) data series on state and regional economies. But you may have a research question or interest that the well-known data sources don't address. The challenge becomes to find out what, if any, data can meet your needs. The sites listed in this third group provide comprehensive directories, with links, to help you to find some of the more specialized data sources.

Resources for Economists on the Internet

Bill Goffe's Resources for Economists on the Internet (RFE), at www.rfe.org, is the granddaddy of Web guides to economic data. The regional data on the RFE site can be found at http://rfe.wustl.edu/USMacro/index.html. However, the site's scope is much broader than local and state economies, and includes links to everything from on-line journals and data sets to collections of working papers to economist jokes. This site provides a scholarly, well-organized, and annotated index of Internet resources.

FedStats

The Federal Interagency Council on Statistical Policy maintains the FedStats Web site, at http://www.fedstats.gov/, that provides links to the Web sites of over 70 federal data organizations. If you want to get a quick overview of what federal agencies provide what kinds of data, come here. You are best off checking out the Programs page, which gives a listing of agencies and data series by 14 data topics. Unfortunately, the Regional Statistics page does not provide a comprehensive listing of regional data series.

Government Information Locator Service

Government Information Locator Service (GILS) – available at http://www.access.gpo.gov/su_docs/gils/gils.html – is a Web-based search engine specifically designed to find federal government data resources available through the Internet. You can search by subjects and keywords to find relevant data sources. Maintained by the Government

Printing Office, GILS is a great place to turn if you are looking for unusual or out-of-the-way information from the federal government.

AUBER's Guide to State Economic Information

Chances are, somebody in your state has gathered data you want on your economy. As mentioned in Chapter 4, in the majority of states, one or more colleges and universities operate research centers that compile data on and research the state economy. Most of these centers are members of the Association for University Business and Economic Research (AUBER). You can find a state-by-state list of Web data sites maintained by members of AUBER at http://www.auber.org/htmls/leapcomp.html.

Sources of Socioeconomic Data for Economic Development Analysis

This site, http://www.econdata.net, was compiled as part of the project that produced this *User's Guide*, and provides links to over 125 different federal, state, and private Web sites that provide regional socioeconomic data. Links are organized by source and topic.

Chapter 8
Seven Pitfalls of Data Analysis

While you can get a good picture of your local economy from the available data, our survey of data users showed that there are a number of problems and limitations that befall and befuddle analysts. Here are seven common pitfalls, some of which you may have encountered, others of which you may want to become aware.

8.1 Series Breaks

The biggest bugaboo in time series analysis is "series breaks" – changes in the way data are defined, classified, or collected from one time period to another. Many series breaks are an inevitable and unfortunate byproduct of attempts to improve our data. For example, if the Bureau of Labor Statistics (BLS) adopts a more accurate method for calculating labor force, the new data are not necessarily comparable with the old.

Data users are on the eve of a very major series break as the federal government abandons the Standard Industrial Classification (SIC) Code used to classify businesses according to the industry for the North American Industry Classification System (NAICS). NAICS will more accurately classify economic activity based on the way the economy now operates. However, federal agencies, for the most part, will not be going back and reclassifying historical data from SIC to NAICS (though they will provide one "bridge" year in which data are provided in both SIC and NAICS formats).[9] While many industries in the NAICS system are similar or identical to those in the SIC system, enough are different that analysts will have some difficulty in tracking industry data trends over time.

8.2 Detail/Accuracy Tradeoff

Many casual observers fail to realize that published socioeconomic data often are statistical estimates based on a population sample. Samples, rather than a full count, usually are carried out in order to save time and money. Familiar data series based on samples include those derived from the Current Population Survey, the long form of the Decennial Census, and the Current Employment Statistics (CES) Program.

For the nation as a whole, extremely accurate estimates can be generated by sampling a tiny fraction of the population. However, for geographic areas smaller than the nation, any particular point estimate is based on fewer observations and has a wider margin of uncertainty. In general, the greater the level of geographic detail, the less likely any point estimate is to be accurate. A similar observation can be made regarding industrial, occupational, racial, or other detail. To the extent possible, data users should be aware of

[9] One exception – BLS indicates that it will be doing some reconstruction of major employment series in the Current Employment Statistics program, going back at least five years.

the confidence intervals in which points estimates lie.[10] Data agencies provide confidence intervals for most sample-based data series. In newer series, such as the Small Areas Income and Poverty Estimates Program and the American Community Survey (ACS), the Census Bureau explicitly publishes findings in terms of confidence intervals.

8.3 Confidentiality

Most of the aggregate statistics reported by federal statistical agencies are based on reports and records from individual persons and businesses. By law, persons and businesses submitting surveys to government agencies, filling out Census forms and completing tax returns are guaranteed that the information submitted will be kept confidential. While confidentiality is not breached when data are aggregated in large groupings, there are levels of aggregation below which it is possible to discern information about a single individual or business. As a rule, most statistical agencies suppress the publication of information about businesses when an SIC category would include fewer than three firms or when the employment contribution of any single firm exceeds 80 percent of the total. In these cases, data are reported only at the next higher level of aggregation, say in the total for all manufacturing.

The smaller the geographic area, the more likely one is to run into the confidentiality problem. Few data points are suppressed at the national level, but many are suppressed or combined with other categories at the county level. As a result, when a single firm is the dominant force in an industry locally, it is often hard to get published data on that industry. One skill of effective data analysts is to develop a "ballpark" sense of suppressed industry data through using data that are available, such as data at the next higher level of industry and geographic aggregation, and business directories.

8.4 Time Lags

A major frustration many data users face is getting timely data. Analysts and decision makers want access to data as current as possible. However, the process of collecting, collating, analyzing, and disseminating data is time consuming. Moreover, while federal data agencies quickly release national data (e.g., unemployment statistics, numbers of new jobs), they provide state and regional data more slowly. As a result, regional data analysts face lags of weeks (monthly local unemployment rates), months (annual employment by industry for counties), and years (Economic Census, County Business Patterns) in getting data. Moreover, beyond any time lag in publication, certain data series, such as the Decennial Census and the Economic Census, come out relatively infrequently, causing the analyst to rely on data that may be significantly out of date.

[10] A confidence interval is a measure of the statistical likelihood that the true point lies within a particular range. For instance, a 90 percent confidence interval of 4.5-5.0 percent unemployment indicates a 90 percent likelihood that the actual unemployment rate is within the range specified.

To demonstrate the issue of time lags, we've prepared the following table, which shows the most recent data available for various popular data series.

Most Recent Data Availability for Major Data Series, as of December 1998

Series	State	Substate
County Business Patterns	1996	
Decennial Census	1990	
Economic Census	1992	
ES-202 Covered Employment	Annual – 1996 or 1997, varies by state	
CES/BLS-790	November, 1998	October, 1998
Local Area Unemployment Statistics	November, 1998	October, 1998
REIS Personal Income	1997	1996

8.5 Differing Definitions and Methods

Analysts report that one of their most valued skills is the ability to work with disparate sources of data. Analyzing a local economy is a bit like making a patchwork quilt, it requires piecing together bits of information from any number of sources. And like quilt-making, sometimes things don't match up too well. One particular problem is that seemingly similar concepts are defined and applied differently in different data series, producing apparently conflicting results. Another problem is that, while the definition may be the same, the collection methodology and the results differ. Employment data series provide the largest number of data conflicts due to differences in definitions and methodologies. You can get dramatically different estimates of the number of people working in an area depending on whether you use ES-202 data, Local Area Unemployment Statistics (LAUS) data, CES data, County Business Patterns, or Regional Economic Information System (REIS) data. To demonstrate, we offer the estimates for Multnomah County, Oregon from each of these sources for calendar year 1995 (except for CES, which is not available at the county level).

Estimates of Employment in Multnomah County, Oregon
Calendar Year 1995, by Various Sources

Source	Employment Measure	Estimate
Bureau of Economic Analysis, REIS (CA-25)	Total Full- and Part-Time Employment Annual Average	511,950
Bureau of Economic Analysis, REIS (CA-27)	Wage & Salary Employment Annual Average	445,434
Oregon Employment Department, ES-202	Covered Employment, Annual Average	415,100
Census, County Business Patterns	Employees, Week of March 12	367,961
Oregon Employment Department, LAUS	Resident Employment, Annual Average	334,750

If asked how many people work in Multnomah County, Oregon, how would you answer? Depending on which series you chose, you could say anywhere from less than 350,000 to more than half a million. None of these measures are wrong, they're all just measuring slightly different things. The most important distinction is between the LAUS definition of employment (which is place-of-residence) and the others (all place-of-work). Because Multnomah County is the central county in a metropolitan region, it has many commuters from surrounding suburban counties, which explains why more people work in the county than reside there.

The three place-of-work data series vary because they count slightly different groups. County Business Patterns excludes all workers not subject to FICA reporting requirements, which leaves out government workers, railroad employees and most agricultural workers. ES-202 counts only those workers subject to state unemployment insurance laws, again omitting agricultural workers. The wage and salary employment number from the Bureau of Economic Analysis (BEA) is somewhat broader. BEA's estimate of total employment includes farm and nonfarm proprietors. For metro areas and states, CES employment data will differ from the others both because of definition and methodology (based on a survey rather than a count).

The range of employment data above provides just one example of the challenges of differing definitions and methodologies for data analysis. Other instances seen in this guide include differing definitions for income (BEA personal income, Census money income) and exports (Census EL and OM series), and differing methodologies for unemployment (LAUS, Geographic Profile, ACS), population characteristics (Population Estimates Program, CPS), money income (CPS, Small Area Income and Poverty Estimates Program, ACS), and hourly wages (CES, National Compensation Survey, Occupational Employment Statistics). So in order to be able to use and interpret data effectively, it's vital to know how data are gathered, and what they are measuring.

8.6 Revisions

Another maddening tradeoff analysts confront is the tension between timeliness and revisions. For some data series, statistical agencies make extra efforts to produce quick estimates of economic data. Using the information that can be gathered easily and quickly (often partial information from a sample of subject workers, firms, or households) they work to generate an estimate in the shortest possible time. Later, as fuller information becomes available, these early estimates are revised. Often, whole series of estimates (e.g., ES-202, personal income) are revised to incorporate newly available data, to conform subarea estimates to state or national totals, or to address methodological or definitional changes. Keeping track of revisions is an ongoing chore for many analysts.

8.7 Microbusinesses and the Self-Employed

One of the aspects of economic development hardest to track is the increasing role that self-employed, sole-proprietor businesses with no employees play in the economy. With corporate downsizing, and the advent of personal computers and advanced telecommunications technology, many more people are working as self-employed contractors and consultants, often out of their homes. Because so much of the federal statistical system is geared to gathering data about wage and salary employment, these workers fly below the radar of many statistical series. You won't find self-employed workers, for example, in ES-202 records, CES, or County Business Patterns. Estimates of proprietorships are part of REIS, and the self-employed are counted as employed through the LAUS Program. In general, though, it can be very challenging to estimate the number of self-employed workers, particularly for small areas and by industry.

Our ability to track sole proprietors is especially important because self-employment is increasing much faster than wage and salary employment. For example, between 1990 and 1995, the number of nonfarm proprietorships in the U.S. increased by 8.7 percent while the number of nonfarm wage and salary employees increased only 3.3 percent. Nationwide, more than 22 million nonfarm proprietorships exist.

Chapter 9
Advanced Analysis: Power Tools for Data

For the most part, we've focused on the basic tools for describing and analyzing local and regional economies. Experience shows that you'll get a lot of mileage out of these methods. However, certain issues and questions may require more detailed and sophisticated analysis, requiring advanced techniques.

In comparison with the basic tools, certain advanced techniques can require much more effort to obtain and manipulate the data, as they do not use "off-the-shelf" data. In some instances, the data supplying agencies must do custom computer runs of their databases, usually for a fee to recover the costs of programming and checks to protect confidentiality.

9.1 Microdata Analysis

Most data that regional analysts utilize are aggregate figures, for example, total employment for an industry in a state. While aggregate data are useful for many purposes, they do have limitations. For instance, data users are stuck with the categories chosen by the person or agency providing the data. If you want to analyze data through your own categories, you need to have access to the individual records, or microdata, from which the aggregate totals were computed.

Getting access to microdata is difficult, due to the cost of working with thousands or millions of records and the need to protect confidentiality. For many types of microdata records, such as Census surveys and tax files, information linked to named persons or businesses legally cannot be released.

However, you can get access to certain Census Bureau microdata on individuals, with identifying information stripped out. The Census Bureau sells CD-ROMs and computer tapes of Public Use Microdata Samples (PUMS) from the Decennial Census (one-percent and five-percent samples), the American Housing Survey (AHS), the Current Population Survey (CPS), and the Survey of Income and Program Participation (SIPP). Geographic identifiers are retained, so you can examine microdata for particular areas. You can find out more about Census microdata files by calling (301) 457-4100. You also can download Census microdata via the Internet:

- Federal Electronic Research and Review Extraction Tool (FERRET) provides on-line access to microdata from the CPS, SIPP, and the National Health Interview Survey. FERRET is a joint effort of the Census Bureau and the Bureau of Labor Statistics. (http://ferret.bls.census.gov/)

- Data Extraction System (DES) is an on-line service that provides access to a variety of Census microdata, including PUMS data from the Decennial

Census, the AHS, and the CPS. (http://www.census.gov/DES/www/welcome.html)

- Soon, PUMS data for the Decennial Census and the ACS will be accessible through a new user-friendly service, American FactFinder. (http://www.census.gov/dads/www/)

One of the most valuable sources of microdata about firms in any state is the ES-202 data file – the payroll tax records of firms subject to state and federal unemployment insurance taxes. This database includes every covered firm's employment and payroll, SIC code, and address, which makes it a tremendous resource for microdata analysis of industry trends and characteristics. The ES-202 database is also extremely useful for applications that involve the mapping of data or efforts to look at subcounty distributions of economic activity. Also, with the ES-202 file, one can reaggregate data using the finer classification of firms reflected by their four-digit SIC codes (most published substate level data about industry is available only at the two-digit level).

ES-202 data are gathered by your state labor market information (LMI) agency. Each state has its own combination of laws and policies governing access to these data, and pricing for providing microdata to eligible users. Access policies vary significantly by state. Some states make the data available to a wide range of users, public and private. Others effectively prohibit access to firm-level data. To find out your state's policy on access to microdata, contact your state LMI agency representative listed in Appendix B.

Manipulating microdata generally requires more computing power and more sophisticated techniques that one uses with aggregate data. To manipulate microdata, you'll probably want a database program (such as Borland's Paradox, Lotus Approach, or Microsoft Access) or a statistical analysis program (such as SPSS or SAS). Each of these programs is capable of manipulating very large data sets.

9.2 Longitudinal Analysis

Longitudinal analysis is an extension of the techniques of microdata analysis. While basic microdata analysis involves looking at a snapshot of data at a specific time, longitudinal analysis examines data on individual persons or businesses over a time period. One common use of longitudinal analysis for economic development is the study of business creation and survival rates. Longitudinal analysis enables you to identify trends in firm contribution to job growth and job loss over time, including the relative contributions of business start-ups, failures, closures, expansions and contractions to net job growth.

If you have direct access to firm-level microdata for a number of years, you can do this kind of longitudinal analysis yourself. (A critical issue here is the ability to connect records for one firm to the comparable record for the same firm in later years). Another approach is to contract with the data agency to perform this analysis on your behalf.

The Census Bureau, for example, will prepare customized longitudinal analyses of firm and establishment changes in employment.

- The Center for Economic Studies provides analysis of manufacturing establishment microdata collected through the Census of Manufactures and the Annual Survey of Manufactures. The Center's database is longitudinal, so it can track characteristics of particular establishments over time. The Center is in the process of building a longitudinal file of all Economic Census microdata. You can view the Center's Web site at http://www.census.gov/ces/ces.html, or call (301) 457-1825.

- Statistics of U.S. Business is a Census unit that provides analysis, on a reimbursable basis, of the corporate and establishment microdata file that serves as the data source for County Business Patterns. The database was created with the help of the Small Business Administration and covers the years 1989-95. Customized tabulations of data can be prepared for geographic areas to the county level, and for the two-, three- or four-digit level of SIC code detail (subject to confidentiality restrictions). Variables also can include firm size (employees and receipts) and form of legal organization (corporation, partnership, or sole-proprietorship). You can visit the Statistics of U.S. Business Web site at http://www.census.gov/epcd/www/sb001.html. You can get more information by calling (301) 457-8641, or sending email to busstat@census.gov.

9.3 Input/Output Analysis and Impact Studies

Often, public decision makers and leaders want to know the economic impacts of major projects or economic events, like the construction of a new plant or the closure of a military base. Because such events produce changes in business and household spending that spread through the entire local economy, it is necessary to have a good idea of the patterns of intersectoral linkages.

The economy-wide impacts of actual or possible events can be determined through input-output analysis. An input-output table is one large matrix that shows the nature of the interrelationships between various economic sectors, and how changes in one sector will affect others and the economy as a whole.

The expense of creating a regional input-output matrix from scratch is prohibitive. Thus, analysts are better off purchasing input-output tables from people who do this for a living.

- The Bureau of Economic Analysis (BEA) will prepare a customized estimate of regional input output multipliers for any region composed of one or more counties. The BEA model for creating regional multipliers, called RIMS II (Regional Input-Output Modeling System II), has been used for more than a decade for evaluating the impacts of developments.

RIMS II multipliers cost $600 per county or group of counties modeled. More information about RIMS II is available on the Web at http://www.bea.doc.gov/bea/rims/rims-1.htm. For further information or to place an order, call (202) 606-5343 or e-mail rimsread@bea.doc.gov.

- In addition to BEA's input-output models, two private companies develop customized regional input-output models. IMPLAN, located in Stillwater, MN, maintains a Web site at http://www.implan.com/index2.htm and can be reached at (651) 439-4421 or sales@implan.com. Regional Economic Models, Inc., (REMI) is located in Amherst, MA. REMI's Web site is http://www.remi.com/ and the firm can be reached at (413) 549-1169 or remi@crocker.com.

Index

To assist the reader in quickly finding information of interest, this index is divided into four sections – statistical organizations, data topics, methodologies and tools, and data intermediaries.

Statistical Organizations

Data Topics

Methodologies and Tools

Data Intermediaries

Appendix A
Census State Data Centers – Lead Agencies

December 1998
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Phoenix, AZ 85005
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Outside Arizona (800)-827-4966
fax (602) 542-6474
http://www.de.state.az.us/research/rahmpg.html

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http://www.calmis.ca.gov/

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http://lmi.cdle.state.co.us/pubs.htm

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Office of Research
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(860) 263-6275 fax -6263
http://www.ctdol.state.ct.us/lmi/misc/lmi.htm

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Workforce Development Cabinet
Labor Market Information Section
275 East Main Street, Second Floor, CHR Bldg.
Frankfort, KY 40621
(502) 564-7976 fax -2937
http://www.des.state.ky.us/agencies/wforce/des/lmi/lmi.htm

LOUISIANA
Louisiana Department of Labor
PO Box 94094
1001 N. 23rd Street
Baton Rouge, LA 70804-9094
(504) 342-3140 fax –9192
http://www.ldol.state.la.us/statpage.htm

MAINE
Division of Labor Market Information Services
Maine Department of Labor
20 Union Street
Augusta, ME 04330
(207) 287-2271 fax –2947
http://www.state.me.us/labor/lmis/maine.html

MARYLAND
Maryland Dept. of Labor, Licensing, and Regulation
Office of Labor Market Analysis & Information
1100 North Eutaw Street, Room 601
Baltimore, MD 21201
(410) 767-2250 fax –2219
http://www.dllr.state.md.us/lmi/index.htm

MASSACHUSETTS
Massachusetts Division of Employment & Training
Economic Research, 2nd Floor
19 Staniford St.
Boston, MA 02114
(617) 626-6556 fax 727-5981
http://www.detma.org/lmiinfo.htm

MICHIGAN
Michigan Jobs Commission – Employment Service Agency
Office of Labor Market Information
7310 Woodward Avenue, Room 520
Detroit, MI 48202
(313) 876-5427 fax -5587
http://www.michlmi.org

MINNESOTA
Minnesota Department of Economic Security
Research and Statistics Office
390 North Robert Street
St. Paul, MN 55101
(888) 234-11147 fax (651) 282-5429
http://www.des.state.mn.us/lmi

MISSISSIPPI
Mississippi Employment Security Commission
Labor Market Information Division
Post Office Box 1699
Jackson, MI 39215-1699
(601) 961-7424 fax -7448
http://www.mesc.state.ms.us/lmi/index.html

MISSOURI
Department of Labor & Industrial Relations
Research and Analysis
421 E. Dunklin, P.O. Box 59
Jefferson City, MO 65104
(314) 751-3595 fax -7160
http://www.works.state.mo.us/lmi/index.htm

MONTANA
Department of Labor and Industry
Research and Analysis
P.O. Box 1728
Helena, MT 59624
(406) 444-2430 fax -2638
http://jsd.dli.state.mt.us/lmi/lmi.htm

NEBRASKA
Nebraska Department of Labor
Division of Employment
Labor Market Information
P.O. Box 94600
Lincoln, NE 68509-4600
(402) 471-2600 fax -9867
http://www.dol.state.ne.us/nelmi.htm

NEVADA
Nevada Department of Employment, Training & Rehabilitation
Information Development & Processing Division
Research & Analysis Bureau
500 E.Third Street
Carson City, NV 89713
(775) 687-4550 fax -1063
http://www.state.nv.us/detr/lmi/

NEW JERSEY
New Jersey Department of Labor
Division of Labor Market and Demographic Research
PO Box 383
Trenton NJ 08625
(609) 292-0099 fax 777-3623
http://www.state.nj.us/labor/lra

NEW HAMPSHIRE
Economic & Labor Market Information Bureau
New Hampshire Department of Employment Security
32 South Main Street
Concord, NH 03301
(603) 228-4123 fax -4172
http://www.nhes.state.nh.us/lmipage.htm

NEW MEXICO
New Mexico Department of Labor
401 Broadway, 1st Floor
PO Box 1928
Albuquerque, NM 87103
(505) 841-8647 fax -9007
http://www3.state.nm.us/dol/dol_lmif.html

NEW YORK
New York Department of Labor
Division of Research and Statistics
State Building 12, Room 490
Albany NY 12240
(518) 457-3801 fax 485-6199
http://www.labor.state.ny.us

NORTH CAROLINA
Labor Market Information Division
Employment Security Commission of North Carolina
Post Office Box 25903
Raleigh, NC 27611
(919) 733-2936 fax -8662
http://www.esc.state.nc.us/html/lmi.html

NORTH DAKOTA
Job Service North Dakota
Research and Statistics
P.O. Box 5507
Bismarck, ND 58506-5507
(701) 328-2868 fax -4193
http://www.state.nd.us/jsnd/lmi2.htm

OHIO
Ohio Bureau of Employment Services
Labor Market Information Division
145 South Front Street
Columbus, OH 43215-1618
(614) 752-9494 fax -9621
http://lmi.state.oh.us/

OKLAHOMA
Oklahoma Employment Security Commission
Will Rogers Memorial Office Building, 4th flr.
Oklahoma City, OK 73105
(405) 557-7265 fax 525-0139
http://www.oesc.state.ok.us/lmi/default.htm

OREGON
Oregon Employment Department
875 Union Street, N.E., Room 207
Salem, OR 97311
(503) 947-1266 fax -1210
http://olmis.emp.state.or.us/

PENNSYLVANIA
Department of Labor & Industry
Bureau of Research and Statistics
L & I Building, Room 220
Seventh & Forster Streets
Harrisburg, PA 17121-0001
(717) 787-3266 fax 772-2168
http://www.lmi.state.pa.us/

PUERTO RICO
Dept. of Labor and Human Resources
Bureau of Labor Statistics
505 Muñoz Rivera Ave –20th floor
Hato Rey, PR 00918
(809) 754-5385 fax 751-7934
http://www.interempleo.org/lmi_english/fr_stat.htm

RHODE ISLAND
Labor Market Information
Department of Labor and Training
101 Friendship Street
Providence, RI 02903-3740
(401) 222-3730 fax -2731
http://www.dlt.state.ri.us/webdev/lmi/lmihome.html

SOUTH CAROLINA
South Carolina Employment Security Commission
Labor Market Information Division
Post Office Box 995
Columbia, SC 29202
(803) 737-2660 fax -2838
http://www.sces.org/lmi/index.htm

SOUTH DAKOTA
South Dakota Department of Labor
LMI Division
420 S. Roosevelt St.
Aberdeen, SD 57401-5131
(605) 626-2314 fax -2322
http://www.state.sd.us/dol/lmic/lmihp.htm

TENNESSEE
Tennessee Department of Employment Security
Research and Statistics Division
Davy Crockett Tower, 11th floor
500 James Robertson Pkwy
Nashville, TN 37245-1000
(615) 741-2284 fax 532-9434
http://www.state.tn.us/empsec/lmi.htm

TEXAS
Texas Workforce Commission
9001 North IH 35
Suite 103A
Austin, TX 78753
(512) 491-4802 fax -4904
http://www.twc.state.tx.us/lmi/lmi.html

UTAH
Utah Department of Employment Security
LMI Division
140 East 300 South
Salt Lake City, UT 84111
(801) 526-9401 fax -9239
http://www.state.ut.us/html/employment.htm

VERMONT
Research and Analysis
Department of Employment & Training
PO Box 488
Montpelier, VT 05601-0488
(802) 828-4202 fax -4050
http://www.det.state.vt.us/~detlmi/lmihp.htm

VIRGINIA
Virginia Employment Commission
Economic Information Services Division
P.O. Box 1358
Room 328
703 East Main Street
Richmond, VA 23218-1358
(804) 786-7496 fax -7844
http://www.vec.state.va.us/lbrmkt/lmi.htm

VIRGIN ISLANDS
Virgin Islands Bureau of Labor Statistics
P.O. Box 303359
St. Thomas, VI 00803
(340) 776-3700 ext. 2034 fax 774-5908
http://www.vidol.org

WASHINGTON
Washington Employment Security Department
Labor Market and Economic Analysis Branch
P O Box 9046
Olympia, WA 98507-9046
(360) 438-4804 fax -4846
http://www.wa.gov/esd/lmea/

WEST VIRGINIA
West Virginia Bureau of Employment Programs
Labor Market Information
Research, Information, & Analysis Division
112 California Avenue
Charleston, WV 25305
(304) 558-2660 fax -0301
http://www.state.wv.us/bep/lmi/default.htm

WISCONSIN
Wisconsin Department of Workforce Development
Bureau of Workforce Information
201 E. Washington Ave.
Madison, WI 53702
(608) 266-2930 fax -5887
http://www.dwd.state.wi.us/dwelmi/

WYOMING
Department of Employment
Research and Planning
P.O. Box 2760
Casper, WY 82602
(307) 473-3801 fax -3806
http://wyjobs.state.wy.us/lmi/rphome.htm

Appendix C
National and Regional Associations with Interests in Economic Development

December 1998

American Chamber of Commerce Executives
4232 King St.
Alexandria, VA 22302
(703) 998-0072 fax 931-5624
http://www.acce.org/

American Chamber of Commerce Researchers Association
4232 King Street
Alexandria, VA 22302
(703) 998-0072 fax 931-5624
http://www.accra.org

American Economic Development Council
9801 West Higgins Road, Suite 540
Rosemont, IL 60018-4726
(847) 692-9944 fax 696-2990
http://www.aedc.org

American Planning Association
122 South Michigan Ave., Suite 1600
Chicago, IL 60603
(312) 431-9100 fax -9985
http://www.planning.org

Association of Public Data Users
Patricia J. Conner, Chief Administrator
Division of Business and Economic Research
University of New Orleans
New Orleans, LA 70148
(504) 280-3154 fax -6094
http://www.apdu.org

Association for University Business & Economic Research
College of Business Administration
Northeast Louisiana University
Monroe, LA 71209-0101
(318) 342-1215
http://www.auber.org

California Association for Local Economic Development
1010 F Street, Suite 100
Sacramento, CA 95814-0836
(916) 448-8252 fax -3811
http://www.caled.org

Community Development Society
1123 N. Water Street
Milwaukee, WI 53202
(414) 276-7106 fax –7704
http://www.comm-dev.org/

Council for Urban Economic Development
1730 K Street, NW, Suite 700
Washington, DC 20006
(202) 223-4735 fax -4745
http://www.cued.org

Council of Professional Associations on Federal Statistics
1429 Duke Street, Suite 402
Alexandria, VA 22314-3415
(703) 836-0404
http://members.aol.com/COPAFS/index.htm

Mid-America Economic Development Council
St. Paul, MN
(612) 290-6296/6278 fax -2266

The Modernization Forum
20501 Ford Road
Dearborn, MI 48128
(313) 271-2790 fax -2791
http://www.modforum.org

National Association for Business Economics
1233 20th Street, NW, Room 505
Washington, DC 20036
(202) 463-6223 fax -6239
http://www.nabe.com

National Association for County Community and Economic Development
1200 19th St., NW, Suite 300
Washington, DC 20036
(202) 429-5118 fax 857-1111
http://www.nacced.org/

National Association of Development Organizations
444 North Capitol Street, NW
Suite 630
Washington, DC 20001
(202) 624-7806 fax -8813
http://www.nado.org

National Association of Regional Councils
1700 K Street, NW, Suite 1300
Washington, DC 20006
(202) 457-0710 fax 296-9352
http://www.narc.org

National Association of State Development Agencies
750 First Street, NE, Suite 710
Washington, DC 20002
(202) 898-1302 fax -1312
http://www.nasda.com

National Conference of State Legislatures
1560 Broadway, Suite 700
Denver, CO 80202
(303) 830-2200
http://www.ncsl.org

National Congress for Community Economic Development
1030 15th Street, NW
Suite 325
Washington, DC 20005
(202) 234-5009 fax –4510
http://www.ncced.org

National League of Cities
1301 Pennsylvania Avenue, NW
Suite 550
Washington, DC 20004-1763
(202) 626-3000 fax -3043
http://www.nlc.org

Northeast Economic Developers Association
PO Box 968
Elkton, MD 21922
(410) 620-1965 fax -1979
http://www.nida.org

Regional Science Association International
University of Illinois
901 S. Mathews
Urbana, IL 61801-3682
(217) 333-8904 fax -3065
http://rsai.geography.ohio-state.edu/rsai/homepage.htm

Science and Technology Council of the States
c/o State Science and Technology Institute
751 Northwest Blvd., Suite 305
Columbus, OH 43212
(614) 421-SSTI (7784) fax -9123
http://www.ssti.org

Southern Economic Development Council
229 Peachtree St., NE, Suite 1008
Atlanta, GA 30303
(404) 523-3030
http://www.sedc.org

Spending Profiles of National Forest Visitors, NVUM Four Year Report

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May 2005

This report is based on an analysis of National Forest Visitor Use Monitoring (NVUM) Survey Data for the first four years covering calendar year 2000, and fiscal years 2001, 2002, and 2003.

JOINT VENTURE AGREEMENT
BETWEEN THE
USDA FOREST SERVICE
INVENTORY AND MONITORING INSTITUTE
and
MICHIGAN STATE UNIVERSITY
Joint Venture Agreement # 01-JV-11130149-203

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ABSTRACT: This report presents national forest visitor spending profiles developed from the USDA Forest Service National Visitor Use Monitoring (NVUM) project surveys collected between January, 2000 and September, 2003. The report is an update of an earlier report covering the first three years of NVUM survey data. The FY 2003 NVUM surveys add an additional 6,314 cases with spending data from an additional 31 national forests. Changes from the three year national spending averages are generally minor. National average spending profiles are developed for seven trip type segments: day trips and overnight trips involving stays on and off the forest for local and non-local visitors, and visitors whose primary trip purpose was not recreation on the forest. Distinct spending profiles are also estimated for high and low spending areas and for selected recreation activity subgroups.

INTRODUCTION

This report updates a previous report (Stynes and White 2004) that estimated spending profiles for national forest visitors based on data from the first three years of the National Visitor Use Monitoring study. In FY 2003, visitors at an additional 31 forests were sampled, adding 6,314 cases to the spending dataset. The three year spending profiles are updated here using data from the first four years of the NVUM survey. National average spending profiles have remained fairly consistent over the four years, with some variations likely due to the mix of forests sampled each year.

There were some changes in the survey instrument in 2003. The effects of these changes are covered more fully in a separate report (Stynes and White 2005) that refines the segments for overnight visitors using information about lodging types gathered in FY 2003. In this four-year combined report, we replicate the procedures used during the first three years and price adjust all spending figures to 2003. The presentation and tables closely follow the three year report (Stynes and White 2004).

BACKGROUND ON NVUM SURVEYS

The objective of the USDA Forest Service National Visitor Use Monitoring study (NVUM) is to estimate the number of recreation visits to national forests (English et al. 2002). To achieve this objective a selection of individual forests in each region are sampled yearly with each administrative forest in the National Forest System being sampled once every five years.

In addition to data necessary to estimate visitation, the NVUM survey gathered other visitor and trip characteristics. A separate economics survey administered to roughly a fourth of those sampled gathered spending information that provides the basis for development of the spending profiles reported here.

The analysis here is based on data gathered during the first cycle of the NVUM project, covering 119 administrative national forests, grasslands, and recreation areas sampled under NVUM. The addition of FY 2003 data yields modest increases in the reliability of the spending averages and now provides estimates for all national forests.

METHODS

National forest visitors were sampled at both designated recreation sites and in the general forest area (GFA) of individual forests. A stratified sampling scheme was employed for sites and days based upon the expected visitation (high, medium, or low visitation) at a given location on a given day (termed a “site day”).

During the first cycle of the NVUM study, a total of 81,277 visitors were sampled. Roughly one fourth (21,406) of these visitors completed a supplemental set of spending questions (Table 1)[1]. The economics portion of the NVUM questionnaire measured spending within fifty miles of the forest on the current recreation trip.

During the first three years, the NVUM questionnaire measured spending of a randomly selected adult in the travel party. Based on our analysis of the data gathered during the first two years (CY 2000 and FY 2001) and comparisons with other studies, we concluded that most respondents were reporting spending for the entire travel party (Stynes, White and Leefers 2003). Spending reported in FY 2002 was also assumed to represent the travel party. In FY 2003 the questionnaire was changed to request the spending of the entire travel party (all people in the vehicle). The lack of significant changes in the spending averages in FY 2003 supports our decision to treat spending reports as representing the travel party.

Table 1. Breakdown of the NVUM sample by Year

	2000	2001	2002	2003	4 Year Total
Total Sample	19,351	22,014	20,589	19,323	81,277
Cases with economic data	4,347	4,957	5,788	6,314	21,406
Outliers in economic data					
Days away from home >= 30	115	107	146	127	495
People in vehicle >= 8	76	82	79	116	353
Total spending >= 1000	129	176	210	308	823
Missing Zip code[a]	181	192	158	91	622
Total omitted cases	501	557	593	642	2,293
Final Cases for economic analysis	3,846	4,400	5,195	5,672	19,113

[a] In total, 767 cases had missing Zip codes (excluding foreign travelers). Of these, 67 are removed as outliers. Of the remaining 700 cases, 78 cases are included within the non-primary purpose trip segment. The remaining 622 are excluded in analyses by trip segment.

National forest visitors reported spending in ten categories. The individual expenditure categories were modified slightly in FY 2003. Table 2 shows the changes in spending categories and how FY 2003 categories were matched with earlier years. The two lodging categories in each version of the instrument are combined to create a general "lodging" category that can be compared across the two versions of the instrument[2]. The new "sporting goods" category in FY 2003 can be combined with the "souvenirs/clothing and other misc" category to be consistent with the combination of "souvenirs/clothing" and "any other expenses" during the first three years[3].

[1] Roughly one in four visitors received the economics survey during the first three years. The percentage was increased to a third in FY 2003.

[2] In the first three years "privately-owned lodging" accounted for 89% of total lodging expenditures. In year 4 "motel, lodge, cabin, B&B" represented 78% of the total lodging expenditures.

[3] See Stynes and White (2005) for a more complete treatment of the effects of changes in spending categories in FY 2003.

Table 2. Expenditure Categories during the First NVUM Cycle

First Three Years	Fourth Year
Privately-owned Lodging	Motel, lodge, cabin, B&B etc.
Government-owned Lodging	Camping
Food/drink at restaurants and bars	Restaurant and Bars
Gasoline and oil	Gasoline and oil
Other food and beverages	Groceries
Other transportation (plane, bus, etc.)	Local transportation (bus, shuttles etc.)
Activities including guide fees & equipment rental	Recreation and entertainment (include guide fees, equipment rental)
Entry, parking, or recreation use fees	Entry, parking, or recreation use fees
Souvenirs/clothing	Souvenirs/clothing and other misc.
Any other expenses	Sporting goods

The economics portion of the NVUM survey recorded the length of the trip (nights away from home) and whether the national forest was the primary destination. The question used to measure trip purpose was changed in FY 2003 to more explicitly identify trips made primarily for business or to visit friends or relatives. For consistency with the earlier version of the trip purpose question, only visitors who stated that their primary purpose was for recreation elsewhere than the NF are classified as non-primary purpose trips.

ANALYSIS METHODS

The analysis of the spending data involved (1) some additional data cleaning and removal of outliers, (2) checking for representativeness of the economic subsample relative to the full sample, (3) choosing appropriate weights for the analysis, (4) testing for differences in spending across visitor subgroups, and (5) estimating spending averages for meaningful segments with distinct spending patterns.

Only a brief discussion of analysis procedures and technical issues is included here. A more complete treatment is included in Stynes, White and Leefers (2003). Except for a few variations dictated by changes in the NVUM instrument in FY 2003, analytical procedures for the combined four year data set are identical to those used in the three year report (Stynes and White 2004).

Defining Local Visitors. Local visitors are defined as those visitors who live within 30 straight-line miles of the forest visited[4]. Identifying the distance that NVUM respondents live from the forest was operationalized in ArcView 3.2 using the reported home Zip code of the respondent obtained from the survey. The location of the reported Zip code was identified using both

[4] Zip codes were identified as local if the Zip code centroid was within 30 straight line miles of the forest boundary. Taking into account road circuity factors, locations of residences within the Zip code, and locations of recreation sites within the forest, distances from the subjects home to the site will be greater than 30 miles.

Delorme Street Atlas 2004 and a Zip code database distributed by ESRI. The straight-line distance from Zip code centroid to the boundary of the forest was calculated for each respondent. Those respondents living within 30 straight-line miles were classified as "local" visitors while those living greater than 30 miles were classified as "non-local" visitors. All foreign visitors were classified as "non-local" visitors. Visitors not providing a Zip code or providing a Zip code that was not found either in Delorme Street Atlas 2004 or in the ESRI database were classified as "missing" and excluded from most economic analyses.

Outliers/Contaminants: Long trips (days away from home >=30), large parties (people in the vehicle >=8), and cases with very high total spending (>=$1,000) were omitted from the spending analysis. Spending data for very long stays or covering large parties were deemed unreliable. Spending reports of $1,000 or more were omitted as these cases appeared to include airfares, other expenses outside the local area, or expenditures not clearly related to the NF visit. Dropping these cases yields more conservative spending averages, but likely better represents what a typical NF visitor spends. Since the NVUM sampling design resulted in very high weights for some cases, the omission of outliers helps to reduce the sensitivity of subgroup parameter estimates to a small number of atypical cases.

Cases with missing Zip codes were dropped in estimating spending patterns of local versus non-local visitors. After omitting contaminants, outliers and cases with missing data, 19,116 cases were available from which to develop spending profiles within a set of trip type segments (Table 1).

Representativeness: Comparisons of selected variables between cases completing the economics portion of the questionnaire versus the overall sample did not reveal any significant differences. The economics sub-sample is therefore assumed to be representative of the entire sample. Representativeness of the overall NVUM sample rests on the stratified sampling design and case weighting to adjust for disproportionate sampling of site days across strata[5]. As the NVUM study was designed primarily to develop reliable use estimates at the national level, the sample may not be completely representative of visitors at the individual forest level. Forest level statistics should therefore be used with caution.

Weights: Two distinct weights are applied to adjust the sample for disproportionate sampling across strata and different levels of exposure of individual visitors to sampling. The exposure weight for each case is the inverse of the number of sites visited. A visitor stopping at two distinct sites on the forest during their visit has twice the chance of being selected as a visitor stopping at only one site and hence is weighted ½ when estimating characteristics of NF visits. Visitors on overnight trips, particularly those staying overnight on the forest were more likely to visit multiple sites.

Strata weights adjust the sample to reflect the number of site days sampled within each stratum[6]. Case weights are the product of the exposure and strata weights. The case weights are used in

[5] See English et. al. 2002 for sampling details.
[6] Strata were defined as high, medium and low use site days within four types of sites (OUDS, DUDS, WILD and GFA). Weights for sites with proxy measures of site use were based on actual proxy use counts. See English et. al. 2002 for details.

estimating segment shares, lengths of stay, party sizes and most other visit and visitor characteristics.

Only the exposure weights are used in estimating spending averages. Spending measures do not vary systematically with the NVUM strata and therefore the case weights do not generally influence the overall spending averages. However, due to small sample sizes within strata at the individual forest level (or for other narrowly defined subgroups of visitors) and wide variations in sampling ratios across strata[7], spending estimates for individual forests that employ strata weights can be sensitive to a small number of cases with very high weights. To avoid this problem, all spending averages are computed using only the exposure weights.

Subgroup Analysis: The rationale for and definition of visitor trip segments is discussed further below. The key subgroups for explaining visitor spending were identified in the analysis of the first two years of NVUM data. Analysis of variance indicated that trip type segments were the best predictors of spending. Variations in spending across forests and recreation activities were much smaller and frequently explained by differences in the trip segment mix for a given forest or activity. Procedures for the spending analysis therefore begin by dividing visitors into trip type segments. Spending averages are then estimated for each segment. Spending estimates presented for other subgroups (e.g., by forest or recreation activity groups) take into account variations resulting from the mix of trip types.

NATIONAL FOREST VISITOR SEGMENTS

A primary objective of the economic analysis is to estimate spending profiles for a set of meaningful visitor segments. To be useful, the segments must a) be identifiable from the NVUM survey variables, b) help to explain differences in spending across different applications, c) be large enough to obtain adequate sample sizes in the survey, and d) be meaningful to anticipated national forest management and policy applications.

Seven trip type segments were identified in the analysis of the first two years of NVUM data.

National Forest Visitor Trip Type Segments

1. **Non-local day trips**: Non-local residents on day trips
2. **Non-local OVN-NF**: Non-local residents staying overnight on the NF
3. **Non-local OVN:** Non-local residents staying overnight off the NF
4. **Local day trips**: Local residents on day trips
5. **Local OVN-NF**: Local residents staying overnight on the NF
6. **Local-OVN**: Local residents staying overnight off the NF
7. **Non-Primary**: Visits where recreating on the NF is not the primary trip purpose.

[7] Strata weights vary from as low as 1 to as high as 100,000. Hence a single case with very high spending could significantly influence the spending averages if the strata weights were used, while hundreds of cases with low weights would have almost no influence at all.

Local visitors are defined as living within 50 miles of the recreation site[8]. Overnight visitors (OVN) are those that reported being away from home more than 24 hours on their trip[9]. The OVN-NF segments are composed of those visitors who stated that they spent the previous night on the national forest[10]. The "non-primary" segment covers visitors who reported recreating at other areas on the trip and did not identify the NF as their primary destination[11].

Spending differences are largest between day trips and overnight trips. There are also differences among overnight visitors between those staying on or off the forest[12]. The trip type segmentation distinguishes local visitors from non-local visitors and splits out non-primary purpose trips as a distinct segment. Identifying locals as a set of distinct segments facilitates distinguishing "new" money (exports) brought in by non-locals from spending by local residents when completing a regional economic analysis[13]. Likewise, the spending by visitors in the non-primary segment can be included or not depending on the purpose of a given analysis[14].

Spending profiles are developed first for the seven trip type segments, as these explain much more variation in individual visitor spending than recreation activities. Variations in spending across forests and activities are frequently explained by the mix of trip segments. For example, forests or sites that attract more local visitors and day trips have lower visitor spending averages than those serving larger percentages of overnight visitors. Local residents on day trips account for a greater share of some activities such as hiking, biking and picnicking, which in part explains why these activities have below average spending.

[8] Formally, locals were defined using the Zip code variable to determine the straight-line distance from the center of the Zip code to the forest boundary. Distances of 30 miles or less were defined as locals. Taking into account the additional distance from the forest boundary to the recreation site, distances from the residence to Zip code centroid and road circuity, locals should be interpreted as living within roughly a 50 mile driving distance of the site.

[9] As the survey in the first three years did not measure nights spent in the local area, the overnight segments will include some visitors on extended trips that do not spend any nights locally. Spending reports were restricted to spending within 50 miles of the site.

[10] This may mis-classify some visitors sampled on the first day of their visit. Since only last-exiting vehicles were interviewed this will not be a problem for visitors contacted at camping sites; however, some NF campers may have been sampled at day use sites prior to setting up camp.

[11] This question was asked differently in FY 2003. See Stynes and White (2005) for details.

[12] The analysis of lodging types in the FY 2003 data suggests that not all visitors claiming to spend the night "on the national forest" were actually on NF lands/facilities.

[13] For use in an economic impact analysis, the definition of the "local region" depends on the region for which impacts are desired. The region should include places where visitors might stay and spend money during a trip to the area. In most cases regions are defined as collections of counties around the forest.

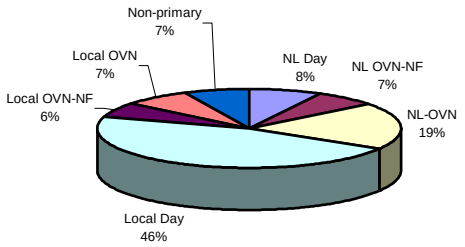
[14] The "non-primary" segment can also be divided between local and non-local residents, but is grouped in the analyses reported here, because most visitors (79%) whose primary purpose was not to visit the NF are non-local.

SEGMENT SHARES

The percentage of national forest visits within the seven trip type segments was estimated from the four years of NVUM data. Local residents on day trips are the largest segment, accounting for 46% of all visits (Figure 1). Another 13% of visits are local residents on overnight trips staying either on- or off- the forest.

Non-local visitors are more likely to be on overnight trips. Nineteen percent of visits are non-local visitors staying overnight off of the forest, 7% are non-local visitors staying overnight on the forest and 8% are non-local day trips.

Figure 1. National Forest Visitor Trip Type Segments



Another 7% of visits are trips where recreating on the national forest was not the primary trip purpose (Figure 1). The majority of non-primary purpose trips are visitors from outside the local region, often involving other activities in the area or a stop en route to other destinations. Non-primary purpose trips are identified as a distinct segment as much of the spending on these trips cannot be directly attributed to the national forest visit.

Segment shares vary widely across recreation activities, seasons of the year, individual forests, and specific sites on a given forest. Variations in these trip type segment shares across forests (Table A-2) and primary recreation activity (Table A-5) are shown in Appendix A.

The national estimates of segment shares are somewhat sensitive to the choice of weights in the NVUM sample and also the exclusions of outliers (Table 3). Outliers primarily come from the non-primary purpose and non-local overnight off-forest segments. The trips that these outliers represent frequently involve extended trips with multiple purposes and some spending not directly related to the NF visit.

Exposure weighting reduces the share of overnight trips relative to day trips as overnight visitors are more likely to visit multiple sites on the forest. Case weights and the full information estimates increase the percentage of local day trips and non-local OVN trips relative to overnight on-forest segment shares.

Table 3. National Forest Visitor Segment Distribution, First NVUM Cycle

	Number of cases [a]		Percent				
	All Cases	Omitting Outliers	All Cases	Drop Outliers	Exposure Wt	Case Wt	Full Info[c]
Non-Local Day	1,632	1,600	8%	8%	9%	9%	8%
Non-Local OVN-NF	3,125	2,845	15%	15%	12%	8%	7%
Non-Local -OVN	3,442	2,840	17%	15%	14%	15%	19%
Local Day	7,373	7,241	36%	38%	43%	48%	46%
Local OVN-NF	1,828	1,753	9%	9%	8%	7%	6%
Local OVN	1,236	1,153	6%	6%	6%	6%	7%
Non-Primary[b]	2,100	1,681	10%	9%	8%	6%	7%
Total	20,736	19,113	100%	100%	100%	100%	100%

[a] Cases with missing Zip codes are omitted in estimating segment shares except for the non-primary segment..

[b] 21% of "non-primary" visitors are local residents.

[c] The full information segment shares are computed using case weights and information from both the economics and general sections of the survey.

The "full information" estimates in the right hand column of Table 2 are the best estimates of the national segment shares as these use the case weights to adjust for disproportionate sampling and make use of additional information from the larger sample completing the general survey. A partial segmentation was developed from questions in the general survey using all cases. Variables from the smaller economic sub-sample were then used to distribute these segments into the final seven trip type segments[15].

The segment mix has changed somewhat from year to year over the first cycle of NVUM surveys (Table 4). Non-local overnight trips (NL-OVN) have ranged from 16% to 25% of all visits, while local day trips have varied from 42% to 51%. The percentage of visits classified as non-primary purpose trips varies from a low of 5% in 2002 to 8% during the first two years.

Table 4. Comparison of Full Information Segment Shares by Year

	Non-Local Segments			Local Segments				
Year	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	Total
2000	6%	5%	16%	51%	5%	9%	8%	100%
2001	8%	7%	20%	44%	4%	9%	8%	100%
2002	9%	7%	25%	42%	6%	6%	5%	100%
2003	10%	9%	14%	50%	7%	3%	7%	100%
2000 & 2001	7%	6%	18%	47%	5%	9%	8%	100%
2000, 2001, 2002	8%	7%	20%	45%	5%	8%	7%	100%
Four Years	8%	7%	19%	46%	6%	7%	7%	100%

[15] The general survey obtained the Zip codes of respondents (to identify local visitors) and whether or not the visitor spent the night on the NF while the number of days away from home on the trip and the primary trip purpose were measured for the economics sub-sample.

Other segments generally represent 5-10% of all visits, fluctuating somewhat within this range. Year to year differences seem to reflect the mix of forests sampled each year, although they may also be due to sites sampled on each forest, or changes over time.

SPENDING PROFILES

Spending profiles give the average amount spent within a set of spending categories for a particular subgroup of visitors. The unit of analysis for spending is the party trip, covering all expenses by the travel party within 50 miles of the interview site during their stay in the area. All spending figures are reported in 2003 dollars. Spending reported each year was price adjusted to 2003 using distinct BLS price indices for each spending category.

1. National averages by trip type segments

Table 5 presents the national spending averages across all national forest visits based on the spending reports of 19,113 visitors sampled on 119 national forests between January, 2000 and September, 2003. Profiles are estimated for the seven trip type segments defined above. Spending is itemized within eight spending categories[16] and reported on a party trip basis. Sample sizes and sampling errors of the totals are given at the bottom of the table. For comparability, this same format is used in all subsequent spending tables.

Table 5. National Forest Visitor Spending Profiles by Trip Type Segment and Spending Category, $ per party per trip[a]

	Non-Local Segments			Local Segments				
Spending category	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	All Visits[b]
Lodging	$ 0.00	$ 25.30	$ 64.85	$ 0.00	$ 16.24	$ 17.62	$ 48.78	$ 19.71
Restaurant	13.60	25.26	58.91	6.12	13.61	21.49	44.80	22.32
Groceries	7.61	36.55	31.28	5.41	41.15	23.46	21.04	17.18
Gas & oil	15.99	37.28	35.79	11.67	27.70	25.93	28.52	21.53
Other transp.	0.98	3.00	7.54	0.21	0.21	1.09	5.10	2.26
Activities	3.87	8.04	15.49	1.82	3.80	6.76	9.67	6.03
Admissions/fees	5.24	10.23	9.02	3.42	10.54	8.37	6.97	6.13
Souvenirs/other	4.31	15.59	22.37	4.20	11.24	11.42	18.64	10.40
Total	**51.60**	**161.25**	**245.25**	**32.85**	**124.49**	**116.14**	**183.52**	**105.57**
N (unwtd)	1,600	2,845	2,840	7,241	1,753	1,153	1,681	19,113
Std Dev. of Total	85	201	249	65	147	162	229	180
SE Mean of Total	2.15	3.79	4.82	0.76	3.53	4.76	5.11	1.30
Pct Error (95% level)	8%	5%	4%	5%	6%	8%	6%	2%

[a] Outliers are excluded and exposure weights are applied in estimating spending averages. All figures expressed in 2003 dollars.
[b] The all visit averages are computed as a weighted average of the columns using the national trip segment shares as weights

[16] The two lodging categories in each version of the survey instrument are combined and sporting goods measured in FY 2003 is combined into the souvenirs and other category.

Spending varies from $33 per party per trip for local day trips, to $52 for non-local day trips, to as high as $245 per trip for non-local visitors on overnight trips staying off the forest. Sampling error (of the totals) at the 95 percent confidence level is two percent overall and between four and eight percent for individual segments (Table 5).

The national spending averages have changed slightly from year to year, although for most segments the differences are not statistically significant (Table 6). Spending averages for visitors staying overnight on the NF were above average in 2001, mainly due to greater spending on groceries and gas. Spending of local visitors on day trips was higher in the first year than the following two years. Changes in spending categories in 2003 likely account for the higher spending for the NL-OVN, L-OVN-NF, and L-OVN segments that year. Changes in the lodging categories increased reported lodging expenses[17]. Year to year changes also reflect differences in the forests surveyed each year.

The "All Visits" spending average for each year is estimated as a weighted average of segment spending averages using the full information segment shares in Table 4 as weights. If segment shares are fixed at their four year values, the all visits spending average is above average in 2003 and below average in 2002. If segment shares are allowed to vary from year to year, the all visits spending average is highest in 2002 and lowest in 2000. The differences in the two columns illustrate the importance of segment shares in determining the overall average spending. The above average percentage of NL-OVN visitors in 2002 raises the spending average that year. The below average percentages of OVN visitors in 2003 compensates for the higher spending of those segments.

Table 6. Comparison of Spending Averages by Year, $ per party per trip

	Non-Local Segments			Local Segments			All Visits[d]		
Year	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	4 year Seg	Annual Seg
2000	$49[a]	$143[a]	$225[a]	$38[a]	$114[abc]	$113[ab]	$197[a]	$103[ab]	$97[a]
2001	63[a]	200[b]	220[a]	29[b]	122[abc]	111[ab]	168[a]	101[ab]	104[b]
2002	49[a]	148[a]	252[ab]	29[b]	115[bc]	86[b]	172[a]	100[a]	111[c]
2003	48[a]	158[a]	285[b]	35[ab]	139[c]	194[c]	192[a]	121[c]	105[b]
Two year	58[a]	178[ab]	222[a]	34[ab]	119[abc]	112[ab]	184[a]	103[ab]	101[ab]
Three year	54[a]	163[a]	232[a]	32[b]	117[ab]	104[ab]	180[a]	101[a]	103[b]
Four Year	52[a]	161[a]	245[a]	33[ab]	124[abc]	116[a]	184[a]	106[b]	106[b]

NOTE: All spending averages computed with exposure weights and with outliers removed. All figures expressed in 2003 dollars. Two and three year averages cover the first two and three years, respectively.
[abc] Denotes significantly different subsets within segments. Segments with the same superscript in any column are not significantly different (95% level), while those with different superscript are. The two, three and four year averages are treated as independent samples in this test
d. The all visits average is computed as a weighted average using full information segment shares as weights. The "4 year Seg" column fixes the segment shares at the 4 year average, while the "Annual Seg" column uses segment shares for each year from Table 4.

[17] See Stynes and White (2005) for further details about the effects of questionnaire changes in 2003. .

2. High and Low Spending Areas

NVUM sample sizes are too small at the individual forest level to reliably capture differences in spending for individual forests. The overall average visitor spending for a given forest can be estimated as a weighted average of the national spending profiles using trip segment shares for the individual forest as weights (Table A-2). This procedure assumes the national spending profiles for each segment in Table 5 can be generalized to individual forests. Differences in spending between forests are then attributed primarily to the mix of visitors attracted.

Spending will vary somewhat from one area to another based upon local prices and spending opportunities. To account for spending variations that are independent of the mix of trip segments, "high" (Table 7) and "low" (Table 8) NF visitor spending profiles were estimated by grouping cases from forests with above or below average spending.

Forests with above or below average spending were identified by comparing spending averages for each forest with the national averages. Day and overnight visitor spending averages (excluding non-primary visitors) were estimated based on the sample of visitors on each forest. To control for differences in the visitor mix across forests, a standardized overall average was computed for each forest, assuming a fixed mix of 60% day trips and 40% overnight trips. The standardized average for each forest was compared to the national standardized average[18]. Of the 119 forests sampled in the NVUM study, 48 have visitor spending averages not significantly different from the national average, after controlling for the segment mix. Forty-four forests have below average spending and 28 forests have above average spending. The classification of individual forests into high, low and average spending categories is reported in Table A-1.

Table 7. High Spending Profiles by Segment and Spending Category, $ per party per trip[a]

	Non-Local Segments			Local Segments				
Spending category	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	All Visits[b]
Lodging	0.00	35.56	80.95	0.00	24.62	28.11	64.62	25.84
Restaurant	16.96	35.41	73.07	6.43	14.28	32.07	64.30	28.28
Groceries	9.08	47.36	38.30	7.50	42.40	28.15	23.51	20.93
Gas & oil	21.62	47.16	37.92	10.58	28.79	29.76	35.18	23.37
Other transp.	1.36	4.61	10.38	0.33	0.00	4.32	6.06	3.28
Activities	4.97	13.51	23.54	1.96	3.47	6.89	23.39	9.05
Admissions/fees	7.60	14.01	10.51	2.69	9.21	8.56	9.79	6.66
Souvenirs/other	6.47	19.74	29.30	7.63	12.32	18.18	26.87	14.87
Total	**68.06**	**217.36**	**303.97**	**37.13**	**135.08**	**156.04**	**253.73**	**132.28**
N(unwtd)	320	830	1,072	1,325	220	206	444	4,417
Std Dev. of Total	110	228	262	85	146	194	253	226
SE Mean of Total	6.13	7.91	7.99	2.33	9.83	13.54	12.02	3.40
Pct Error (95% level)	18%	7%	5%	13%	15%	17%	9%	5%

[a] Outliers are excluded and exposure weights are applied in estimating spending averages. All figures expressed in 2003 dollars.
[b] All visits averages are computed as a weighted average of the columns using the national trip segment shares as weights

[18] See Stynes, White and Leefers (2003) for a more detailed description of this procedure.

A forest identified as a high spending area should use the profiles in Table 7 instead of the national averages in Table 5. Forests identified as low spending areas should use the averages in Table 8. The high and low tables can also be used for more specific applications. Forest recreation areas near major tourist destinations or in close proximity or easy access to commercial areas and spending opportunities can generally expect above average visitor spending, while sites in more remote, rural areas will likely experience below average spending. On many national forests there will be both "high" and "low" spending areas. An assessment of nearby spending opportunities and prices can help in deciding between the average, high, or low spending profiles in a particular situation.

Table 8. Low Spending Profiles by Segment and Spending Category, $ per party per trip[a]

	Non-Local Segments			Local Segments				
Spending category	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	All Visits[b]
Lodging	$ 0.00	$ 13.56	$ 41.71	$ 0.00	$ 10.03	$ 12.27	$ 30.81	$ 12.49
Restaurant	11.72	14.91	42.08	5.75	9.18	16.68	27.25	16.25
Groceries	6.90	26.89	20.70	4.31	34.79	16.53	17.88	12.85
Gas & oil	12.62	29.26	29.29	11.84	24.28	22.41	19.71	18.47
Other transp.	0.43	1.12	5.68	0.21	0.00	0.32	5.94	1.73
Activities	3.27	3.04	9.65	1.77	2.46	9.19	1.61	4.03
Admissions/fees	4.30	7.52	7.25	3.54	8.50	8.01	3.15	5.17
Souvenirs/other	2.05	10.42	15.06	2.29	6.96	7.17	12.14	6.58
Total	**41.29**	**106.72**	**171.42**	**29.71**	**96.20**	**92.59**	**118.48**	**77.56**
N(unwtd)	710	891	524	3,238	713	402	408	6,886
Std. Dev. of Total	70	151	205	56	116	131	193	122
SE Mean of Total	2.62	5.05	8.97	0.98	4.35	6.51	9.54	1.48
Pct Error (95% level)	13%	9%	10%	7%	9%	14%	16%	4%

[a] Outliers are excluded and exposure weights are applied in estimating spending averages. All figures expressed in 2003 dollars.
[b] All visits averages are computed as a weighted average of the columns using the national trip segment shares as weights

Use of the spending profiles in Tables 5, 7 and 8 does not require any knowledge of specific activities on the forest, but does require knowledge of the percentages of visitors who are local versus non-local, on day versus overnight trips, and staying overnight on or off the forest. Estimates of segment shares for individual forests are given in Table A2 in the Appendix. Stynes and White (2004) provide a detailed explanation of how to combine the national spending profiles with forest-level segment shares to estimate total recreation spending for an individual forest.

3. Spending Profiles for Particular Activities

Some activities have distinctive spending patterns that should be taken into account in addition to trip types. Spending profiles for recreation activity segments are useful for evaluating management alternatives aimed at particular activity groups. Spending profiles for specific activities are estimated based on the primary activity identified by NVUM respondents.

Differences in spending by particular activity subgroups are generally due to unique expenses associated with the activity, such as additional gas for motorized recreation activities, special fees for skiing, golf, and camping, and in some cases equipment rental/purchases on the trip for particular activities. For many activities, however, special activity-related expenses are small compared to the more general expenditures that vary with trip types, transportation modes, length of stay and party sizes. Hence, for many activities the spending averages do not differ significantly from the general averages or the differences are explained by the mix of trip types. The trip type mixes are reported in Table A-5.

Tests were carried out on the NVUM data to identify activities with above or below average spending. Spending averages for all activity-trip type combinations with at least 50 cases in the four year spending data set are reported in Table 9. Spending significantly different from the overall segment spending mean at the bottom of the column are indicated with an asterisk (95% confidence level).

Table 9. Spending Averages by Primary Activity and Segment, $ per party trip

	Non-Local Segments			Local Segments				
Primary Activity	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	All Visits
Biking			343*	20*				$ 78*
Boating[a]		158	288	52*	100			108
Cross-country skiing			346*	34				105
Developed Camping		140	146*		128	127	117*	131*
Downhill skiing	80*		331*	53*		129		136*
Driving	40		166*	24*			129*	71*
Fishing	42	205*	238	42*	135	99	225	108
General/Relaxing	46	158	245	33	125	148	146	118*
Hiking	37*	147	276	20*	79*	83*	217	77*
Hunting	44	201	250	51*	174*	130		122*
Multiple activities			173*	36			152	98
Nature-related[a]	52	213	225	27*		134	190	121*
No primary activity		138	252	42	100		190	119
OHV use[a]	62	147	182*	38	114			89*
Other[a]		135	222	31			161	88
Other non-motorized	43	163	262	31				70*
Picnic	59			38				73*
Prim. camp/Backpacking		105*	104*		93*	99		99
Resort								222*
Snowmobile	108*		343*	68*				157*
National Average	**52**	**161**	**245**	**33**	**124**	**116**	**184**	**106**

NOTE: Means are reported for segment/activity combinations with at least 50 cases. Averages are computed using exposure weights and omitting outliers. All figures expressed in 2003 dollars.

[a] "Nature-related" activities include viewing wildlife, viewing natural features, nature study, visiting a nature center, or viewing forest. "OHV use" includes other motorized activity. "Boating" combines motorized and non-motorized boating. The "other" category includes gathering, visiting historic sites, and horseback riding

* Indicates the mean is significantly different from the overall total at the bottom of the column (95% confidence level)

Complete spending profiles for activity-trip type combinations with significantly different spending averages (95% confidence level) are reported in Tables 10-14. Sampling errors for spending averages of individual activity-trip type segments are generally between 10 and 20% at a 95% confidence level. A few segments that are not significantly different are shown in these tables for comparison. It should be noted that spending averages for individual activities may vary across forests or individual sites.

Activity-specific spending profiles are grouped into tables covering (1) motorized activities, (2) skiing, (3) hunting and fishing, (4) camping, and (5) general day trip activities. A more complete analysis of wildlife-related activities is included in Appendix B.

Motorized Activities

Visitors whose primary activity is a motorized activity spend more money on gas and oil (Table 10). For example, snowmobilers on day trips from more than 50 miles away (non-local) spend $108 per trip including $52 for gas and oil. This compares to the national day trip spending average of $52 with $16 for gas and oil. The national spending average for local day trips is $33 of which $12 is for gas. Local snowmobilers spend $68 per day and $32 for gas. Local day visitors whose primary activity is boating (motorized) spend about $28 more per trip than the overall local day trip average. Almost half of this difference is due to the higher gas and oil expenses. Spending by local OHV users on day trips is not significantly different than the overall average, although the difference in the sample of about $5 is largely additional fuel purchases.

Table 10. Spending Profiles for Visitors in Motorized Activities; Selected Day Trip Segments, $ per party per day

	Snowmobile		Motorized Boating	OHV Use
Spending category	Non-Local Day	Local Day	Local Day	Local Day
Lodging	0.00	0.00	0.00	0.00
Restaurant	22.92	11.28	7.00	6.43
Groceries	11.50	7.02	10.38	7.21
Gas & oil	52.48	31.64	23.81	15.89
Other transp.	0.75	0.26	1.28	0.00
Activities	10.72	2.14	1.35	2.58
Admissions/fees	8.32	6.64	5.34	2.36
Souvenirs/other	1.42	9.47	11.83	3.40
Total	**108.11**	**68.45**	**60.98**	**37.88**[a]
N	56	162	101	211
Std Dev. of Total	155	82	96	59
SE Mean of Total	21	6	10	4
Pct Err (95% level)	38%	19%	31%	21%

Note: All figures expressed in 2003 dollars.
[a] Not significantly different from the overall segment spending average at 95% confidence level.

Skiing

Higher spending of skiers results primarily from greater expenditures for activities and admissions and fees, reflecting the additional costs of lift tickets, equipment rental and use fees (Table 11). Half of the spending by skiers on day trips is for activities or admissions/fees. This percentage is more than double what other day visitors spend in these two categories. Non-local OVN downhill skiers spend $76 per party on activities and admissions/fees, accounting for most of the difference in spending compared to the overall average for the NL-OVN segment. Comparatively lower spending on activities and fees of local skiers may reflect the omission of season passes in the spending reports. Higher lodging expenses for skiers on overnight trips reflects the greater percentage staying in resorts and lodges, compared to summer visitors, although an unknown number of skiers on overnight trips may be staying in owned seasonal homes or with friends and relatives[19].

Spending by the NL-OVN cross country ski segment is statistically similar to the corresponding downhill ski segment and statistically different from the national average NL-OVN spending. Local cross country skiers on day trips spend similar amounts per visit as other local visitors on day trips.

Table 11. Skier Spending Profiles for Selected Trip Segments, $ per party per trip

	Downhill Ski				Cross Country Skiing	
Spending category	Non-Local Day	Local Day	Non-Local-OVN	Local OVN	Non-Local OVN	Local Day
Lodging	0.00	0.00	88.09	18.32	117.94	0.00
Restaurant	13.60	9.79	66.24	31.81	90.22	7.74
Groceries	5.47	2.75	25.85	7.92	32.96	7.31
Gas & oil	13.21	11.19	29.93	17.06	35.78	7.70
Other transp.	0.00	0.01	19.07	1.13	10.28	0.00
Activities	18.06	11.95	43.77	14.35	23.87	3.35
Admissions/fees	24.65	12.62	32.52	20.94	10.36	5.04
Souvenirs/other	4.56	5.03	25.41	17.39	24.39	2.90
Total	**79.54**	**53.34**	**330.89**	**128.91**	**345.81**	**34.04**[a]
N	138	397	170	57	59	227
Std Dev. of Total	94	84	290	177	267	82
SE Mean of Total	8	4	22	24	35	5
Pct Err (95% level)	20%	16%	13%	36%	20%	32%

Note: All figures expressed in 2003 dollars.
[a] Not significantly different from the overall segment spending average at 95% confidence level.

[19] Specific lodging types were not measured in the first three years of NVUM surveys. Greater detail on lodging types is reported in Stynes and White (2005).

Hunting and Fishing

Distinct spending profiles are identified for hunters and anglers within selected trip type segments (Table 12). Non-local anglers who stayed the night on the national forest and local anglers on day trips spent significantly more than the average for all visitors in those segments. Local hunters, whether on a day trip or spending the night on the national forest, also spent significantly more than the average for those trip type segments. The spending of non-local OVN-NF hunters and local OVN-NF anglers was also above average, although this difference was not statistically significant. The greater spending by hunters and anglers can mostly be attributed to higher expenditures in the lodging, groceries, gas and oil, and souvenirs/other expenditure categories.

Table 12. Spending Profiles for Hunting and Fishing, $ per party per trip

	Fishing			Hunting		
Spending category	Non-Local OVN-NF	Local Day	Local OVN-NF	Non-Local OVN-NF	Local Day	Local OVN-NF
Lodging	39.06	0.00	17.58	19.87	0.00	12.64
Restaurant	29.91	7.28	14.87	24.79	4.86	15.98
Groceries	46.78	8.19	43.89	51.16	8.72	57.04
Gas & oil	46.43	14.90	31.09	66.52	16.89	47.70
Other transp.	3.70	0.04	0.00	0.00	0.00	1.14
Activities	10.11	1.83	3.36	6.29	2.00	3.30
Admissions/fees	9.31	3.77	9.19	6.14	1.60	3.58
Souvenirs/other	19.64	5.64	15.41	26.16	16.67	32.77
Total	**204.94**	**41.65**	**135.39**[a]	**200.92**[a]	**50.74**	**174.14**
N	306	646	154	177	395	111
Std Dev. of Total	216	79	156	221	90	178
SE Mean of Total	12	3	13	17	5	17
Pct Err (95% level)	12%	15%	19%	17%	18%	19%

Note: All figures expressed in 2003 dollars.
[a] Not significantly different from the overall segment spending average at 95% confidence level.

Some USDA FS programmatic analyses require separate estimates for wildlife-related recreation including hunting, fishing and wildlife viewing. Appendix B presents a more detailed analysis of wildlife-related visitors including a comparison of wildlife-related and non-wildlife-related visitors. Grouping of the three wildlife-related activities yields larger samples for subgroup analyses, although this aggregation loses differences among the three activities. From Table 12 we see that anglers spend slightly more than hunters if staying overnight on the forest, but spend slightly less on day trips or when staying overnight off the forest.

Camping

Among visitors staying overnight on the national forest, two distinct groups of campers with divergent spending patterns may be identified (Table 13). Those staying in primitive campgrounds or the backcountry spend $105 per trip if non-local and $94 if local. Campers staying in developed campgrounds spend approximately 35% more than primitive campers. Lodging expenditures account for some of the difference[20], but those camping in developed areas also spend more on groceries and gas and oil. Campers from the local area spend less than those from outside the local region.

Table 13. Trip Spending Profiles for Campers, $ per party per trip*

	Primitive Camping		Developed Camping	
Spending category	Non-Local Visitors	Local Visitors	Non-Local Visitors	Local Visitors
Lodging	8.76	8.51	14.65	11.18
Restaurant	17.54	11.08	20.83	12.48
Groceries	20.85	33.22	37.79	46.28
Gas & oil	25.17	20.64	34.87	27.39
Other transp.	6.24	0.10	1.48	0.32
Activities	5.29	1.61	7.01	3.81
Admissions/fees	6.76	7.80	13.37	18.10
Souvenirs/other	14.07	11.10	11.28	8.30
Total	**104.68**	**94.07**	**141.29**	**127.87**
N (unwtd)	409	228	656	588
Std Dev. of Total	163	116	173	139
SE Mean of Total	8	8	7	6
Pct Error (95% level)	15%	16%	10%	9%

Note: All figures expressed in 2003 dollars.

[20] Camping fees may have been reported as lodging or as admissions/fees and in some cases possibly as activity expenses.

General Day Trip Activities

Spending averages for biking, hiking and driving for pleasure on day trips were about a third less than the general day trip spending averages. As the spending profiles for these activities are similar, they are grouped together in Table 14.

Table 14. Day Trip Spending Profiles for Biking, Hiking and Driving for Pleasure, $ per party per day

	Bike, Hike, Drive	
Spending category	Non-Local	Local Day
Lodging	0.00	0.00
Restaurant	12.48	4.49
Groceries	5.23	3.08
Gas & oil	10.93	8.02
Other transp.	2.32	0.12
Activities	0.82	0.57
Admissions/fees	2.60	2.20
Souvenirs/other	2.68	2.07
Total	**37.05**	**20.56**
N	431	2529
Std Dev. of Total	77	48
SE Mean of Total	4	1
Pct Err (95% level)	20%	9%

Note: All figures expressed in 2003 dollars.

The activity-based spending profiles in Tables 10-14 may be used to evaluate alternatives involving specific activities or when the number of visitors in distinct activity groups is known. For example, the skier profiles may be applied to changes in skier visits, snowmobile profile to changes in visits from modifications of snowmobile trails, and the developed camping profiles to an increase or decrease in campground use.

Summary and Conclusion

This report has updated previous NVUM spending profiles using data gathered at an additional 31 national forests in FY 2003. Overall, the four-year spending average for all national forest visitors has remained around $100 per party per trip or $43 per person.

Spending patterns have remained reasonably consistent across the four years in the first cycle of NVUM surveys. Year to year differences in the national averages are likely explained by the mix of forests surveyed each year and some changes in the survey instrument in FY 2003. Results based on the combined sample provide reliable estimates of the national averages.

Modifications to the survey instrument in FY2003 will permit some refinements to the visitor segments in future years. Spending profiles on both a per day and a per trip basis can be estimated from the FY2003 data with overnight visitors divided into lodging types that better explain differences in spending of overnight visitors. Spending profiles for lodging type segments are presented in the FY2003 report (Stynes and White 2005). We recommend developing spending profiles with the revised segments in the second NVUM cycle.

Appendices to this report provide estimates for individual forests. Appendix B presents results for wildlife-related activities. Results for individual forests will be less reliable than the national averages and therefore should be used with caution. The number of usable cases for the economic analysis range from 33 cases on the Rio Grande National Forest to 528 on the Tonto National Forest (Table A-4). Sample sizes for specific trip types and activities at the forest level are much smaller and results can be quite sensitive to the NVUM case weights.

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Appendix A.

Supplemental Tables

Table A-1. Spending Averages by Forest and Day Versus Overnight Trip Segments, $ per party per trip[a]

		Day Trips		Overnight Trips		Overall Spending Average	
NVUM Year	Forest	Spending	N	Spending	N	Forest Sample	Standardized
Above-average Spending							
2	Apache-Sitgreaves	$55	23	$253	176	$231	$134
2	Ashley	$52	48	$198	99	$143	$111
4	Black Hills	$77	50	$295	63	$132	$164
3	Chequamegon-Nicolet	$72	65	$189	103	$127	$119
2	Chippewa	$32	40	$237	73	$116	$114
1	Coconino	$58	65	$210	92	$125	$119
1	Flathead	$77	48	$271	38	$158	$155
4	Gallatin	$30	187	$252	89	$105	$119
4	Grand Mesa, Uncompahgre and Gunnison	$36	146	$262	105	$117	$127
3	Inyo	$39	37	$242	283	$201	$120
2	Lake Tahoe Mgmt. Unit	$33	102	$287	163	$185	$135
4	Lincoln	$66	61	$271	61	$164	$148
4	Ottawa	$44	28	$257	79	$180	$129
2	Routt	$37	33	$244	67	$161	$120
1	Sawtooth	$40	37	$226	76	$127	$114
4	Sequoia	$51	65	$249	174	$152	$130
3	Shasta-Trinity	$38	70	$245	112	$150	$121
	Tongass (All Years)	$10	192	$302	67	$112	$127
4	Wallowa-Whitman	$54	60	$257	86	$123	$135
2	Wenatchee	$70	104	$165	104	$122	$108
1	White Mountain	$100	30	$229	92	$189	$152
3	White River	$32	196	$269	197	$188	$127
Average Spending							
2	Allegheny	$38	42	$141	80	$83	$79
1	Beaverhead-Deerlodge	$46	61	$150	61	$100	$88
3	Bridger-Teton	$20	167	$181	121	$75	$84
1	Caribbean	$43	18	$112	51	$105	$71
1	Caribou-Targhee	$64	55	$157	109	$98	$101
4	Carson	$36	46	$238	65	$177	$117
4	Chattahoochee-Oconee	$31	82	$173	47	$86	$88
3	Cherokee	$21	83	$167	85	$60	$80
2	Chugach	$57	35	$191	36	$76	$111
2	Cleveland	$47	115	$166	57	$68	$95
1	Columbia Gorge NSR	$18	169	$183	58	$36	$84
2	Coronado	$30	166	$152	80	$63	$79
3	Dakota Prairie	$31	14	$123	15	$70	$68
3	Deschutes	$36	62	$166	76	$97	$88
4	Dixie	$50	42	$215	70	$144	$116
3	Fishlake	$22	27	$168	53	$104	$80
2	Fremont	$43	28	$148	43	$99	$85
2	Gifford-Pinchot	$26	67	$155	63	$79	$78
2	Gila	$84	10	$110	42	$102	$94
1	Green Mountain	$28	65	$174	47	$76	$86
1	Hiawatha	$31	24	$155	48	$98	$81
1	Humboldt-Toiyabe	$26	32	$182	31	$93	$89

Table A-1 (Continued). Spending Averages by Forest and Day Versus Overnight Trip Segments, $ per party per trip[a]

NVUM Year	Forest	Day Trips Spending	Day Trips N	Overnight Trips Spending	Overnight Trips N	Overall Spending Average Forest Sample	Overall Spending Average Standardized
	Average Spending (continued)						
2	Huron-Manistee	$43	26	$163	84	$111	$91
4	Idaho Panhandle	$55	126	$198	117	$94	$112
1	Kaibab	$37	27	$143	38	$89	$80
3	Land Between the Lakes	$25	22	$154	19	$74	$77
1	Lassen	$33	17	$231	61	$144	$112
4	Malheur	$33	27	$181	57	$114	$92
2	Manti-La Sal	$43	37	$149	36	$78	$86
4	Midewin Tallgrass Prairie	$25	23	$0	0	$25	$15
4	Monongahela	$47	75	$200	170	$137	$108
4	Mt. Hood	$40	131	$194	136	$102	$101
3	Nebraska	$33	18	$190	31	$107	$95
1	Nez Perce	$72	15	$116	19	$99	$89
4	NFS of Alabama	$36	41	$167	56	$69	$88
1	NFS of Florida	$67	50	$131	23	$82	$93
3	NFS of Mississippi	$52	30	$128	57	$76	$83
2	NFS of North Carolina	$33	53	$210	93	$120	$104
4	NFS of Texas	$32	31	$235	26	$103	$113
1	Okanogan	$45	19	$192	69	$145	$104
1	Olympic	$51	69	$167	89	$92	$97
1	Ouachita	$39	81	$149	77	$69	$83
2	Ozark-St. Francis	$36	54	$190	59	$122	$98
3	Payette	$47	37	$158	49	$94	$91
2	Pike San Isabel	$35	130	$150	91	$79	$81
1	Plumas	$42	75	$134	111	$75	$79
1	Rio Grande	$29	9	$280	20	$139	$130
3	Rogue River	$62	12	$211	15	$139	$121
4	San Bernardino	$36	171	$212	77	$75	$107
1	San Juan	$22	57	$219	45	$124	$100
4	Shoshone	$35	54	$214	58	$126	$107
3	Sierra	$62	57	$153	119	$117	$98
3	Siskiyou	$24	34	$185	38	$93	$88
3	Siuslaw	$32	32	$208	54	$108	$103
4	Six Rivers	$29	42	$173	51	$107	$87
4	Stanislaus	$70	78	$179	218	$127	$114
1	Superior	$35	17	$176	43	$101	$92
2	Tahoe	$34	163	$162	172	$89	$85
2	Umpqua	$36	33	$190	68	$119	$98
2	Winema	$25	20	$167	15	$99	$82

Table A-1 (Continued). Spending Averages by Forest and Day Versus Overnight Trip Segments, $ per party per trip[a]

NVUM Year	Forest	Day Trips Spending	Day Trips N	Overnight Trips Spending	Overnight Trips N	Overall Spending Average Forest Sample	Overall Spending Average Standardized
Below-average Spending							
1	Angeles	$47	206	$54	24	$48	$50
1	Arapaho-Roosevelt	$28	153	$122	79	$60	$66
2	Bighorn	$43	52	$107	81	$76	$69
3	Bitteroot	$26	140	$107	58	$46	$59
1	Boise	$43	36	$104	44	$60	$67
1	Cibola	$29	128	$111	41	$53	$62
2	Clearwater	$43	36	$106	56	$81	$69
4	Colville	$33	50	$103	45	$56	$61
3	Custer	$21	36	$90	36	$44	$49
3	Daniel Boone	$40	81	$105	100	$58	$66
4	Eldorado	$30	158	$125	171	$62	$68
3	Francis Marion and Sumter	$30	99	$134	32	$52	$72
1	G. Washington & Jefferson	$55	97	$102	75	$66	$74
4	Helena	$39	91	$148	33	$56	$83
4	Hoosier	$38	72	$105	44	$55	$64
2	Kisatchie	$21	22	$81	9	$22	$45
2	Klamath	$30	39	$106	33	$58	$60
3	Kootenai	$34	101	$127	74	$67	$71
2	Lewis and Clark	$41	44	$116	45	$77	$71
2	Lolo	$19	96	$107	23	$40	$54
2	Los Padres	$18	126	$123	46	$34	$60
3	Mark Twain	$26	73	$103	59	$37	$57
3	Medicine Bow	$29	73	$101	115	$62	$58
3	Mendocino	$15	126	$91	112	$34	$46
1	Modoc	$28	13	$55	31	$39	$39
1	Mt. Baker-Snoqualmie	$26	129	$62	71	$43	$40
1	Ochoco	$21	9	$135	25	$101	$67
3	Prescott	$26	163	$120	79	$48	$64
4	Salmon-Challis	$26	30	$138	131	$103	$71
4	Santa Fe	$25	229	$148	132	$55	$74
2	Shawnee	$27	64	$118	72	$62	$64
3	Tonto	$36	358	$115	187	$60	$68
2	Uinta	$29	265	$129	89	$49	$69
4	Umatilla	$47	125	$120	51	$80	$76
4	Wasatch-Cache	$18	284	$167	105	$48	$78
4	Wayne	$41	83	$134	40	$63	$78
3	Willamette	$50	159	$112	172	$71	$75
	Three-Year Avg.[b]	$35	6,424	$169	6,352	$89	$89
	FY2003 Avg.[b]	$37	2,712	$194	2,566	$100	$100

[a] A standardized average is computed using a fixed mix of day trips (60%) and overnight trips (40%) for each forest. The standardized averages should not be used to represent visitors to a particular forest, as they are based on a fixed mix of day and overnight visitors. The forest sample average is computed based upon the forest's mix of day and overnight visitors as shown in Table A-2 (excluding non-primary visitors). As the spending averages reported at the forest-level are generally based upon very limited sample sizes these figures may not be reliable.

[b] Forests sampled in the first three years are compared to the three year standardized average and forests in year 4 are compared to the FY 2003 standardized average.

Table A-2. Full Information Segment Shares by Forest

	Non-Local Segments			Local Segments				
Forest	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	Total
National Average	8%	7%	19%	46%	6%	7%	7%	100%
Allegheny	4%	6%	29%	50%	2%	6%	3%	100%
Angeles	9%	0%	1%	81%	5%	4%	0%	100%
Apache-Sitgreaves	3%	42%	35%	8%	4%	6%	2%	100%
Arapaho-Roosevelt	5%	2%	10%	54%	8%	11%	10%	100%
Ashley	16%	20%	24%	18%	5%	6%	11%	100%
Beaverhead-Deerlodge	2%	11%	6%	39%	6%	22%	14%	100%
Bighorn	9%	8%	15%	32%	8%	11%	17%	100%
Bitteroot	10%	2%	5%	63%	9%	8%	3%	100%
Black Hills	0%	5%	11%	65%	6%	0%	13%	100%
Boise	7%	1%	1%	64%	13%	13%	1%	100%
Bridger-Teton	9%	6%	16%	52%	3%	7%	7%	100%
Caribbean	5%	0%	44%	2%	0%	20%	29%	100%
Caribou-Targhee	0%	4%	11%	57%	12%	7%	9%	100%
Carson	6%	9%	51%	22%	3%	1%	8%	100%
Chattahoochee-Oconee	10%	9%	14%	50%	14%	1%	2%	100%
Chequamegon-Nicolet	17%	5%	35%	34%	2%	3%	4%	100%
Cherokee	11%	3%	3%	56%	16%	3%	8%	100%
Chippewa	5%	16%	17%	53%	3%	5%	1%	100%
Chugach	12%	0%	4%	47%	5%	1%	31%	100%
Cibola	5%	0%	18%	60%	2%	7%	8%	100%
Clearwater	12%	21%	3%	22%	20%	9%	13%	100%
Cleveland	0%	1%	7%	79%	6%	3%	4%	100%
Coconino	16%	7%	24%	31%	2%	4%	16%	100%
Columbia Gorge NSR	5%	1%	6%	72%	1%	2%	13%	100%
Colville	11%	15%	7%	51%	9%	0%	7%	100%
Coronado	7%	5%	9%	62%	4%	7%	6%	100%
Custer	31%	11%	17%	31%	2%	0%	8%	100%
Dakota Prairie	4%	6%	14%	49%	1%	18%	8%	100%
Daniel Boone	8%	9%	7%	65%	8%	3%	0%	100%
Deschutes	5%	11%	19%	43%	4%	8%	10%	100%
Dixie	1%	9%	26%	35%	4%	9%	16%	100%
Eldorado	21%	13%	12%	40%	6%	1%	7%	100%
Fishlake	10%	19%	16%	31%	5%	12%	7%	100%
Flathead	0%	2%	15%	55%	3%	20%	5%	100%
Francis Marion and Sumter	7%	4%	5%	70%	4%	8%	2%	100%
Fremont	17%	14%	20%	30%	12%	6%	1%	100%
Gallatin	2%	4%	18%	59%	7%	2%	8%	100%
Gifford-Pinchot	13%	7%	17%	40%	6%	7%	10%	100%
Gila	1%	11%	22%	24%	5%	16%	21%	100%
Grand Mesa, Uncompahgre and Gunnison	5%	10%	13%	56%	6%	6%	4%	100%
Green Mountain	16%	4%	19%	49%	3%	6%	3%	100%
George Washington & Jefferson	2%	5%	6%	70%	4%	6%	7%	100%
Helena	14%	4%	4%	66%	5%	2%	5%	100%
Hiawatha	1%	4%	31%	35%	2%	6%	21%	100%
Hoosier	13%	12%	2%	60%	9%	1%	3%	100%
Humboldt-Toiyabe	1%	4%	29%	52%	5%	2%	7%	100%
Huron-Manistee	19%	5%	44%	24%	2%	5%	1%	100%
Idaho Panhandle	5%	4%	3%	65%	11%	8%	4%	100%

Table A-2 (Continued). Full Information Segment Shares by Forest

	Non-Local Segments			Local Segments				
Forest	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	Total
Inyo	2%	10%	62%	16%	0%	1%	9%	100%
Kaibab	7%	12%	23%	33%	1%	2%	22%	100%
Kisatchie	2%	1%	0%	97%	0%	0%	0%	100%
Klamath	2%	9%	13%	55%	4%	7%	10%	100%
Kootenai	10%	4%	8%	49%	3%	17%	9%	100%
Lake Tahoe Mgmt. Unit	9%	2%	48%	27%	1%	2%	11%	100%
Land Between the Lakes	10%	12%	13%	51%	10%	2%	2%	100%
Lassen	3%	15%	26%	38%	4%	7%	7%	100%
Lewis and Clark	11%	7%	20%	38%	11%	8%	5%	100%
Lincoln	14%	12%	27%	36%	3%	4%	4%	100%
Lolo	4%	3%	10%	70%	5%	5%	3%	100%
Los Padres	12%	3%	5%	71%	5%	2%	2%	100%
Malheur	1%	23%	24%	40%	2%	1%	9%	100%
Manti-La Sal	2%	6%	3%	41%	4%	8%	36%	100%
Mark Twain	6%	5%	1%	77%	7%	1%	3%	100%
Medicine Bow	10%	14%	13%	40%	9%	7%	7%	100%
Mendocino	27%	16%	5%	48%	3%	1%	0%	100%
Midewin Tallgrass Prairie	21%	0%	0%	78%	0%	0%	1%	100%
Modoc	4%	5%	8%	50%	5%	19%	9%	100%
Monongahela	11%	11%	33%	25%	4%	4%	12%	100%
Mt. Hood	13%	11%	12%	41%	10%	3%	10%	100%
Mt. Baker-Snoqualmie	7%	5%	11%	43%	4%	22%	8%	100%
Nebraska	2%	15%	18%	41%	3%	2%	19%	100%
Nez Perce	7%	18%	36%	28%	0%	2%	9%	100%
NFS of Alabama	4%	5%	3%	70%	8%	9%	1%	100%
NFS of Florida	5%	9%	5%	67%	0%	8%	6%	100%
NFS of Mississippi	1%	2%	3%	65%	6%	20%	3%	100%
NFS of North Carolina	9%	4%	24%	38%	5%	13%	7%	100%
NFS of Texas	3%	4%	20%	62%	10%	1%	0%	100%
Ochoco	0%	17%	10%	30%	18%	24%	1%	100%
Okanogan	2%	8%	50%	28%	5%	1%	6%	100%
Olympic	1%	2%	12%	52%	6%	9%	18%	100%
Ottawa	4%	5%	24%	18%	1%	9%	39%	100%
Ouachita	2%	6%	9%	67%	7%	3%	6%	100%
Ozark-St. Francis	9%	2%	24%	33%	2%	26%	4%	100%
Payette	26%	14%	23%	30%	2%	1%	4%	100%
Pike San Isabel	6%	2%	12%	50%	3%	17%	10%	100%
Plumas	11%	9%	11%	49%	8%	6%	6%	100%
Prescott	17%	7%	9%	58%	3%	4%	2%	100%
Rio Grande	3%	4%	8%	37%	1%	19%	28%	100%
Rogue River	2%	3%	9%	35%	5%	23%	23%	100%
Routt	3%	9%	41%	34%	1%	4%	8%	100%
Salmon-Challis	16%	31%	26%	14%	5%	4%	4%	100%
San Bernardino	27%	7%	6%	45%	7%	0%	8%	100%
San Juan	4%	8%	22%	38%	5%	11%	12%	100%
Santa Fe	16%	7%	11%	54%	4%	0%	8%	100%
Sawtooth	10%	8%	18%	41%	9%	10%	4%	100%
Sequoia	5%	17%	18%	38%	8%	2%	12%	100%
Shasta-Trinity	4%	13%	15%	38%	8%	14%	8%	100%

Table A-2 (Continued). Full Information Segment Shares by Forest

	Non-Local Segments			Local Segments				
Forest	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	Total
Shawnee	12%	5%	15%	46%	4%	12%	6%	100%
Shoshone	3%	11%	13%	35%	12%	4%	22%	100%
Sierra	8%	18%	14%	31%	9%	18%	2%	100%
Siskiyou	1%	3%	14%	48%	10%	10%	14%	100%
Siuslaw	11%	19%	14%	39%	3%	1%	13%	100%
Six Rivers	3%	9%	15%	35%	10%	11%	17%	100%
Stanislaus	21%	26%	18%	24%	4%	0%	7%	100%
Superior	2%	13%	24%	49%	5%	3%	4%	100%
Tahoe	9%	4%	28%	43%	3%	5%	8%	100%
Tongass (All Years)	1%	1%	24%	62%	2%	6%	6%	100%
Tonto	9%	4%	1%	60%	22%	3%	1%	100%
Uinta	9%	2%	2%	67%	10%	5%	5%	100%
Umatilla	13%	11%	17%	40%	11%	5%	3%	100%
Umpqua	2%	13%	8%	37%	13%	11%	16%	100%
Wallowa-Whitman	18%	13%	10%	43%	6%	2%	8%	100%
Wasatch-Cache	2%	2%	7%	76%	9%	1%	3%	100%
Wayne	17%	8%	7%	57%	2%	7%	2%	100%
Wenatchee	17%	5%	21%	27%	3%	25%	2%	100%
White Mountain	10%	15%	48%	20%	1%	3%	3%	100%
White River	13%	2%	57%	20%	1%	4%	3%	100%
Willamette	15%	9%	9%	46%	7%	6%	8%	100%
Winema	4%	5%	24%	44%	11%	11%	1%	100%

NOTE: The full information segment shares are computed using NVUM case weights and some information from the general portion of the NVUM survey. Questions for distinguishing day and overnight trips and to identify non-primary purpose trips were only asked on the economics portion of the survey.

Table A-3. People per Vehicle by Segment by Forest[a]

	Non-Local Segments			Local Segments				
Forest	Day	OVN-NF	OVN	Day	OVN -NF	OVN	Non-Primary	Total
Allegheny		2.3	2.5	1.8				2.1
Angeles	2.9			2.4				2.5
Apache-Sitgreaves		2.9	2.8	2.2				2.7
Arapaho-Roosevelt	2.5		4.4	1.9	2.4	2.9	2.6	2.3
Ashley	2.8	2.9	2.2	2.0			2.3	2.5
Beaverhead-Deerlodge		2.9		2.3	3.2			2.8
Bighorn		1.8	2.5	2.4			2.5	2.4
Bitteroot	3.8			2.0	2.2			2.2
Black Hills		3.2	2.1	1.9				2.2
Boise				2.1	2.4			2.5
Bridger-Teton	1.9	2.6	2.3	2.3		2.4	2.9	2.4
Caribbean			2.4					2.6
Caribou-Targhee			2.1	2.0	2.3	2.6	2.9	2.1
Carson		2.8	2.8	1.8				2.4
Chattahoochee-Oconee	1.6			1.8	2.8			2.1
Chequamegon-Nicolet	1.7	2.6	2.6	2.0			2.5	2.3
Cherokee		1.9		2.1	2.3			2.2
Chippewa		2.1	2.7	1.9				2.1
Chugach				2.5			3.5	2.7
Cibola			3.2	2.3			3.6	2.6
Clearwater		3.0		2.6				2.5
Cleveland				2.3	2.5			2.1
Coconino	2.5	2.7	2.6	1.4			2.2	2.1
Columbia Gorge NSR	2.5		2.6	2.4			2.5	2.4
Colville		2.6		1.8				2.0
Coronado	2.2		2.5	2.0	2.4			2.1
Custer	2.7	3.0						2.7
Dakota Prairie								2.5
Daniel Boone	2.7	2.4		1.7	2.4			2.0
Deschutes		2.2	2.6	1.9			2.9	2.2
Dixie		2.8	2.5	2.7			2.6	2.6
Eldorado	3.0	2.2	2.9	2.1	1.9		2.6	2.4
Fishlake		2.9	2.5	2.0				2.3
Flathead				1.9				2.3
Francis Marion and Sumter	2.5			1.9				2.0
Fremont				2.1				2.3
Gallatin			2.7	1.9	1.9		2.5	2.1
Gifford-Pinchot	2.4		2.9	2.6	2.1		2.8	2.5
Gila			2.4					2.1
Grand Mesa, Uncompahgre and Gunnison	1.6	2.1	2.2	2.2	2.0		2.1	2.2
Green Mountain			2.2	2.3				2.1
George Washington & Jefferson			1.5	1.6		2.9		1.8
Helena				2.4				2.7
Hiawatha			2.3	1.5			2.4	2.2
Hoosier		2.9		2.4	1.7			2.4
Humboldt-Toiyabe				2.3				2.6

Table A-3 (Continued). People per Vehicle by Segment by Forest[a]

	Non-Local Segments			Local Segments				
Forest	Day	OVN-NF	OVN	Day	OVN -NF	OVN	Non-Primary	Total
Huron-Manistee			2.4	1.8		2.1		2.2
Idaho Panhandle	1.6	2.3		2.1	3.1	2.1	2.6	2.3
Inyo		2.3	2.5	1.2			2.3	2.3
Kaibab			3.5	2.3			2.8	2.8
Kisatchie				2.4				2.4
Klamath				1.6				1.7
Kootenai		2.3	4.0	2.3		1.8	2.6	2.5
Lake Tahoe Mgmt. Unit	1.8	2.4	2.5	1.7			2.8	2.1
Land Between the Lakes				2.3				2.3
Lassen		2.7	2.5					2.6
Lewis and Clark				2.2				2.5
Lincoln	2.9	2.0	2.7	2.7				2.5
Lolo				1.9				1.9
Los Padres	2.2			1.7				1.8
Malheur		2.0		2.9				2.8
Manti-La Sal				2.2				2.6
Mark Twain		2.2		2.2				2.3
Medicine Bow	1.9	2.6	3.0	1.9	2.8		1.5	2.2
Mendocino	1.8	2.6	2.7	1.9				2.0
Midewin Tallgrass Prairie				1.6				1.5
Modoc								2.7
Monongahela	2.1	3.0	2.4	2.1	2.2		2.6	2.4
Mt. Hood	2.5	2.4	2.5	2.5	2.2			2.5
Mt. Baker-Snoqualmie	2.0			2.6	2.2	2.1	2.4	2.8
Nebraska		2.4		2.3				2.7
Nez Perce								2.4
NFS of Alabama				1.7	3.0			1.8
NFS of Florida				2.4				2.5
NFS of Mississippi		2.0		1.6	3.2	1.9		1.7
NFS of North Carolina		2.6	2.3	1.6		2.7	2.7	2.1
NFS of Texas				2.3				2.3
Ochoco								1.9
Okanogan		2.6	2.4					2.2
Olympic			2.5	1.8	2.7	2.6	2.5	2.1
Ottawa		1.6	2.4	2.2			2.1	2.2
Ouachita		2.5	1.4	2.3				2.3
Ozark-St. Francis			4.0	2.5		1.8		2.5
Payette	2.1	2.0	3.6	2.4				2.4
Pike San Isabel			3.1	1.6		2.6	2.0	2.0
Plumas		2.5	2.2	2.2	2.4	2.2		2.3
Prescott	2.1	2.9	2.3	1.7				2.0
Rio Grande								2.5
Rogue River							2.7	2.7
Routt		1.7	2.2	3.1				2.6
Salmon-Challis		2.8	3.0	1.6	2.2			2.7
San Bernardino	2.8	2.8	3.8	2.8	4.1		2.5	2.9
San Juan		3.0	2.5	1.9			2.7	2.2
Santa Fe	2.9	3.1	2.7	2.0	3.3		2.3	2.4
Sawtooth		3.1	2.3	1.8		2.9		2.4
Sequoia		3.2	3.4	2.4	2.3		2.8	2.7

Table A-3 (Continued). People per Vehicle by Segment by Forest[a]

	Non-Local Segments			Local Segments				
Forest	Day	OVN-NF	OVN	Day	OVN -NF	OVN	Non-Primary	Total
Shasta-Trinity		2.2	2.4	2.6	3.2		2.8	2.6
Shawnee	2.8	3.1	2.8	2.4		3.1		2.6
Shoshone		3.0	3.3	1.9			2.3	2.4
Sierra		2.6	3.9	2.6	2.1	2.4		2.7
Siskiyou				2.6				2.6
Siuslaw		3.1	2.1	2.7			3.4	2.6
Six Rivers				2.7	2.0		2.6	2.3
Stanislaus	2.6	2.6	3.3	3.2	2.0			2.7
Superior			2.9					2.1
Tahoe	1.5	2.5	2.1	1.7	2.4	2.8	1.8	1.9
Tongass (All Years)			2.2	1.9				2.0
Tonto	2.3	2.1	3.0	2.3	3.1	3.2		2.4
Uinta	2.7			2.4	3.7	2.4	2.5	2.6
Umatilla	2.4	2.7		2.2				2.4
Umpqua		2.8		2.3	2.5		2.2	2.4
Wallowa-Whitman		2.5	3.0	1.8			2.4	2.1
Wasatch-Cache			3.7	2.3	3.0			2.5
Wayne	2.0	2.4		2.3				2.3
Wenatchee	2.8	2.1	3.4	2.2		3.6		2.9
White Mountain		2.0	3.3	2.3				2.6
White River	2.2	1.9	2.7	1.7	2.0	2.1	2.3	2.2
Willamette	2.5	2.4	2.5	2.3	2.4	2.4	2.4	2.4
Winema				2.3				2.7
National Average	**2.3**	**2.5**	**2.7**	**2.1**	**2.5**	**2.5**	**2.6**	**2.3**

[a] If a forest has less than 15 cases in a segment the value is left blank. In these instances the national average at the bottom of the column may be used.

Table A-4. Economic Sub-Sample Size by Forest and Segment[a]

	Non-local Segments			Local Segments				
Forest	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	Total
Allegheny	6	17	47	35	4	10	6	125
Angeles	20	0	2	177	7	13	1	220
Apache-Sitgreaves	8	96	61	15	5	9	5	199
Arapaho-Roosevelt	15	7	16	135	18	38	32	261
Ashley	27	37	36	18	7	13	20	158
Beaverhead-Deerlodge	4	15	13	54	17	13	9	125
Bighorn	13	36	24	37	8	11	39	168
Bitteroot	21	9	8	114	29	11	12	204
Black Hills	3	28	20	46	11	1	11	120
Boise	3	4	3	31	25	12	1	79
Bridger-Teton	25	41	43	137	12	20	51	329
Caribbean	2	0	19	6	0	3	10	40
Caribou-Targhee	4	6	33	50	24	41	23	181
Carson	7	21	32	36	6	3	13	118
Chattahoochee-Oconee	22	11	13	58	18	4	10	136
Chequamegon-Nicolet	15	28	53	48	12	8	16	180
Cherokee	14	15	9	66	53	3	7	167
Chippewa	6	32	23	33	3	5	3	105
Chugach	7	1	5	22	8	3	21	67
Cibola	10	0	25	116	3	12	18	184
Clearwater	14	16	13	21	8	12	9	93
Cleveland	4	4	11	105	29	8	7	168
Coconino	19	18	55	45	8	6	22	173
Columbia Gorge NSR	22	13	28	141	6	9	43	262
Colville	10	21	7	39	14	1	12	104
Coronado	20	13	17	144	33	13	10	250
Custer	21	22	9	12	4	0	9	77
Dakota Prairie	2	2	4	11	4	4	2	29
Daniel Boone	15	53	14	64	23	6	3	178
Deschutes	6	29	32	54	7	5	17	150
Dixie	3	25	29	37	10	5	23	132
Eldorado	42	102	18	116	47	4	18	347
Fishlake	7	22	15	19	8	8	6	85
Flathead	1	5	12	42	8	11	14	93
Francis Marion and Sumter	18	8	10	77	8	4	8	133
Fremont	2	14	11	26	9	6	4	72
Gallatin	11	14	46	173	16	12	31	303
Gifford-Pinchot	20	6	29	42	15	11	20	143
Gila	4	6	20	5	3	6	9	53
Grand Mesa, Uncompahgre and Gunnison	15	32	41	129	23	9	26	275
Green Mountain	10	8	27	53	3	9	6	116
George Washington & Jefferson	4	11	15	87	13	23	5	158
Helena	8	6	10	83	12	5	9	133
Hiawatha	1	9	28	20	3	6	23	90
Hoosier	12	21	7	58	15	1	10	124
Humboldt-Toiyabe	1	2	12	31	8	5	6	65
Huron-Manistee	10	12	46	15	8	15	3	109
Idaho Panhandle	15	20	13	106	61	20	15	250

Table A-4 (Continued). Economic Sub-Sample Size by Forest and Segment[a]

	Non-local Segments			Local Segments				
Forest	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	Total
Inyo	10	126	134	27	5	6	61	369
Kaibab	8	7	24	19	2	4	37	101
Kisatchie	2	2	1	18	3	2	1	29
Klamath	1	8	10	35	7	7	6	74
Kootenai	12	15	15	89	7	36	15	189
Lake Tahoe Mgmt. Unit	28	22	121	73	6	13	38	301
Land Between the Lakes	3	9	3	17	1	4	4	41
Lassen	3	16	24	13	12	5	7	80
Lewis and Clark	12	6	14	29	11	12	9	93
Lincoln	17	26	26	44	5	3	7	128
Lolo	8	7	5	86	5	6	5	122
Los Padres	15	8	8	102	13	9	5	160
Malheur	6	41	7	20	7	1	8	90
Manti-La Sal	6	9	10	30	8	9	14	86
Mark Twain	11	31	9	60	13	5	6	135
Medicine Bow	17	43	30	53	21	14	16	194
Mendocino	53	84	15	70	8	1	2	233
Midewin Tallgrass Prairie	7	0	0	16	0	0	2	25
Modoc	2	14	6	11	6	4	7	50
Monongahela	23	69	76	51	17	7	38	281
Mt. Hood	21	37	25	110	62	9	13	277
Mt. Baker-Snoqualmie	17	4	12	106	20	33	19	211
Nebraska	2	16	12	16	1	1	9	57
Nez Perce	3	5	13	12	0	1	4	38
NFS of Alabama	9	14	4	31	32	6	7	103
NFS of Florida	8	1	10	40	0	10	4	73
NFS of Mississippi	4	18	5	23	17	16	2	85
NFS of North Carolina	12	15	41	39	12	24	19	162
NFS of Texas	2	9	2	28	14	1	1	57
Ochoco	0	6	7	6	3	8	2	32
Okanogan	5	24	36	13	6	3	13	100
Olympic	4	11	23	59	22	31	43	193
Ottawa	7	29	36	20	8	5	48	153
Ouachita	14	39	23	66	11	4	5	162
Ozark-St. Francis	6	6	31	47	5	15	6	116
Payette	15	25	16	20	5	1	6	88
Pike San Isabel	13	7	25	109	13	37	26	230
Plumas	14	26	27	60	32	24	12	195
Prescott	39	37	18	118	14	6	5	237
Rio Grande	1	8	5	5	3	2	9	33
Rogue River	3	4	1	9	5	5	18	45
Routt	4	20	33	27	3	10	12	109
Salmon-Challis	13	66	37	17	17	10	10	170
San Bernardino	43	26	19	118	26	4	19	255
San Juan	5	15	17	51	2	11	19	120
Santa Fe	81	67	33	145	27	3	24	380
Sawtooth	7	25	24	28	8	16	8	116
Sequoia	11	102	46	52	19	6	31	267
Shasta-Trinity	11	51	27	55	19	11	17	191
Shawnee	17	17	30	47	6	17	5	139

Table A-4 (Continued). Economic Sub-Sample Size by Forest and Segment[a]

	Non-local Segments			Local Segments				
Forest	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	Total
Shoshone	10	21	18	44	14	5	20	132
Sierra	11	48	23	44	29	18	6	179
Siskiyou	1	8	7	31	14	9	11	81
Siuslaw	7	20	21	25	10	1	28	112
Six Rivers	7	11	11	35	20	9	20	113
Stanislaus	45	143	48	31	18	2	13	300
Superior	2	14	22	13	4	3	5	63
Tahoe	32	60	65	129	25	22	20	353
Tongass (All Years)	8	3	44	182	8	11	13	269
Tonto	36	34	18	300	104	25	11	528
Uinta	31	8	9	227	48	21	20	364
Umatilla	43	20	12	79	14	1	2	171
Umpqua	2	27	8	29	20	7	17	110
Wallowa-Whitman	7	34	32	53	10	8	26	170
Wasatch-Cache	3	8	15	281	71	10	12	400
Wayne	16	19	5	66	12	2	2	122
Wenatchee	43	28	42	56	14	19	3	205
White Mountain	9	40	39	18	1	6	8	121
White River	53	34	121	141	21	18	24	412
Willamette	48	71	34	110	49	17	36	365
Winema	2	3	6	18	2	4	2	37
Total	**1,600**	**2,845**	**2,840**	**7,241**	**1,753**	**1,153**	**1,681**	**19,113**

[a] Excludes outliers and cases with missing Zip codes.

Table A-5. Trip Segment Distribution by Primary Activity[a]

	Non-Local Segments			Local Segments				
Primary Activity	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	Total
National Average[b]	8%	7%	19%	46%	6%	7%	7%	100%
Biking[c]	5%	1%	22%	59%	3%	4%	6%	100%
Boating[c]	11%	11%	15%	43%	9%	7%	5%	100%
Cross-country skiing	10%	3%	29%	53%	2%	3%	1%	100%
Developed Camping	1%	32%	12%	2%	35%	12%	7%	100%
Downhill skiing	15%	1%	31%	43%	1%	6%	2%	100%
Driving	6%	1%	8%	71%	0%	3%	11%	100%
Fishing	11%	12%	13%	50%	7%	5%	4%	100%
General/Relaxing	8%	18%	12%	36%	14%	7%	5%	100%
Hiking	8%	3%	12%	64%	2%	4%	6%	100%
Hunting	5%	13%	7%	50%	10%	12%	3%	100%
Multiple activities	11%	14%	11%	32%	7%	14%	11%	100%
Nature-related[c]	10%	3%	22%	43%	2%	5%	16%	100%
No primary activity	4%	18%	17%	44%	8%	5%	5%	100%
OHV use[c]	11%	11%	11%	49%	8%	5%	5%	100%
Other[c]	8%	3%	7%	60%	6%	9%	7%	100%
Other non-motorized	10%	3%	6%	74%	2%	2%	2%	100%
Picnic	6%	2%	10%	60%	2%	5%	16%	100%
Prim. camp/Backpacking	0%	33%	14%	4%	33%	13%	2%	100%
Resort	3%	16%	12%	9%	26%	15%	19%	100%
Snowmobile	7%	2%	11%	56%	6%	7%	10%	100%

[a] Excludes cases with missing Zip codes, activity segment distributions are case weighted using the economic subsample.

[b] National average segment shares are computed using case weights and information from both the economics and general sections of the survey.

[c] "Nature-related" activities include viewing wildlife, viewing natural features, nature study, visiting a nature center, or viewing forest. "OHV use" also includes other motorized activity. "Boating" combines motorized and non-motorized boating. The "other" category includes gathering, visiting historic sites, and horseback riding

Table A-6. Participation in Recreation Activities and Reported Primary Activity on the Trip

Recreation Activity	Percent Participating[a]	Percent Primary Activity[a]	Numer of Cases (Full Sample)	Number of Cases (Economic Sample)
Biking	5%	3%	1,766	448
Boating[b]	6%	2%	2,014	579
Cross-country skiing	4%	3%	1,651	425
Developed Camping	11%	4%	5,409	1,583
Downhill skiing	15%	14%	3,875	971
Driving	23%	4%	2,688	703
Fishing	15%	8%	7,011	1,843
General/Relaxing	40%	7%	8,100	2,223
Hiking	39%	14%	14,827	4,067
Hunting	10%	8%	4,189	1,079
Nature-related[b]	60%	10%	9,175	2,300
OHV use[b]	7%	3%	2,119	599
Other Activity[b]	13%	3%	2,358	646
Other non-motorized	9%	3%	2,830	760
Picnic	13%	2%	2,363	572
Prim. camp/Backpacking	9%	2%	2,759	791
Resort	4%	1%	689	168
Snowmobile	3%	2%	1,702	434
Multiple primary activities	---	4%	3,382	750
No primary activity	---	3%	2,370	465
Total	**---**	**100%**	**81,277**	**21,406**

[a] Estimated using case weights on full sample.

[b] "Nature-related" activities include viewing wildlife, viewing natural features, nature study, visiting a nature center, or viewing forest. "OHV use" also includes other motorized activity. "Boating" combines motorized and non-motorized boating. The "other" category includes gathering, visiting historic sites, and horseback riding.

Appendix B.

Spending Profiles of Wildlife-Related National Forest Visitors

This Appendix presents two sets of spending profiles for national forest visitors. One set is for visitors whose primary activity on the forest was wildlife-related. The other set is for visitors whose primary activity was one of 23 other general recreation activities (non-wildlife-related). The wildlife-related activity spending profiles can be used to evaluate the economic contribution of wildlife-related recreation activity on National Forests. Estimates are based on the National Forest Visitor Use Monitoring Project (NVUM) data for the first four years of the NVUM cycle (calendar year 2000 through fiscal year 2003)[21].

Wildlife-related visitors were identified by their response to two questions on the NVUM Survey: "What activities have you participated in while on this visit?" and "Of these, which was your primary recreation activity?". Respondents who selected viewing wildlife, hunting, or fishing were considered wildlife-related visitors.

Forty-four percent of national forest visitors participated in a wildlife-related activity during their visit (Table B-1). Twenty-eight percent engaged in wildlife viewing, 15 percent fished, and 10 percent hunted. Nineteen percent of visitors stated that their primary activity during their visit was wildlife-related. Only one percent of visitors cited viewing wildlife as their primary activity, while eight percent cited fishing and nine percent stated hunting was their primary activity. Only respondents to the economic portion of the survey who stated that their primary recreation activity was wildlife-related are used in the subsequent analysis[22].

"Viewing wildlife" was not included in the list of activities in the first year of NVUM sampling so the four year sample underestimates the percentage of wildlife viewers. Based on the data from years 2001, 2002, and 2003, 20 percent of national forest visitors came primarily for a wildlife-related activity, two percent of these were wildlife viewing, nine percent were fishing and nine percent were hunting.

[21] Wildlife viewing was not included in the activity list during the first year of the NVUM survey. The percentage of visitors engaged in wildlife-related activities (Table B-1) is therefore also estimated based on the last three years of data. Spending averages are based on data from all four years.

[22] The patterns of wildlife-related recreation participation in the economic sub-sample are similar to that of the general sample.

Table B-1. Participation in Wildlife-Related Recreation by NVUM Respondents

	All Respondents	Any Wildlife-Related	Viewing Wildlife	Fishing	Hunting
NVUM General Survey					
Participated, N	81,277	42,972	31,893	15,551	5,180
Raw Percent	100%	53%	39%	19%	6%
Weighted [a]		44%	28%	15%	10%
Last 3 years, weighted [a,b]		54%	40%	16%	10%
Primary Activity, N[a,b]	75,525	12,298	1098	7,011	4,189
Raw Percent	100%	16%	1%	9%	6%
Weighted [a]		19%	1%	8%	9%
Last 3 years, weighted [a,b]		20%	2%	9%	9%
Economic Subsample					
Primary Activity, N[a,b]	20,191	3,225	303	1,843	1,079
Raw Percent	100%	16%	2%	9%	5%
Weighted [a]		18%	1%	8%	9%
Last 3 years, weighted [a,b]		19%	2%	8%	9%

Note: Respondents identifying multiple primary activities or failing to provide a primary activity are excluded from primary activity figures.
[a] Weighted figures adjust the sample for sampling exposure and disproportionate sampling across NVUM strata using NVUM case weights.
[b] The four year data underestimates viewing wildlife as this activity was not included during the first year of NVUM sampling. We therefore recommend using estimates based on the last three years.

Spending Profiles by Trip Segments

The average spending of wildlife-related visitors was not significantly different than non-wildlife related visitors, although there were significant differences within particular visitor segments (Table B-2). Wildlife-related visitors in the OVN-NF trip segments and the local day trip segment spent more per trip than non-wildlife visitors. Non-local visitors on day trips whose primary activity was wildlife-related spent less than their non-wildlife-related counterparts

The higher spending for the OVN-NF segments is mostly explained by longer stays of wildlife-related visitors. On a per night basis wildlife-related visitors in both OVN-NF segments spent less than non-wildlife related visitors. Local visitors on day trips spent significantly more if their primary activity was wildlife-related, while non-local visitors on day trips spend less than average if their primary activity was wildlife-related. The difference in the day trip segments stems largely from a higher percentage of visitors “viewing wildlife” in the non-local day trip segment compared to the local day trip segment. Visitors on day trips whose primary activity was “viewing wildlife” spent between $10 and $25 less than day trip visitors whose primary activity was “hunting” or “fishing”.

Table B-2. Comparison of Wildlife-Related and Not Wildlife-Related Visitor Spending[a]

	Non-Local Segments			Local Segments				
Spending category	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	Total[b]
Spending per party per trip								
Wildlife-related	$41*	$204*	250	$44*	$152*	$116	$195	$104
Non-wildlife-related	$54*	$151*	244	$31*	$120*	$116	$182	$105
Full Information Segment Shares[c]								
Wildlife-related	6.9%	10.7%	10.4%	50.5%	8.9%	8.8%	3.9%	100%
Non-wildlife-related	8.4%	6.5%	20.4%	45.9%	5.1%	6.4%	7.4%	100%
Spending per night on the NF								
Wildlife-related		$57			$46			
Non-wildlife-related		$63			$57			

[a] All dollar figures expressed in 2003 dollars.
* Averages that are statistically different (95% confidence level) are designated by an asterisk
[b] Spending averages are computed as a weighted average of the columns using the full information segment shares.
[c] The full information segment shares are computed using NVUM case weights and some information from cases that did not complete the economics portion of the survey.

Tables B-3 and B-4 provide the detailed spending patterns for wildlife-related and non-wildlife-related visitors, respectively. The spending profiles for non-wildlife-related visitors are similar to the overall national averages, since the majority of visitors fall into this group. The higher spending by wildlife-related visitors in some trip segments is due primarily to higher spending on gas and oil, and groceries.

Table B-3. Wildlife-related Visitor Spending by Trip Type Segment and Spending Category, $ per party per trip[a]

	Non-Local Segments			Local Segments				
Spending category	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	All Visits[b]
Lodging	0.00	31.62	63.70	0.00	15.02	14.87	47.56	14.50
Restaurant	8.39	28.44	57.76	6.19	15.15	18.44	37.70	17.18
Groceries	7.00	48.53	33.62	8.11	49.42	24.67	25.08	20.80
Gas & oil	16.00	54.31	47.04	15.51	38.40	34.89	34.17	27.44
Other transp.	0.00	2.10	1.74	0.02	0.52	0.16	1.62	0.54
Activities	2.97	8.47	18.81	1.81	3.28	4.58	20.06	5.46
Admissions/fees	2.44	8.03	6.50	2.81	6.47	3.46	5.36	4.21
Souvenirs/other	3.91	22.28	20.78	9.58	23.66	15.42	23.40	14.02
Total	**40.71**	**203.78**	**249.95**	**44.03**	**151.92**	**116.49**	**194.95**	**104.15**
N(unwtd)	262	501	406	1117	270	206	134	2,896
Std. Dev. of Total	65	220	231	82	165	184	239	183
SE Mean of Total	4.0	9.9	11.8	2.5	10.1	12.9	17.6	3.4
Pct Error (95% level)	20%	10%	9%	11%	13%	22%	18%	7%

[a] Outliers are excluded and exposure weights are applied in estimating spending averages. All figures expressed in 2003 dollars.

[b] All visits averages are computed as a weighted average across columns using full information segment shares for wildlife related visitors (Table B-2). The inclusion of cases without spending data in estimating segment shares explains why both the wildlife and nonwildlife "all visits" averages are less than the overall average of 105.57 in Table 2.

Table B-4. Not Wildlife Related Visitor Spending by Trip Type Segment and Spending Category, $ per party per trip[a]

	Non-Local Segments			Local Segments				
Spending category	Day	OVN-NF	OVN	Day	OVN-NF	OVN	Non-Primary	All Visits[b]
Lodging	0.00	23.82	65.05	0.00	16.44	18.24	48.90	20.42
Restaurant	14.64	24.52	59.11	6.11	13.33	22.19	45.48	23.12
Groceries	7.73	33.76	30.88	4.92	39.65	23.18	20.66	16.41
Gas & oil	15.99	33.31	33.84	10.96	25.76	23.85	27.99	20.33
Other transp.	1.17	3.21	8.55	0.24	0.15	1.30	5.43	2.65
Activities	4.05	7.94	14.91	1.82	3.89	7.27	8.69	6.03
Admissions/fees	5.79	10.74	9.46	3.53	11.28	9.51	7.12	6.44
Souvenirs/others	4.39	14.03	22.66	3.21	8.99	10.49	18.19	9.84
Total	**53.76**	**151.33**	**244.46**	**30.79**	**119.49**	**116.03**	**182.46**	**105.24**
N(unwtd)	1,338	2,344	2,434	6,124	1,483	947	1,547	16,217
Std. Dev. of Total	88	196	252	61	143	157	228	180
SE Mean of Total	2.4	4.0	5.1	0.8	3.7	5.1	5.8	1.4
Pct Error (95% level)	9%	5%	4%	5%	6%	9%	6%	3%

[a] Outliers are excluded and exposure weights are applied in estimating spending averages. All figures expressed in 2003 dollars.

[b] All visits averages are computed as a weighted average across columns using full information segment shares for non-wildlife related visitors only (Table B-2).

Wildlife-related Visitor Trip and Party Characteristics

Visitors whose primary activity was wildlife-related had smaller party sizes and were less likely to include children in the party than visitors whose primary activity was not wildlife-related (Table B-5). Wildlife-related visitors staying overnight on the national forest had longer stays, averaging at least an extra night compared to OVN-NF visitors in general.

The percentage of visitor parties whose primary activity was wildlife-related varies across forests (Table B-6). For some forests, the percentages are sensitive to the choice of weights. For example, for Land Between the Lakes the raw percentage of wildlife-related visitor parties in the NVUM sample is 59%, but drops to 44% when case weights are applied. Conversely, 13% of the NVUM sample on the Cherokee National Forest were wildlife-related visitors, but after case weighting, the share of wildlife-related visitors increases to 30%. Figures in Table B-6 should be used cautiously if the weighted and unweighted estimates are very different. The percentage of the NVUM sample classified as wildlife-related on each forest depends somewhat on the relative proportion of site days assigned to distinct locations and seasons, as these may differentially attract wildlife-related visitors.

The percentage of visitors identified as wildlife-related depends on the proportion of wildlife viewers, hunters and anglers on each forest who identified the activity as their primary activity. While most trips involving hunting identified hunting as the primary activity, only about half of the trips in which someone in the party fished identified angling as the primary activity, and less than 5% of trips involving wildlife viewing identified it as the primary activity (Table B-1). The percentage of visitors identified as wildlife-related is therefore sensitive to the proportions of wildlife viewers and anglers on each forest who identify the activity as their primary one.

Table B-5. Wildlife-Related and Not Wildlife-Related Visitor Characteristics

		Non-Local Segments			Local Segments				
Characteristic	Wildlife-related	Day	OVN-NF	OVN	DAY	OVN-NF	OVN	Non-Primary	Total
Segment Share[a]	Yes	6.9%	10.7%	10.4%	50.5%	8.9%	8.8%	3.9%	100%
	No	8.4%	6.5%	20.4%	45.9%	5.1%	6.4%	7.4%	100%
People per Vehicle[b]	Yes	2.0	2.1	2.2	1.9	2.0	2.2	2.1	2.0
	No	2.4	2.6	2.7	2.1	2.6	2.5	2.7	2.4
Children Under 16[b]	Yes	0.3	0.2	0.4	0.3	0.3	0.4	0.4	0.3
	No	0.3	0.6	0.5	0.4	0.7	0.6	0.5	0.5
Nights on the National Forest[b]	Yes	0.0	3.6	0.5	0.0	3.3	0.1	2.6	2.5
	No	0.0	2.4	0.2	0.0	2.1	0.1	1.0	1.6

[a] Based on full-information segment shares computed using NVUM case weights and some information from cases that did not complete the economics portion of the survey.
[b] Outliers and cases with missing Zip codes excluded, case weighted

Table B-6. Percentage of Wildlife-Related Visits by Forest

Forest	Un-weighted	Exposure Weights	Case Weights
National Average	16%	17%	19%
Allegheny	24%	27%	44%
Angeles	8%	8%	9%
Apache-Sitgreaves	18%	19%	21%
Arapaho-Roosevelt	11%	12%	9%
Ashley	33%	33%	41%
Beaverhead-Deerlodge	42%	42%	39%
Bighorn	18%	17%	28%
Bitteroot	10%	10%	19%
Black Hills	16%	19%	31%
Boise	15%	17%	18%
Bridger-Teton	13%	12%	13%
Caribbean	0%	0%	0%
Caribou-Targhee	8%	7%	29%
Carson	9%	10%	9%
Chattahoochee-Oconee	30%	29%	21%
Chequamegon-Nicolet	32%	33%	39%
Cherokee	13%	14%	30%
Chippewa	54%	53%	58%
Chugach	39%	36%	32%
Cibola	7%	6%	8%
Clearwater	18%	19%	20%
Cleveland	8%	8%	12%
Coconino	7%	7%	9%
Columbia Gorge NSR	2%	2%	2%
Colville	20%	21%	22%
Coronado	9%	7%	10%
Custer	21%	19%	33%
Dakota Prairie	41%	44%	42%
Daniel Boone	18%	20%	33%
Deschutes	28%	28%	21%
Dixie	23%	24%	21%
Eldorado	16%	18%	13%
Fishlake	51%	51%	57%
Flathead	20%	21%	19%
Francis Marion and Sumter	35%	36%	41%
Fremont	44%	45%	50%
Gallatin	11%	10%	19%
Gifford-Pinchot	11%	13%	17%
Gila	18%	21%	33%
Grand Mesa, Uncompahgre and Gunnison	12%	11%	18%
Green Mountain	12%	12%	9%
George Washington & Jefferson	23%	23%	37%
Helena	39%	40%	49%
Hiawatha	9%	9%	23%
Hoosier	20%	21%	39%
Humboldt-Toiyabe	10%	7%	15%
Huron-Manistee	29%	31%	30%
Idaho Panhandle	21%	22%	28%
Inyo	23%	22%	13%
Kaibab	11%	10%	18%
Kisatchie	14%	18%	20%

Table B-6 (Continued). Percentage of Wildlife-Related Visits by Forest

Forest	Un-weighted	Exposure Weights	Case Weights
Klamath	21%	19%	12%
Kootenai	22%	22%	39%
Lake Tahoe Mgmt. Unit	2%	2%	4%
Land Between the Lakes	59%	61%	44%
Lassen	31%	28%	25%
Lewis and Clark	25%	25%	31%
Lincoln	4%	3%	2%
Lolo	13%	12%	21%
Los Padres	7%	6%	13%
Malheur	35%	34%	32%
Manti-La Sal	21%	23%	17%
Mark Twain	11%	11%	21%
Medicine Bow	21%	23%	24%
Mendocino	13%	13%	18%
Midewin Tallgrass Prairie	47%	47%	85%
Modoc	36%	34%	25%
Monongahela	23%	25%	29%
Mt. Hood	7%	7%	3%
Mt. Baker-Snoqualmie	5%	6%	3%
Nebraska	31%	35%	29%
Nez Perce	20%	21%	29%
NFS of Alabama	14%	14%	36%
NFS of Florida	7%	6%	35%
NFS of Mississippi	34%	34%	74%
NFS of North Carolina	11%	13%	15%
NFS of Texas	29%	32%	55%
Ochoco	18%	18%	24%
Okanogan	5%	5%	7%
Olympic	9%	10%	15%
Ottawa	20%	21%	27%
Ouachita	19%	23%	52%
Ozark-St. Francis	21%	22%	32%
Payette	28%	29%	27%
Pike San Isabel	10%	11%	15%
Plumas	25%	25%	21%
Prescott	13%	14%	15%
Rio Grande	20%	18%	20%
Rogue River	16%	16%	19%
Routt	16%	17%	11%
Salmon-Challis	37%	41%	41%
San Bernardino	6%	5%	2%
San Juan	14%	15%	16%
Santa Fe	12%	11%	8%
Sawtooth	5%	5%	6%
Sequoia	14%	17%	25%
Shasta-Trinity	18%	19%	34%
Shawnee	11%	14%	17%
Shoshone	21%	21%	24%
Sierra	12%	11%	10%
Siskiyou	8%	9%	8%
Siuslaw	16%	19%	11%
Six Rivers	23%	24%	31%
Stanislaus	15%	15%	16%

Table B-6 (Continued). Percentage of Wildlife-Related Visits by Forest

Forest	Un-weighted	Exposure Weights	Case Weights
Superior	35%	37%	27%
Tahoe	13%	13%	8%
Tongass (All Years)	9%	9%	7%
Tonto	17%	17%	23%
Uinta	21%	19%	21%
Umatilla	21%	19%	36%
Umpqua	21%	23%	26%
Wallowa-Whitman	13%	15%	37%
Wasatch-Cache	9%	8%	9%
Wayne	16%	16%	23%
Wenatchee	9%	9%	12%
White Mountain	2%	2%	1%
White River	9%	9%	2%
Willamette	17%	18%	19%
Winema	18%	19%	38%

Note: WR percentages are estimated using the full sample. Respondents reporting multiple primary activities or failing to provide a primary activity are excluded.

Using Social Accounts to Estimate Tax Impacts

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Paper originallygiven at the Mid-Continent Regional Science Association Meetings in Minneapolis, MN
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Introduction

This paper describes the wealth of information available in an IMPLAN Social Accounting Matrix and how that information can be used to estimate taxes and other payments received by governments. This information is summarized in a Tax Impact report which can be generated by the IMPLAN software for each impact analysis. This paper also discusses the assumptions that the IMPLAN user should be aware of.

General SAM Description

The Social Accounts of a region track the monetary flows between industries and institutions. Social accounts track all monetary flows, both market and non-market. The market flows are those between producers of goods and services and their consumers, both industrial, and non-industrial (e.g., households, government, investment, and trade). The non-market flows are those between households and government, government and households, capital and households and so on. These flows are called inter-institutional transfers. These have no perceived value being exchanged for the dollars spent (of course, taxes do pay for government services, but these do not have a market value).

Traditional input-output models are a sub-set of the social accounts. They only show the market value flows of industry purchases from industries, final demands -i.e., final consumption of industry production by local institutions and export and payments to value added by industry.

Table 1 shows the industry by industry social accounts matrices for Larimer County, CO 1996. The rows represent producers or those receiving payments. The columns represent those purchasing or making expenditures. The row total represents the total income received by that institution. The column represents the disbursement of those funds. The row total and the corresponding column total are equal -i.e., the distribution of all funds received by the row is accounted for by the column.

Sherman Robinson stated at the 1996 IMPLAN Conference that a good social accounts table has three main characteristics:

1) The table rows and corresponding table columns sum to an equal value
2) The table fits on a single page
3) The table does not need a magnifying glass to be read

I must add a corollary to number 1 above:

4) For each column there is a corresponding row

In order to fit on a single page, table 1 must be highly aggregated. The 500 by 500 industry transactions matrix is collapsed and represented by a single scalar value of $2,528 millions. Instead of displaying the nine separate household sectors, a single row and column represent the aggregated households.

Each of the table elements have an interpretation. Household (column 10000) payments to Federal Government NonDefense (row 11001) represent withholding and income tax payments to the Federal government including licenses, fees, permits and other payments.

Row Details

In the IMPLAN data sets we have an even a more detailed breakdown for receipts of income (rows). However, the disbursement of this income is not unique. For example, we know that Employee Compensation payments to Federal Government can be broken down into two components - social insurance, employee contribution and social insurance, employer contribution. The Federal Government expenditure patterns are not affected significantly by the source of income. It is all added to the big federal pot of money to be spent. There are dedicated funds, money to be spent on specific line items, at both the Federal and state level, but practical considerations (data and programming) do not allow inclusion of these to the IMPLAN social accounts.

Table 2 shows the industry by industry social accounts with row detail for Larimer County, Colorado. This SAM table violates two principles. First, the number of rows and columns are no longer equal. There are many more rows than columns. In fact the row detail table is descriptive only. When type SAM multipliers are generated only the more aggregated sectors that spawned the detail are internalized along with their corresponding columns.

Second, even though the Household sectors have been aggregated for this table (each of the nine household categories are treated as a separate column and row -each row with its own detail, in IMPLAN) it is virtually necessary to use a magnifying glass to read this table. Some of the rows have no entries in any of the columns by definition of the industry by industry formulation.

Tax Impact Report

We can take advantage of the tremendous amount of information in the social accounts to generate an estimate of the changes in income received by Federal and State/Local governments. We can do this by making the following assumptions:

1) Marginal changes (impacts) will use the same distribution as pictured in the base year social accounts.
2) The detail distribution of expenditures by Employment Compensation, Proprietor Income, Other Property Income, Indirect Business Taxes and Enterprises holds, no matter what the mix of affected industries.

The first assumption is the same assumption used in input-output analysis in the derivation of predictive multipliers in that the current picture of the local economy holds true for marginal changes. If there is something unique as a result of a policy analysis then the social accounts can be modified to reflect that uniqueness before the analysis is run.

The second assumption is a problem of aggregation. Once indirect business taxes (or any of the value added elements) are estimated from the various impacted industries those indirect business taxes are disbursed as a single entity. A tourism study would affect sales, lodging taxes; wood products or mining would be heavily weighted towards severance taxes; liquor or tobacco would be heavily weighted towards excise taxes, but the indirect business taxes for all these types of studies would have the same distribution as shown in table 4, column 8001 (indirect business taxes).

Using these assumptions, we create the Tax Impact report.

In an IMPLAN input-output impact analysis we generate change in:

a) Employee compensation
b) Proprietor income
c) Indirect business taxes
d) Other property income

These are the four components of value added. The level of change in these components are unique to the level of direct effects specified in the impact analysis and the industries affected directly or indirectly.
Utilizing assumption 1 we can apply these changes to the normalized social accounts table (table 3 - the coefficients sum to one).

Table 4 is a subset of table 3. It shows how much each dollar of impact is disbursed to each of the receiving sectors. Column 5001 corresponds to employee compensation. Distributing employee compensation down this vector gives income to federal and state/local governments directly. But it also gives income to households who in turn disburse monies to government. Proprietor income (column 6001) also distributes income directly to government, as well as, indirectly through households. All other property income (7001) payments to households are treated as a leakage. Households that receive income from a corporation do not necessarily reside in the region that the corporation operates. At the national level, of course, this assumption is completely false, but at a local level it is quite likely to be true. This is a conservative formulation which is traditionally done when calculating type II induced multipliers as well. Other property income will disburse money indirectly; however, through the Enterprise sector. The enterprise sector disburses money to government by way of profits taxes and dividends.

Table 5 shows the specific disbursement pattern of resulting household income and enterprise income impacts to the government sectors.

Example Analysis

An example Tax Impact report is shown as table 6. These are the tax implications of the 3,897 jobs in the computer (sector 339) sector. These 3,897 jobs yielded a total regional value added activity (direct, indirect and induced effects) of 834 million dollars. Looking at table 6 we see that, based on the social accounts of the region, computers generate an additional 81 million dollars of revenue to state and local governments from all sources and an additional 150 million dollars to the Federal government.
Payments to government as a proportion of Value added in this scenario is approximately 30% (231/834) which is a reasonable number. But how good is this estimate?
First, the estimate of the components of value added come from state and county level data sources which were, at least, 2-digit SIC, so we can be comfortable with these impacts. The next round of estimates rely on distribution of the total value added impacts (by component) which are a regional average and not based on specific industries.
For example, total indirect business tax (IBT) impact is based on the IBT to industry output relationship for each industry - so far, so good. That IBT total is then disbursed to

the SAM detail for a region wide average (this is assumption 2 from above). This distribution is state specific for state/local government. The data comes from the Annual Survey of Government Finances. In this case a total IBT impact of $43.7 million was distributed for a computer scenario. But, that distribution would be the same whether it was computers, tourism, tobacco or forest products. Logically, forest products or mining would have a higher proportion of severance taxes compared to computers or tobacco, but that would not show up in the tax impact report. It is up to the analyst to make adjustments as necessary.

Conclusion

Social accounts relationships from IMPLAN have been used for several years to estimate taxes. We now have a logical process built into IMPLAN Pro 2.0 which makes it easy to take advantage of those relationships. The assumptions and methodology of the Tax Impact Report are disclosed to help avoid turning ease-of-use to misuse.

Table 1. Social Accounts Report

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Aggregate Ixl SAM (Aggregated Industries, Aggregated Rows)

June 9, 1999

Base Year: 1996 Larimer 96.iap

Institution Receipts \ Institution Payments-->	1001	5001	6001	7001	8001	10000	11001	11002	11003	12001	12002	12003	13001	14001	14002	25001	28001	Total
1001 Industry Total	2,528.0	0.0	0.0	0.0	0.0	2,461.6	78.2	66.2	1.8	354.7	431.3	135.4	0.0	1,297.0	27.0	1,147.6	2,885.7	*11,414.6*
5001 Employee Compensation	3,612.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*3,612.5*
6001 Proprietary Income	420.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*420.8*
7001 Other Property Income	1,610.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*1,610.7*
8001 Indirect Business Taxes	503.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*503.9*
10000 Households	0.2	3,102.3	403.8	488.7	0.0	117.9	719.6	0.0	0.0	306.6	0.0	0.0	198.8	385.9	0.0	12.7	147.4	*5,883.7*
11001 Federal Government NonDefense	0.1	410.8	17.0	-17.0	101.9	611.7	0.0	0.0	0.0	0.0	0.0	0.0	152.9	0.0	0.0	0.1	0.2	*1,277.7*
11002 Federal Government Defense	0.0	0.0	0.0	0.0	0.0	0.0	29.3	0.0	0.0	0.0	0.0	0.0	0.0	40.4	0.0	0.0	0.0	*69.7*
11003 Federal Government Investment	0.0	0.0	0.0	0.0	0.0	0.0	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*16.9*
12001 State/Local Govt NonEducation	16.3	99.4	0.0	17.1	402.0	465.5	62.3	0.0	0.0	0.8	0.1	0.0	22.6	0.1	0.0	0.2	17.4	*1,104.0*
12002 State/Local Govt Education	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	482.9	0.0	0.0	0.0	*482.9*
12003 State/Local Govt Investment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	162.2	0.0	0.0	0.0	*162.2*
13001 Enterprises (Corporations)	0.0	0.0	0.0	614.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*614.2*
14001 Capital	0.6	0.0	0.0	1,184.2	0.0	510.1	362.0	0.0	12.3	385.5	0.5	2.0	239.9	0.0	11.2	8.4	654.7	*3,371.5*
14002 Inventory Additions/Deletions	6.2	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	13.7	0.1	25.8	15.3	*61.7*
25001 Foreign Trade	287.1	0.0	0.0	5.3	0.0	265.5	5.6	0.3	0.4	5.8	4.5	8.1	0.0	608.5	3.5	0.5	0.0	*1,195.2*
28001 Domestic Trade	2,428.3	0.0	0.0	-681.9	0.0	1,450.9	3.8	3.1	2.2	50.6	46.4	16.6	0.0	380.7	19.9	0.0	0.0	*3,720.7*
Total	*11,414.6*	*3,612.5*	*420.8*	*1,610.7*	*503.9*	*5,883.7*	*1,277.7*	*69.7*	*16.9*	*1,104.0*	*482.9*	*162.2*	*614.2*	*3,371.5*	*61.7*	*1,195.2*	*3,720.7*	*35,522.8*

*All values are in Millions of Dollars

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Table 2. SAM Row Detail

			1001	5001	6001	7001	8001	10000	11001	11002	11003	12001	12002	12003	13001	14001	14002	25001	28001
1001	Industry Total	15051 Commodity Trade																1147.578	2885.699
1001	Industry Total	15055 Industry Use	2527.953					2461.631	78.230	66.218	1.826	354.712	431.310	135.410		1297.025	27.021		
5001	Employee Compensation	15053 Factor Receipts	3612.507																
6001	Proprietary Income	15053 Factor Receipts	420.761																
7001	Other Property Income	15053 Factor Receipts	1610.669																
8001	Indirect Business Taxes	15053 Factor Receipts	503.930																
10000	HouseholdsAll	15002 Emp Comp (Wages/Salary w/o Soc Sec)		2803.191															
10000	HouseholdsAll	15003 Employee Comp (Other Labor Income)		301.341															
10000	HouseholdsAll	15004 Proprietors Inc (w/o Soc Sec & CCA)			403.752														
10000	HouseholdsAll	15005 Rent with Capital Consumption Adj				123.004													
10000	HouseholdsAll	15006 Business Transfers				22.410													
10000	HouseholdsAll	15007 Dividends													198.810				
10000	HouseholdsAll	15008 Interest (Net-from Industries)				409.931													
10000	HouseholdsAll	15009 Interest (Gross)						117.874	206.975			51.908							
10000	HouseholdsAll	15010 Transfers		-2.278					512.606			254.673							
10000	HouseholdsAll	15011 Surplus or Deficit				-44.944										385.852			
10000	HouseholdsAll	15036 Interest (Net-from RoW)						20.628											
10000	HouseholdsAll	15037 Factor Trade																	
10000	HouseholdsAll	15051 Commodity Trade																	
10000	HouseholdsAll	15055 Industry Use																	
11001	Federal Government NonDefense	15008 Interest (Net-from Industries)				0.000													
11001	Federal Government NonDefense	15009 Interest (Gross)																	
11001	Federal Government NonDefense	15013 Wage Accruals Less Surplus		0.000															
11001	Federal Government NonDefense	15014 Soc Sec Tax Employee Contribution		180.507	17.009														
11001	Federal Government NonDefense	15015 Soc Sec Tax Employer Contribution		230.307															
11001	Federal Government NonDefense	15016 Surplus-Subsidy Govt Enterprises				-17.015													
11001	Federal Government NonDefense	15017 Indirect Bus Tax: Excise Taxes					60.265												
11001	Federal Government NonDefense	15018 Indirect Bus Tax: Custom Duty					20.700												
11001	Federal Government NonDefense	15019 Indirect Bus Tax: Fed NonTaxes					20.916												
11001	Federal Government NonDefense	15026 Corporate Profits Tax													152.941				
11001	Federal Government NonDefense	15027 Personal Tax: Income Tax						573.680											
11001	Federal Government NonDefense	15028 Personal Tax: Estate and Gift Tax						15.054											
11001	Federal Government NonDefense	15029 Personal Tax: NonTaxes (Fines Fees						2.237											
11001	Federal Government NonDefense	15036 Interest (Net-from RoW)				0.000													
11001	Federal Government NonDefense	15051 Commodity Trade																0.091	0.220
11001	Federal Government NonDefense	15055 Industry Use	0.086					0.054	0.000	0.000	0.000	0.001	0.003	0.003		0.000	0.001		
11002	Federal Government Defense	15010 Transfers							29.254										
11002	Federal Government Defense	15011 Surplus or Deficit														40.413			
11003	Federal Government Investment	15010 Transfers							16.861										
12001	State/Local Govt NonEducation	15007 Dividends													13.634				
12001	State/Local Govt NonEducation	15008 Interest (Net-from Industries)				0.000													
12001	State/Local Govt NonEducation	15009 Interest (Gross)						167.747											
12001	State/Local Govt NonEducation	15010 Transfers							62.111										
12001	State/Local Govt NonEducation	15013 Wage Accruals Less Surplus		0.000															
12001	State/Local Govt NonEducation	15014 Soc Sec Tax Employee Contribution		28.923	0.000														
12001	State/Local Govt NonEducation	15015 Soc Sec Tax Employer Contribution		70.516															
12001	State/Local Govt NonEducation	15016 Surplus-Subsidy Govt Enterprises				17.133													
12001	State/Local Govt NonEducation	15020 Indirect Bus Tax: Sales Tax					184.084												
12001	State/Local Govt NonEducation	15021 Indirect Bus Tax: Property Tax					183.191												
12001	State/Local Govt NonEducation	15022 Indirect Bus Tax: Motor Vehicle Lic					3.630												
12001	State/Local Govt NonEducation	15023 Indirect Bus Tax: Severance Tax					0.583												
12001	State/Local Govt NonEducation	15024 Indirect Bus Tax: Other Taxes					16.300												
12001	State/Local Govt NonEducation	15025 Indirect Bus Tax: S/L NonTaxes					14.262												
12001	State/Local Govt NonEducation	15026 Corporate Profits Tax													8.989				
12001	State/Local Govt NonEducation	15027 Personal Tax: Income Tax						114.656											
12001	State/Local Govt NonEducation	15028 Personal Tax: Estate and Gift Tax						0.765											
12001	State/Local Govt NonEducation	15029 Personal Tax: NonTaxes (Fines Fees						18.475											
12001	State/Local Govt NonEducation	15030 Personal Tax: Motor Vehicle License						5.908											
12001	State/Local Govt NonEducation	15031 Personal Tax: Property Taxes						3.014											
12001	State/Local Govt NonEducation	15032 Personal Tax: Other Tax (Fish/Hunt)						4.674											
12001	State/Local Govt NonEducation	15051 Commodity Trade																0.201	17.407
12001	State/Local Govt NonEducation	15055 Industry Use	16.286						0.229	0.009	0.000	0.785	0.144	0.000		0.112	0.000		
12002	State/Local Govt Education	15010 Transfers						150.241				0.000							
12002	State/Local Govt Education	15011 Surplus or Deficit														482.868			
12003	State/Local Govt Investment	15010 Transfers										0.000							
12003	State/Local Govt Investment	15011 Surplus or Deficit														162.204			
13001	Enterprises (Corporations)	15001 Corporate Profits with IVA				614.248													
14001	Capital	15011 Surplus or Deficit						495.580	361.950		12.330	385.457			239.874		10.650		648.388
14001	Capital	15033 Capital Consumption Allowance				1211.583													
14001	Capital	15035 NIPA Statistical Discrepancy				-27.360													
14001	Capital	15051 Commodity Trade																8.384	6.320
14001	Capital	15055 Industry Use	0.564					14.546	0.005	0.018	0.000	0.079	0.486	2.022		0.000	0.583		
14002	Inventory Additions/Deletions	15051 Commodity Trade																25.784	15.269
14002	Inventory Additions/Deletions	15055 Industry Use	6.240					0.490	0.028	0.008	0.009	0.018	0.017	0.054		13.737	0.072		
25001	Foreign Trade	15010 Transfers				5.300		14.658	5.049										
25001	Foreign Trade	15011 Surplus or Deficit														386.970			
25001	Foreign Trade	15051 Commodity Trade						250.877	0.590	0.277	0.448	5.773	4.548	8.123		219.574	3.499	0.479	
25001	Foreign Trade	15056 Industry Trade	287.081																
28001	Domestic Trade	15037 Factor Trade				-681.877													
28001	Domestic Trade	15051 Commodity Trade						1450.863	3.800	3.137	2.248	50.602	46.361	16.593		380.704	19.916		
28001	Domestic Trade	15056 Industry Trade	2428.336																
	Column Total		11414.43	3612.51	420.76	1632.41	503.93	5883.65	1277.69	69.67	16.86	1104.01	482.87	162.20	614.25	3371.46	61.74	1182.52	3573.32

Table 3. SAM Row Detail Coefficients

			1001	5001	6001	7001	8001	10000	11001	11002	11003	12001	12002	12003	13001	14001	14002	25001	28001
1001	Industry Total	15051 Commodity Trade																0.970454	0.807567
1001	Industry Total	15055 Industry Use	0.221470					0.418385	0.061228	0.950495	0.106293	0.321295	0.893225	0.834808		0.384707	0.437643		
5001	Employee Compensation	15053 Factor Receipts	0.316486																
6001	Proprietary Income	15053 Factor Receipts	0.036862																
7001	Other Property Income	15053 Factor Receipts	0.141110																
8001	Indirect Business Taxes	15053 Factor Receipts	0.044149																
10000	HouseholdsAll	15002 Emp Comp (Wages/Salary w/o Soc Sec)		0.775968															
10000	HouseholdsAll	15003 Employee Comp (Other Labor Income)		0.083416															
10000	HouseholdsAll	15004 Proprietors Inc (w/o Soc Sec & CCA)			0.959575														
10000	HouseholdsAll	15005 Rent with Capital Consumption Adj				0.075351													
10000	HouseholdsAll	15006 Business Transfers				0.013728													
10000	HouseholdsAll	15007 Dividends													0.323664				
10000	HouseholdsAll	15008 Interest (Net-from Industries)				0.251120													
10000	HouseholdsAll	15009 Interest (Gross)						0.020034	0.161991			0.047017							
10000	HouseholdsAll	15010 Transfers		-0.000631					0.401197			0.230681							
10000	HouseholdsAll	15011 Surplus or Deficit				-0.027532										0.114447			
10000	HouseholdsAll	15036 Interest (Net-from RoW)						0.003506											
10000	HouseholdsAll	15037 Factor Trade																	
10000	HouseholdsAll	15051 Commodity Trade																	
10000	HouseholdsAll	15055 Industry Use																	
11001	Federal Government NonDefense	15008 Interest (Net-from Industries)				0.000000													
11001	Federal Government NonDefense	15009 Interest (Gross)																	
11001	Federal Government NonDefense	15013 Wage Accruals Less Surplus		0.000000															
11001	Federal Government NonDefense	15014 Soc Sec Tax Employee Contribution		0.049967	0.040425														
11001	Federal Government NonDefense	15015 Soc Sec Tax Employer Contribution		0.063753															
11001	Federal Government NonDefense	15016 Surplus-Subsidy Govt Enterprises				-0.010423													
11001	Federal Government NonDefense	15017 Indirect Bus Tax: Excise Taxes					0.119590												
11001	Federal Government NonDefense	15018 Indirect Bus Tax: Custom Duty					0.041077												
11001	Federal Government NonDefense	15019 Indirect Bus Tax: Fed NonTaxes					0.041505												
11001	Federal Government NonDefense	15026 Corporate Profits Tax													0.248969				
11001	Federal Government NonDefense	15027 Personal Tax: Income Tax						0.097504											
11001	Federal Government NonDefense	15028 Personal Tax: Estate and Gift Tax						0.002559											
11001	Federal Government NonDefense	15029 Personal Tax: NonTaxes (Fines Fees						0.000380											
11001	Federal Government NonDefense	15036 Interest (Net-from RoW)				0.000000													
11001	Federal Government NonDefense	15051 Commodity Trade																0.000077	0.000062
11001	Federal Government NonDefense	15055 Industry Use	0.000008						0.000000	0.000000	0.000000	0.000001	0.000006	0.000017		0.000000	0.000018		
11002	Federal Government Defense	15010 Transfers						0.000009	0.022696										
11002	Federal Government Defense	15011 Surplus or Deficit														0.011987			
11003	Federal Government Investment	15010 Transfers							0.013197										
12001	State/Local Govt NonEducation	15007 Dividends													0.022197				
12001	State/Local Govt NonEducation	15008 Interest (Net-from Industries)				0.000000													
12001	State/Local Govt NonEducation	15009 Interest (Gross)						0.028511											
12001	State/Local Govt NonEducation	15010 Transfers							0.048612										
12001	State/Local Govt NonEducation	15013 Wage Accruals Less Surplus		0.000000															
12001	State/Local Govt NonEducation	15014 Soc Sec Tax Employee Contribution		0.008006	0.000000														
12001	State/Local Govt NonEducation	15015 Soc Sec Tax Employer Contribution		0.019520															
12001	State/Local Govt NonEducation	15016 Surplus-Subsidy Govt Enterprises				0.010495													
12001	State/Local Govt NonEducation	15020 Indirect Bus Tax: Sales Tax					0.365297												
12001	State/Local Govt NonEducation	15021 Indirect Bus Tax: Property Tax					0.363524												
12001	State/Local Govt NonEducation	15022 Indirect Bus Tax: Motor Vehicle Lic					0.007203												
12001	State/Local Govt NonEducation	15023 Indirect Bus Tax: Severance Tax					0.001158												
12001	State/Local Govt NonEducation	15024 Indirect Bus Tax: Other Taxes					0.032345												
12001	State/Local Govt NonEducation	15025 Indirect Bus Tax: S/L NonTaxes					0.028301												
12001	State/Local Govt NonEducation	15026 Corporate Profits Tax													0.014633				
12001	State/Local Govt NonEducation	15027 Personal Tax: Income Tax						0.019487											
12001	State/Local Govt NonEducation	15028 Personal Tax: Estate and Gift Tax						0.000130											
12001	State/Local Govt NonEducation	15029 Personal Tax: NonTaxes (Fines Fees						0.003140											
12001	State/Local Govt NonEducation	15030 Personal Tax: Motor Vehicle License						0.001004											
12001	State/Local Govt NonEducation	15031 Personal Tax: Property Taxes						0.000512											
12001	State/Local Govt NonEducation	15032 Personal Tax: Other Tax (Fish/Hunt)						0.000794											
12001	State/Local Govt NonEducation	15051 Commodity Trade																0.000170	0.004871
12001	State/Local Govt NonEducation	15055 Industry Use	0.001427					0.025535	0.000179	0.000123	0.000000	0.000711	0.000299	0.000000		0.000033	0.000000		
12002	State/Local Govt Education	15010 Transfers										0.000000							
12002	State/Local Govt Education	15011 Surplus or Deficit														0.143222			
12003	State/Local Govt Investment	15010 Transfers										0.000000							
12003	State/Local Govt Investment	15011 Surplus or Deficit														0.048111			
13001	Enterprises (Corporations)	15001 Corporate Profits with IVA				0.376283													
14001	Capital	15011 Surplus or Deficit						0.084230	0.283285		0.731265	0.349144			0.390517		0.172492		0.181452
14001	Capital	15033 Capital Consumption Allowance				0.742204													
14001	Capital	15035 NIPA Statistical Discrepency				-0.016761													
14001	Capital	15051 Commodity Trade																0.007090	0.001769
14001	Capital	15055 Industry Use	0.000049					0.002472	0.000004	0.000261	0.000000	0.000071	0.001006	0.012468		0.000000	0.009437		
14002	Inventory Additions/Deletions	15051 Commodity Trade																0.021804	0.004279
14002	Inventory Additions/Deletions	15055 Industry Use	0.000547					0.000083	0.000022	0.000115	0.000521	0.000016	0.000035	0.000332		0.004075	0.001164		
25001	Foreign Trade	15010 Transfers				0.003247		0.002491	0.003952										
25001	Foreign Trade	15011 Surplus or Deficit														0.115371			
25001	Foreign Trade	15051 Commodity Trade						0.042640	0.000462	0.003973	0.026584	0.005229	0.009418	0.050080		0.065127	0.056676	0.000405	
25001	Foreign Trade	15056 Industry Trade	0.025151																
28001	Domestic Trade	15037 Factor Trade				-0.417711													
28001	Domestic Trade	15051 Commodity Trade						0.246592	0.002974	0.045033	0.133337	0.045835	0.098011	0.102295		0.112920	0.322570		
28001	Domestic Trade	15056 Industry Trade	0.212743																
	Column Total		1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000

Table 4. Distributing Value Added Impacts

				5001	6001	7001	8001
10000	HouseholdsAll	15002	Emp Comp (Wages/Salary w/o Soc Sec)	0.775968			
10000	HouseholdsAll	15003	Employee Comp (Other Labor Income)	0.083416			
10000	HouseholdsAll	15004	Proprietors Inc (w/o Soc Sec & CCA)		0.959575		
10000	HouseholdsAll	15005	Rent with Capital Consumption Adj			na	
10000	HouseholdsAll	15006	Business Transfers			na	
10000	HouseholdsAll	15007	Dividends				
10000	HouseholdsAll	15008	Interest (Net-from Industries)			na	
10000	HouseholdsAll	15009	Interest (Gross)				
10000	HouseholdsAll	15010	Transfers	-0.000631			
10000	HouseholdsAll	15011	Surplus or Deficit			na	
10000	HouseholdsAll	15036	Interest (Net-from RoW)				
10000	HouseholdsAll	15037	Factor Trade				
10000	HouseholdsAll	15051	Commodity Trade				
10000	HouseholdsAll	15055	Industry Use				
11001	Federal Government NonDefense	15008	Interest (Net-from Industries)			0.000000	
11001	Federal Government NonDefense	15009	Interest (Gross)				
11001	Federal Government NonDefense	15013	Wage Accruals Less Surplus	0.000000			
11001	Federal Government NonDefense	15014	Soc Sec Tax Employee Contribution	0.049967	0.040425		
11001	Federal Government NonDefense	15015	Soc Sec Tax Employer Contribution	0.063753			
11001	Federal Government NonDefense	15016	Surplus-Subsidy Govt Enterprises			-0.010423	
11001	Federal Government NonDefense	15017	Indirect Bus Tax: Excise Taxes				0.119590
11001	Federal Government NonDefense	15018	Indirect Bus Tax: Custom Duty				0.041077
11001	Federal Government NonDefense	15019	Indirect Bus Tax: Fed NonTaxes				0.041505
11001	Federal Government NonDefense	15026	Corporate Profits Tax				
11001	Federal Government NonDefense	15027	Personal Tax: Income Tax				
11001	Federal Government NonDefense	15028	Personal Tax: Estate and Gift Tax				
11001	Federal Government NonDefense	15029	Personal Tax: NonTaxes (Fines Fees				
11001	Federal Government NonDefense	15036	Interest (Net-from RoW)			0.000000	
11001	Federal Government NonDefense	15051	Commodity Trade				
11001	Federal Government NonDefense	15055	Industry Use				
11002	Federal Government Defense	15010	Transfers				
11002	Federal Government Defense	15011	Surplus or Deficit				
11003	Federal Government Investment	15010	Transfers				
12001	State/Local Govt NonEducation	15007	Dividends				
12001	State/Local Govt NonEducation	15008	Interest (Net-from Industries)			0.000000	
12001	State/Local Govt NonEducation	15009	Interest (Gross)				
12001	State/Local Govt NonEducation	15010	Transfers				
12001	State/Local Govt NonEducation	15013	Wage Accruals Less Surplus	0.000000			
12001	State/Local Govt NonEducation	15014	Soc Sec Tax Employee Contribution	0.008006	0.000000		
12001	State/Local Govt NonEducation	15015	Soc Sec Tax Employer Contribution	0.019520			
12001	State/Local Govt NonEducation	15016	Surplus-Subsidy Govt Enterprises			0.010495	
12001	State/Local Govt NonEducation	15020	Indirect Bus Tax: Sales Tax				0.365297
12001	State/Local Govt NonEducation	15021	Indirect Bus Tax: Property Tax				0.363524
12001	State/Local Govt NonEducation	15022	Indirect Bus Tax: Motor Vehicle Lic				0.007203
12001	State/Local Govt NonEducation	15023	Indirect Bus Tax: Severance Tax				0.001158
12001	State/Local Govt NonEducation	15024	Indirect Bus Tax: Other Taxes				0.032345
12001	State/Local Govt NonEducation	15025	Indirect Bus Tax: S/L NonTaxes				0.028301
12001	State/Local Govt NonEducation	15026	Corporate Profits Tax				
12001	State/Local Govt NonEducation	15027	Personal Tax: Income Tax				
12001	State/Local Govt NonEducation	15028	Personal Tax: Estate and Gift Tax				
12001	State/Local Govt NonEducation	15029	Personal Tax: NonTaxes (Fines Fees				
12001	State/Local Govt NonEducation	15030	Personal Tax: Motor Vehicle License				
12001	State/Local Govt NonEducation	15031	Personal Tax: Property Taxes				
12001	State/Local Govt NonEducation	15032	Personal Tax: Other Tax (Fish/Hunt)				
12001	State/Local Govt NonEducation	15051	Commodity Trade				
12001	State/Local Govt NonEducation	15055	Industry Use				
12002	State/Local Govt Education	15010	Transfers				
12002	State/Local Govt Education	15011	Surplus or Deficit				
12003	State/Local Govt Investment	15010	Transfers				
12003	State/Local Govt Investment	15011	Surplus or Deficit				
13001	Enterprises (Corporations)	15001	Corporate Profits with IVA			0.376283	

Table 5. Distributing Household and Enterprise				10000	13001
11001	Federal Government NonDefense	15008	Interest (Net-from Industries)		
11001	Federal Government NonDefense	15009	Interest (Gross)		
11001	Federal Government NonDefense	15013	Wage Accruals Less Surplus		
11001	Federal Government NonDefense	15014	Soc Sec Tax Employee Contribution		
11001	Federal Government NonDefense	15015	Soc Sec Tax Employer Contribution		
11001	Federal Government NonDefense	15016	Surplus-Subsidy Govt Enterprises		
11001	Federal Government NonDefense	15017	Indirect Bus Tax: Excise Taxes		
11001	Federal Government NonDefense	15018	Indirect Bus Tax: Custom Duty		
11001	Federal Government NonDefense	15019	Indirect Bus Tax: Fed NonTaxes		
11001	Federal Government NonDefense	15026	Corporate Profits Tax		0.248989
11001	Federal Government NonDefense	15027	Personal Tax: Income Tax	0.097504	
11001	Federal Government NonDefense	15028	Personal Tax: Estate and Gift Tax	0.002559	
11001	Federal Government NonDefense	15029	Personal Tax: NonTaxes (Fines Fees	0.000380	
11001	Federal Government NonDefense	15036	Interest (Net-from RoW)		
11001	Federal Government NonDefense	15051	Commodity Trade		
11001	Federal Government NonDefense	15055	Industry Use		
11002	Federal Government Defense	15010	Transfers	0.000009	
11002	Federal Government Defense	15011	Surplus or Deficit		
11003	Federal Government Investment	15010	Transfers		
12001	State/Local Govt NonEducation	15007	Dividends		0.022197
12001	State/Local Govt NonEducation	15008	Interest (Net-from Industries)		
12001	State/Local Govt NonEducation	15009	Interest (Gross)	0.028511	
12001	State/Local Govt NonEducation	15010	Transfers		
12001	State/Local Govt NonEducation	15013	Wage Accruals Less Surplus		
12001	State/Local Govt NonEducation	15014	Soc Sec Tax Employee Contribution		
12001	State/Local Govt NonEducation	15015	Soc Sec Tax Employer Contribution		
12001	State/Local Govt NonEducation	15016	Surplus-Subsidy Govt Enterprises		
12001	State/Local Govt NonEducation	15020	Indirect Bus Tax: Sales Tax		
12001	State/Local Govt NonEducation	15021	Indirect Bus Tax: Property Tax		
12001	State/Local Govt NonEducation	15022	Indirect Bus Tax: Motor Vehicle Lic		
12001	State/Local Govt NonEducation	15023	Indirect Bus Tax: Severance Tax		
12001	State/Local Govt NonEducation	15024	Indirect Bus Tax: Other Taxes		
12001	State/Local Govt NonEducation	15025	Indirect Bus Tax: S/L NonTaxes		
12001	State/Local Govt NonEducation	15026	Corporate Profits Tax		0.014633
12001	State/Local Govt NonEducation	15027	Personal Tax: Income Tax	0.019487	
12001	State/Local Govt NonEducation	15028	Personal Tax: Estate and Gift Tax	0.000130	
12001	State/Local Govt NonEducation	15029	Personal Tax: NonTaxes (Fines Fees	0.003140	
12001	State/Local Govt NonEducation	15030	Personal Tax: Motor Vehicle License	0.001004	
12001	State/Local Govt NonEducation	15031	Personal Tax: Property Taxes	0.000512	
12001	State/Local Govt NonEducation	15032	Personal Tax: Other Tax (Fish/Hunt)	0.000794	
12001	State/Local Govt NonEducation	15051	Commodity Trade		
12001	State/Local Govt NonEducation	15055	Industry Use	0.025535	
12002	State/Local Govt Education	15010	Transfers		
12002	State/Local Govt Education	15011	Surplus or Deficit		
12003	State/Local Govt Investment	15010	Transfers		
12003	State/Local Govt Investment	15011	Surplus or Deficit		

Table 6. Tax Impact Report

June 9, 1999

TAX IMPACT

IMPACT NAME: Computers MULTIPLIER: Type SAM
Larimer 96.iap

		Employee Compensation	Proprietary Income	Household Expenditures	Enterprises (Corporations)	Indirect Business Taxes	Total
Federal Government NonDefense	Corporate Profits Tax				20,645,737		*20,645,737*
	Indirect Bus Tax: Custom Duty					1,797,025	*1,797,025*
	Indirect Bus Tax: Excise Taxes					5,231,820	*5,231,820*
	Indirect Bus Tax: Fed NonTaxes					1,815,764	*1,815,764*
	Interest (Gross)			1,812,644			*1,812,644*
	Personal Tax: Estate and Gift Tax			1,412,396			*1,412,396*
	Personal Tax: Income Tax			53,824,372			*53,824,372*
	Personal Tax: NonTaxes (Fines Fees			209,846			*209,846*
	Soc Sec Tax Employee Contribution	27,077,165	1,236,189				*28,313,355*
	Soc Sec Tax Employer Contribution	34,547,418					*34,547,418*
	Total	*61,624,583*	*1,236,189*	*57,259,258*	*20,645,737*	*8,844,609*	*149,610,376*
State/Local Govt NonEducation	Corporate Profits Tax				1,213,373		*1,213,373*
	Dividends				1,840,494		*1,840,494*
	Indirect Bus Tax: Motor Vehicle Lic					315,119	*315,119*
	Indirect Bus Tax: Other Taxes					1,415,035	*1,415,035*
	Indirect Bus Tax: Property Tax					15,903,378	*15,903,378*
	Indirect Bus Tax: S/L NonTaxes					1,238,096	*1,238,096*
	Indirect Bus Tax: Sales Tax					15,980,975	*15,980,975*
	Indirect Bus Tax: Severance Tax					50,649	*50,649*
	Interest (Gross)			14,740,162			*14,740,162*
	Personal Tax: Estate and Gift Tax			71,243			*71,243*
	Personal Tax: Income Tax			10,677,736			*10,677,736*
	Personal Tax: Motor Vehicle License			550,212			*550,212*
	Personal Tax: NonTaxes (Fines Fees			1,562,596			*1,562,596*
	Personal Tax: Other Tax (Fish/Hunt)			435,487			*435,487*
	Personal Tax: Property Taxes			254,960			*254,960*
	Soc Sec Tax Employee Contribution	4,338,572					*4,338,572*
	Soc Sec Tax Employer Contribution	10,577,776					*10,577,776*
	Total	*14,916,348*	*0*	*28,292,395*	*3,053,866*	*34,903,251*	*81,165,861*
Total		*76,540,932*	*1,236,189*	*85,551,653*	*23,699,603*	*43,747,860*	*230,776,237*

Appendix A: Definitions and Data Sources for numbers in the Tax Impact Report

Data Sources: the tax impact report values are based on the existing relationships of the data found in the IMPLAN database. The general sources for that data are described immediately below:

NIPA: As with all items in the IMPLAN data sets all data is ultimately controlled, at the US level, by the BEA's (Bureau of Economic Analysis) NIPA (National income and product accounts) values. For 1996 IMPLAN data, the National values were controlled to the revised NIPA accounts released in the August, 1997 issue of the Survey of Current Business (volume 77, number 8). Tables 3.4 – Personal Tax and Nontax Receipts, 3.5 – Indirect Business Tax and Nontax Accruals, and 3.6 – Contributions for Social Insurance (all on page 67) and Tables 3.2 – Federal Government Receipts and Current Expenditures (page 65) and 3.3 – State and Local Government Receipts and Current Expenditures (page 66) contain controls for all the IMPLAN data elements found in the Tax Impact report.

Consumer Expenditure Survey (CES): The Bureau of the Census annually conducts surveys and diary samplings of household expenditure patterns. It is from these surveys that the BEA benchmarks the personal consumption expenditures portion of NIPA. The survey data is reported for nine different categories of household income. We can establish the tax to income level relationships for the nine different household categories. It is based on these relationships that we can distribute many of the State and Federal tax values to a county and state level, using the number of local households in each of the nine household categories.

Annual Survey of State and Local Government Finances (SLGF): The Bureau of the Census also collects annual state and local government receipts and expenditures data. This data acts as preliminary controls for state level values (subject to controlling to the National NIPA values).

Regional Economic Information System (REIS): The BEA collects and reports income, wealth, tax, and employment data on a regional (state and county) basis also. Much of the data used to distribute the US NIPA values to states and counties come from REIS tables:

Table CA05 -- Personal Income by major source and Earnings by industry

Table SA50 -- Personal Tax and Nontax Payments

Figure A-1 Key to Tax Report Definitions and Sources

TAX IMPACT

December 6, 1999

IMPACT NAME: 400 computer jobs MULTIPLIER: Type SAM
Larimer 96.iap

		Employee Compensation	Proprietary Income	Household Expenditures	Enterprises (Corporations)	Indirect Business Taxes	Total
Federal Government NonDefense	Corporate Profits Tax				o		2,184,174
	Indirect Bus Tax: Custom Duty					r	170,790
	Indirect Bus Tax: Excise Taxes					s	497,248
	Indirect Bus Tax: Fed NonTaxes					t	172,569
	Personal Tax: Estate and Gift Tax			f			130,515
	Personal Tax: Income Tax			g			4,973,749
	Personal Tax: NonTaxes (Fines- Fees			h			19,391
	Soc Sec Tax- Employee Contribution	a	e				2,972,403
	Soc Sec Tax- Employer Contribution	b					3,576,909
	Total	6,380,373	168,938	5,123,655	2,184,174	840,607	14,697,748
State/Local Govt NonEducation	Corporate Profits Tax				p		119,219
	Dividends				q		181,203
	Indirect Bus Tax: Motor Vehicle Lic					u	32,211
	Indirect Bus Tax: Other Taxes					v	135,003
	Indirect Bus Tax: Property Tax					w	1,511,337
	Indirect Bus Tax: S/L NonTaxes					x	148,366
	Indirect Bus Tax: Sales Tax					y	1,921,627
	Indirect Bus Tax: Severance Tax					z	4,832
	Personal Tax: Estate and Gift Tax			i			7,325
	Personal Tax: Income Tax			j			1,097,840
	Personal Tax: Motor Vehicle License			k			65,050
	Personal Tax: NonTaxes (Fines- Fees			l			149,924
	Personal Tax: Other Tax (Fish/Hunt)			m			13,368
	Personal Tax: Property Taxes			n			71,639
	Soc Sec Tax- Employee Contribution	c					365,613
	Soc Sec Tax- Employer Contribution	d					891,384
	Total	1,256,997	0	1,405,145	300,422	3,753,375	6,715,938
Total		7,637,370	168,938	6,528,800	2,484,596	4,593,982	21,413,686

Definitions and data interpretation (letters correspond to the value positions in figure A-1)

a) The employee paid portion for Federal social insurance – this includes social security, unemployment insurance, medical and retirement plans. Source: US NIPA value ("Personal contributions: Federal social insurance funds" minus "Old-age, survivors, disability and hospital insurance: Self-employed " – table 3.6) is distributed to states and counties based on the "Personal Contribution for Social Insurance" from BEA REIS CA05 (Personal Income) table.

b) The employer paid portion for Federal social insurance – this includes social security, medical and retirement plans. Source: US NIPA value ("Employer contributions: Federal social insurance funds" – table 3.6) is distributed to states and counties based on the "Personal Contribution for Social Insurance" from BEA REIS CA05 (Personal Income) table. The employer paid portion is assumed to be a constant proportion of the personal paid proportion. This assumption will be affected by, a greater or lesser than average, proprietor income.

c) The employee paid portion for State social insurance – this represents retirement plans and temporary disability insurance. Source: US NIPA value ("Personal contributions: State and local social insurance funds – table 3.6) is distributed to states and based on each state's share of employee paid state social insurance specified in the SLGF. The SLGF categories comprising employee paid state social insurance are: "X01 Employee Retirement – Local Employee Contribution"; "X02 Employee Retirement – State Employee Contribution"; and "Y11 Workers Compensation – Other Contributions". County distribution is based on county portion of state and local government non-education employee compensation from IMPLAN.

d) The employer paid portion for State social insurance – this represents retirement plans, worker's comp and temporary disability insurance. Source: US NIPA value ("Employer contributions: State and local social insurance funds – table 3.6) is distributed to states and based on each state's share of employer paid state social insurance specified in the SLGF. The SLGF categories comprising employer paid state social insurance are: "X04 Employee Retirement – From Local Government"; "X05 Employee Retirement – From State Government"; "Y01 Unemployment Compensation – Contribution"; and "Y10 Workers Compensation – Own Contributions". County distribution is based on county portion of state and local government non-education employee compensation from IMPLAN.

e) Federal social insurance paid by self-employed – this includes social security, unemployment insurance, medical and retirement plans. Source: US NIPA value ("Personal contributions: Federal social insurance funds: Old-age, survivors, disability and hospital insurance: Self-employed " – table 3.6) is distributed to states and counties based on the "Proprietors' Income" from BEA REIS CA05 (Personal Income) table.

f) Estate and gift taxes are net of refunds (including interest). Source: State "Federal government: Estate and gift taxes" from REIS table SA50 (tax tables) is controlled to the US NIPA value ("Federal: Estate and gift taxes" – table 3.4). State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

g) Income tax are taxes paid to the Federal Government through withholding, declarations and final settlement less refunds. Source: State "Federal government: Individual Income taxes (net of refunds)" from REIS table SA50 (tax tables) is controlled to the US NIPA value ("Federal: Income taxes" – table 3.4). State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

h) Personal nontaxes consist of a variety of small payments –e.g., passport and immigration fees, fines and migratory bird-hunting stamps. Source: State "Federal government: Nontaxes" from REIS table SA50 (tax tables) is controlled to the US NIPA value ("Federal: Nontaxes" – table 3.4). State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

i) Household estate tax payments to state and local governments. Source: US NIPA value ("State and local: Estate taxes" – table 3.4) value is distributed to states based on "Tax – Death & Gift" (item T50) from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

j) Household personal income tax payments to state and local governments. Source: US NIPA value ("State and local: Income taxes" – table 3.4) value is distributed to states based on "Tax – Individual Income" (item T40) from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

k) Household personal motor vehicle fee payments to state and local governments. Source: US NIPA value ("State and local: Motor Vehicle Licenses" – table 3.4) value is distributed to states based on "Miscellaneous – Fines & Forfeits " (item U30) from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

l) Household personal nontax payments to state and local governments include payments for fines and donations. Source: US NIPA value ("State and local: Nontaxes" – table 3.4) value is distributed to states based on "Tax –

Motor Vehicle License " (item T25) from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

m) Household personal other tax payments to state and local governments includes hunting, fishing and other personal licenses. Source: US NIPA value ("State and local: Other taxes" – table 3.4) value is distributed to states based on "Tax – Hunting and Fishing License " (item T23) from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

n) Household personal property tax payments to state and local governments. Source: US NIPA value ("State and local: Property taxes" – table 3.4) value is distributed to states based on "Tax – Property " (item T01) from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

o) Federal Corporate profits tax. Source: US NIPA value ("Corporate profits tax accruals" – table 3.2) is distributed to states and counties based on the their proportion of US Other Property Income (from IMPLAN database).

p) State & Local government Corporate profits tax. Source: US NIPA value ("Corporate profits tax accruals" – table 3.3) is distributed to states based on "Tax – Corporate Net Income " (item T41) from the SLGF. The state distribution to counties is based on counties based on the their proportion of state Other Property Income (from IMPLAN database).

q) State & Local government dividends represents dividend payments to government by corporations from investments. Source: US NIPA value ("Dividends received by government" – table 3.3) is distributed to states based on: "Employee Retirement – Securities – Mortgages" (X42); "Employee Retirement – Securities – Corporate Stocks" (X41); "Employee Retirement – Securities – Corporate Bonds" (X40); and "Employee Retirement – Total Other Securities" (X44) from the SLGF. The state distribution to counties is based on the their proportion of state Other Property Income (from IMPLAN database).

r) Custom duties are gross collections net refunds. Source: US NIPA value ("Federal: Customs duties" – table 3.5) is distributed to states and counties based on IMPLAN estimates of total IBT for all industries in relationship to US total IBT.

s) Includes federally levied excise taxes on alcohol, tobacco, telephones, coal, fuels, air transportation, vehicles, etc. Source: US NIPA value ("Federal: Excise taxes" – table 3.5) is distributed to states and counties based on IMPLAN estimates of total IBT for all industries in relationship to US total IBT.X

t) IBT federal non-tax payments include petroleum royalties, fines, regulatory fees, forfeitures and donated funds. Source: US NIPA value ("Federal: Nontaxes" – table 3.5) is distributed to states and counties based on IMPLAN estimates of total IBT for all industries in relationship to US total IBT.

u) Motor vehicle license taxes paid to state and local governments. Source: US NIPA value ("State and Local: Motor Vehicle Licenses" -table 3.5) is distributed to states based on each state's proportion of "Tax – Motor Vehicle Operator's License" (item T25) plus "Tax – Motor Vehicle License" (item T24) from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

v) Other taxes paid to state and local governments include business licenses, documentary and stamp taxes. Source: US NIPA value ("State and Local: Other taxes" -table 3.5) is distributed to states based on each state's proportion of: "T99 Tax – Corporation License"; "T21 Tax – Amusement License"; "T29 – Other License"; "T51 Tax – Documentary & Stock Transfer"; "T27 Tax – Public Utility License"; "T20 Tax – Alcoholic Beverage License"; "T28 Tax – Occupation & Business License, NEC"; and "T99 Tax – NEC" from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

w) Property taxes paid to state and local governments. Source: US NIPA value ("Indirect business tax and nontax accruals: Property Taxes" -table 3.3) is distributed to states based on each state's proportion of . "Tax – Property" (item T01) from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

x) Non taxes paid to state and local governments include rents and royalties, special assessments, fines, settlements and donations. Source: US NIPA value ("State and Local: Nontaxes" - table 3.5) is distributed to states based on each state's proportion "U 40 Miscellaneous – Rents"; "U01 Miscellaneous – Special Assessments"; "U41 Miscellaneous – Royalties"; and "U50 Miscellaneous – Donations From Private Sources" from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

y) Sales taxes paid to state and local government. Source: US NIPA value ("Indirect business tax and nontax accruals: Property taxes" -table 3.3) is distributed to states based on each state's proportion of "Tax – Total General Sales" (item T09) from the SLGFState values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

z) Severance taxes paid to state and local governments. Source: US NIPA value ("State and Local: Severance taxes" -table 3.5) is distributed to states based on each state's proportion of "Tax - Severance" (item T53) plus "Tax – Motor Vehicle License" (item T24) from the SLGF. State values are distributed to counties based on total "Personal Income" from the BEA REIS CA05 (Personal Income) table.

Minnesota IMPLAN Group, Inc.

Elements of the Social Accounting Matrix

MIG IMPLAN Technical Report TR-98002

Elements of the Social Accounting Matrix

Introduction

This document will describe the structure and data elements of the IMPLAN Pro social accounting matrix. Understanding each element in the row detail SAM is important in understanding the flow of funds throughout the economy. Specifically, we will identify the data elements collected and how they fit into the framework as well as describe the procedure for distributing the national controls to the states and counties.

To replicate the SAM describe in this document, you will need the 1995 US data Version 4.16.98 and IMPLAN Professional Version 1.1.6008 (there were both SAM data and software changes made to earlier releases). One change to the IMPLAN system is that the IO accounts are based on GNP totals, not GDP. This has no effect on the multipliers since the difference between GNP and GDP is only net factor income payments to rest-of-world (SCB, August 91, Page 8).

When necessary, usually definitions not found in the IMPLAN manuals, I will cite the appropriate source.

The SAM Framework

The Social Accounts of a region track the monetary flows between industries and institutions. In fact, the input-output accounts are a subset of the entire social accounts of a region. The social accounts track all monetary flows, both market and non-market. The market flows are those between producers of goods and services and consumers, both industrial, and non-industrial (i.e households, government, investment, and trade). The non-market flows are those between households and government, government and households, capital and households and so on. These flows are often called inter-institutional transfers. There is no perceived value being exchanged in return for the dollars (of course, taxes do pay for government services, but these do not have a market value).

The terminology in a social accounting framework is somewhat different than that of an input-output model and bears review. The typical term for payments to workers and profits is value-added. In a SAM framework, we refer to value added as payments to factors of production. The consumption of goods and services by households, government, and capital are usually call final demands in an IO framework. In a SAM framework, the consuming final demand sectors are called institutions, hence the term inter-institutional transfers. We still have industries and commodities and trade.

A simple social accounting matrix (SAM), in the IMPLAN framework is in Table 1.

Table 1 Social Accounting Matrix Framework

	1 Industry	2 Commodity	3 Factors	4 Institutions	5 Foreign Trade	6 Domestic Trade
1-Industry		1x2			1x5	1x6
2-Commodity	2x1			2x4		
3-Factors	3x1					
4-Institutions		4x2	4x3	4x4	4x5	4x6
5-Foreign Trade	5x1		5x3	5x4	5x5	
6-Domestic Trade	6x1		6x3	6x4		

Each cell represents a sub-matrix. The table format is similar to the Aggregated SAM report found in the IMPLAN Pro software. The data for this framework can also be written to files. In the SAM 26 file version each cell is a different file. In the one file version, there is one file with trade aggregated. There are also ways to extract the SAM with additional row detail that we will discuss next. The framework above is a good starting point to understanding the SAM.

The SAM is fairly simple. Each row cell represents an institutional or industry receipt of income. Each column cell represents an institutional or industry payment or disbursement. The SAM tracks the dollar flows through the economy as sets of income and payments. Each row and column balance exactly so all flows are counted.

The definitions of the 6 row and column header entries are

1. Industry is the 528 IMPLAN industry sectors from the IMPLAN I/O model
2. Commodity is the 528 IMPLAN commodities
3. Factors include the value-added elements:
   - Employee compensation
   - Proprietary income
   - Other property type income
   - Indirect business tax
4. Institutions include
   - Households (can be broken down by income
   - Federal government
   - State and local government
   - Enterprises (basically consists of corporate profits)
   - Capital
   - Inventory
5. Foreign trade
   - Foreign imports
   - Foreign exports
6. Domestic trade
   - Domestic imports
   - Domestic exports

Examining Table 1 cell by cell, we have the following:

Column 1 represents payments by industries
Cell 2x1 Domestic use of commodities by industries or payments to commodities
Cell 3x1 Factor incomes or value added elements or payments to workers, interest, profits etc.
Cell 5x1 Total foreign imports to industry use or payments to imports
Cell 6x1 Total domestic imports to industry use
The total for column 1 represents total industry output.

Column 2 represents payments by commodities
Cell 1x2 Domestic industry make
Cell 4x2 Domestic institutional make (this is the same as institutional commodity sales
The total represents total commodity output

Column 3 represents payments or distributions of factor income
Cell 4x3 Factor or value added distributions
Cell 5x3 Foreign factor imports

Cell 6x3 Domestic factor imports
The total represents total factor payments

Column 4 represents payments by institutions to commodities or other institutions. Row 4 represents receipts of income by institution
Cell 2x4 Domestic institutional use or final demands by institution
Cell 4x4 Inter-institutional transfers
Cell5x4 Foreign institutional imports or foreign imports to final demand
Cell6x4 Domestic institutional imports or domestic imports to final demand
The total represents total expenditures by each institution.

Column 5 represents payments by foreign exports, row 5 represents foreign imports.
Cell 1x5 Total foreign commodity exports
Cell 4x5 Foreign institutional exports
Cell 5x5 Foreign trans-shipments or goods that are shipped into the US and back out again without further processing.
The total represents total foreign trade.

Column 6 represents payments by domestic exports, row 6 represents domestic imports.
Cell 1x6 Total domestic commodity exports
Cell 4x6 Domestic institutional exports

There is a lot of detail available for each of these cells. Different IMPLAN reports give different levels of detail.

The Aggregated Social Accounting Matrix (SAM) report shows each cell with the factors and institution detail the same as the above list. Here the use and make matrices represent industry purchases and production of commodities respectively, and are aggregated to one number. The value-added elements, final demands, and trade are aggregated to single numbers as well. The inter-institutional transfer's data has as much column detail as available, but the row detail is summarized to the same number of elements as the columns.

Additional industry (but not institutional) row detail is available either through the 1 file SAM report or the 26 file report. Both reports are actually written to text files for use in spreadsheets or other programs. The one file report gives you Figure 1 layout with full detail for industries and commodities, but has trade aggregated to a vector. This can be imported into a spreadsheet. However, this really only works with models aggregated to 100 or fewer sectors.

The 26 file report is meant to be used with the GAMS modeling language. The 26 file report allows you to give a 5 character identifier and then attaches the cell location to the file name. The 26 files also give full trade detail as an option. In other words, with the following files, you can have trade matrices instead of vectors.

The 26 file report also provides the following satellite tables which contain detailed imports and exports. These tables can either replace the trade cells to provide trade detail, or can be added to data in cells to create an import laden SAM. Following each table description are instructions for creating an import laden SAM or creating the trade detail.

7x1 Industry foreign import use
8x1 Industry domestic import use
7x4 Institutional foreign import use
8x4 Institutional domestic import use

1x7 Industry foreign export make
1x8 Industry domestic export make
4x7 Institutional foreign export make
4x8 Institutional domestic export make

To create a detail trade SAM with imports separated, then follow Table 2.

Table 2 Social Accounting Matrix Framework Detail Trade

	1 Industry	2 Commodity	3 Factors	4 Institutions	5 Foreign Trade	6 Domestic Trade
1-Industry		1x2			1x7	1x8
2-Commodity	2x1			2x4		
3-Factors	3x1					
4-Institutions		4x2	4x3	4x4	4x7	4x8
5-Foreign Trade	7x1		5x3	7x4	5x5	
6-Domestic Trade	8x1		6x3	8x4		

To create a SAM with detail trade included in the Use matrix, then follow Table 3.

Table 3 Social Accounting Matrix Framework Detail Trade in Use

	1 Industry	2 Commodity	3 Factors	4 Institutions	5 Foreign Trade	6 Domestic Trade
1-Industry		1x2+1x7+1x8				
2-Commodity	2x1+7x1+8x1			2x4+7x4+8x4		
3-Factors	3x1					
4-Institutions		4x2+4x7+4x8	4x3	4x4		
5-Foreign Trade			5x3		5x5	
6-Domestic Trade			6x3			

The Aggregated Social Accounting Matrix report is usually the best place to start in learning the SAM. However, to really understand the flows, we need to examine the row detail, which represents the different kinds of income received by the institutions. A 1995 US SAM spreadsheet is available with this PDF file. To replicate the US SAM discussed below, you will need the 1995 US file version 4.1.98 and the detail SAM MS Access query. This is available via download from our web site. Look for a zip file named DETLSAM.ZIP. This has a Microsoft Access query that creates a cross-tab table that shows the SAM row detail. IMPLAN Pro Version 2 will allow direct printing of the row detail aggregated SAM.

Data Elements of the Row Detail US SAM

There are actually two sets of data in the IMPLAN SAM. The first is the input-output data that has been part of IMPLAN since 1985. The second data set is the inter-institutional transfers data. MIG has developed this data set to track the flows of monetary transfers between institutions.

Probably the easiest way to approach the SAM is to work with each individual row and column representing one institution. The report printed from the software is an aggregated version of the SAM. We are going to discuss the detailed version. If you can run MS Access, you can download the query used to create the Detail SAM to follow along by clicking here. Otherwise, you can print out the 1995 Detail SAM spreadsheet distributed with this file. The detail SAM report will be included in IMPLAN Pro Version 2. The following discussion will be easier to follow if you are also referring to the detail SAM spreadsheet.

I am first going to discuss the national SAM. I will then step briefly through the state and county data distribution methods.

Columns represent payments or expenditures by the column industry, commodity, or institution. Rows represent a receipt of income by industry, commodity, or institution. While this discussion could center on either rows or columns, I have decided to focus on the columns since there is more detail along the rows. Each column payment represents a receipt of income for the row. One additional note, for the following discussion, households have been aggregated to one group.

You should be somewhat familiar with the IMPLAN Type Codes since the columns and rows are identified by these codes (Analysis Guide, Appendix D). You should also be familiar with the IMPLAN data element definitions.

The control totals for the SAM data are derived from the National Income and Product Accounts (NIPA) tables and are similar to the IO control totals. Most SAM values can actually be matched to the NIPA values. The 1995 data control totals are from the August 1998 issue of the Survey of Current Business. A forthcoming technical report will map the US IMPLAN SAM to the NIPA summary account tables.

Industry Purchases/Production

The first rows and columns represent industry transactions. Table 4 shows the industry column elements.

The first element in the Industry, type code 1001, column is the aggregated use matrix or industry payments to commodities. This use matrix is local only, the imports have been removed at this point and are at the foreign trade entry. The Type of Transfer refers to the specific element. Here, it is Commodity Use (15050.

The next element is industry payments to employee compensation (5001). This represents a receipt of income by employee compensation.

Table 4: Industry Column

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
1001	2001	Commodity Total	15050	Commodity Use	$5,019,780
1001	5001	Employee Compensation	15053	Factor Receipts	$4,215,434
1001	6001	Proprietary Income	15053	Factor Receipts	$489,000
1001	7001	Other Property Income	15053	Factor Receipts	$1,983,702
1001	8001	Indirect Business Taxes	15053	Factor Receipts	$582,800
1001	25001	Foreign Trade	15051	Commodity Trade	$464,781
1001	28001	Domestic Trade	15051	Commodity Trade	$0
		Total			*$12,755,497*

The next three rows are industry (1001) payments to proprietary income (6001), other property income (7001), and indirect business taxes (8001). This completes the payments to factors of production.

The last elements are industry payments to imports. We have industries making payments to foreign imports (25001) and domestic imports (28001). Note that in the national model, the domestic imports are 0. These represent imports to the use of commodities by industry.

Commodity Purchases/Production

This column, commodity (2001) payments, represents the payments made by (i.e. production of) commodities (Table 5). The first element is domestic commodity payments to industries. This is the distribution of domestic commodity income to the industries using commodities in production. This is also called the domestic industry make matrix. It's domestic since exports are removed from the make at this point.

In addition to industry production of commodities, institutions also produce commodities. In the BEA Benchmark table, this takes the form of negative final demands. In IMPLAN we change the negative to a positive and call them institutional commodity sales. These sales are net additions to commodity supply. Institutional sales are shown in the next five entries in Table 5. These are domestic commodity payments to institutions. We have, in this case, households (10001 - households have been aggregated from three income level to one), state and local government (12001), federal government (11001), capital (14001), and inventory (14002)..

Table 5 Commodity Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
2001	1001	Industry Total	15052	Commodity Make	$12,020,554
2001	10001	Households	15052	Commodity Make	$2,991
2001	11001	Federal Government NonDefense	15052	Commodity Make	$4,237
2001	12001	State/Local Govt NonEducation	15052	Commodity Make	$157,080
2001	14001	Capital	15052	Commodity Make	$38,215
2001	14002	Inventory Additions/Deletions	15052	Commodity Make	$48,181
		Total			*$12,271,257*

Employee Compensation

Employee compensation payments or distributions have the first actual SAM elements. In Table 4, we showed industry payments to factors, employee compensation being one of them. Table 6 shows the distribution of employee compensation.

Table 6 Employee Compensation Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
5001	10001	Households	15002	Emp Comp (Wages/Salary w/o Soc Sec)	$3,178,417
5001	10001	Households	15003	Employee Comp (Other Labor Income)	$406,836
5001	10001	Households	15010	Transfers	$(2,534)
5001	11001	Federal Government NonDefense	15013	Wage Accruals Less Surplus	$0
5001	11001	Federal Government NonDefense	15014	Soc Sec Tax, Employee Contribution	$244,900
5001	11001	Federal Government NonDefense	15015	Soc Sec Tax, Employer Contribution	$310,500
5001	12001	State/Local Govt NonEducation	15013	Wage Accruals Less Surplus	$0
5001	12001	State/Local Govt NonEducation	15014	Soc Sec Tax, Employee Contribution	$21,800
5001	12001	State/Local Govt NonEducation	15015	Soc Sec Tax, Employer Contribution	$55,500
5001	25001	Foreign Trade	15037	Factor Trade	$15
5001	28001	Domestic Trade	15037	Factor Trade	$0
		Total			*$4,215,434*

The first three payments represent payments to households. This also represents income received by households. The first entry is employee compensation (5001) payments to total

households (10001). This payment represents wages and salaries without employee contributions to social security. Contributions to social security are not considered part of household income. The second row is payments to households of other labor income. This is benefits and other non-wage compensation. The last row is net rest-of-world payments of employee compensation or the difference between factor income receipts and payments. *Rest-of-world factor income receipts is compensation paid by foreigners to US workers. Factor income payments are compensation of employees paid to foreign workers by US residents.*

There are 3 payments by employee compensation (5001) to non-defense related federal government. The first is federal wage accruals less surplus. This occurs at the end of the accounting period if there are wages that workers have earned but not received. The next is payments for employee contributions to social security. In other words, these are payments of employee social security withholdings. The next is payments of company social security obligations.

The last category is employee compensation to Foreign trade. Foreign payments represent net rest-of-world payments of employee compensation. It is the difference between receipts of employee compensation income from the rest of world (or workers being paid by foreign companies) less payments of employee compensation to rest-of-world (foreign workers being paid by US companies). For the US, this is actually a result of rounding since rest-of-world is treated as a net-payment-to-households figure.

Proprietors Income

Table 7 shows the distribution of proprietor's income. This income is distributed to households as self-employed income without social security, and to federal government as employee payments of social security tax. Since by definition, for proprietors, employee and employer are the same, the social security payment is allocated only to employees.

This table could have social security payments to state and local governments, but no NIPA data exists for this. There could also be foreign or domestic factor trade, but by definition, all proprietors are local (non-foreign) residents.

Table 7 Proprietors Income Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
6001	10001	Households	15004	Proprietors Inc (w/o Soc Sec & CCA)	$462,600
6001	11001	Federal Government NonDefense	15014	Soc Sec Tax, Employee Contribution	$26,400
6001	12001	State/Local Govt NonEducation	15014	Soc Sec Tax, Employee Contribution	$0
		Total			*$489,000*

Other Property Type Income

The distribution of other property type income is shown in Table 8. There are four different payments to households. The first is rental income with a capital consumption adjustment. This is payment to households primarily for rental properties from the real estate and owner occupied dwelling sector. Capital consumption adjustment is "*the difference between tax-return based capital consumption allowances and capital consumption based on the use of uniform services lives, straight-line depreciation, and replacement cost*" (SCB August 97, page 21). That is, the difference between real depreciation and tax depreciation.

The next is business transfer payments. Business transfer payments include corporate gifts to individuals, medical malpractice payments, and insurance payments (SCB, August 97, Page 143, Table 8.14).

The third item is net interest from industries. This is interest paid by industries to households less interest paid by households to industry. Interest paid by industries to households includes, savings interest, bond interest payments, pension payments, and life insurance interest. Interest paid by households to industry consists primarily of payments for mortgage and loans. The value is positive indicating households receive more interest than they pay. Interest payments on mortgage and home improvement loans are counted with interest paid by businesses since homeownership is treated like a business in the NIPA's. (SCB, March 98, Page 33)

The fourth row is interest paid by households to rest-of-world businesses less interest received by households from rest-of-world businesses. In this case it is negative indicating that households pay more interest to the rest-of-world than they receive. (SCB, March 98, Page 33)

Table 8 Other Property Type Income Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
7001	10001	Households	15005	Rent with Capital Consumption Adj	$132,800
7001	10001	Households	15006	Business Transfers	$25,000
7001	10001	Households	15008	Interest (Net-from Industries)	$504,100
7001	10001	Households	15036	Interest (Net-from RoW)	$(78,900)
7001	11001	Federal Government NonDefense	15016	Surplus-Subsidy, Govt Enterprises	($36,400)
7001	12001	State/Local Govt NonEducation	15016	Surplus-Subsidy, Govt Enterprises	$11,200
7001	13001	Enterprises (Corporations)	15001	Corporate Profits with IVA	$650,000
7001	14001	Capital	15033	Capital Consumption Allowance	$796,800
7001	14001	Capital	15035	NIPA Statistical Discrepency	($28,200)
7001	25001	Foreign Trade	15010	Transfers	$7,300
7001	25001	Foreign Trade	15037	Factor Trade	$2
		Total			*$1,983,702*

There are two payments from other property type income to federal non-defense and state and local government. These are government enterprise surplus less government enterprise subsidy. It is like a net income value for government enterprises. An example of a federal government enterprise sector is the US Postal Service. The Post Office receives income from the sale of stamps. It also gets subsidies from the federal government to operate. The difference between the surplus revenues they have and the subsidies they receive is the surplus less subsidy. (SCB, March 98, Page 33)

There are two capital related transfers. The first is other property type income payment to capital consumption allowance. Capital consumption allowances are "*tax-return-based depreciation for corporations and nonfarm proprietorships and historical-cost depreciation for farm proprietorships, rental income of persons and nonprofit institutions*" (SCB August 97, page 21). In other words, capital consumption allowances are tax-return based, and capital consumption adjustment is real depreciation less tax based. This has the effect of adding back tax based depreciation to other property type income. This is similar to adding tax based depreciation charges to financial statements of cash flow (if you recall financial accounting 101).

The last two transactions are payments to foreign trade. The first is business transfers to rest-of-world. Again, business transfer payments are things like corporate gifts to individuals, medical malpractice payments, and insurance payments paid to rest-of-world.

The last transaction is also a net rest-of-world payment of factor income to rest-of-world. This is rounding since factor payments to rest-of-world are found in net rest-of-world

payments to households. Payments of dividends to rest-of-world, also a component of factor income, is hidden in the corporate profits receipt and are not broken out.

Indirect Business Tax Payments

Table 9 shows the distribution of indirect business tax receipts. There are two distributions. The first is to federal non-defense government. These are for excise taxes, customs duty, non-tax related income. Excise taxes include gasoline,, alcholic beverages, tobacco, diesel fuel, air transport, crude oil windfall profits tax, and other The other includes taxes on telephones, tires, coal, nuclear fuel, trucks and other refund. The non-taxes include revenue from outer continental shelf royalties, deposit insurance premiums, and other fines, fees and royalties. (SCB, August 97, Page 67, Table 3.5)

Table 9 Indirect Business Tax Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
8001	11001	Federal Government NonDefense	15017	Indirect Bus Tax: Excise Taxes	$58,090
8001	11001	Federal Government NonDefense	15018	Indirect Bus Tax: Custom Duty	$19,396
8001	11001	Federal Government NonDefense	15019	Indirect Bus Tax: Fed NonTaxes	$16,097
8001	12001	State/Local Govt NonEducation	15020	Indirect Bus Tax: Sales Tax	$239,358
8001	12001	State/Local Govt NonEducation	15021	Indirect Bus Tax: Property Tax	$197,366
8001	12001	State/Local Govt NonEducation	15022	Indirect Bus Tax: Motor Vehicle Lic	$4,599
8001	12001	State/Local Govt NonEducation	15023	Indirect Bus Tax: Severance Tax	$3,799
8001	12001	State/Local Govt NonEducation	15024	Indirect Bus Tax: Other Taxes	$23,895
8001	12001	State/Local Govt NonEducation	15025	Indirect Bus Tax: S/L NonTaxes	$20,196
		Total			*$582,800*

Payments to state and local government include sales tax, property tax, motor vehicle tax, severance tax, other taxes, and non-taxes. The property tax paid by indirect business tax to state and local government is both from households and businesses. In the national income and products accounts, and subsequently, for the IMPLAN input-output accounts, the household ownership of homes is treated like a industry. Therefore, payments of property taxes comes out of owner occupied dwelling value added.

Non taxes consist of business licenses and documentary and stamp taxes. Other non-taxes is largely donations. (SCB, August 97, Page 67, Table 3.5)

Households

Table 10 shows the distribution of household expenditures. Households get income from employee compensation, proprietor's income, and other sources. You can see all sources of household income by examining the household row in the detail SAM table.

Households make expenditures for goods and services, taxes, and savings. The first set, household to commodity total is purchases of commodities (actually final demands). The next expenditure is household payments of interest to households. This is for things like personal notes, contracts for deed, and other inter-household loans.

The next set of payments are to the federal government. The first payment is gross interest paid to federal government. This is for things like FHA loans. Next are payments to federal taxes including, income tax, estate and gift tax, and non-taxes. Non-taxes include fines and forfeitures.

The next set of payments is to state and local government. The first is gross interest. The next is taxes including, income, estate and gift tax, non-taxes, motor vehicle licenses, property taxes, other taxes such as fishing and hunting fees. Property taxes in this set are

only personal property taxes and not real estate taxes (which are covered in indirect business taxes).

Table 10 Household Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
10001	2001	Commodity Total	15051	Commodity Trade	4,777,556
10001	10003	Households-	15009	Interest (Gross)	$128,500
10001	11001	Federal Government NonDefense	15009	Interest (Gross)	$25,200
10001	11001	Federal Government NonDefense	15027	Personal Tax: Income Tax	$588,700
10001	11001	Federal Government NonDefense	15028	Personal Tax: Estate and Gift Tax	$14,900
10001	11001	Federal Government NonDefense	15029	Personal Tax: NonTaxes (Fines, Fees	$2,200
10001	12001	State/Local Govt NonEducation	15009	Interest (Gross)	$123,700
10001	12001	State/Local Govt NonEducation	15027	Personal Tax: Income Tax	$140,300
10001	12001	State/Local Govt NonEducation	15028	Personal Tax: Estate and Gift Tax	$5,300
10001	12001	State/Local Govt NonEducation	15029	Personal Tax: NonTaxes (Fines, Fees	$26,700
10001	12001	State/Local Govt NonEducation	15030	Personal Tax: Motor Vehicle License	$10,500
10001	12001	State/Local Govt NonEducation	15031	Personal Tax: Property Taxes	$3,700
10001	12001	State/Local Govt NonEducation	15032	Personal Tax: Other Tax (Fish/Hunt)	$2,800
10001	14001	Capital	15011	Surplus or Deficit	$457,524
10001	25001	Foreign Trade	15010	Transfers	$14,800
10001	25001	Foreign Trade	15051	Commodity Trade	$259,692
		Total			*$6,582,073*

After state and local government expenditures, there is payments to capital which represents savings. Actually, all household expenditures are accounted for prior to the savings calculation. Savings, therefore, represents a residual value. Dis-savings can also occur when a household spends more than it makes. This shows up as a payment from capital to households.

The last expenditures are to trade. The first being household transfer payments to the rest-of-world. This includes cash transfers as well as goods to the rest-of-world (SCB, March 98, Page 34). The last entry is household purchases of imported goods from foreign sources.

Federal Non-Defense

Federal non-defense government distributions are shown in Table 11. The expenditures are for domestic goods and services, transfers to households, transfers to defense, and foreign trade. The first expenditure is for locally produced goods and services (federal non-defense final demands).

Table 11 Federal Government Non-defense Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
11001	2001	Commodity Total	15051	Commodity Trade	$169,231
11001	10001	Households	15009	Interest (Gross)	$250,000
11001	10001	Households	15010	Transfers	$709,400
11001	11002	Federal Government Defense	15010	Transfers	$345,600
11001	12001	State/Local Govt NonEducation	15010	Transfers	$211,900
11001	25001	Foreign Trade	15010	Transfers	$11,500
11001	25001	Foreign Trade	15051	Commodity Trade	$869
		Total			*$1,698,500*

There are two payments to households. The first is interest payments to households. This consists primarily of payments to holders of government bonds and other securities. The next is transfer payments to households. These payments include social security, veterans benefits, food stamps, black lung benefits, supplemental security income, direct relief, earned income credit, and other. Other includes payments to non-profits institutions, aid to

students, and payments for medical services for retired military personal and their dependents at nonmilitary facilities. (SCB, March 98, Page 34)

The next payment is a transfer to defense related federal government. This provides funding for defense related expenditures.

Next are payments to state and local government. These are federal grants-in-aid, and provide part of the money necessary for state and local governments to operate.

The last set of payments are to federal transfers to rest-of-world, and to imports of foreign goods and services. Federal transfers to rest-of-world total $11,500 million and consist of payments of aid to other countries. The federal government also imports $869 million from foreign sources (this is an IMPLAN estimate).

Federal Defense

Table 12 shows the distribution of federal defense expenditures. The only defense related expenditures made are to domestic and foreign goods and services.

Table 12 Federal Government Defense Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
11002	2001	Commodity Total	15051	Commodity Trade	$332,455
11002	25001	Foreign Trade	15051	Commodity Trade	$13,144
11002	28001	Domestic Trade	15051	Commodity Trade	$0
		Total			*$345,600*

State and Local Government Non-Education

Payments by state and local government go to five different institutions, commodities, households, state and local government education, foreign and domestic trade (Table 13). The first payment is for domestic goods and services. This is the same thing as domestic final demands.

The next payment group is to households. State and local governments pay interest to households and make transfer payments. The interest is for bond holding primarily. Transfer payments include state welfare payments and unemployment compensation.

Table 13 State and Local Government Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
12001	2001	Commodity Total	15051	Commodity Trade	$590,088
12001	10001	Households	15009	Interest (Gross)	$64,100
12001	10001	Households	15010	Transfers	$280,600
12001	12002	State/Local Govt Education	15010	Transfers	$400,656
12001	25001	Foreign Trade	15051	Commodity Trade	$12,455
12001	28001	Domestic Trade	15051	Commodity Trade	$0
		Total			*$1,347,900*

There is one transfer payment to state and local government education. This is an allocation of funds from administrative government for education related expenditures.

The last transaction is foreign commodity trade. This is state and local government purchases of imported goods. There is no domestic trade in the national model.

State and Local Government Education

Table 14 shows the distribution of state and local government purchases. The first is domestic commodity purchases. This is the same thing as final demand purchases. The next is commodity purchases of foreign imported goods.

Table 14 State and Local Education Purchases

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
12002	2001	Commodity Total	15051	Commodity Trade	$395,602
12002	25001	Foreign Trade	15051	Commodity Trade	$5,053
12002	28001	Domestic Trade	15051	Commodity Trade	$0
		Total			*$400,656*

Enterprise

Enterprise income as seen in Table 9 consists entirely of corporate profits. These profits are distributed to households, government and capital. First is profit payments to households of $251,900. This represents dividend income to households.

The next are payments to government. Corporate profits tax collections of $182,100 go to the federal government. State and local government receives a dividend payment since state and local governments hold stocks in retirement and other investment accounts. They also receive corporate profits tax payments as well.

The last entry is a payment to capital of $172,400. This represents retained earnings, which is then used for things like private investment in the next year.

Table 15 Enterprise Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
13001	10001	Households	15007	Dividends	$251,900
13001	11001	Federal Government NonDefense	15026	Corporate Profits Tax	$182,100
13001	12001	State/Local Govt NonEducation	15007	Dividends	$12,500
13001	12001	State/Local Govt NonEducation	15026	Corporate Profits Tax	$31,100
13001	14001	Capital	15011	Surplus or Deficit	$172,400
		Total			*$650,000*

Capital

Table 16 shows the distribution of capital income. Capital purchases represent the distribution of capital income from savings and investment. The first payment is to commodities. This represents purchases of domestic capital goods. Remember that in an input-output framework, investment is outside the use matrix, that is investment is treated as a final demand or institutional purchase.

Table 16 Capital Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
14001	2001	Commodity Total	15051	Commodity Trade	$915,736
14001	10001	Households	15011	Surplus or Deficit	$189,563
14001	11001	Federal Government NonDefense	15011	Surplus or Deficit	$240,216
14001	12001	State/Local Govt NonEducation	15011	Surplus or Deficit	$44,384
14001	14002	Inventory Additions/Deletions	15011	Surplus or Deficit	$30,100
14001	25001	Foreign Trade	15051	Commodity Trade	$135,405
		Total			*$1,555,405*

The next payment is to households. This payment represents dis-savings or withdrawals of capital by households to support consumption. In this report, since we have combined the

three household categories to one, we have both savings, Table 10, and dis-savings shown here.

Capital payments to governments are next. We have payments to both federal and state and local. This value is somewhat skewed from the figures reported in NIPA since in this model, government investment is actually together with consumption purchases. This will be corrected in subsequent releases of the software and data.

There is a payment to inventory. This represents net inventory change. The flow of Inventory payments will be shown in the next table.

The last entry is payments to foreign trade. This represents capital purchases from foreign sources.

Inventory

Table 17 shows the distribution of inventory value. The first entry represents inventory purchases. This is actually demand for commodities from inventory. In other words, not all commodities produced during a year are distributed to industries or consumers, some is placed in inventory to be distributed the next year. The other entry represents foreign demand for inventory. Some of the total demand for inventory is satisfied through foreign imports.

Table 17 Inventory Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
14002	2001	Commodity Total	15051	Commodity Trade	$70,809
14002	25001	Foreign Trade	15051	Commodity Trade	$11,369
		Total			*$82,178*

Foreign Trade

The last table represents payments by the foreign trade account. A large part of these transactions are actually exports of goods and services. Foreign imports have been accounted for in each set of payment tables. The difference between exports and imports is net foreign investment.

The first entry is exports of goods and services to foreign markets. This is can also be thought of as foreign trade payments to industries in the form of purchases of goods and services, or again exports. There are also exports of goods produced by households, government, capital, and inventory. These represent commodity sales by institutions. Most of this takes the form of used and second hand goods and scrap. In the BEA table, these show up as negative final demands. In our model, we move them outside and treat these transactions as commodity sales.

The entry for capital surplus or deficit of $113,839 is net foreign investment. This is the final calculated figure in the IMPLAN social accounting matrix. This US value should be close to the value reported in the NIPAs. If it is close, then the SAM balancing program is working correctly and the data has been properly specified. The value reported in NIPA is $114,400. We are about $500 off from the reported value. This is essentially rounding error. We calculate the control totals from NIPA. However, the values used in the IMPLAN accounts are quite detailed compared to the values listed in the NIPA summary accounts. Our values for other property type income are taken from detail tables and are often different from the value listed in the summary account due to rounding. We will make adjustments for this in subsequent releases of IMPLAN data so the net foreign investment matches exactly. As a

point of reference, our discrepancy of $500 is small compared to the published NIPA statistical discrepancy value of $28,500.

Table 18 Foreign Trade Payments

Institution Payments	Institution Receipts	Type Codes.Description	Type of Transfer	Type Codes_1.Description	Value
25001	1001	Industry Total	15051	Commodity Trade	$734,942
25001	10001	Households	15037	Factor Trade	$0
25001	10001	Households	15051	Commodity Trade	$76,699
25001	11001	Federal Government NonDefense	15051	Commodity Trade	$1,963
25001	12001	State/Local Govt NonEducation	15051	Commodity Trade	$221
25001	14001	Capital	15011	Surplus or Deficit	$113,840
25001	14001	Capital	15051	Commodity Trade	$4,826
25001	14002	Inventory Additions/Deletions	15051	Commodity Trade	$3,897
25001	25001	Foreign Trade	15051	Commodity Trade	$1,588
		Total			*$937,976*

Creating Regional SAM Databases

Now that we've discussed the layout and balancing of the US SAM, how do we create a regional SAM? Essentially, the regional SAM layout is the same as the national SAM, with the exception of domestic trade flows. Domestic trade flows consist of commodity trade (goods and services), and net factor income (employee compensation, and other property type income).

Much of the data for the regional SAM comes from the IMPLAN I/O accounts. These data sources are discussed in detail in the IMPLAN Pro manual and will not be covered here. The data not covered by the IO accounts are the inter-institutional transfers including the distribution of IMPLAN IO factor income. Most of the elements of the SAM come directly from the SAM database. Capital and domestic trade are calculated as part of the balancing process

We construct a separate SAM database for each state and county using similar techniques as described in the IMPLAN Pro Data Manual. The national SAM data is allocated to the states and counties based on our collected data. The software reads the SAM data, and together with the IO data, balances the trade and capital accounts to form a balanced SAM. The following will discuss the regional SAM data sources and state and county allocation procedures.

Households

Regional household income information is from the Bureau of Economic Analysis (BEA) Regional Economic Information System (REIS) data. The expenditure information is primarily from the Bureau of Labor Statistics)BLS) Consumer Expenditure Survey (CES). These data set gives detailed information on consumer purchases and consumer income. The purchases data also gives us a means to break a single household consumption pattern into patterns for different household income groups.

Similarly, the REIS data provides detail on income sources, including wages and salaries, interest, dividend, as well as transfer payments by different household income groups. This provides us with a source to estimate regional household income.

There are some inherent problems with the CES that bear discussion. At the very low income range of the data there appears to be a problem with either the income data or the expenditure data. Households in the very low-income range, $5,000 and below, spend far more on consumption ($14,096) than they make. This pattern holds true until household

income reaches around $15,000 - $20,000. This is likely to be the result of underreporting income or receiving gifts that are not being counted. This presents a problem in the SAM in that we report high dis-savings for these groups. With three household income groups, the problem was somewhat muted. However, as we move to nine different categories as planned, the problem will be exaggerated. Since we don't know much about the problem, for now we have simply left the data as is. It's possible that we might make some adjustments to this in the future.

Creating the state and county SAM data involves taking the number of households by the nine income groups and the average income and expenditures by each group, and creating vectors of income and expenditures for them. Once these have been generated, they are controlled back to the US values to ensure data consistency.

Federal Government

Federal government income is primary taxes. Regional household payments of income taxes are from the CES data. Social security taxes are from the Bureau of Economic Analysis Regional Economic Information System (REIS) data. Corporate tax payments are based on the other property income in the region from the IMPLAN data.

Tax collections from households are based on the CES data. CES shows all household tax expenditures by income group. The average household expenditure by-income category is multiplied by the number of households in each income class to form an estimate of expenditure by household. This estimate is used to allocate the national SAM tax expenditure data to states and counties.

State and Local Government

This data is entirely from the Bureau of Census State and Local Government Finances data. This gives detailed information on tax revenues and expenditures. This data is taken directly from the Census dataset. The raw data elements then serve as a means to allocate the US control totals.

Enterprise

Enterprise income is estimated from the IMPLAN IO accounts output. This serves as an allocator for the US control total.

Capital

Capital allocation is based on estimated output for the region. Capital surplus or deficit figures are balancing items.

Inventory

Inventory change is based on estimated output for the region.

Foreign Trade

Foreign trade is allocated based on estimated output for the region.

Domestic Trade

All domestic trade is calculated from the IMPLAN IO model and the SAM balancing routine.

Regional Purchase Coefficients

Introductory Information:

This paper describes the basic ideas behind IMPLAN RPCs (regional purchase coefficients) which determine IMPLAN trade flow assumptions. The main source for this material is an unpublished paper by Alward and Despotakis (1988).

Why derive regional purchasing coefficients?:

A non-survey IMPLAN I-0 (Input-Output) model for a region is derived from a national set of structural matrices. The national model represents the ”average’, condition for a particular industry. Consequently, without adjustments for regional differences, the national production functions do not, necessarily, represent industries comprising a local or regional economy.

Stevens and Trainor (1980) note that estimating regional trade flows (imports and exports) across regional boundaries is, perhaps, the largest source of error in deriving non-survey I-0 models. Use of Regional Purchasing Coefficients (RPCs) is one way to eliminate some of the bias inherent in non-survey models.

An RPC represents the proportion of intermediate demands and final demands for a specific commodity that will be satisfied by local production. For example, a RPC value of 0.8 for the commodity ”fish” means that 80% of the final demand for fish (by fish processors, fish wholesalers, foreign exports and others) are provided by local fishermen. The remainder, 20%, is imported.

Introduction to RPCs:

Gross regional trade flows (gross exports and imports) of commodities are estimated by developing regional purchase coefficients (RPCs). An RPC represents the proportion of the total supply of a good or service used to fulfill the demands of a region that is supplied by the region to itself. For example, given an RPC value of 0.8 for the commodity ”fish”, then 80% of the demand by fish processors, fish wholesalers, foreign exports, and all other demands for fish are met by local producers. Alternatively 20% (1.0-RPC) of the demand is imported.

What causes errors in trade flow estimation?:

1) A particular commodity or service classification may contain a number of different grades or attributes. A quality difference, real or perceived can determine whether or not a local consumer is able to or willing to purchase a locally produced commodity or service. Aggregating different products or services into a single category aggravates this problem. Goats 40 and rabbits are quite often lumped into a single "Miscellaneous livestock" category yet a fur coat manufacturer will not view them as substitutable.
2) Given a choice between two suppliers of a substitutable commodity, a consumer may still choose the one that is more expensive, or of inferior quality for any one of a number of cultural, administrative, or other perceptional reasons. A tourist may buy hand made Indian jewelry even though the similar jewelry costs less and may be of better quality when machine made. An American may buy a car made in Detroit when a cheaper and better quality car can be imported. Any number of factors can affect costs and cause inefficiencies observed when haulers of an identical commodity pass each while going opposite directions on the highway (otherwise known as "crosshauling").

Estimating RPCs:

The equation for deriving RPCs is as follows: for each commodity (i):

$$RPC_i = X_i/Y_i; \text{ since} \quad (1)$$

$$Y_i = X_i + M_i \quad (2)$$

we can derive the following by splitting imports into its two components (foreign and domestic):

$$RPC_i = \frac{1}{1+\left(\frac{MW_i}{X_i}\right)+\left(\frac{MUS_i}{X_i}\right)} \quad (3)$$

where: X_i is total regional production of commodity (i) consumed by the region
Y_i is total regional consumption of commodity (i)
M_i is total imports of commodity (i) to the region
MW_i is foreign imports of commodity (i) to the region
MUS_i is domestic imports of commodity (i) to the region

Due to limitations of data, MW_i/X_i is a constant for all regions for each commodity i. This assumes that foreign imports to the Nation are proportionally distributed to each county and state on the basis of production of that commodity. on the other hand, MUS_i/X_i is estimated as follows:

$$\ln\left(\frac{MUS_i}{X_i}\right) = \beta_0 + \beta_1 \ln(WR_i) + \beta_2 \ln\left(\frac{ERi}{EUSi}\right) + \beta_3 \ln\left(\frac{ERi/TERi}{EUSi/TEUSi}\right) + \beta_4 \ln\left(\frac{AR}{AUS}\right) \quad (4)$$

where: MUS_i is imports from rest of US (domestic) to region
X_i is amount of commodity (i) produced by the region consumed by the region
WR_i is total regional employee compensation for industry (i)
ER_i is regional employment in industry (i)
TER_i is total regional employment
EUS_i is National employment in industry (i)
$TEUS_i$ is total National employment
AR is the land area of the region
AUS is the land area of the U.S.

The resulting coefficients are given in table 1. Note that the predictive equation is only used for IMPLAN sectors 1-445 (based on the 1985 and earlier IMPLAN sectoring scheme), that is, those sectors with ”shippable” commodities. The remaining sectors are the ”observed” values for each state based from the MRIO data produced by John Haven at Boston College. Counties within a state use the same observed values as the encompassing state, except as constrained by the local supply of that non-shippable commodity.

Source of data for predictive equations:

Empirical trade flow data were obtained from the 1977 Multiregional Input-Output Accounts (USDH, 1983), or MRIOA, which is a cross-sectional data base of state input-output accounts linked with consistent cross interstate trade flows. The MRIOA provides 51 125-sector input-output tables, for all states and. the District of Columbia, accompanied by 125 sets of industry-specific interstate trade flow matrices by mode of transportation. Under the MRIOA conventions, international trade figures record flows of good (i) through the foreign border of a state regardless of the actual final user or original user in the U.S. In order to compute a Leontief inverse (i.e., multipliers) net of foreign imports it is necessary to convert the trade flow data to original point of origin and final destination. U.S. flows of foreign imports and exports were allocated to states proportionally to consumption (imports) and output (exports). It was then necessary to rebalance the state trade flows. Note, that for states with no foreign borders the gross change in total imports and exports is unchanged.

The parameters for the RPC predictive equation were calculated for the first 84 (sectors with a shippable commodity) of the 125 MRIOA commodity sectors. Each of the MRIOA sectors corresponds to one or several of IMPLAN commodity sectors as shown in table 1.

Citations:

Alward, Greg and Kostas Despotakis. 1988. IMPLAN Version 2.0: Data Reduction Methods for Constructing Regional Economic Accounts. Unpublished paper; Land Management Planning; USDA Forest Service; Fort Collins, CO.

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Stevens, B. and G. Trainor. 1980. Error generation on regional input-output analysis and its implications for non-survey models, in S. Pleeter (ed.) Economic Impact Analysis: Methodology and Applications. Amsterdam: Marinus Nijhoff, pp. 68-84.

U.S. Department of Health and Human Services. 1983. The multiregional input-output accounts, 1977. Vol. I-VI, Jack Faucett Associates, Report submitted to the U.S. Department of Health and Human Services, Contract No. HHS-100-81-0057, July 1983.

Table 1. RPC Coefficients

MRIO Sector	1985 IMPLAN Sector	Constant (β0)	Wages (β 1)	Employment ratio (β 2)	Location quotient (β 3)	Area ratio (β 4)
1	1	-6.113101	-0.208808	-0.409649	-0.789999	-0.472072
2	2-9	-1.898400	0.337024	0.176079	-1.516760	-0.136363
3	10-15	-1.013940	0.174168	-0.230216	-0.382870	-0.062189
4	16-23,26-27	-1.168050	0.588951	0.135748	-1.432700	-0.127222
5	24	-2.883630	-0.393424	-0.825149	0.344069	0.119376
6	25	-2.875680	1.509740	-0.015274	-0.723569	-0.300379
7	28-29	-0.013565	2.744200	-0.277488	-0.335571	0.329375
8	30-38	0.162582	-1.452170	0.513889	-0.961546	-0.390737
9	39-40	-0.080814	0.170687	0.035015	-0.807814	-0.195466
10	41	0.040175	0.029028	0.245137	-1.304630	-0.253223
11	42-43	-3.630790	-3.100950	0.548191	-2.042260	-1.152330
12	44-58	-3.113950	-0.192131	-0.657423	-0.667580	0.107799
13	59-65	-5.502260	1.645210	-0.671340	-0.058228	-0.742139
20	77-81	3.750940	7.517890	1.532850	-2.071750	-0.541420
21	82-85	-1.014560	-0.906438	0.172872	-0.823781	-0.458971
22	86-90	-1.693080	-0.481835	-0.056430	-0.539105	-0.247793
23	91-98	-1.452430	0.199462	-0.195459	-0.243278	-0.361598
24	99-105	-2.060380	0.102318	-0.328083	0.021611	-0.196162
25	106-107	-2.129030	-1.116360	-0.129689	-1.251160	-0.190435
26	108-111	-3.494900	-1.504400	-0.881239	0.364389	-0.217384
27	112-117	-2.161090	-0.060594	-0.308559	-0.245858	-0.251497
28	118-126	1.028040	-0.686402	-0.103475	-0.556805	0.189756
29	127-130	-4.473370	-3.920250	0.045643	-0.221646	-1.128630
30	131-134	-0.638073	0.657857	0.240988	-0.766622	-0.502768
31	135-144	-0.479988	0.002476	-0.417444	-0.414948	0.258241
32	145-146,150	-0.302165	-0.957880	0.789046	-1.735780	-0.833389
33	151,147-148	0.359817	0.169443	0.129054	-0.828553	-0.082400
34	149,152-159	1.895770	-1.525130	0.441984	-1.281450	-0.032697
35	160-163	1.911530	-0.312368	0.289130	-1.080720	0.219315
36	164-167,169-173	0.238550	-0.693003	-0.158677	-0.647830	0.175722
37	'168,413	-0.256287	1.887510	-0.615424	-1.232560	0.680443
38	174-179	0.717765	-0.298865	0.100854	-0.941175	0.128500
39	180-166	1.213410	-0.418556	0.151888	-1.220870	0.096996
40	187-198	1.559390	1.562380	0.149267	-1.229580	-0.050727
41	199	-2.338450	-4.555030	-0.003611	-0.586195	-0.460479
42	200-214	-0.835022	0.035633	-0.155709	-0.200547	-0.008823
43	215	-0.553954	-0.397906	-0.099790	-0.452767	-0.122956
44	216-218	-1.292720	0.236246	0.024366	-0.916444	-0.357308
45	219-224	1.315910	-1.143860	-0.233800	-0.106408	0.343931
46	225-228	-0.207160	-4.969640	-0.189272	-0.354475	-0.143464
47	229	-0.385889	0.220298	1.009280	-2.169350	-1.013930
48	230-233	-0.450860	-1.021650	-0.276760	-0.028149	-0.128255
49	234	-1.771160	0.339153	-0.436181	-0.281119	-0.061059
50	235-239	-1.940540	-2.559940	-0.112898	-1.040420	-0.359562
51	240-245	1.115250	1.499510	-0.033238	-0.542946	0.140858
52	246-254	0.334794	-0.804193	0.135217	-0.879905	-0.224722
53	255-256	1.701150	-1.284360	0.434405	-1.614830	-0.024304
54	257-279	-2.657060	1.322480	-0.319800	-1.332100	0.010652

55	280-281,283-284,286-288	0.649689	0.349133	-0.032550	-0.533510	0.069356
56	285	0.661768	1.977780	0.160717	-0.831453	-0.007613
57	289-302	0.959576	0.230042	-0.276664	-0.130766	0.330336
58	282,303-304,319-329	0.107608	-0.011626	-0.125102	-0.434321	0.047689
59	305-314	-1.118570	0.248825	-0.286617	-0.678756	-0.109745
60	315-318	-0.129954	0.429353	0.050063	-0.847225	0.025109
61	330-331	2.590440	-13.674600	0.448669	-1.835170	0.025289
62	332-333	1.853710	-2.663530	0.193895	-0.719776	0.069689
63	334-336	-0.026181	0.213615	0.068855	-0.848012	-0.297383
64	337-340	-0.501390	0.109244	0.079618	-0.879382	-0.167482
65	341-346	-0.069521	-0.089400	0.519785	-1.473430	-0.496051
66	347-352	0.661173	-2.136390	-0.261071	0.083840	0.119599
67	353-361	1.294200	2.610130	-0.441997	-0.173180	0.501816
68	362-365	0.863698	-2.946460	0.426379	-0.770580	-0.369712
69	366-370	0.007898	3.111820	-0.032371	0.253563	-0.252983
70	371-378	1.179720	-0.251639	-0.018113	-0.638651	0.016026
71	379-385	-0.933332	0.536288	-0.005676	-1.124050	-0.446767
72	386-388	0.930680	1.095670	-0.197422	-0.049664	0.134506
73	389-390	2.238000	-1.012530	0.695168	-1.768700	-0.130522
74	391-392	-1.308830	-2.958060	-0.757777	0.098700	0.064928
75	393-395	0.057450	-0.332667	0.307389	-0.932155	-0.365013
76	396-400	1.592220	-1.562730	0.262553	-0.832709	-0.099275
77	401-404	2.889630	-0.157940	0.044403	-0.601083	0.238931
78	405	0.327700	-0.646307	-0.127931	-1.279460	0.102084
79	407,76	-6.917070	2.197180	-1.419740	0.827274	-0.245145
80	406	4.801970	-0.838219	-0.026320	-0.128689	0.891699
81	408-412,414-415	-1.447080	0.247309	-0.363890	-0.294939	-0.072236
82	416-418,422,425	-0.800730	0.435004	0.381853	-1.613680	-0.424452
83	419-421,423-424	-0.059323	-0.505167	0.398911	-1.476490	-0.319757
84	426-445	-0.321246	0.394834	-0.044341	-1.032750	-0.190201