SHRP 2 Reliability Project C03

Transportation Project Impact Case Studies (T-PICS)

Data Dictionary

SHRP 2
STRATEGIC HIGHWAY RESEARCH PROGRAM
Accelerating solutions for highway safety, renewal, reliability, and capacity

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

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Contents

Chapter 1
Introduction

Project Background and Overview

The second Strategic Highway Research Program (SHRP 2) Capacity Project C03, Interactions between Transportation Capacity, Economic Systems, and Land Use, produced a series of reports on methods, models, and case studies that examined the economic and development impacts of highway capacity investment projects. This report is one volume in that series.

Project Objective

The intent of this project and its research products and web tool is to further public and transportation agency understanding of the range of economic impacts that result from various types of highway projects. This information can aid both technical research and public discussion of the topic. It can also help define the broad range of impacts and factors affecting highway projects to assist transportation agencies in their planning processes. And it can help refine public debate about highway projects by establishing boundaries of the likely positive and negative impacts that typically result from such projects.

The products of this study were designed to aid the collaborative decision-making process for transportation planning by providing a background context on the range of observed results from past highway projects. Such information can potentially be of substantial use in early stages of the planning process when alternative project concepts are being suggested and screened.

One cannot assume that every proposed project will have the same results as the average observed from past projects of a similar type. The unreliability of such an assumption is precisely why local data are collected and models are developed in later stages of the planning process to identify expected changes in local traffic characteristics and subsequent economic development. Thus, this project should be viewed as a complement to, rather than a replacement for, specific local transportation and economic impact analysis that may be necessary in later phases of the planning process.

Case Study Database

The most notable accomplishment of this project was the development of 100 case studies of highway projects to (a) compare preproject and postproject changes in economic and land development conditions, (b) contrast them with corresponding conditions to provide a basis for comparison, and (c) include both quantitative impact measures and qualitative assessments based on local interviews.

This collection of case studies, completed in 2010, was compiled with the goal of including all known preproject and postproject highway impact studies in the United States, plus available English language studies from Canada and abroad. Members of the project team conducted additional quantitative and qualitative data collection and analysis to bring all of the

cases up to a similar standard of comparability. For further information on the case study development process, readers are referred to Chapter 3 in *SHRP 2 Report S2-C03-RR: Interactions Between Transportation Capacity, Economic Systems, and Land Use* (http://www.trb.org/Main/Blurbs/166934.aspx).

T-PICS Web Tool

The case studies were put into Transportation Project Impact Case Studies (T-PICS), a web-based viewing and analysis system that includes (a) a search function that allows for user-defined screening and selection of relevant cases; (b) a case study viewer that provides user access to impact measures, discussion text, maps, and related documents; and (c) an impact estimation calculator that shows the average and expected range of impacts associated with any user-defined project profile. For further information on this system, readers are referred to the *T-PICS Web Tool User's Guide*, which is available at http://transportationforcommunities.com/t-pics.

The T-PICS system was designed to assist transportation agencies in project planning and evaluation by providing agency staff and interested stakeholders with a means for establishing the range of job, income, and development impacts typically associated with various types of transportation projects in different settings.

Objective of T-PICS Web Tool

The T-PICS web tool was designed for the user to do the following:

- Review, select, and analyze case studies based on criteria selection;
- Understand the relationship between project characteristics and economic impacts;
- Compare and evaluate projects by specified criteria; and
- Develop a range of anticipated impacts for customized projects.

The tool's user interface is structured around two approaches to project analysis:

- "Case Search" accesses the database of case studies of highway projects, which allows users to
  1. Filter the cases they want to see based on a variety of factors (e.g., type, region, and cost);
  2. Select cases to view separately or compare based on their criteria;
  3. View preconditions, postconditions, project area settings, project characteristics, intermodal freight or passenger volume (if applicable), and economic impacts for each case;
  4. Read a short narrative on the case that provides background on how the project came to be built, its influence on the local area, and other nontransportation factors that enhanced or mitigated the economic impacts of the project; and
  5. View a Google map image of the project's location.

- "My Project Tools" provides an estimate of economic impacts for a hypothetical project based on
  1. The type, length, and setting of the project chosen by the user;
  2. The magnitude of average annual daily traffic (AADT), miles, and project cost, which are estimated based on the type, length, and setting of the project but can be changed by the user; and
  3. The extent to which there are supporting business climate, infrastructure, and land use policies to encourage economic development.

Guide to This Document

This technical documentation provides an overview of the data gathered for the SHRP 2 case studies presented on the T-PICS website. It outlines sources of data, ranges of values, hierarchical classifications, and overall definitions in order to assist the user to properly understand and use the data.

This document is composed of three further chapters and an appendix:

- Chapter 2 provides a summary of data set content and properties;
- Chapter 3 provides a more in-depth explanation of data fields including the field type, source, missing values, and definition;
- Chapter 4 provides guidance on using impact estimates and explains how economic impact estimates were derived and how to appropriately use this information; and
- The Appendix provides a data dictionary summary of data fields, measurement units, and sources.

Further discussion on interpreting and using economic impacts in decision making can be found in the *T-PICS Web Tool User Guide* and by accessing the Capacity Project C03 report at http://www.trb.org/Main/Blurbs/166934.aspx.

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Chapter 2
Data Set Content and Properties

This chapter provides a summary of the data set content and properties. A more in-depth explanation of individual data fields is provided in Chapter 3.

Data Set Overview

Number of Records

There are 108 data categories for 100 case studies, totaling 10,800 records.

Content of Records

The data fields fall within five category groups that provide a specific type of description. The category groups are Characteristics, Settings, Preproject Conditions, Postproject Conditions, and Economic Impacts. Each data field is identified by a unique ID number, contains a column location identifier (an alpha field) in which the data are located in the exported Comma Delimited File, and is identified as being either qualitative or quantitative in nature.

Data Field Characteristics

Table 2.1 lists the 40 fields. Each field provides a general description of the project's location, motivation for construction, cost, time period, and other categories that define the nature, scope, and scale of the project.

Table 2.1. Data Field Characteristics

ID	Field Name	Column location	Type of Data
1	Case study name	A	Quantitative
2	ID	B	Quantitative
3	State	C	Quantitative
4	City	D	Quantitative
5	Impact Area	E	Quantitative
6	Description	F	Qualitative
7	Classification/Type	G	Quantitative
8	Project Motivation - Air Access	H	Qualitative
9	Project Motivation - Rail Access	I	Qualitative
10	Project Motivation - Int'l Border Access	J	Qualitative
11	Project Motivation -Marine Port Access	K	Qualitative
12	Project Motivation -Site Development	L	Qualitative
13	Project Motivation -Labor Market	M	Qualitative
14	Project Motivation -Delivery Market	N	Qualitative
15	Project Motivation -Tourism	O	Qualitative
16	Project Motivation -Congestion Mitigation	P	Qualitative
17	Planned Cost (YOE$'s)	Q	Quantitative
18	Actual Cost (YOE$'s)	R	Quantitative
19	Actual Cost (2008$)	S	Quantitative
20	Length (miles)	T	Quantitative
21	Initial Study Date	U	Quantitative
22	Construction Start Date	V	Quantitative
23	Construction End Date	W	Quantitative
24	Post-Construction Study Date	X	Quantitative
25	GIS lat Coordinates	Y	Quantitative
26	GIS long Coordinates	Z	Quantitative
27	AADT	AA	Quantitative
30	BEA Region	AB	Quantitative
97	General & Bulk Cargo Volume (Metric Tons) (IM only)	AC	Quantitative
98	Container Volume (Metric Tons) (IM only)	AD	Quantitative
99	Container Volume (TEUS) (IM only)	AE	Quantitative
100	Passenger Ridership per year (TOD only)	AF	Quantitative
101	Parking Spaces	AG	Quantitative
102	Intermodal Project Actual Cost (YOE$'s)	AH	Quantitative
103	Highway/road access improvement costs (YOE$'s)	AI	Quantitative
104	Intermodal Project Actual Cost (2008$'s)	AJ	Quantitative
105	Highway/road access improvement costs (2008$'s)	AK	Quantitative
106	Project Year of Expenditure (YOE $'s)	AL	Quantitative
107	Lanes	AM	Quantitative
108	Lane Miles	AN	Quantitative

Settings

The 11 fields classified as settings in Table 2.2 provide descriptive information regarding the nature of the geographic area in which the project is located. This includes information in socioeconomic (unemployment, population, income growth, and market size), topographical (terrain type), and transportation access (distance to airport, interstate, and major market) areas.

Table 2.2. Settings Fields

ID	Field Name	Column location	Type of Data
28	Class Level	CT	Quantitative
29	Economically Distressed	CV	Quantitative
31	Population Density	CW	Quantitative
32	Population Growth Rates	CX	Quantitative
33	Employment Growth Rate	CY	Quantitative
34	Income Growth Rate	CZ	Quantitative
35	Market Size (population within 40 minutes, etc)	DA	Quantitative
36	Airport Travel Distance	DB	Quantitative
37	Interstate Travel Distance	DC	Quantitative
38	Major Market Travel Distance	DD	Quantitative
39	Extent of mountain terrain	DE	Quantitative

Preyear Conditions

Eight fields describe the economic conditions at the local, county, or state levels. Data were collected for the year before the construction start year in order to prevent any influence construction might have had on the local, county, or state economy. These fields represent the preyear conditions and provide context to understand the economic conditions of the surrounding economy (Table 2.3).

Table 2.3. Preyear Conditions

ID	Field Name	Column location	Type of Data
40	Pre - Personal Income Per Capita - Local	BV	Quantitative
41	Pre - Personal Income Per Capita - County	BX	Quantitative
42	Pre - Personal Income Per Capita - State	BY	Quantitative
43	Pre- Economic Distress - Local	BZ	Quantitative
44	Pre - Economic Distress - County	CA	Quantitative
45	Pre - Economic Distress - State	CB	Quantitative
46	Pre - Number of Jobs - Local	CC	Quantitative
47	Pre - Number of Jobs - County	CD	Quantitative
48	Pre - Number of Jobs - State	CE	Quantitative
49	Pre - Business Sales - Local	CF	Quantitative
50	Pre - Business Sales - County	CG	Quantitative
51	Pre - Business Sales - State	CH	Quantitative
52	Pre- Tax Revenue- Local	CI	Quantitative
53	Pre- Tax Revenue-County	CJ	Quantitative
54	Pre- Tax Revenue-State	CK	Quantitative
55	Pre - Population- Local	CL	Quantitative
56	Pre - Population - County	CM	Quantitative
57	Pre - Population - State	CN	Quantitative
58	Pre - Property Value - Local	CO	Quantitative
59	Pre - Property Value - County	CP	Quantitative
60	Pre - Property Value - State	CQ	Quantitative
61	Pre - Density - Local	CR	Quantitative
62	Pre - Density - County	CS	Quantitative
63	Pre - Density - State	CT	Quantitative

Postyear Conditions

The same eight fields describing the economic conditions at the local, county, or state levels are repeated for the postyear conditions (Table 2.4). The postyear date usually ranges from 2 to 5 years after the construction completion year. Postyears vary due to different construction timelines and the need to allow enough time for economic results to be manifested.

Table 2.4. Postyear Conditions

ID	Field Name	Column location	Type of Data
64	Post - Personal Income Per Capita - Local	AX	Quantitative
65	Post - Personal Income Per Capita - County	AZ	Quantitative
66	Post - Personal Income Per Capita - State	BA	Quantitative
67	Post - Economic Distress - Local	BB	Quantitative
68	Post - Economic Distress - County	BC	Quantitative
69	Post - Economic Distress - State	BD	Quantitative
70	Post - Number of Jobs- Local	BE	Quantitative
71	Post - Number of Jobs - County	BF	Quantitative
72	Post - Number of Jobs - State	BG	Quantitative
73	Post - Business Sales - Local	BH	Quantitative
74	Post - Business Sales - County	BI	Quantitative
75	Post - Business Sales - State	BJ	Quantitative
76	Post - Tax Revenue - Local	BK	Quantitative
77	Post - Tax Revenue - County	BL	Quantitative
78	Post - Tax Revenue - State	BM	Quantitative
79	Post - Population- Local	BN	Quantitative
80	Post - Population - County	BO	Quantitative
81	Post - Population - State	BP	Quantitative
82	Post -Property Value- Local	BQ	Quantitative
83	Post - Property Value - County	BR	Quantitative
84	Post - Property Value - State	BS	Quantitative
85	Post - Density - Local	BT	Quantitative
86	Post - Density - County	BU	Quantitative
87	Post - Density - State	BV	Quantitative

Chapter 3
Data Field Documentation

Data Field Elements

This chapter provides a dictionary of the data fields in terms of their key elements: name, description, the type of data, unit of measurement, source, time period covered (minimum and maximum), and specified terms for declaring missing values. These elements are described as follows:

- **Field Name:** Name of data field category;
- **Description**: An expanded explanation of the data field content;
- **Field type:** The type of information contained in the data field (e.g., text, number, or currency);
- **Units of measurement:** Units included in the data, such as dollars, miles, years, latitude/longitude, daily trips, and percentages. Several data fields do not have a unit measurement but instead are descriptive in nature, such as state, city, impact area, or classification type.
- **Source of data:** Information was collected from federal, state, and local government organizations as well as private industry sources identified in this category. A significant amount of information describing the project characteristics and economic impacts of the project was gathered from interviews with staff at metropolitan planning organizations, regional planning commissions, state departments of transportation, economic development corporations, chambers of commerce, local developers, and planning commissions. In some cases, the case researcher or the developer may have used information gathered from these interviews to estimate certain values based on professional judgment and assimilation of data. All of the data fields that contain data determined by the case researcher are listed under the Interviews category.
- **Time period minimum:** For fields that span a range of years, time period minimum is the earliest preyear conditions date that data were collected.
- **Time period maximum:** For fields that span a range of years, time period maximum is the latest postyear conditions date that data were collected.
- **Missing values (when applicable):** Data are not always available for each field. For example, projects at a county or multicounty level by nature will not have local information. Other data fields may have missing values for a variety of reasons: for example, county-level unemployment information is only available after 1990, and per capita income is derived from the U.S. Census. For more details on the methodology on estimating missing data for the T-PICS web tool, readers should access the Capacity Project C03 report at http://www.trb.org/Main/Blurbs/166934.aspx.

- **Dollar adjustment:** In order to compare projects that span different time periods, all currency fields were converted into 2008 dollars using the consumer price index (CPI-U) from the Bureau of Labor Statistics. The following equation was used to convert year of expenditure dollars (YOE$) into 2008 dollars (2008$): YOE$ × (CPI 2008)/(CPI in YOE) = 2008$.

Table 3.1 shows documentation details for each specific data field.

Table 3.1. Explanation of Data Fields

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Case study name	Text	Description	Interviews	Name of Case study				
ID	Number	1-100	Interviews	Project ID#				
State	Text	Description	Project Location	State where the project was located				
City	Text	Description	Project Location	City where the project was located				
Impact Area	Text	Description	Project Location	Relevant Counties				
Description	Text	Description	Interviews	Text description of the project to give the reader a quick understanding of the project and results				
Classification/Type	Text	Description	Interviews	Code for the type of transportation project				
Project Motivation - Air Access	Number	1 - Motivation, 0-Not a Motivation	Interviews	Purpose for project investment				

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Project Motivation - Rail Access	Number	1 - Motivation, 0-Not a Motivation	Interviews	Purpose for project investment				
Project Motivation - Int'l Border Access	Number	1 - Motivation, 0-Not a Motivation	Interviews	Purpose for project investment				
Project Motivation - Marine Port Access	Number	1 - Motivation, 0-Not a Motivation	Interviews	Purpose for project investment				
Project Motivation - Site Development	Number	1 - Motivation, 0-Not a Motivation	Interviews	Purpose for project investment				
Project Motivation - Labor Market	Number	1 - Motivation, 0-Not a Motivation	Interviews	Purpose for project investment				
Project Motivation - Delivery Market	Number	1 - Motivation, 0-Not a Motivation	Interviews	Purpose for project investment				
Project Motivation - Tourism	Number	1 - Motivation, 0-Not a Motivation	Interviews	Purpose for project investment				

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Planned Cost (YOE$'s)	Number	1 - Motivation, 0-Not a Motivation	Interviews	Initial planned cost of the project			Cost estimates not located	
Actual Cost (YOE$'s)	Number	1 - Motivation, 0-Not a Motivation	Interviews	Final actual cost of the project (YOE$'s)				YOE
Actual Cost (2008$)	Currency	Dollars	Interviews	Final actual cost of the project (2008$'s)				2008$'s
Length (miles)	Number	Miles	Interviews	Length of the construction in miles			Length not included for Interchanges	
Initial Study Date	Number	Year	Interviews	Date of initial study on the proposed project	1969	2005		
Construction Start Date	Number	Year	Interviews	Date construction began - Year	1957	2006		
Construction End Date	Number	Year	Interviews	Date construction ended - Year	1969	2007		
Post-Construction Study Date	Number	Year	Interviews	Date of post-project impact study	1992	2008	Some post construction study dates were not captured	

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
GIS long Coordinates		Latitude Coordinates	Google Earth	Set of GIS coordinates defining the geospatial center of the project				
AADT	Number	Average Annual Daily Trips	Interviews/ESRI	Average Annual Daily Traffic			Some Freight and Passenger Intermodal Rail cases did not have AADT	
Class Level	Text	Description	CBSA as defined by OMB-classification developed by Interviews (see Chapters 3 and 5 in SHRP 2 C03 report for further explanation)	Code of the population size surrounding the project				
Economically Distressed	Number	Ratio of local to national unemployment rate	BLS	Local unemployment rate relative to national rate	1992	2008	Econ Distress not available for some international cases	

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Population Density	Number	Population per square mile	Census	Population per square mile	1992	2008		
Population Growth Rates	Number	Percentage	U.S. Census	Population growth rate at the time of project operation	2001	2006		
Employment Growth Rate	Number	Percentage	Economic Census	Income growth rate at the time of project operations (% change in employment relative to state or nat'l levels)	2001	2006		
Income Growth Rate	Number	Percentage	IMPLAN assembled data from US Bureau of Economic Analysis Regional Economic Information Service and the US Dept of Labor.	Employment growth rate at the time of project operations (% change in employment relative to state or national levels)	2001	2006		

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Airport Travel Distance	Number	Miles	ESRI ARC-View Geographic Information System and Federal Aviation Administration information	Distance to major airports (time)			Airport travel distance not available for some international cases	
Interstate Travel Time Distance	Number	Miles	Interviews	Minutes to nearest interstate (not sure if this will be available) (time)			Several cases were either 1) an interstate or 2) connected to an interstate (values were 0)	
Major Market Travel Time Distance	Number	Miles	Interviews	Minutes to nearest major market (not sure if this will be available) (time)			Several cases were located within a major market and therefore values were 0	
Pre - Personal Income Per Capita - Local	Currency	Dollars	www.city-data.com	Per Capita Income at the local level (pre-project)	1969	2005	Some data not available at the local level or for cases that are county or multi-county in scope	2008$'s

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Pre - Personal Income Per Capita - County	Currency	Dollars	Bureau of Economic Analysis (BEA)	Per Capita Income at the county level (pre-project)	1969	2005	Per Capita income not available for some international cases	2008$'s
Pre - Personal Income Per Capita - State	Currency	Dollars	Bureau of Economic Analysis (BEA)	Per Capita Income at the state level (pre-project)	1969	2005	Per Capita income not available for some international cases	2008$'s
Pre- Economic Distress - Local	Number	Ratio of local to national unemployment rate	Bureau of Labor Statistics & U.S. Census	Local unemployment rate relative to national rate (pre-project)	1969	2005	Some data not available at the local level, county or multi-county in scope	
Pre - Economic Distress - State	Number	Ratio of local to national unemployment rate	Bureau of Labor Statistics	State unemployment rate relative to national rate (pre-project)	1969	2005	State level unemployment data not available prior to 1976 & international data not available	

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Pre - Number of Jobs - Local	Number	Jobs	County Business Patterns (CBP) & U.S. Economic Census	Total number of jobs at the local level (by place of employment: pre-project)	1969	2005	Some data not available at the local level or for cases that are county or multi-county in scope	
Pre - Number of Jobs - County	Number	Jobs	Bureau of Economic Analysis (BEA)	Total number of jobs at the county level (by place of employment: pre-project)	1969	2005	Employment data not available for some int'l cases	
Pre - Number of Jobs - State	Number	Jobs	Bureau of Economic Analysis (BEA)	Total number of jobs at the state level (by place of employment: pre-project)	1969	2005	Employment data not available for some international cases	
Pre - Business Sales - County	Currency	Dollars	County Business Patterns & U.S. Economic Census	Total revenue of businesses at the county level (pre-project)	1969	2005	Business sales data difficult to locate - only select cases have information	2008$'s
Pre - Business Sales - State	Currency	Dollars	County Business Patterns & U.S. Economic Census	Total revenue of businesses at the state level (pre-project)	1969	2005	Business sales data difficult to locate - only select cases have information	2008$'s

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Pre- Tax Revenue-Local	Currency	Dollars	Auditors, tax reports, & department of revenues	Total annual local tax revenue (pre-project)	1969	2005	Some data not available at the local level or for cases that are county or multi-county in scope	2008$'s
Pre- Tax Revenue-County	Currency	Dollars	Tax Revenue Division	Total annual county tax revenue (pre-project)	1969	2005	Tax Revenue data difficult to locate - only select cases have information	2008$'s
Pre - Population-Local	Number	Population	U.S. Census & local data	Population of the local area (pre-project)	1969	2005	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	
Pre - Population - County	Number	Population	U.S. Census	Population of the county area (pre-project)	1969	2005		
Pre - Population - State	Number	Population	U.S. Census	Population of the state area (pre-project)	1969	2005		

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Pre - Property Value - Local	Currency	Dollars	U.S. Census & County Appraiser	Median SF House Price at the local level (pre-project)	1969	2005	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	2008$'s
Pre - Property Value - County	Currency	Dollars	U.S Census American Community Survey (ACS) and National Association of Retailers	Median SF House Price at the county level (pre-project)	1969	2005	Property Value only available for select years (e.g. Decennial Census and American Community Survey)	2008$'s
Pre - Property Value - State	Currency	Dollars	U.S Census American Community Survey (ACS) and National Association of Retailers	Median SF House Price at the state level (pre-project)	1969	2005	Property Value only available for select years (e.g. Decennial Census and American Community Survey)	2008$'s
Pre - Density - Local	Number	Population per square mile	Local data & U.S. Census	Density of the local area (pre-project)	1969	2005	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Pre - Density - County	Number	Population per square mile	U.S Census	Density of the county area (pre-project)	1969	2005	Pre-Density not available for international cases	
Pre - Density - State	Number	Population per square mile	U.S Census	Density of the state area (pre-project)	1969	2005	Pre-Density not available for international cases	
Post - Personal Income Per Capita - Local	Currency	Dollars	www.city-data.com	Per Capita Income at the local level (post-project)	1992	2008	Some data not available at the local level or for cases that are county or multi-county in scope	2008$'s
Post - Personal Income Per Capita - County	Currency	Dollars	Bureau of Economic Analysis (BEA)	Per Capita Income at the county level (post-project)	1992	2008	Per Capita income not available for some international cases	2008$'s
Post - Personal Income Per Capita - State	Currency	Dollars	Bureau of Economic Analysis (BEA)	Per Capita Income at the state level (post-project)	1992	2008	Per Capita income not available for some international cases	2008$'s
Post - Economic Distress - Local	Number	Ratio of local to national unemployment rate	Bureau of Labor Statistics & U.S. Census	Local unemployment rate relative to national rate (post-project)	1992	2008	Some data not available at the local level or for cases that are county or multi-county in scope	

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Post - Economic Distress - County	Number	Ratio of local to national unemployment rate	Bureau of Labor Statistics	County unemployment rate relative to national rate (post-project)	1992	2008	County level unemployment data not available prior to 1990 & international data not available	
Post - Economic Distress - State	Number	Ratio of local to national unemployment rate	Bureau of Labor Statistics	State unemployment rate relative to national rate (post-project)	1992	2008	State level unemployment data not available prior to 1976 & int'l data not available	
Post - Number of Jobs- Local	Number	Jobs	County Business Patterns (CBP) & U.S. Economic Census	Total number of jobs at the local level (by place of employment: post-project)	1992	2008	Some data not available at the local level or for cases that are county or multi-county in scope	
Post - Number of Jobs - County	Number	Jobs	Bureau of Economic Analysis (BEA)	Total number of jobs at the county level (by place of employment: post-project)	1992	2008	Employment data not available for some international cases	
Post - Number of Jobs - State	Number	Jobs	Bureau of Economic Analysis (BEA)	Total number of jobs at the state level (by place of employment: post-project)	1992	2008	Employment data not available for some international cases	

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Post - Business Sales - Local	Currency	Dollars	County Business Patterns, U.S. Economic Census, & local comptroller	Total revenue of businesses at the local level (post-project)	1992	2008	Some data not available at the local level or for cases that are county or multi-county in scope	2008$'s
Post - Business Sales - County	Currency	Dollars	County Business Patterns & U.S. Economic Census	Total revenue of businesses at the county level (post-project)	1992	2008	Business sales data difficult to locate - only select cases have information	2008$'s
Post - Business Sales - State	Currency	Dollars	County Business Patterns & U.S. Economic Census	Total revenue of businesses at the state level (post-project)	1992	2008	Business sales data difficult to locate - only select cases have information	2008$'s
Post - Tax Revenue - Local	Currency	Dollars	Auditors, tax reports, & department of revenues	Total annual local tax revenue (post-project)	1992	2008	Some data not available at the local level or for cases that are county or multi-county in scope	2008$'s
Post - Tax Revenue - County	Currency	Dollars	Tax Revenue Division	Total annual county tax revenue (post-project)	1992	2008	Tax Revenue data difficult to locate - only select cases have information	2008$'s

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Post - Tax Revenue - State	Currency	Dollars	Tax Revenue Division	Total annual state tax revenue (post-project)	1992	2008	Tax Revenue data difficult to locate - only select cases have information	2008$'s
Post - Population-Local	Number	Population	U.S. Census & local data	Population of the local area (post-project)	1992	2008	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	
Post - Population - County	Number	Population	U.S. Census	Population of the county area (post-project)	1992	2008		
Post - Population - State	Number	Population	U.S. Census	Population of the state area (post-project)	1992	2008		
Post -Property Value- Local	Currency	Dollars	U.S. Census & County Appraiser	Median SF House Price at the local level (post-project)	1992	2008	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	2008$'s

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Post - Property Value - County	Currency	Dollars	U.S Census American Community Survey (ACS) and National Association of Retailers	Median SF House Price at the county level (post-project)	1992	2008	Property Value only available for select years (e.g. Decennial Census and American Community Survey)	2008$'s
Post - Property Value - State	Currency	Dollars	U.S Census American Community Survey (ACS) and National Association of Retailers	Median SF House Price at the state level (post-project)	1992	2008	Property Value only available for select years (e.g. Decennial Census and American Community Survey)	2008$'s
Post - Density - Local	Number	Population per square mile	Local data & U.S. Census	Density of the local area (post-project)	1992	2008	Some data not available at the local level (pre-1990) or for cases that are county or multi-county in scope	
Post - Density - County	Number	Population per square mile	U.S Census	Density of the county area (post-project)	1992	2008	Pre-Density not available for international cases	
Post - Density - State	Number	Population per square mile	U.S Census	Density of the state area (post-project)	1992	2008	Pre-Density not available for international cases	

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Direct Jobs	Number	Jobs	Interviews	Number of Direct Jobs attributed to the project investment	1992	2008	Some cases were deemed to have no economic impact on the surround area	
Indirect Jobs	Number	Jobs	Interviews	Number of Indirect Jobs attributed to the project investment	1992	2008	Some cases were deemed to have no economic impact on the surround area	
Total Jobs	Number	Jobs	Interviews	Number of Total Jobs attributed to the project investment	1992	2008	Some cases were deemed to have no economic impact on the surround area	
Direct Income	Currency	Dollars	Interviews and IMPLAN job to income ratios	Amount of Direct Income attributed to the project investment	1992	2008	Some cases were deemed to have no economic impact on the surround area	2008$'s
Indirect Income	Currency	Dollars	Interviews and IMPLAN job to income ratios	Amount of Indirect Income attributed to the project investment	1992	2008	Some cases were deemed to have no economic impact on the surround area	2008$'s

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Total Income	Currency	Dollars	Interviews and IMPLAN job to income ratios	Amount of Total Income attributed to the project investment	1992	2008	Some cases were deemed to have no economic impact on the surround area	2008$'s
Direct Output	Currency	Dollars	Interviews and IMPLAN job to output ratios	Amount of Direct Output attributed to the project investment	1992	2008	Some cases were deemed to have no economic impact on the surround area	2008$'s
Indirect Output	Currency	Dollars	Interviews and IMPLAN job to output ratios	Amount of Indirect Output attributed to the project investment	1992	2008	Some cases were deemed to have no economic impact on the surround area	2008$'s
Total Output	Currency	Dollars	Interviews and IMPLAN job to output ratios	Amount of Total Output attributed to the project investment	1992	2008	Some cases were deemed to have no economic impact on the surround area	2008$'s
General & Bulk Cargo Volume (Metric Tons) (IM only)	Number	Metric Tons	Interviews	Metric Tons of General and Bulk Cargo transported through Intermodal Rail location			For Freight Intermodal Rail cases only	

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period Max	Missing Values	Dollar Adjustment
Container Volume (Metric Tons) (IM only)	Number	Metric Tons	Interviews	Metric Tons of Container Cargo transported through Intermodal Rail location			For Freight Intermodal Rail cases only	
Container Volume (TEUS) (IM only)	Number	Twenty-foot equivalent unit (TEU)	Interviews	Twenty-foot equivalent units (TEUs) of Container Cargo			For Freight Intermodal Rail cases only	
Passenger Ridership per year (INTERMODAL PASS. only)	Number	Passengers	Interviews	Annual passenger ridership on passenger Intermodal Rail system			For Passenger Intermodal Rail cases only	
Parking Spaces	Number	Parking Spaces	Interviews	Parking Spaces at passenger Intermodal Rail station			For Passenger Intermodal Rail cases only	
Intermodal Rail Project Actual Cost (YOE$'s)	Currency	Dollars	Interviews	Intermodal Rail Project Actual Cost (YOE$'s)	1963	2008		Year of Expenditure

Field Name	Field Type	Units of Measurement	Source of Data	Description	Time Period – Min	Time Period – Max	Missing Values	Dollar Adjustment
Highway/road access improvement costs (YOE$'s)	Currency	Dollars	Interviews	Highway/road access improvement costs (YOE$'s)	2008			Year of Expenditure
Intermodal Rail Project Actual Cost (2008$'s)	Currency	Dollars	Interviews	Intermodal Rail Project Actual Cost (2008$'s)	2008			2008$'s
Highway/road access improvement costs (2008$'s)	Currency	Dollars	Interviews	Highway/road access improvement costs (2008$'s)	1963	2008		2008$'s
Project Year of Expenditure (YOE $'s)	Currency	Dollars	Interviews	Project Year of Expenditure (YOE $'s)				Year of Expenditure
Lanes	Number	Lanes	Interviews	Number of lanes in project			Lanes not included for interchanges	
Lane Miles	Number	Lane Miles	Interviews	Number of lane miles in project			Lane miles not included for interchanges	

Chapter 4
Warning on Compatibility and Interpretation of Data

Data Compatibility for Analysis

Case studies, by their very nature, span a range of different time periods and geographic areas. Data availability also varies with time and geography. The specific database developed for this project and used in the T-PICS web tool incorporates a set of controls intended to help users allow or adjust for such differences. These controls include indicators of time and geographic differences, as well as adjustment of dollar fields from their original reported values into constant dollars. Users, however, must be aware of these indicators and adjustments and use them accordingly. Key elements are noted below.

1. **Year of expenditure dollars versus constant dollars.** Because some of the data expressed in dollars can vary across time periods, all currency data were adjusted to 2008 dollars using the consumer price index (CPI-U) published by the Bureau of Labor Statistics.
2. **Local-, county-, or multicounty-level geographies.** Cases vary in their geographic scope. In order to make an accurate assessment when comparing cases, it is important to consider the relative geographic scale of each case. For example, two projects equal in cost and other characteristics can vary in scale of economic impacts if one is confined to a local municipal area and the other covers multiple counties.
3. **Sources of information**. State, county, metropolitan, municipal, and tract or zip code data were gathered from a variety of published sources and reports. The variety of data sources creates potential noise, as not all of the data sources adopt identical definitions of the same concept, and they do not all use exactly the same data collection methods. In addition, some information on observed impacts is derived from local interviews and locally available data sources, which may also vary in their data collection methods and inclusiveness. More detailed information on published data sources is found in the Appendix. More information on interview data collection is found by accessing the Capacity Project C03 report at http://www.trb.org/Main/Blurbs/166934.aspx.
4. **Postyear conditions**. Users should note that each case has a different construction period and postanalysis year. More information on preconstruction and postconstruction conditions can be found by accessing http://www.trb.org/Main/Blurbs/166934.aspx.

Calculation and Interpretation of Economic Impact Data Measures

One of the key objectives of the case study database and T-PICS web tool is to provide information enabling improved estimates of the job economic impact of highway investment projects. To use that information properly, it is important for the user to understand the source and derivation of the impact data fields, and thus appreciate their uses and limitations.

For each case study project, preproject and postproject information was collected for a variety of available economic indicators. The actual impact estimates, however, also drew considerable input from local interviews. Staff at local public and private sector organizations were contacted and interviewed to gather perspectives and insight regarding the degree to which each project attracted development and new businesses that resulted in new jobs to the area. Efforts were made to exclude any external economic trends or conditions that were unrelated to the project in order to isolate project-related job creation impacts. An estimate of net job creation impacts was derived by combining and synthesizing locally collected data, trends, interview insights, and economic development patterns.

Some impact data fields were calculated from other data fields. The output and wage impacts were based on employment impact numbers by using average output–job and wage–job ratios for a composite of manufacturing and business service industries in each county. The data used to calculate these ratios were provided by IMPLAN and were based on Bureau of Economic Analysis data. To calculate total job impacts (direct job impacts plus estimated indirect and induced effects), multipliers were applied to the direct impact numbers obtained from the case study data collection process. The ratios and multipliers represent the time period from 2004 to 2008.

It is also important to note that the economic impact estimates provided in the database were developed for specific project characteristics and settings. Each case study is unique in regard to its impacts and should only be used as a reference for the type of impacts than can be expected. A good rule of thumb is to combine several cases of the same project type to gain a spectrum of values, characteristics, settings, and economic impacts to help users understand the range of potential results for particular projects in order to align economic development goals and outcomes. Nonetheless, these cases should only be used as a preliminary guide and not as a substitute for the in-depth economic impact analysis that is usually required for project funding.

A more in-depth discussion of the scope, range, and limitations of using these impact results can be found by accessing the Capacity Project C03 report at http://www.trb.org/Main/Blurbs/166934.aspx.

Appendix A
List of Case Study Records

Table A.1. List of Case Records by Project Name, Type, and Location

Project Name	Project Type	City or County	County(ies)	Location	BEA Region
Hammondsport	Access Road	Hammondsport	Steuben	NY	New England/ Mid-Atlantic
Clermont County Industrial Park in Miami	Access Road	Milford	Clermont	OH	Great Lakes/ Plains
Cattaraugus Economic Development Zone Infrastructure	Access Road	Allegany	Cattaraugus	NY	New England/ Mid-Atlantic
Carolina Factory Shops Infrastructure	Access Road	Gaffney	Cherokee	SC	Southeast
Columbus - Lowndes County Riverside	Access Road	Columbus	Lowndes	MS	Southeast
New Phalen Boulevard Corridor	Access Road	St. Paul	Ramsey	MN	Great Lakes/ Plains
State Route 126, Fenton Lake Bridge	Access Road	Jemez Springs	Sandoval	NM	Southwest
Richmond, Virginia, I-295 Bypass	Beltway	Richmond	Henrico, Hanover, Chesterfield, Prince George	VA	Southeast
Appleton, Wisconsin, Route 441 Bypass	Beltway	Appleton	Winnebago, Outagamie, Calumet	WI	Great Lakes/ Plains
Fort Wayne, Indiana, I-469 Bypass	Beltway	Fort Wayne	Allen	IN	Great Lakes/ Plains
Danville, Virginia, I-785 Bypass	Beltway	Danville	Danville	VA	Southeast
Beltway 8 Houston segments	Beltway	Houston	Harris	TX	Southwest
E470 Denver	Beltway	Denver	Boulder, Adams, Denver, Douglas, Arapahoe	CO	Rocky Mtn./ Far West
Arizona Route 101	Beltway	Phoenix	Maricopa	AZ	Southwest

Project Name	Project Type	City or County	County(ies)	Location	BEA Region
I-476 Blue Route	Beltway	Philadelphia	Delware	PA	New England/ Mid-Atlantic
World Trade Bridge	Bridge	Laredo	Webb	TX	Southwest
Oresund Bridge	Bridge	Copenhagen, Denmark, Malmö, Sweden		Denmark, Sweden	International
The Gene Hartzell Memorial Bridge,	Bridge	Bethlehem	Northampton	PA	New England/ Mid-Atlantic
Third Bridge (Route 3)	Bridge	Augusta	Kennebec	ME	New England/ Mid-Atlantic
Mo. Route 370 Bridge	Bridge	St. Charles	St. Charles and St. Louis	MO	Great Lakes/ Plains
Isle of Palms Connector (SC 517)	Bridge	Mt Pleasant, Isle of Palms	Charleston	SC	Southeast
The Neuse River Bridge,	Bridge	New Bern	Craven	NC	Southeast
Lexington Bridge between I-5 and SR 411	Bridge	Kelso-Lakeview	Cowlitz	WA	Rocky Mtn./ Far West
Potato Hill Bridge	Bridge	Moses Lake	Grant	WA	Rocky Mtn./ Far West
Lake Natoma Crossing Bridge	Bridge	City of Folsom	Sacramento	CA	Rocky Mtn./ Far West
Yass Bypass	Bypass	Yass	Yass Shire	Australia	International
Karuah Bypass	Bypass	Karuah		Australia	International
Eastern Washington - SR 195 Bypass	Bypass	Rosalia	Whitman	WA	Rocky Mtn./ Far West
Fort Atkinson Bypass	Bypass	Fort Atkinson	Washburn	WI	Great Lakes/ Plains
Verona Bypass	Bypass	Verona	Dane	WI	Great Lakes/ Plains
Stonewall Bypass	Bypass	Stonewall	Pontotoc	OK	Southwest
Wichita Northeast Bypass	Bypass	Wichita	Grady & Kiowa	KS	Great Lakes/ Plains
Hollister SR156	Bypass	Hollister	San Benito	CA	Rocky Mtn./ Far West

Project Name	Project Type	City or County	County(ies)	Location	BEA Region
Sonora & East Sonora SR49 & SR108	Bypass	Sonora	Tuolumne	CA	Rocky Mtn./ Far West
US-400 Parsons Bypass	Bypass	Parsons	Labette	KS	Great Lakes/ Plains
Georgetown Bypass	Bypass	Georgetown	Scott	KY	Southeast
Mercer Co. KY, US-127 Bypass	Bypass	Harrodsburg	Mercer	KY	Southeast
Bennington Bypass, VT 279	Bypass	Bennington	Bennington	VT	New England/ Mid-Atlantic
US Highway 281, San Antonio (Extension)	Connector	San Antonio	Bexar	TX	Southwest
I-705 Connector in Washington	Connector	Tacoma	Pierce	TX	Rocky Mtn./ Far West
Branson W (Ozark Mt. Highroad)	Connector	Branson	Stone, Teney	Branson	Great Lakes/ Plains
Southern Connector	Connector	Greenville	Greenville	SC	Southeast
Ted Williams Freeway	Connector	San Diego	San Diego	CA	Rocky Mtn./ Far West
Topsham Bypass/Connector	Connector	Topsham	Sagadahoc & Cumberland	ME	New England/ Mid-Atlantic
US 460	Connector	Blacksburg and Christiansburg	Montgomery	VA	Southeast
US 25 Kentucky	Connector	Dry Ridge	Grant	KY	Southeast
I-70 and 110th Street Interchange	Interchange	Kansas City	Wyandotte	KS	Great Lakes/ Plains
Blue Route and Schuylkill interchange	Interchange	Conshohocken	Montgomery	PA	New England/ Mid-Atlantic
Commerce Parkway Interchange	Interchange	Hays, KS	Ellis	CA	Great Lakes/ Plains
I-95 and Route 128 Peabody	Interchange	Peabody	Essex	MA	New England/ Mid-Atlantic
Interchanges in Major Urban Areas - Bloomington, MN	Interchange	Bloomington, MN	Hennepin	MN	Great Lakes/ Plains

Project Name	Project Type	City or County	County(ies)	Location	BEA Region
Big I Albuquerque	Interchange	Albuquerque	Bernalillo	NM	Southwest
Dallas High Five Interchange	Interchange	Dallas, TX	Dallas	TX	Southwest
I-435 & Nall/Roe Ave. Interchange	Interchange	Overland Park	Johnson	KS	Great Lakes/ Plains
Central Freeway, San Francisco	Interchange	San Francisco	San Francisco	CA	Rocky Mtn./ Far West
I-20 Interchange	Interchange	Jackson	Hinds	MS	Southeast
I-35 and US 290, Texas	Interchange	Austin	Travis	TX	Southwest
Veteran's Parkway Georgia	Interchange	Savannah	Chatham	GA	Southeast
Auburn Intermodal Rail Center	Intermodal Rail	Auburn	Androscoggin	ME	New England/ Mid-Atlantic
Devens Intermodal Rail Rail Terminal	Intermodal Rail	Ayer	Middlesex	MA	New England/ Mid-Atlantic
Global III Intermodal Rail Terminal - Rochelle, IL	Intermodal Rail	Rochelle	Ogle & Lee	IL	Great Lakes/ Plains
Fairburn CSX Industry Yard, Fairburn, GA	Intermodal Rail	Fairburn	Fulton	GA	Southeast
Huntsville Alabama	Intermodal Rail	Huntsville	Madison	AL	Southeast
Tchoupitoulas Corridor	Intermodal Rail	New Orleans	Orleans parish	LA	Southeast
Logistics Park – Alliance TX	Intermodal Rail	Fort Worth	Denton, Tarrant	TX	Southwest
Bayport TX	Intermodal Rail	Seabrook	Harris	TX	Southwest
WorldPort at DIA	Intermodal Rail	Denver	Denver	CO	Rocky Mtn./ Far West
Elwood, IL – CenterPoint Intermodal Rail Center & BNSF Logistics Park	Intermodal Rail	Elwood	Will	IL	Great Lakes/ Plains
Interstate 68	Major Hwy		Garret, Allegany	MD	New England/ Mid-Atlantic

Project Name	Project Type	City or County	County(ies)	Location	BEA Region
Interstate 29	Major Hwy		See footnote 1	IA	Great Lakes/ Plains
Interstate 43	Major Hwy	From Milwaukee to Green Bay	See footnote 2	WI	Great Lakes/ Plains
SR 29	Major Hwy	Chippewa Falls to Green Bay	See footnote 3	WI	Great Lakes/ Plains
Interstate 81 (PA)	Major Hwy	Connects Harrisburg to Wilkes-Barre/Scranton	See footnote 4	PA	New England/ Mid-Atlantic
Interstate 81 (VA)	Major Hwy	Bristol, Roanoke, Harrisonburg, and Winchester.	See footnote 5	VA	Southeast
Interstate 16	Major Hwy	Savannah to Macon	See footnote 6	GA	Southeast
Interstate 26	Major Hwy	Connects Spartanburg to Charleston	See footnote 7	SC	Southeast
Interstate 27	Major Hwy	Amarillo to Lubbock	See footnote 8	TX	Southwest
Corridor B	Major Hwy		See footnote 9	TN	Southeast
I-515 Henderson	Major Hwy	Henderson	Burleson	NV	Southwest
Central Artery Tunnel	Major Hwy	Boston	Suffolk	MA	New England/ Mid-Atlantic
Casey Highway in Pennsylvania (US Route 6)	Major Hwy	Scranton	Lackawanna	PA	New England/ Mid-Atlantic
Interstate 105/Interstate 110 Interchange	Major Hwy	Los Angeles	Los Angeles	CA	Rocky Mtn./ Far West
Anderson Regional Transportation Center, Woburn, MA	Intermodal Pass.	Woburn	Middlesex	MA	New England/ Mid-Atlantic
Sunset Transit Center, Portland, OR	Intermodal Pass.	Beaverton	Washington	OR	Rocky Mtn./ Far West
Bellevue Transit Center, Bellevue, WA	Intermodal Pass.	Bellevue	King	WA	Rocky Mtn./ Far West
Tri-Rail Boca Raton Intermodal Rail Transit Center	Intermodal Pass.	Boca Raton	Palm Beach	FL	Southeast

Project Name	Project Type	City or County	County(ies)	Location	BEA Region
Lindberg Station, MARTA (Atlanta)	Intermodal Pass.	Lindberg/Morosgo	Fulton	GA	Southeast
DART	Intermodal Pass.	Dallas	Dallas	TX	Southwest
BART	Intermodal Pass.	Daly City and Colma	San Mateo	CA	Rocky Mtn./ Far West
Arlington Heights METRA	Intermodal Pass.	Village of Arlington Heights	Cook & Lake	IL	Great Lakes/ Plains
Emerson Park MetroLink	Intermodal Pass.	East St. Louis	St. Clair	IL	Great Lakes/ Plains
Corridor D	Widening		See footnote 10	WV	Southeast
I-86 NY Southern Tier	Widening	Allegany, Cattaguarus, Chautauqua and Steuben	See footnote 11	NY	New England/ Mid-Atlantic
I-15 Reconstruction - Salt Lake City	Widening	SLC	Salt Lake	UT	Rocky Mtn./ Far West
I-70 Glenwood Canyon	Widening	Glenwood Springs	Garfield	CO	Rocky Mtn./ Far West
Santan Freeway: part of Maricopa RTP, AZ	Widening	Meas, Gilbert, and Chandler	Maricopa	AZ	Southwest
Corridor J, Appalachia	Widening		See footnote 12	KY	Southeast
Corridor Q, Appalachia	Widening		See footnote 13	VA	Southeast
US 75 North Central Expressway, Dallas	Widening	Dallas	Dallas	TX	Southwest
I-394 Minnesota	Widening	Golden Valley	Hennepin	MN	Great Lakes/ Plains

Footnotes (county details):
1: Fremont, Mills, Pottawattamie, Harrison, Monona, Woodbury
2: Brown, Manitowoc, Sheboygan, Ozaukee and Milwaukee
3: Chippewa, Clark, Marathon, Shawano, Brown
4: Franklin, Cumberland, Dauphin, Lebanon, Schuylkill, Luzerne, Lackawanna, and Susquehanna
5: Bristol CITY, Washington, Smyth, Wythe, Pulaski, Montgomery, Botetourt, Roanoke, Rockbridge, Augusta, Staunton, Rockingham, Shenandoah, Warren, Frederick
6: Chatham Effingham, Bryan, Twiggs, Bibb, Bulloch, Bleckley, Candler, Laurens, Treutlen, Wilkinson, Emanuel
7: Spartanburg, Laurens, Newberry, Richland, Lexington, Calhoun, Orangeburg, Dorchester, Berkeley
8: Lubbock, Swisher, Randall, Potter
9: Buncombe, NC; Madison, NC; Unicoi, TN; Washington, TN; Sullivan, TN
10: Doddridge, Harrison, Wood, Ritchie

11: Chautauqua, Cattaraugus, Allegany and Steuben, Chemung
12: Laurel, Pulaski, Wayne, Clinton, Cumberland
13: Montgomery, Giles, Tazewell, Buchanan, Mercer, WV