

# **Methodology Manual**

**Regional ECONomic System for Federal Spending**

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**U.S. Army Corps of Engineers  
Institute for Water Resources**

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# Introduction

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The U.S Army Corps of Engineers (USACE) Institute for Water Resources has developed a Regional ECONomic System (RECONS) that provides accurate and defensible estimates of regional and national job creation and other economic measures such as income, value added, and sales. RECONS will be used as a means to document the performance of direct investment spending of the USACE as directed by the American Recovery and Reinvestment Act (ARRA). RECONS provides the USACE the ability to evaluate project and program expenditures associated with the annual expenditure by the USACE. In addition, RECONS offers USACE users the ability to evaluate economic consequences of USACE projects and programs at a regional level across all business lines, which has not been possible in the past.

A primary objective of RECONS was to create a modeling tool to evaluate the economic impacts of the *direct investment and operational spending* of the USACE, whether through the ARRA or through annual capital and operating budgets. A subsequent objective was to develop a tool that can estimate forward linkages or stemming-from effects of the USACE business line activities. Additional modules of RECONS were developed to examine important stemming-from effects of USACE business lines. This aspect of RECONS will be discussed in a subsequent model design documents.

The USACE's Civil Works (CW) program has authority to carry out projects associated with water resource development in several important mission areas: (1) Navigation; (2) Flood Damage Control/Flood Risk Management; (3) Environment (Aquatic Ecosystem Restoration; Environmental Stewardship; Environment: Formerly Utilized Sites Remediation Action Program [FUSRAP]); (4) Regulatory; (5) Emergency Management; (6) Water Storage for Water Supply; (7) Hydropower; and (8) Recreation. Efforts to develop RECONS centered on these different business lines. This allowed the project team to build in expenditure profiles, appropriate impact areas, and estimate project multipliers that can be used to evaluate economic impacts of business line investments.

RECONS differentiates the 1) USACE Operational Expenditures from the 2) Project Expenditures. USACE wages, benefits and overhead expenditures are provided in the Operational Expenditures module of RECONS. The Project Expenditures module of RECONS focuses on expenditures associated with contracted work activities and USACE labor in support of business line activities.

RECONS utilizes the Impact on PLANning (IMPLAN) software and data system, provided by the Minnesota IMPLAN Group, to estimate the economic impacts of Federal Spending. IMPLAN model(s) were created for each USACE project, and the impact area data, multipliers, direct ratios, and geographic capture rates were extracted from the IMPLAN models and imported into RECONS. Each USACE project, associated with a program code, is linked with one or more county-based impact areas. USACE work activities were identified with single or multiple IMPLAN industry sectors, depending on the complexity of the activity, and are termed "spending profiles." IMPLAN's trade flows regional purchase coefficients and margins are

primarily utilized, although in some instances they have been customized to more accurately represent USACE expenditures.

This methodology document provides the approach for the development of RECONS. USACE CW expenditures are run through RECONS to estimate their respective effects on local, state, and national economies. In addition to this methodology document, there are four additional documents describing RECONS: the Resource Guide for Work Activities and Spending Profiles (Appendix A of this report), the User's Guide, and the ARRA Report. A summary of the CW expenditures is included in this document. The ARRA results are summarized in the ARRA Economic Impacts Report.

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# Evaluating Business Line Expenditures

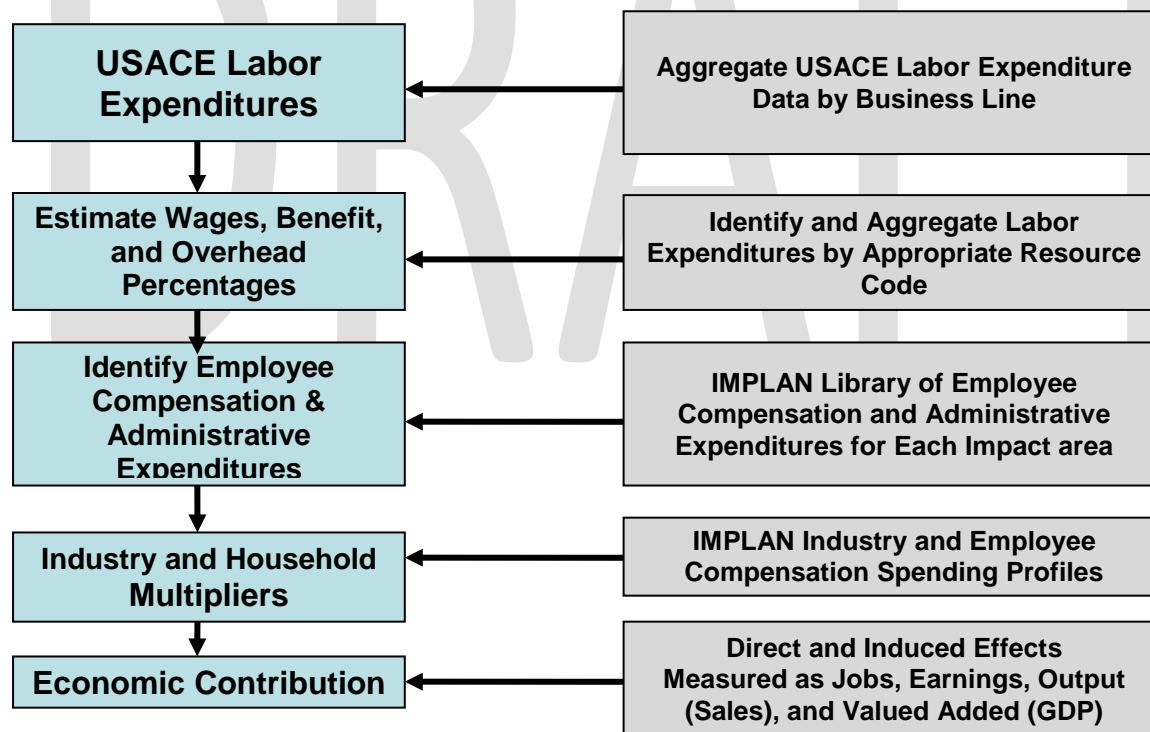
## USACE Operational Expenditures

The USACE generates a significant economic contribution through their expenditures on goods and services for administration (expenses not allocated to projects) and on the compensation of government employees. RECONS includes a module that estimates this contribution for fiscal year (FY) 2009.

Also included in this module of RECONS are FY2009 non-salary administrative expenses such as overhead and burden, which were budgeted for district office and headquarters operations (and not otherwise accounted for in project analysis by business line).

Figure 1 illustrates the approach for the estimation of USACE salary expenditures.

**Figure 1. Flow Diagram of USACE Operational Expenditures**



USACE provided the project team with aggregate data on labor costs by business line. These expenditures were obtained from the U.S. Army Corps of Engineers Financial Management System /Operations and Maintenance Business Information Link (CEFMS/OMBIL) databases for FY2009 and are summarized in Table 1. The Method of Accomplishment (MOA) codes for this data identified the USACE labor and administrative expenditures (MOA=I2) as well as the total USACE expenditures (MOA=I1, I2, C1, and C2).

**Table 1: CEFMS 2009 USACE Labor and Total Expenditures**

<b>Business Line</b>	<b>USACE Labor and Overhead (I2)</b>	<b>Contracted and Other Expenses (I1, C1, C2)</b>	<b>Total</b>	<b>Percent (%) Labor and Overhead</b>
<b>Navigation</b>	\$483,117,869	\$1,719,309,874	\$2,202,427,744	22
<b>Flood Risk Management</b>	\$434,231,948	\$1,323,170,542	\$1,757,402,490	25
<b>Hydropower</b>	\$218,891,544	\$184,232,448	\$403,123,993	54
<b>Regulatory</b>	\$173,902,940	\$11,812,071	\$185,715,011	94
<b>Recreation</b>	\$147,417,171	\$191,338,683	\$338,755,855	44
<b>Environmental Restoration</b>	\$105,687,975	\$289,385,338	\$395,073,313	27
<b>Environmental Stewardship</b>	\$73,076,015	\$59,117,593	\$132,193,608	55
<b>Other</b>	\$67,166,426	\$171,241,180	\$238,407,606	28
<b>EO</b>	\$10,753,070	\$21,823,049	\$32,576,118	33
<b>Water Supply</b>	\$9,271,209	\$47,004,216	\$56,275,425	16
<b>JT</b>	\$2,237,729	\$2,085,183	\$4,322,912	52
<b>Emergency Management</b>	\$1,182,740	\$1,307,720	\$2,490,460	47
<b>Total</b>	<b>\$1,723,516,168</b>	<b>\$4,021,827,897</b>	<b>\$5,745,344,065</b>	<b>30</b>

These business line expenditures were specified based on an analysis of the CEFMS/OMBIL data. Overall, approximately 30% of the USACE annual expenditures are associated with wages, benefits, and overhead costs.

The next step, as illustrated in Figure 2, is the mapping of labor costs to wages, salaries, benefits, and other administrative costs such as overhead and burden. A further analysis of the Resource Codes within the USACE Labor and Overhead I2 MOA code indicates that approximately 67% of the in-house labor expense is associated with direct labor costs and benefits, while the remaining 33% is overhead and burden costs.

USACE labor costs are mapped to IMPLAN Sector 439, Federal Non-Military Government Employee Compensation. Version 3 of IMPLAN allows impacts to be estimated for employee compensation, which includes both wages/salaries and benefits. For consistency with IMPLAN's employee compensation approach, the USACE payroll costs should include both direct labor or wage costs as well as benefits. IMPLAN Sector 439 allocates approximately 13.6% of the direct output to a capital consumption allowance (ratio of total output to employee compensation) (Lindall, 2010). Since all of this spending should be allocated to employee compensation, the income allocated to this sector was increased by 13.6% to capture all impacts as employee compensation.

An advantage of running employee compensation as a labor income change is that IMPLAN provides an adjustment for disposable income or marginal propensity to spend for each identified impact area. This approach assumes that all government payroll spending is distributed across all of the household income sectors, using the same distribution as the impact area as a whole. Sensitivity analyses were run to compare the Sector 439 multipliers with those of the household income change for \$50,000 to \$75,000 (less payroll taxes). There were no consistent differences in the results. For example, sometimes Sector 439 response coefficients were greater and sometimes the response coefficients for the household income changes (\$50,000 to \$75,000 income level) was greater. These differences ranged from 3% to 15%. IMPLAN's Sector 439 direct ratios are also utilized for this impact, resulting in direct, indirect, induced, and total effects of the USACE wages and overhead expenditures.

USACE overhead expenditures for the business lines are also included in this part of RECONS. The USACE cost of doing business includes overhead, facility burden, and other operational expenditures for buildings, equipment, and facilities. These expenditures were extracted from the CEFMS/OMBIL labor costs with the applicable Resource Codes and are mapped to IMPLAN Sector 386, Business Support Services. This sector supports the operations and maintenance of facilities. The choice of this sector was approved by IMPLAN expert, Greg Alward.

Any USACE labor expenditures either for ARRA or for the CW spending assume a default spending profile of 67% wages, salaries, and benefits and 33% overhead and burden. As described previously, this allocation was based on the CEFMS/OMBIL Resources Codes within the In-house Labor (I2) Account.

## **USACE Project Expenditures**

In its mission to contribute to the national welfare and to serve the public, the USACE has four areas of emphasis for its CW program including:

- development and management of the nation's water resources
- protection, restoration, and management of the environment
- disaster response and recovery
- engineering and technical services (USACE 2004)

In meeting these objectives, the USACE makes a number of direct government expenditures on goods and services. These expenditures range from contracting large construction projects to operating and maintaining water-related infrastructure throughout the U.S.

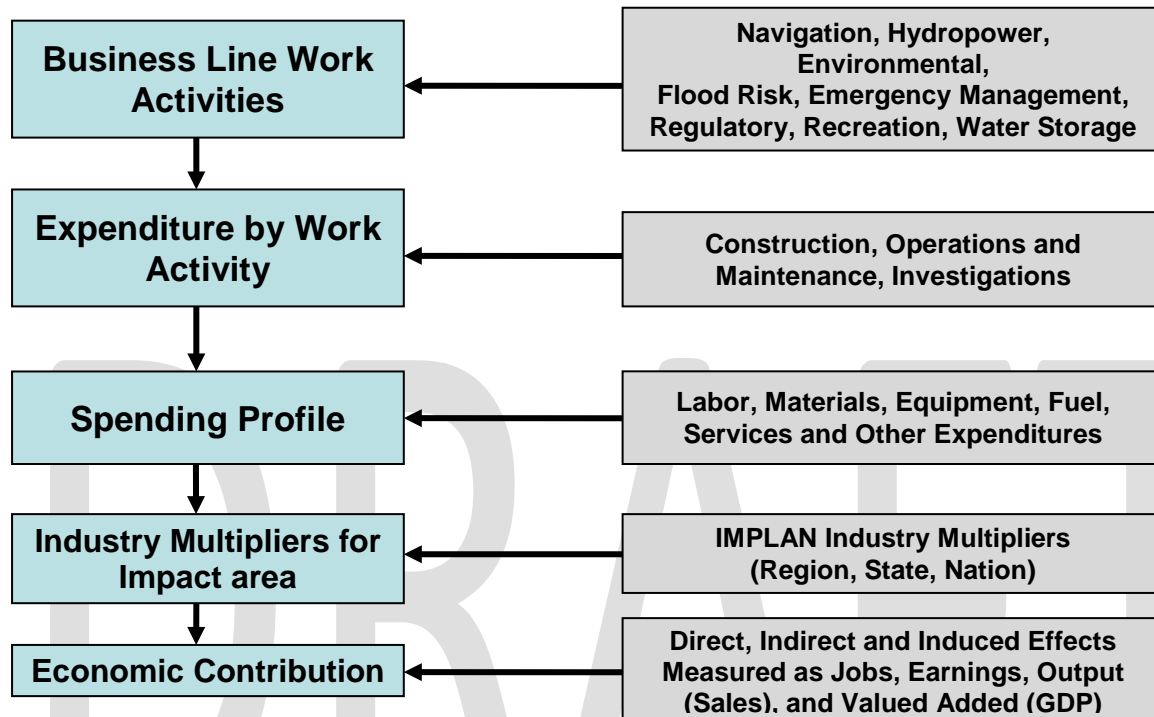
Figure 1 shows how contracted project expenditures of the USACE can be evaluated using an expenditure approach (Alward 2009). This method, also known as a "bill-of-goods" or "second-round" approach seeks to disaggregate project expenditures into key component activities, where appropriate, so these activities can be mapped separately to the corresponding industry in IMPLAN for estimation of the multiplier effects.

Because the nature and magnitude of project expenditures vary by business line, research was undertaken to identify the types of business line expenditures. Thus, the first line in the diagram



below shows how USACE project expenditures would be tracked by business line. Typical project activities associated with each of the business lines as well as project activities that may occur across all of the business lines were identified.

**Figure 2. Flow Diagram of USACE Project Expenditures**



In order to estimate the full economic impact (i.e., direct effects plus indirect and induced multiplier effects through backward-linkages) of USACE work activity expenditures, the project team estimated a series of industry multipliers, using the IMPLAN model, that can be applied to the expenditures discussed above. Multipliers were estimated for every output measure reported, including number of jobs, employment earnings, output (sales), and value added (gross domestic product [GDP]). The multipliers were specific to the local and state (or multi-state) in which the activity takes place (see section on Impact Areas). Economic impacts are identified for three categories of impacts: direct, indirect, and induced.

For purposes of this effort, the direct effect is defined as the work activity expenditures made by the USACE under each business line. In the impact area in which a project is located, direct effects represent that proportion of the expenditure in each industry that flows to material and service providers in the region. For employment and earnings measures, the direct effect represents the jobs associated with the work activity (e.g., construction jobs onsite that are likely to be filled by residents of the region [i.e., after adjustment for in-commuting by workers residing outside the region]). The extent to which an effect is captured within the impact area is represented by regional purchase coefficients (RPCs), which are primarily obtained from the IMPLAN model. This parameter is based on trade flow data for each industry sector.

For retail and wholesale trade sales, primarily associated with the purchase of manufactured products, materials, or structures, a margin is applied to the direct effect, allocating it among the

manufacturing, retail trade, wholesale trade, and transportation sectors. Margins are further described below.

The indirect effects include the backward-linked suppliers for any goods and services used by the directly affected activities. The induced effect to the region occurs from household expenditures associated with workers' earnings from both direct and indirect businesses.

RECONS will also be capable of analyzing future or prospective USACE work activity expenditures in each of the business lines. The analysis of these new expenditures will be based on the work activities, and spending profiles and multipliers derived from the ARRA FY2009 project dataset. The user will have the opportunity to enter key information about the project and view and edit the spending profile, as necessary to accurately represent the proposed activity.

To summarize, RECONS will use a series of industry multipliers, derived from IMPLAN, to characterize the contribution of USACE work activities to a region's economy. The multipliers used will correspond to the distribution of work activity expenditures across key spending categories (spending profile). To facilitate the analysis of existing and proposed investments, projects will be categorized by business line and work activity. Work activities by business line as well as general work activities that fall across all business lines are described in the Resource Guide for Work Activities and Spending Profiles (Appendix A).

### **Work Activities and Spending Profiles**

Work activities associated with each of the USACE CW business lines were identified, as well as work activities that are currently associated with multiple business lines or are general enough that they could be included in all business lines. Information on work activities was obtained from USACE documents, web searches, and interviews with USACE experts and a number of key vendors. A detailed description of the work activities, the spending profiles, and interviews conducted on which these profiles and categories were developed is provided in the Resource Guide for Work Activities and Spending Profiles (Appendix A).

The work activity classification system serves two purposes:

1. To organize and arrange both USACE CW ARRA-funded projects as well as CW federal work activities in a manner that is easily identifiable to the end-users of RECONS.
2. To create a mapping structure whereby USACE work activities map directly to one or multiple IMPLAN sectors.

As an example, Table 2 provides the work activities and definitions associated with the navigation business line (dredging activities were handled separately).

**Table 2: Navigation Work Activities List with Definitions**

Work Activity	Work Activity Definition
Construction and Repair of Concrete / Wooden Breakwaters and Jetties	Concrete or wooden breakwater and seawall construction or repair. Examples include construction of rubblemounds, breakwaters, breakwater extensions, and the purchase of concrete and other materials for repairs to historic wooden structures.
Construction and Repair of Large Stone Breakwaters and Jetties	Breakwater and seawall construction or repair. Examples include construction of rubblemounds, breakwaters, breakwater extensions, and the purchase and placement of jetty stone.
Lock Construction of On-Site Features	New construction and major rehabilitation of locks (using either wet or dry construction practices, such as cofferdams). Examples include foundation and drainage work, construction of guide walls and partial height monoliths, and construction and rehabilitation of access roads and bridges.
Lock or Dam Gate Fabrication and Installation	Fabrication or installation of lock or dam gates. Examples include the fabrication, transportation, and installation of lock gates, culvert valves, new miter gates, and lift gates.
New Construction or Major Repair of Navigation or Multi-Purpose Dams	New construction or major rehabilitation of dams and related structures. Examples include drainage, foundation work, earthworks, seepage control, stilling basins, spillways, stoplogs, outlet works, intake structure, power intake works, water supply systems, pumping plants, access roads, and bridges.
Repair and Maintenance of Locks	Repair and maintenance of locks. Examples include rehabilitation of lockport controlling works, fabrication of new culvert valve machinery, tainter gate shell placement, lock culvert valve machinery repairs, and replacement of mechanical/electrical equipment.
Repair and Maintenance of Navigation or Multi-Purpose Dams	Repairs and maintenance to multi-purpose dams. Examples include valves, associated mechanical/electrical equipment, and other related systems.
Structural Activities for Channel Maintenance (does not include dredging)	Activities undertaken to stabilize banks (such as rehabilitation of canal walls) and activities to control erosion near navigation areas.
Placement Area Construction and Rehabilitation	Carrying out the construction or rehabilitation of placement areas, including activities to increase dredged material placement capacity to reduce future maintenance costs.

All work activities map to at least one IMPLAN sector and in some cases map to multiple sectors, depending on the complexity of the activity. For instance, it is anticipated that a large infrastructure construction project would have several items within a spending profile, while a contract to provide security services at a facility may have only one item. For complex projects, sub-groupings (e.g., materials separated into steel, concrete, glass; or services into architecture/engineering, security, business services) will be added, as appropriate, to best match expenditure types to IMPLAN industry categories.

For each business line, the Resource Guide for Work Activities and Spending Profiles (Appendix A) identifies and defines the typical work activities, describes the associated spending profile, and provides a rationale for each spending profile. These profiles are based on an evaluation of how similar the work activities associated with the business align with the industries and their activities, as defined by the IMPLAN model. If the work activities aligned well with an IMPLAN sector, the spending profile was mapped to only one IMPLAN sector. The North American Industry Classification System (NAICS) was consulted for relevant industry sectors as well as IMPLAN's bridge to the NAICS codes.

Work activities mapping to more than one IMPLAN sector are denoted as “multi-sector” spending profiles. Generally, the multi-sector spending profile table presents: (1) the cost components; and (2) the estimated geographical capture rate (local, state, national) of those cost components. The spending profile of the cost components identifies the proportion of work activity spending associated with each of the cost components. The methodology of how labor costs and impacts are estimated in RECONS is provided in the General Work Activities section of the Resource Guide (Appendix A), under the labor work activities.

For example, turbine rehabilitation projects (hydropower business line) include the purchasing of the turbines and the installation and assembly labor. Typically, the costs of these projects are 55% turbine manufacturing costs and 45% labor costs, which are assigned to two distinct IMPLAN sectors. These are the cost components of this spending profile.

The spending profile also identifies the geographical capture rate of the cost components, which is discussed in the next section.

In general, IMPLAN's margins are utilized for the analysis, although a number of industry sector margins were modified to more accurately estimate the economic impacts of purchasing work activities. Additional discussion on margins is provided in the Margins section in this document.

RECONS provides the general or default spending profile—the cost allocations and geographic capture rate—of the “multi” work activities. This general or default spending profile is provided if the user of RECONS does not have information on the specific costs of the project. However, RECONS user is also able to modify the spending profile cost allocation and the geographic capture rate if the user has more information from the project cost estimates or, for example, understands the contractor and its labor force.

The development of work activities and spending profiles was accomplished through a comprehensive program of data analysis, research, and interviews. Additionally, each ARRA budget line item work description by business line was researched to better understand the nature of work being contracted for USACE work activities.

## **Geographical Capture Rates**

The spending profile also identifies the geographical capture rate, also called Local Purchase Coefficient (LPC) in RECONS, of the cost components. The geographic capture rate is the portion of USACE spending on industries (sales) captured by industries located within the impact area. In many cases, IMPLAN's trade flows Regional Purchase Coefficients (RPCs) are utilized as a proxy to estimate where the money flows for each of the receiving industry sectors of the cost components within each of the impact areas (See additional description of RPCs below). However, in some cases, the USACE or contractor experts were able to provide better geographic capture rate (economic leakages) estimates than the trade flows RPCs in IMPLAN, and the geographic capture rate was customized for these specific industry sectors. For example, the geographic allocation for labor on a lock construction project could include 20% labor from the local region (general laborers and likely locally residing employees), 50% labor pool from the state (includes the local), and 50% highly specialized labor coming from outside the region. A detailed description of the rationale regarding the selection of IMPLAN sectors and their RPCs or customized RPCs is provided for each work activity in the Resource Guide (Appendix A of the Methodology Manual).

## **Impact Areas**

RECONS provides the ability to evaluate impacts on the three levels of geography:

1. Local or regional
2. State or multi-state
3. National

The smallest level of geography was based on the nature of the specific project or work being evaluated and the geographic extent of the work activity (e.g. discrete project location such as a single lock rehabilitation versus a linear project such as a channel dredging project spanning

multiple counties). Each local or regional impact area was associated with a state or multi-state region. For example, the Kansas City district office was associated with the Kansas City metropolitan statistical area (MSA), which was associated with the Kansas and Missouri multi-state region.

Impact areas were determined during the model development stage based on project location and the type of work activity. Initially the ARRA projects, which were identified by program codes, were researched along with the ARRA work descriptions for each of the projects. In general USACE projects, which are usually identified with a unique program code, are names of locations of the projects.

There were approximately 784 program codes associated with the almost 3,000 ARRA budget line items. A list of the ARRA projects is found in the ARRA report.

#### Impact Area Types

Each of the program codes was identified with one or multiple local impact areas. The impact area types for the smallest level of geography, or the local regions, were organized into four different types of regions:

- Metropolitan
- Micropolitan
- Rural
- Large scale

In some cases the program code and the accompanying work activity were not identified with a local impact model, only a state or nation. For example, the program codes for the Inspection of Completed Works were only associated with a state model; no local impact area was identified. A number of program codes were identified with only the national model if the work fell in multiple locations that were not easily identifiable. Examples of program code names where this was the case include Hydrologic Studies, Flood Damage data, National Dam Safety Program, and others. For the ARRA projects, there were 61 program codes that were not identified with local impact areas (only state impact areas were identified), and there were 21 program codes that were only identified with the national region (local or state or multi-state regions were not identified).

Multi-county **metropolitan** and **micropolitan** regions were utilized if a site-specific or large-scale project fell within one or more counties within the Office of Management and Budget (OMB)-defined metropolitan or micropolitan statistical area. These core-based statistical areas (CBSAs) are defined based on population and labor force commuting patterns. The U.S. Census Bureau summarizes the OMB-defined statistical areas this way:

The 2000 standards provide that each CBSA, including both metropolitan and micropolitan statistical areas) must contain at least one urban area of 10,000 or more in population. Each metropolitan statistical area must have at least one urbanized area of 50,000 or more inhabitants. Each micropolitan statistical area must have at least one urban cluster of at least 10,000 but less than 50,000 population. Under the standards, the county (or counties) in which at least 50 percent of the population resides within urban areas of 10,000 or more in population, or that contain at least 5,000 people residing within a single urban area of 10,000 or more in population, is identified as a "central county" (counties). Additional "outlying counties" are included in the CBSA if they meet specified requirements of commuting to or from the central counties. Counties or equivalent entities form the geographic "building blocks" for metropolitan and micropolitan statistical areas throughout the United States and Puerto Rico.

These CBSAs were utilized to capture the majority of the workforce surrounding a USACE project location as workers are not necessarily coming from the county in which the project resides, but from the entire micropolitan or metropolitan region. Any site-specific region that did not fall in a metropolitan or micropolitan area (county) was defined as a **rural** region (i.e., counties with less than 10,000 people). The counties associated with the rural impact areas were identified based on an approach called Functional Economic Areas, as developed by the U.S. Department of Agriculture (USDA) Forest Service (METI Corp n.d.; Retzlaff 2008). For projects that were not located in a metropolitan or micropolitan area, the USDA Forest Service Protocols for Delineation of Economic Impact Analysis Areas (Forest Service Protocols *or* Protocols) on non-metro project locations were followed.

The Forest Service Protocols (METI Corp n.d.) provide step-by-step instructions on how to use LED OnTheMap, a tool developed by Longitudinal Employer-Household Dynamics (LEHD) Program from the U.S. Census Bureau in collaboration with the state labor departments to analyze labor flows. The Protocols also establish criteria on how to use this commuting data to define study areas that are comparable to the criteria used by the Office of Management and Budget (OMB), the Bureau of Economic Analysis (BEA) and the Bureau of Labor Statistics (BLS). The LED OnTheMap tool and the Forest Service Protocols are further explained below.

The Protocols have three main components:

1. Issue Identification
2. Labor Market Protocols
3. Trade Flow Protocols

During the issue identification stage, the question to ask is, “Are the issues fundamentally concerned with labor and income or with business interactions?” If the dominant issue is labor and income, then the study area will be defined based on labor flows. For instance, the project will create jobs; How will it affect the local economy? If the dominant issue is business interactions, then the study area will be defined based on trade flows. The project will lead to the closing of a pulp mill; How will this affect the local sawmills, which are the major suppliers to pulp mills? If the issues are general in nature, such as, “Consider the local economic impacts of the alternatives...”, the labor and income approach will be used (USDA 2003).

After a review of the project activities by business line, the study team utilized the Protocols to determine impact areas to analyze the economic contribution of non-metropolitan or non-micropolitan projects.

Functional economic areas based on labor markets are derived from data on commute flows. The general rules for defining an impact area using labor flow data from LED OnTheMap included in the Forest Service Protocols are as follows:

- Include the top counties in terms of residential location of workers until a cumulative share of jobs reaches at least 60% in the selection area; subject to the following:
  - Counties that account for at least 25% of the jobs in the selection area should always be included.
  - Counties that account for less than 25% of jobs may be included if at least 25% of its residents work in the selection area.

Finally, the last rule excludes urban counties if the issue is focused on rural or non-metropolitan counties. As a result of following the Protocols, site-specific program codes that were not in MSAs or micropolitan statistical areas were identified with single or multi-county impact areas.

**Large-scale** impact areas generally required more research of locations. Some of the program codes that were large-scale projects, such as the Ohio River, were identified with multiple sub-program codes. This approach is further described in the following section. These impact areas typically included metropolitan, micropolitan, and rural counties along and adjacent to river stretches. For example, if a river stretch included a metropolitan area, such as Pittsburgh, all counties along the river on both sides and those counties comprising the Pittsburgh MSA (7-county region) were included in the impact area.



## Approach for Identifying the Impact Areas

There were approximately 784 program codes and names in the ARRA data. These program codes were reviewed to identify program codes that have potentially large-scale locations. These codes needed additional research to define the impact area. The process to identify the local impact areas associated with the more site-specific local regions began with the project team obtaining part of the Watershed Investment Decision Tool geographic information system (GIS) locations. The names of each of the program codes were matched with those in the Watershed Investment Decision Tool. The names that matched were defined with a county. Those counties were then identified as associated with an MSA, a micropolitan statistical area, or neither. Counties that were not associated with an MSA or a micropolitan statistical area were analyzed through the functional economic area, labor market approach, described in the previous section.

The potentially large-scale project locations (program code names) were researched by looking at the ARRA work descriptions and researching USACE district web sites to identify the location or locations of the work being undertaken. For 454 program codes, multiple impact areas were created for one program code; these were titled as “location ID” and were numbered with increasing digits added to the end of the program code. For example, the Allegheny River (program code 002300) had seven locations identified within this program code, adding seven location IDs to the database, 0023001 to 0023007. In all cases, where multiple impact areas were identified for a program code, a broad area was defined which was inclusive of the site-specific locations. This broad impact area was utilized for the CW budget economic impacts.

The recreation impact areas were also analyzed in a slightly different fashion. Many of these areas, typically lake regions, are encompassed within one or multiple counties. The GIS coordinates from the Watershed Investment Decision Tool identified the dam location for these lake regions. However, work activities at these lakes occur at the dam location, but also in other locations within the recreation area. For this reason, both site-specific (typically, dam locations), and broader impact areas were created for these program codes. The project team obtained the multi-county regions from the Recreation Stemming-From Effects Module, which identified multi-county impact areas associated with counties within 30 miles of the recreation area. These multi-county impact areas were analyzed to ascertain if any of the included counties were also included in a MSA or micropolitan statistical area. If one or more of the counties were included in the metropolitan statistical area, then the impacted region included the multi-county 30-mile region as well as all counties within the MSA or micropolitan statistical area.

If the large-scale project was a river stretch, the impact area included the adjacent river counties and adjacent MSA and micropolitan statistical area counties in the impact area. If the ARRA work description identified a specific site location, one was created. In all cases, if the project location fell in an MSA or a micropolitan county, all other counties within that CBSA were included in the impact area. Similarly, if the county was not in a CBSA, then a functional economic analysis was undertaken.

In total, approximately 1,146 local impact areas were created for the ARRA analysis: 409 MSAs; 345 micropolitan statistical areas; 197 rural regions; and 42 large-scale regions. In addition, there are 50 state and 98 multi-state models in RECONS.

The CW budget program codes were also added into RECONS. An additional 467 program codes were in the CW budget that did not occur in the ARRA projects. Large-scale program code names were flagged and research as described above. Of the 467 program codes, 99 program codes were not identified with local impact areas, only state impact areas, and 49 program codes were not identified with local or state (or multi-state) regions, only the nation. Of the 467 program codes, 409 matched existing impact areas associated with the ARRA data, while 59 new impact areas needed to be created.

### Estimating Generic Multipliers and LPCs

Generic multipliers were created for the situation when a specific impact area is not available in RECONS. If the RECONS user does not find a relevant impact area for the analysis, he or she can choose to use generic multipliers developed from the available impact areas in RECONS. The multipliers typically vary by the rural or urban nature of the economy, so these were analyzed based on the types of local impact areas, as discussed in this section.

There were four types of local impact areas: metropolitan; micropolitan; rural; and large-scale study areas. The multiplier table was divided into four subsets based on the impact area types for all the ARRA projects. There were 993 impact areas on which these generic multipliers were calculated: 409 MSAs; 345 micropolitan statistical areas; 197 rural regions; and 42 large-scale regions.

Multipliers that were zero for industries absent from impact areas were deleted so the averages would not be skewed. Generic multipliers were developed for each impact area type by averaging relevant multiplier (direct, indirect, and induced) for each sector for each type of impact (employment, labor income, value added, output) for each type of region. The average LPC was also created for each local impact area. The generic multipliers and LPCs are shown in Appendix E.

Dispersion statistics around the mean were analyzed to ensure that the variations were not too broad for each of the region types. The range and standard deviation for the multipliers for the 65 industries in RECONS were analyzed. There is one instance where the average of the standard deviations for each region type is greater than one, which occurs in the direct output ratio for the micropolitan regions.

**Table 3: Dispersion Statistics for the 65 Industry Multipliers in RECONS**

<b>Multipliers and Statistic</b>	<b>Indirect Output</b>	<b>Induced Output</b>	<b>Direct Employment</b>	<b>Indirect Employment</b>	<b>Induced Employment</b>	<b>Direct Labor Income</b>	<b>Indirect Labor Income</b>	<b>Induced Labor Income</b>	<b>Direct Value Added</b>	<b>Indirect Value Added</b>	<b>Induced Value Added</b>
Rural Models Average of Ranges	0.20	0.17	7.75	1.51	1.74	0.17	0.06	0.05	0.22	0.10	0.10
Micro Models Average of Ranges	0.28	0.26	7.56	2.28	2.42	0.26	0.08	0.08	0.34	0.14	0.15
Metro Models Average of Ranges	0.58	0.53	6.89	3.21	4.03	0.29	0.18	0.17	0.39	0.29	0.31
Large Scale Models Average of Ranges	0.40	0.41	2.74	1.79	2.71	0.15	0.13	0.14	0.20	0.20	0.24
Rural Models Averages of Standard Deviation	0.01	0.01	0.04	0.03	0.04	0.00	0.00	0.00	0.00	0.00	0.00
Micro Models Average of Standard Deviation	0.06	0.05	1.03	0.42	0.46	0.04	0.02	0.02	0.06	0.03	0.03
Metro Models Averages of Standard Deviation	0.11	0.10	0.85	0.57	0.74	0.04	0.04	0.03	0.06	0.06	0.06
Large Scale Models Average of Standard Deviation	0.10	0.11	0.62	0.44	0.76	0.03	0.03	0.04	0.05	0.05	0.06

## Choosing an Impact area

For evaluation of new projects in locations not yet identified, one of the following two methods should be employed as, appropriate.

- Utilize an impact area which is loaded into the system for another project. This option can be used if the project is located in the same county or CBSA or other functional economic area as a project that was previously uploaded into RECONS. Searching by county to identify the various impact areas from which to choose is possible.
- The user can identify the type of location in which the project is expected to occur. Generic multipliers are identified for the following types of regions: rural, micropolitan, metropolitan, and large-scale (see previous definitions). The generic multipliers can be used to estimate economic contribution where a precise study area has not been determined.

## **IMPLAN Data and Modifications**

### **Extracting IMPLAN Data**

Minnesota IMPLAN Group, Inc. (MIG) created IMPLAN models for more than 1,200 impact areas defined by the project team, as described in the previous section. The multipliers within these models were created with RPCs based on the trade flow dataset included in IMPLAN Version 3 (see description below on Trade Flows RPCs). A unique model ID was assigned to each impact area. There are seven types of impact areas:

- Metropolitan areas (one or more counties)
- Micropolitan areas (one or more counties)
- Rural areas (one or more counties)
- Large-scale study area (group of counties)
- State (single state)
- Multi-state (group of states)
- Nation

The project team exported the following tables from each IMPLAN model:

1. StudyAreaGeneralInformation – This table provides the names and Federal Information Processing Standard (FIPS) codes of the counties and states included in the model. It also provides total number of households and total personal income. This table includes one record for each county within the study area.
2. StudyAreaIndustryData – This table provides study area overview information including study area output, jobs, labor income, and value added in 2008. This table includes one record for each IMPLAN industry (440).

3. CommonMargins – This table include both industry and household margins. Type 1 margins refer to household margins, while Type 2 refers to industry margins.
4. RegionalCommodityBalances – This table includes the average RPC. This table includes one record for each IMPLAN industry (440).
5. ReportsMultipliersOutput – This table includes the direct output ratio, and indirect and induced output multiplier, per million dollars in output. This table includes one record for each IMPLAN industry (440).
6. ReportsMultipliersEmployment – This table includes the direct employment ratio, indirect, and induced employment multiplier, per million dollars in output. This table includes one record for each IMPLAN industry (440).
7. ReportsMultipliersLaborIncome – This table includes the direct labor income ratio, and indirect and induced labor income multiplier, per million dollars in output. This table includes one record for each IMPLAN industry (440).
8. ReportsMultiplierValueAdded – This table includes the direct value-added ratio, and indirect and induced value-added multiplier, per million dollars in output. This table includes one record for each IMPLAN industry (440).

The Project Team combined the extracted IMPLAN data into four summary tables for use in RECONS:

1. Impact area overview (based on StudyAreaGeneralInformation table from IMPLAN models for metropolitan, micropolitan, rural, and large scale study areas)
2. Local baseline and multipliers (based on StudyAreaIndustryData, RegionalCommodityBalances, ReportsMultipliersOutput, ReportsMultipliersEmployment, ReportsMultipliersLaborIncome, and ReportsMultipliersValueAdded tables from IMPLAN models for metropolitan, micropolitan, rural, and large-scale study areas)
3. State baseline and multipliers (based on RegionalCommodityBalances, ReportsMultipliersOutput, ReportsMultipliersEmployment, ReportsMultipliersLaborIncome, and ReportsMultipliersValueAdded tables from IMPLAN models for state and multi-state study areas)
4. National baseline and multipliers (based on RegionalCommodityBalances, ReportsMultipliersOutput, ReportsMultipliersEmployment, ReportsMultipliersLaborIncome, and ReportsMultipliersValueAdded tables from IMPLAN models for national study areas)

### **Private Sector Labor Response Coefficients**

Household income and labor income expenditures are not associated with direct multipliers in IMPLAN, but have vectors of spending associated with differing income levels. All USACE labor is estimated through IMPLAN Sector 439—Federal Government, Non-Military Employee Compensation. However, to determine the private sector labor impact on local and regional

economies, employee compensation response coefficients were estimated for each of the types of impact areas.

The household income level of \$35,000 to \$50,000 was utilized for these estimates based on the average income for a worker in the construction industry (IMPLAN Sector 36). Impact areas were identified as:

- Metropolitan
- Micropolitan
- Rural
- Large-scale, state, or multi-state
- The nation

One million dollars less 15.3% payroll taxes was run through ten randomly chosen impact areas of each type. Average response coefficients for each type of region were computed and are shown in Table 4. These are the induced response coefficients, representing jobs, income, value added, and output effects associated with households spending their income within the local and regional economies.

The direct employment ratio of employee compensation to employment was utilized from IMPLAN Sector 36, Other New Non-Residential Construction, for each region type. For example, in metropolitan regions, \$1 million in wages equates to 24.2 jobs in the construction industry. Other direct ratios for output, value added, and labor income are assumed to equal the employee compensation amount or the amount allocated to labor. These private sector labor response coefficients are summarized in Table 4.

**Table 4: Private Sector Labor Response Coefficients for \$1 Million in Wages**

Type of Impact area	Direct	Induced			
	Employment (Number of Jobs)	Employment (Number of Jobs)	Labor Income	Value Added	Output
<b>Metropolitan</b>	24.2	6.61	\$280,159	\$505,916	\$852,362
<b>Micropolitan</b>	35.8	5.12	\$153,659	\$288,451	\$490,970
<b>Rural</b>	42.9	3.58	\$97,119	\$204,194	\$345,804
<b>State/Multi-State/Large-scale</b>	27.1	7.77	\$310,097	\$551,598	\$960,371
<b>Nation</b>	24.9	11.7	\$554,792	\$972,984	\$1,831,594

## **Trade Flow Regional Purchase Coefficients (RPCs) and LPCs**

MIG defines RPC as the proportion of the total demand for a commodity by all users in the impact area that is supplied by producers located within the impact area. IMPLAN Version 3 incorporates a new approach to measuring RPCs: the IMPLAN National Trade Flows Model. This new approach utilizes a doubly constrained gravity model using IMPLAN's county-level estimates of commodity demand and supply. In general terms, the import and export flows between regions are thought to be proportional to the "mass," "attractiveness," or "size" of an economy and inversely proportional to the "distance" or cost of moving goods and services between them. There are three main databases used in the Trade Flows Model: the Oak Ridge National Laboratory county-to-county distances by mode of transportation, the Commodity Flows Survey ton-miles data by commodity, and the IMPLAN commodity supply and demand by county.

In RECONS' application, the RPC is utilized as a proxy for the portion of industry sales (as a result of USACE spending) within an impact area that is supplied by industries and producers within the impact area. In many cases, RECONS utilizes IMPLAN Trade Flows RPCs as the default geographic capture rate or LPC. In a number of cases, these rates were customized when information collected from industry and USACE experts was better than the default trade flows values. These customized geographic capture rates are explained in detail in the Resource Guide for Work Activities and Spending Profiles (Appendix A).

### **Margins**

Margins represent the difference between producer and purchaser prices. Margins allocate the expenditures among the industry sectors that manufacture the products, the retail and wholesale trade industries that sell the products, and the industries that transport the products, including truck, rail, waterborne, and pipeline sectors.

IMPLAN's industry margins, extracted from the IMPLAN data, are primarily utilized in RECONS to allocate these expenditures and revenues for all the manufacturing, transportation, and trade industry sectors to which industry margins are applied. For RECONS, several of the margins included in IMPLAN were modified as identified below.

1. IMPLAN Sector 69, Other Food Manufacturing (e.g., consumable operating expenses for dredging projects -- food)
2. IMPLAN Sector 115, Petroleum Refining (e.g., fuel or gasoline)
3. IMPLAN Sector 163, Other Concrete Product Manufacturing (e.g., concrete security barriers)
4. IMPLAN Sector 186, Plate Work and Fabricated Structural Product Manufacturing (e.g., pre-fabricated metal/aluminum structures)
5. IMPLAN Sector 187, Ornamental and Architectural Metal Products Manufacturing (e.g., elevators)
6. IMPLAN Sector 198, Valve and Fittings Other than Plumbing (e.g., consumable operating expenses -- non-durable items for dredging projects)

7. IMPLAN Sector 200, Ball and Roller Bearing manufacturing (e.g., thrust bearing oil coolers)
8. IMPLAN Sector 205, Construction Machinery Manufacturing (e.g., construction and maintenance equipment and machinery)

For IMPLAN industry sectors 163, 186, 187, 200, and 205, the industry margins were modified to reduce the retail margin. This is due to the fact these items are typically purchased for USACE through wholesalers or the manufacturing industry itself, and are not purchased through retailers. These fairly expensive items would not be purchased through retail building stores. The retail allocation was zeroed out and reallocated to the manufacturing; the wholesale trade sectors remained the same.

Fuel purchases occur within the spending profile for dredging projects, as dredging company vendors spend a considerable portion of their operating expenses on fuel. IMPLAN did not have an industry margin for fuel, only state and local and household margins for Sector 115, petroleum refineries. In interviews with USACE dredging experts and dredging companies, it was determined that dredging fuel purchases are typically purchased through wholesalers. Therefore, the retail gasoline margins were zeroed out to account for fuel purchased through wholesalers. In the IMPLAN margins, gasoline taxes are allocated to the wholesale trade industry, which inflates this margin to be higher than it should be. As a result, the margins in RECONS were adjusted for the petroleum refining sector: 93% to the refining sector, 5% to wholesale trade sector, 1% to truck transportation, less than 1% to other transportation industry sectors (Stynes, 2010).

The margins for the manufacturing sectors within the Consumable Operating Expenses line item of the dredging work activities were also adjusted to account for information obtained from interviews with dredging companies. Interviews with dredging experts indicated that consumable items such as food, lubricants, ropes, and metal parts and valves were purchased through both wholesalers and retailers. Therefore, 14% was allocated each to wholesale trade and retail (retail grocery stores and retail building supply stores) from the amount in the manufacturing sectors (Sectors 69 and 198). Additional description regarding the spending profile for the dredging work activities is provided in the Resource Guide for Work Activities and Spending Profiles (Appendix A).

The retail allocation or margins in IMPLAN was small or non-existent for all other industry margins for the sectors in RECONS, and was therefore not adjusted.

### **Local Impact areas with No Industries**

An analysis was undertaken to better understand the frequency and implications of having local impact areas in RECONS that do not include multipliers for certain industries. The lack of multipliers in a given impact area implies the industry does not exist in the region and therefore economic impacts are estimated to be zero for this industry.

IMPLAN Sector 386, Business Support Services, is utilized for USACE overhead and burden expenditures. These operational expenditures are primarily local in nature (e.g., lawn care,



utilities, waste disposal, computer services, office supplies, rentals and leasing, etc.) and therefore at least a portion of which should be captured in the regional economies. To ensure that these general expenditures are not completely leaked out of local impact areas, an analysis was undertaken on the number of local impact areas where multipliers in this sector did not exist. Of the 1,074 local models in RECONS, there were 131 impact regions without multipliers, of which 45 had LPCs in Sector 386 that were zero.

Generic multipliers were utilized for the local models where sector 386 parameters did not exist. These impact areas were identified as a type of region (i.e., rural, metropolitan, micropolitan, and large-scale), and the generic multipliers and LPCs for Sector 386 were applied to these impact areas. To ensure that all local models contain this sector, which will be widely used for these types of expenditures, generic multipliers were utilized if no multipliers existed in a given impact area.

An analysis was undertaken for the impact areas without multipliers for the project impact areas. There was a total of \$361,588,891 (or 7.9%) of ARRA planned allocations that was not captured due to industries that did not exist in a local impact area (i.e., missing multipliers). There were 268 local impact areas with 1,371 spending categories or industries affected. The industries were grouped into several categories, shown in Table 5. In most cases, the absence of an industry from the rural impact areas imply that the spending would leak to a broader region where industries exist; substitute industries would likely not be available to provide these services.

**Table 5: ARRA Spending by Work Activity for Sectors that Do Not Exist in Local Impact Areas**

Industry Type	Work Activity Expenditure Total	Percent (%) of Funding	Number of Projects
Manufacturing	\$289,365,750	80	1,274
Construction	\$4,213,607	1	8
Services	\$27,226,057	8	83
Commercial Rental and Leasing	\$39,258,264	11	5
Food and Drink	\$13,826	0	1
Transportation	\$1,418,187	0	2
Trade	\$93,201	0	2
	\$361,588,891	100	1,371

The bulk of the spending is in manufacturing. Therefore, it is likely that in many local impact areas, these manufacturing industries do not exist, and so should not be captured in the local impact area. They will be captured at the state and national levels. The service and manufacturing industries are shown in Table 6 and Table 7, and equipment rental and leasing spending is shown in Table 8.

**Table 6: ARRA Spending on Services by IMPLAN Sector where No Industry Sectors Exist**

<b>IMPLAN Sector</b>	<b>IMPLAN Name</b>	<b>Number of Occurrences</b>	<b>ARRA Planned Allocation</b>
369	Architectural, Engineering, and Related Services	1	\$38,520
375	Environmental and Other Technical Consulting Services	41	\$19,723,128
376	Scientific Research and Development Services	4	\$1,250,200
385	Facilities Support Services	36	\$6,197,041
393	Other Educational Services	1	\$17,168

**Table 7: ARRA Spending on Manufacturing by IMPLAN Sector Where No Industry Exists**

<b>IMPLAN Sector</b>	<b>IMPLAN Name</b>	<b>Number of Occurrences</b>	<b>ARRA Planned Allocation</b>
25	Stone Mining and Quarrying	4	\$1,242,164
26	Sand, Gravel, Clay, and Ceramic and Refractory Minerals Mining and Quarrying	39	\$27,081,019
53	Frozen Food Manufacturing	101	\$1,397,285
54	Fruit and Vegetable Canning, Pickling, and Drying	61	\$915,974
62	Bread and Bakery Product Manufacturing	28	\$218,665
65	Snack Food Manufacturing	92	\$1,517,958
69	All Other Food Manufacturing	87	\$987,301
70	Soft Drink and Ice Manufacturing	58	\$837,968
85	All Other Textile Product Mills	49	\$852,926
97	Engineered Wood Member and Truss Manufacturing	21	\$349,878
115	Petroleum Refineries	95	\$35,072,976
141	All Other Chemical Product and Preparation Manufacturing	84	\$3,801,158
149	Other Plastics Product Manufacturing	1	\$160,906
160	Cement Manufacturing	38	\$7,065,716
163	Other Concrete Product Manufacturing	1	\$8,003
171	Steel Product Manufacturing from Purchased Steel	42	\$45,452,425
174	Aluminum Product Manufacturing from Purchased Aluminum	1	\$46,282
186	Plate Work and Fabricated	1	\$115,704

<b>IMPLAN Sector</b>	<b>IMPLAN Name</b>	<b>Number of Occurrences</b>	<b>ARRA Planned Allocation</b>
	Structural Product Manufacturing		
187	Ornamental and Architectural Metal Products Manufacturing	1	\$1,255,008
195	Machine Shops	22	\$366,523
196	Turned Product and Screw, Nut, and Bolt Manufacturing	81	\$3,965,194
198	Valve and Fittings Other than Plumbing	76	\$1,996,883
200	Ball and Roller Bearing Manufacturing	1	\$219,202
201	Fabricated Pipe and Pipe Fitting Manufacturing	62	\$39,192,020
205	Construction Machinery Manufacturing	34	\$19,606,992
207	Other Industrial Machinery Manufacturing	8	\$6,171,087
214	Air Purification and Ventilation Equipment Manufacturing	2	\$291,421
222	Turbine and Turbine Generator Set Units Manufacturing	5	\$13,335,624
223	Speed Changer, Industrial High-Speed Drive, and Gear Manufacturing	2	\$4,328,812
225	Other Engine Equipment Manufacturing	1	\$154,273
226	Pump and Pumping Equipment Manufacturing	2	\$107,393
228	Material Handling Equipment Manufacturing	7	\$479,897
230	Other General Purpose Machinery Manufacturing	1	\$308,545
232	Industrial Process Furnace and Oven Manufacturing	1	\$10,737
238	Broadcast and Wireless Communications Equipment	24	\$1,575,713
239	Other Communications Equipment Manufacturing	6	\$954,562
240	Audio and Video Equipment Manufacturing	1	\$26,998
249	Search, Detection, and Navigation Instruments Manufacturing	7	\$763,361
253	Electricity and Signal Testing Instruments Manufacturing	2	\$349,473
254	Analytical Laboratory Instrument Manufacturing	1	\$219,202
266	Power, Distribution, and Specialty	9	\$21,638,970

<b>IMPLAN Sector</b>	<b>IMPLAN Name</b>	<b>Number of Occurrences</b>	<b>ARRA Planned Allocation</b>
	Transformer Manufacturing		
267	Motor and Generator Manufacturing	14	\$3,779,416
268	Switchgear and Switchboard Apparatus Manufacturing	67	\$25,676,070
270	Storage Battery Manufacturing	1	\$215,982
279	Motor Vehicle Body Manufacturing	1	\$115,704
290	Ship Building and Repairing	5	\$9,507,982
291	Boat Building	9	\$2,304,802
311	Sporting and Athletic Goods Manufacturing	7	\$545,611
317	All Other Miscellaneous Manufacturing	11	\$2,777,985

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**Table 8: Equipment Rental and Leasing Industries where No Industry Exists**

Project Name	Business Line	Work Activity Category	IMPLAN Sector	Work Activity \$\$	Work Activity	District
Arkansas - Red River Basins Chloride Control - Area VIII, Texas	Environment	Equipment	365	\$26,579	Pump Station Rehabilitation or Construction	Tulsa
Akutan Harbor, Alaska	Navigation	Equipment	365	\$17,290,665	Construction and Repair of Large Stone Breakwaters and Jetties	Alaska
Clearwater Lake, Missouri	Flood Risk Management	Equipment	365	\$11,189,799	Construction or Major Repair of Earth Dams and Spillways	Little Rock
Yazoo Basin - Upper Yazoo Projects, Mississippi	Flood Risk Management	Equipment	365	\$4,540,545	Structural Activities for Channel Maintenance (does not include dredging)	Vicksburg
Yazoo Basin - Upper Yazoo Projects, Mississippi	Flood Risk Management	Equipment	365	\$6,210,676	Structural Activities for Channel Maintenance (does not include dredging)	Vicksburg

The service industries, sectors 375 and 385, account for the majority economic leakages in local impact areas. It is likely that environmental and technical consulting industries are not present in all impact areas, especially in rural impact areas. Therefore, there were no changes made to these impact area multipliers.

Sector 385, Facility Support Services, impacts were associated with a recreation work activity associated with operations. It was determined that most of the work activities occurring in support of the Recreation operations are local in nature and are more closely aligned with IMPLAN Sector 39, Repair and Maintenance Construction Activities. The IMPLAN Sector 385, Facility Support Services, is no longer utilized in the RECONS work activities.

It is likely that commercial and industrial machinery and equipment rental companies do not exist in some local impact areas, especially rural areas; therefore these multipliers were not changed.

## Database Information

This section describes the identifiers, the data tables, and the links between the different tables that are part of the Microsoft Office Access database used to estimate the economic impacts.

### Database Tables

**Profile Table** – The profile table in the Access database provides the spending profile for each work activity ID. The spending profile includes the distribution of spending across industries and the LPCs. These profiles are described in detail in the Resource Guide for Work Activities and Spending Profiles (Appendix A).

**Main IMPLAN Tables** – This IMPLAN multiplier tables includes the regional and local industry-specific LPCs, direct ratios, and multipliers for each impact area as described above. Each local and regional impact area is identified with a Model ID. The IMPLAN tables are linked to the work activity ID table with the IMPLAN industry code.

**Main States IMPLAN Table** -- This IMPLAN multiplier tables includes the state industry-specific LPCs, direct ratios, and multipliers for each state impact area as described above. Each state or multi-state impact area is identified with a Model ID. The IMPLAN tables are linked to the work activity ID table with the IMPLAN industry code.

**Main US IMPLAN Table** -- This IMPLAN multiplier tables includes the US industry-specific LPCs, direct ratios, and multipliers for the US model, as described above. The US model was identified with a Model ID. The IMPLAN tables are linked to the work activity ID table with the IMPLAN industry code.

**Model ID to Program Code Bridge** – A bridge table links the program code with the model ID associated with the IMPLAN tables, which include local, state (multi-state), and nation. This bridge table ensures that the multipliers applied to the spending are impact area-specific. This bridge is provided in Appendix F.

**Project Data** – The USACE provided the project team with the most current ARRA allocations in August, 2010, which lists 2,959 projects. Key information, summarized in the ARRA Report, includes project name, program code, USACE district, congressional district, work description, and allocated amount. Additional information on the ARRA economic impacts can be found in the ARRA Report. The USACE also provided the project team with the CW fiscal year 2009 budget data. This data was organized to identify the dollar amount, district identifier, business line, and appropriation code. A budget line item identifier was associated with each ARRA and CW budget line item. The project team added a work activity ID to the USACE ARRA and CW

budget data. The profile table is linked to the project data table in the database using the work activity ID.

It should be noted that there are three funding amounts for each ARRA budget line item, consistent with the approach outlined in the ARRA Report. Each ARRA budget line item was reduced by 3%, of which 75% was mapped to the local or regional project location as USACE labor and overhead, and 25% was mapped to the appropriate district office location as USACE labor and overhead. The remaining 97% of the ARRA budget line item allocation was assumed to be private sector work activity funding.

**Deflator Table** – This table includes the Office of Management and Budget GDP deflators, which are applied to the spending or allocations prior to being applied to the employment multipliers.

**Margin Table** – This table includes both industry and household margins. The margins were extracted from IMPLAN, and a number of industry and household margins were modified, consistent with the section on IMPLAN Data and Modifications. The margin table is linked to the profiles table through the IMPLAN industry sectors.

**General Information Table** – This table includes general impact area information that was extracted from each IMPLAN model. This includes information such as population, land area, number of households and personal income.

**Direct FTE Table** – This table provides the part time to full time ratio for each industry sector, which was obtained from the MIG site. This table is provided in Appendix C.

**FTE Indirect and Induced** – This table provides the indirect and induced part time to full time ratio that was calculated for each work activity, as described in the Other RECONS Data section. This table is provided in Appendix D.

**Top Ten Industries Table** – This table provides the top ten employing industries and total employment associated with \$1 million in spending on each work activity, when this spending is applied to the national model.

**Counties Included Table** – This table specifies the counties and FIPS codes included in each of the models. This table is provided in Appendix G.

**States Included Table** – This table specifies the states included in each of the single and multiple state models. This table is provided in Appendix H.

**Industry Summary Bridge Table** – This table identifies the approach aggregate the 440 industries in IMPLAN to show broader categories of industry sectors. This information is provided in RECONS as the impact area profile.

## **Database Structure**

**ARRA and CW Budget Line Item Identifiers** – A unique project identifier was assigned to each ARRA budget line item.

**Program Codes** – Also called AMSCO codes, program codes are identifiers from the USACE financial and reporting systems. Program codes often, but not always, refer to a geographic location. Program codes were associated with most of the CW budget, the CEFMS/OMBIL expenditures, and the ARRA budget line items. Each program code has one or more projects associated with it. For large-scale projects identified with one program code, it was necessary to create multiple sub-locations within the program code to account for the specific locations identified in the ARRA work description. If the RECONS user chooses a program code with multiple locations, the locations and titles show up on a subsequent screen; these are also called program codes, but are the USACE program code plus one or two digits to uniquely identify the specific location.

**Work Activity ID** – The project team developed 140 work activities, each with a unique work activity ID. The work activities are described by business in the Resource Guide for Work Activities and Spending Profiles (Appendix A).

**Model Identifier** – As described above, each IMPLAN impact area was assigned a unique model ID.

**IMPLAN Industry** – There are 440 unique IMPLAN industry codes.

### **Analysis of Local, State, and National Impacts (Query Descriptions)**

Using the structure outlined above, the project team estimated the local, state, and national impact of the CW budget or ARRA budget line item. The impact is expressed in terms of employment, labor income, value added, and output. To ensure that state and national LPCs are never lower than local LPCs, a check and replace is done before queries are implemented.

Direct and secondary multipliers can vary depending on the geographic extent and economic conditions of the impact area of concern. Typically, direct effects, especially the employment and labor income multipliers, are larger in small rural areas, and smaller in urban regions. To more accurately capture these impacts, the direct state and national impacts are calculated incrementally to capture the direct impacts at the smaller geography (i.e., the local and state impact area, respectively). For example, the state direct jobs are calculated by the sum of the local direct jobs plus the amount that is captured at the state level and not at the local level (state LPC less local LPC), multiplied by the state direct employment multipliers. The state and national induced and indirect multipliers are utilized to calculate these respective impacts, as the entire rollover effect is captured within the broader geographic region.

The detailed queries are explained below.

#### 1. Local Impacts

The local capture amount is the federal spending on industries (allocated by work activity profiles) multiplied by the local impact area LPC. The direct effects are equal to the local



capture amount multiplied by the local impact area direct ratios for employment, value added, and labor income. The local capture is equal to the direct output. The local indirect impacts are equal to the local capture multiplied by the induced multipliers, and the local induced impacts are equal to the local capture multiplied by the induced multipliers. The local total effects are equal to the sum of the direct, indirect, and induced effects for output, employment, value added, and labor income.

## 2. State Impacts

The state capture amount is equal to the federal spending on industries multiplied by the state geographic capture rate. The “state increment spending” is equal to the federal spending multiplied by the difference between the state and local geographic capture rate. The direct state impacts are equal to the local direct impacts (calculated in “Local Impacts” above) plus the state increment spending multiplied by the state direct multipliers. The state indirect impacts are equal to the state capture multiplied by the state induced impacts multipliers. The state induced impacts are equal to the state capture multiplied by the state induced multipliers. The total state impacts are equal to the direct, indirect, and induced state impacts for output, employment, value added, and labor income.

## 3. National Impacts

The national capture amount is equal to the federal spending on industries multiplied by the national industry geographic capture rate. The “national increment spending” is equal to the national federal spending multiplied by the difference between the nation and state geographic capture rates. The direct national impacts are equal to the state direct impacts (calculated in “Local Impacts” above) plus the national increment multiplied by the national direct multipliers. The national indirect impacts are equal to the national capture multiplied by the national induced impacts multipliers. The national induced impacts are equal to the national capture multiplied by the national induced multipliers. The total national impacts are equal to the direct, indirect, and induced national impacts for output, employment, value added, and labor income.

## Model Testing

Large-scale impact areas were verified and quality controlled through GIS. Each of the large scale regions were mapped and were viewed to ensure that they were contiguous and appropriate to the program code name.

Michigan State University was provided with the Access database, on which they created a consistent web-based on-line tool. They verified the queries and approach and tested their on-line model such that it was consistent with the desk-top version.

## **Other RECONS Data**

### **Inflation**

The USACE spending is adjusted for inflation before it is applied to the employment ratios and multipliers, based on the consumer price index (CPI). The White House, OMB GDP deflators are utilized as the deflation indices (OMB, 2010). The spending is not adjusted prior to being applied to the output, labor income, and value added multipliers so the year the spending or funding occurs is assumed to be the current year.

### **Top Ten Industries Affected**

Each of the work activities, as described in the Resource Guide for Work Activities and Spending Profiles (Appendix A), was run through the IMPLAN Version 3 model for \$1 million spending on a project. The results were used to estimate the top ten industries, in terms of employment, for each of the work activities. Amounts allocated to IMPLAN Sector 5001 were reduced by 15.3 percent to account for payroll taxes. In cases where there were multi-sector profiles for which labor was a part, the estimates were adjusted to include the direct component, as IMPLAN only estimates induced effects for household income changes (see the Private Sector Labor Response Coefficients section).

The top ten industries affected are provided for each work activity as part of RECONS output. These affected industries apply to the nation's economy; some of these industries in the nation may not be present in local impact areas. These assumptions are provided in RECONS output reports in the User's Manual.

### **Full-Time Equivalent Employment Calculations**

One of the requirements of ARRA is to report job impacts in full-time equivalents (FTE). IMPLAN data and multipliers include full-time and part-time job estimates, and as such, need to be adjusted to provide full-time employment equivalent measures.

MIG provides a spreadsheet on its website to adjust IMPLAN's full- and part-time estimates to FTEs on an industry basis. The directly affected industries were identified in RECONS query, and the ratios were applied to these specific industries for the direct jobs adjustment. These industry ratios are provided in Appendix C.

For the indirect and induced employment effects, it was necessary to take an additional step. The top ten employing industries for each work activity in the nation were identified as part of separate step. The FTE IMPLAN ratios were identified with each of the ten industries for each work activity. From this analysis, a weighted ratio was then calculated for each work activity for each induced and indirect employment. These weighted FTE ratios were then applied to all indirect and induced employment for the relevant work activity. These indirect and induced FTE ratios by work activity are provided in Appendix D.

## Aggregating Industries for Impact Area Reporting

In RECONS, each impact area has demographic and socioeconomic information provided in one of the screens. This includes impact areas data such as population, average household income, employment, employment by industry, etc. This information is all provided by tables extracted from the IMPLAN models.

IMPLAN provides economic data on 440 industry sectors. To report employment by industry in a more user-friendly manner, the industries were aggregated into broader industry groupings. Table 9 summarizes the IMPLAN sectors included in each aggregate industry group.

**Table 9: ARRA Spending on Services by IMPLAN Sector where No Industry Sectors Exist**

<b>IMPLAN Sectors</b>	<b>Aggregated Industry Name</b>	<b>Aggregated Industry Number</b>
1-19	Agricultural, Forestry, Fishing and Hunting	1
20-30	Mining	2
31-33	Utilities	3
34-40	Construction	4
41-318	Manufacturing	5
319	Wholesale Trade	6
320-331	Retail Trade	7
332-340	Transportation and Warehousing	8
341-353	Information	9
354-360	Finance, Insurance, Real Estate, and Leasing	10
362-380	Professional, Scientific and Technological Services	11
381	Management of Companies and Enterprises	12
382-390	Administration and Waste Management Services	13
391-393,438	Education	14
394-401	Health Care and Social Assistance	15
402-410	Arts, Entertainment, and Recreation	16
411-413	Accommodations and Food Service	17
414-426	Other Services	18
427-437, 439-440	Government	19
361	Imputed Rents	20

# ARRA Approach

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RECONS was utilized to run the budget line items for USACE ARRA projects. The approach and results are documented in the ARRA Report.

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# Civil Works Budget Economic Impacts

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The economic impact of the Civil Works budget for Fiscal Year 2009 was estimated using RECONS. This section explains the approach to estimate these impacts, and summarizes the impact results.

## Civil Works Budget Approach

To utilize RECONS to estimate the economic impact of the FY2009 CW budget, the following steps were implemented:

1. Identify impact areas associated with the program codes not already captured in the RECONS
2. Develop work activity profiles for the business lines and appropriation accounts
3. Develop an approach for expenditures that were not identified with programs codes (e.g., Rivers and Harbors, Regulatory, Expenses, ASA, etc.)

### Identify Impact Areas

There were an additional 467 program codes in the CW budget that did not occur in the ARRA project database. Large-scale program code names were flagged and researched as described above. Of the 467 program codes, 99 program codes were not identified with local impact areas, only state impact areas, and 49 program codes were not identified with local or state (or multi-state) regions, only the nation. Of the 467 program codes, 409 matched existing impact areas associated with the ARRA data, while 59 new impact areas needed to be created. For the 409 program codes that matched with ARRA impact areas, if the program code was identified with multiple impact areas, the broadest impact area associated with the program code was utilized for the CW budget economic impact analysis.

### Work Activity Profiles

Spending profiles were developed for each of the business lines and appropriation accounts. This was based on an analysis of the ARRA national work activities specified by business line and appropriation account as well as an assessment of the USACE labor and overhead expenditures, also analyzed by business line and appropriation account.

The labor and overhead percentage by business line and appropriation account was obtained from the FY2009 CEFMS/OMBIL data on USACE expenditures by Method of Accomplishment (MOA) code, as described in the Business Line Operational Expenditures Section. Queries of the CEFMS/OMBIL data reveal the following USACE labor and overhead percentages as a portion of all MOA expenditures for the following business lines and appropriation accounts (Table 10).

**Table 10: Labor and Overhead Percentages by Business Line and Appropriation Account**

<b>Business Line</b>	<b>Appropriation Accounts</b>	<b>Labor and Overhead (MOA=I2)</b>	<b>Notes on Relevant Appropriation Accounts</b>
Environment	O&M and MRT-O	50%	3123 and 3135 Environment (not FUSRAP)
	I and MRT-O	51%	3121 and 3133 for environment (not FUSRAP)
	C and MRT-C	19%	3122 and 3134 for environment (not FUSRAP)
	FUSRAP	9%	FUSRAP
Emergency Management	All	46%	3123, 3135, 3121 for EM
Flood Risk Management	C and MRT-C	16%	3122 and 3134 for FRM
	I and MRT-I	55%	3121 and 3133 for FRM
	OM and MRT-O	45%	3123 and 3135 for FRM
Hydropower	C	14%	3122 and 3134 for Hydro
	OM	65%	3123 and 3135 for Hydro
	I	88%	3121 for hydro
Navigation	C and MRT-C	11%	3122 and 3134 for Nav
	I	56%	3121 and 3133 for Nav
	OM and MRT-O	23%	3123 and 3135 for Nav
Recreation	OM and MRT-O	42%	3123 and 3135 for Rec
	C	40%	3122 for Rec
	I	18%	3121 for Rec
Water Supply	OM	95%	3123 and 3135 for WS
	C	10%	3122 for WS
	I	26%	3121 for WS

These labor and overhead percentages are embedded in each of the CW profiles. Once the proportion of labor and overhead was identified, the default value of 67% wages, salaries and benefits and 33% overhead was utilized to allocate these labor expenditures for all business lines and appropriation codes. Again, this is a percentage obtained from the CEFMS/OMBIL data. USACE wages, salaries, and benefits are mapped to IMPLAN Sector 439, and overhead is mapped to IMPLAN Sector 386. For example, 50% of O&M Environmental funding is allocated to USACE labor and overhead, of which 33% is mapped to overhead and 67% is mapped to USACE wages and benefits.

Based on discussions with USACE Chief of Operations, it was estimated that approximately 75% of the labor costs are incurred at the project (i.e., local) location, while approximately 25%

of these costs are incurred at the district office location (Lichy, 2010). As a result, the LPC for the labor IMPLAN Sector 439 was set to 75% local, while 100% was assumed to be incurred at the state and national level. IMPLAN's LPC for overhead expenditures, Sector 386, was utilized for the analysis.

The ARRA budget line items, identified by business lines and appropriation accounts, were queried to develop an aggregate industry profile associated with all work activities in the grouping. The profile identified industries, not specific work activities, proportioned by the amount of spending on the relevant work activities, which are mapped to industries. The spending profile then embedded the appropriate percentage of labor and overhead for the OMBIL/CEFMS data. Industries with less than one percent of profile were deleted and the remaining profile redistributed among the remaining industries to aggregate to 100%. These profiles were based on the national work activities, again sorted by business line and appropriation account. An example is provided for the Hydropower Construction Profile in Table 11.

**Table 11: Hydropower Construction Profile for CW Budget**

<b>IMPLAN Sector</b>	<b>Spending Category Name</b>	<b>Percent</b>
222	Turbine equipment and parts	9.2
266	Power, Distribution, and Specialty Transformer Equipment	18.3
268	Switchgear and Switchboard Apparatus Equipment	12.1
36	Construction of Other New Nonresidential Structures	6.4
369	Architectural, Engineering, and Related Services	2.0
375	Planning, Environmental, Engineering and Design Studies and Services	7.8
39	Repair and Maintenance Construction Activities	16.8
5001	Private Sector Labor or Staff Augmentation	12.9
439	USACE Wages and Benefits	9.7
386	USACE Overhead	4.8
Total		100.0

Where data was not available from the ARRA budget line items, default profiles were developed based on the labor percentages, and the following IMPLAN industry sectors: investigations was mapped to IMPLAN Sector 375; construction was mapped to IMPLAN Sector 36; and operations and maintenance was mapped to IMPLAN Sector 39. The following profiles used these default allocations:

- Hydropower investigations
- Recreation construction
- Recreation investigations
- Water supply construction
- Water supply investigations

There were no Emergency Management ARRA budget items; therefore, the profile was based on the industries present in the work activities associated with this business line, including erosion control, repair and maintenance construction, and private sector labor. These work activities were identified through research on USACE activities associated with this business line. The CW budget profiles by business line and appropriation account are provided in Appendix F; the work activity IDs range from 1011 to 1029.

Once the business line and appropriation accounts profiles were developed, it was necessary to develop profiles for only the business lines. This provides the user with the flexibility to run business line expenditures either through an appropriation account or just through the business line. The business line profiles were created by weighting the business line/appropriation account profiles by the proportional funding in the FY2009 CW budget. The result is a generic business line profile. These profiles are provided in Appendix F; the work activity IDs range from 1001 to 1010.

All program code expenditures by business line and appropriation account were run through the appropriate spending profile in the location identified with the program code, which included in most cases, the local or regional, state or multi-state, and national impact areas.

#### **Approach for Non-Program Code CW Budget Data**

The final step in the process was to determine how the appropriation accounts for which there was no ARRA data would be modeled. All of the following budget items were not associated with a program code and were therefore applied at either the headquarters location (i.e., Washington, DC) or the national level. ASA and half of the Expenses account were run through the Washington DC model. The remainder of the Expenses account and the Regulatory business line were applied only to the national impact area. The Rivers and Harbors and FCCE accounts were only associated with the national impact area. The approach is summarized in Table 12.



**Table 12: Approach for CW Budget Appropriation Accounts**

<b>Account/Business Line</b>	<b>FY2009 Amount</b>	<b>Approach</b>	<b>Impact Area</b>
Rivers and Harbors – Investigations	23,000,000	Use Navigation Investigations Profile	Nation Only
Rivers and Harbors – Construction	308,000,000	Use Navigation Construction Profile	Nation Only
Rivers and Harbors – Mississippi River and Tributaries	34,000,000	Use Navigation Profile	Nation Only
Rivers and Harbors – Operations and Maintenance	35,000,000	Use Navigation Operations and Maintenance Profile	Nation Only
Flood Control and Coastal Emergencies (FCCE)	40,000,000	Use Emergency Management Profile	Nation Only
Expenses	177,000,000	USACE Labor and Overhead	Half to Washington, DC, multi-state, and nation; half only to nation
Regulatory	180,000,000	USACE Labor and Overhead	Nation Only
ASA	6,000,000	USACE Labor and Overhead	Washington, DC, multi-state, and nation

## **CW Budget Economic Impact Results**

The approach described above was applied to the 2009 fiscal year budget line items. A total of \$5.1 billion was included in the budget, which supports a total of \$14 million in economic output, almost \$8 million in value added or Gross Domestic Product, and almost 100,000 jobs nationally. Fewer direct expenditures were spent at the state and local levels due to the non-specific nature of the projects. Typically, the LPCs are lower at the local than the state level, and lower at the state level than the nation. Therefore, there is less direct output captured at the local and state levels of geography and therefore fewer economic impacts are supported in aggregate at these state and local impact regions when compared to that of the nation. Table 13 summarizes the national impacts associated with the 2009 FY budget and also includes the aggregation of the economic impacts estimated at the state/multi-state and local impact areas.

**Table 13: Summary of FY2008 CW Budget Economic Impacts**

<b>Type of Impact</b>	<b>National</b>	<b>State and Multi-State</b>	<b>Local/Regional</b>
Direct Expenditures	\$5,140,726,655	\$4,066,749,174	\$3,767,575,601
Direct Output	\$4,780,701,409	\$3,479,703,237	\$2,753,579,688
Total Output	\$14,022,815,101	\$6,856,469,530	\$4,823,403,810
Direct Jobs (FTE)	47,453	37,793	32,935
Total Jobs (FTE)	99,135	60,822	45,635
Direct Value Added	\$3,194,246,597	\$2,467,001,965	\$1,965,168,918
Total Value Added	\$7,995,679,830	\$4,378,958,299	\$3,162,881,464
Direct Labor Income	\$2,703,156,718	\$2,122,256,587	\$1,701,498,219
Total Labor Income	\$5,515,999,740	\$3,226,602,828	\$2,388,867,257

Table 14 summarizes the economic impacts of the FY2009 CW budget by business line.

**Table 14: National FY 2009 CW Budget Economic Impacts by Business Line**

Type of Impact	USACE	Economic Impacts			
		Direct	Indirect	Induced	Total
Business Line	Expenditures	Output			
Navigation	\$2,298,647,195	\$2,196,609,556	\$1,298,784,250	\$2,712,690,325	\$6,208,084,131
Flood Risk Management	\$1,314,558,809	\$1,269,851,719	\$668,861,937	\$1,788,486,488	\$3,727,200,144
Environment	\$511,233,900	\$491,296,753	\$324,365,055	\$648,943,834	\$1,464,605,643
Expenses	\$183,000,000	\$137,021,250	\$34,856,708	\$279,601,740	\$451,479,698
Hydropower	\$318,697,751	\$276,241,756	\$110,214,531	\$434,057,133	\$820,513,420
Recreation	\$270,583,000	\$270,570,400	\$137,701,245	\$374,572,096	\$782,843,741
Regulatory	\$180,000,000	\$89,550,000	\$34,285,287	\$275,018,105	\$398,853,392
Emergency Management	\$58,000,000	\$44,515,000	\$28,889,389	\$80,413,696	\$153,818,085
Water Supply	\$6,006,000	\$5,044,976	\$1,285,521	\$9,086,351	\$15,416,848
<b>Total</b>	<b>\$5,140,726,655</b>	<b>\$4,780,701,409</b>	<b>\$2,639,243,924</b>	<b>\$6,602,869,768</b>	<b>\$14,022,815,101</b>
Business Line	USACE Expenditures	Jobs			
Navigation	\$2,298,647,195	20,262	6,075	15,818	42,154
Flood Risk Management	\$1,314,558,809	14,001	3,489	10,457	27,947
Environment	\$511,233,900	4,437	1,681	3,812	9,930
Hydropower	\$183,000,000	3,111	562	2,543	6,216
Recreation	\$318,697,751	2,918	676	2,201	5,794
Expenses	\$270,583,000	1,266	217	1,645	3,128
Regulatory	\$180,000,000	973	213	1,618	2,805
Emergency Management	\$58,000,000	432	143	473	1,047
Water Supply	\$6,006,000	53	8	53	114
<b>Total</b>	<b>\$5,140,726,655</b>	<b>47,453</b>	<b>13,063</b>	<b>38,619</b>	<b>99,135</b>
Business Line	USACE Expenditures	Value Added			
Navigation	\$2,298,647,195	\$1,377,985,335	\$633,231,499	\$1,431,516,079	\$3,442,732,913
Flood Risk Management	\$1,314,558,809	\$878,642,728	\$336,738,528	\$947,143,893	\$2,162,525,148
Environment	\$511,233,900	\$297,251,348	\$160,773,995	\$345,526,721	\$803,552,063
Hydropower	\$183,000,000	\$217,875,460	\$54,117,371	\$230,583,066	\$502,575,897
Recreation	\$318,697,751	\$191,501,221	\$65,852,793	\$199,608,330	\$456,962,344
Expenses	\$270,583,000	\$126,404,594	\$19,017,143	\$149,376,576	\$294,798,313
Regulatory	\$180,000,000	\$72,494,866	\$18,705,386	\$146,927,780	\$238,128,032
Emergency Management	\$58,000,000	\$27,462,190	\$13,875,177	\$42,878,716	\$84,216,083
Water Supply	\$6,006,000	\$4,628,856	\$705,722	\$4,854,459	\$10,189,037
<b>Total</b>	<b>\$5,140,726,655</b>	<b>\$3,194,246,597</b>	<b>\$1,303,017,613</b>	<b>\$3,498,415,619</b>	<b>\$7,995,679,830</b>

Table 15 summarizes the national economic impacts of the FY 2009 CW budget by appropriation accounts.

**Table 15: National FY 2009 CW Budget Economic Impacts by Appropriation Accounts**

<b>Appropriations</b>	<b>Direct Expenditures</b>	<b>Total Output</b>	<b>Total FTE</b>	<b>Total VA</b>
O&M	\$2,474,727,471	\$6,741,890,977	47,853	\$3,910,738,318
Construction	\$1,402,000,000	\$3,967,569,345	28,868	\$2,196,516,072
Rivers and Harbors	\$400,000,000	\$1,070,494,956	7,093	\$572,463,637
Expenses	\$183,000,000	\$451,479,698	3,128	\$294,798,313
Regulatory	\$180,000,000	\$398,853,392	2,805	\$238,128,032
MR&T - O&M	\$162,743,184	\$460,331,114	3,431	\$272,503,394
FUSRAP	\$130,000,000	\$369,653,841	2,027	\$188,114,304
Investigations	\$91,000,000	\$235,208,228	1,575	\$139,811,947
MR&T - Construction	\$75,807,000	\$217,315,911	1,607	\$122,092,197
Flood Control and Coastal Emergencies	\$40,000,000	\$106,081,438	722	\$58,080,057
MR&T - Investigations	\$1,449,000	\$3,936,202	27	\$2,433,559
<b>Total</b>	<b>\$5,140,726,655</b>	<b>\$14,022,815,101</b>	<b>99,135</b>	<b>\$7,995,679,830</b>

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## **Appendix A: Resource Guide for Work Activities and Spending Profiles**

See Document:

[Work Activity Spending Profiles Resource Guide\\_Final.docx](#)

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## Appendix B: Glossary

CEFMS/OMBIL	U.S. Army Corps of Engineers Financial Management System /Operations and Maintenance Business Information Link (CEFMS/OMBIL) is used to describe the process that the USACE undertook to access the data in their Financial Management System. The OMBIL tool was utilized to query the financial data in CEFMS.
Direct Effect	The work activity expenditures made by the USACE under each business line. In the impact area in which a project is located, direct effects represent that proportion of the expenditure in each industry that flows to material and service providers in the region. For employment and labor income measures, the direct effect represents the jobs and labor income associated with the work activity.
Economic Contribution & Economic Impact	Economic impact and contribution estimate the change (impact) or existence (contribution) in economic activity (output, labor income, value added, and employment) associated with the new or already occurring economic stimulus to an economy.
Economic Output	Economic Output or total industry output is the value of production by industry for a given time period. Output can be measured either by total value of purchases by intermediate and final consumers or by intermediate outlays plus value added. It is also known as gross revenues or sales.
Employment	The work in which one is engaged; an occupation by which a person earns income. The percentage or number of people gainfully employed.
Geographic Capture Rate	The geographic capture rate or the Local Purchase Coefficient is the portion of industry sales satisfied with industries located within the impact area. In most cases, IMPLAN's trade flows Regional Purchase Coefficients (RPCs) are utilized to this rate. However, in some cases, the geographic capture rate was customized.
Gross Regional Product	Gross Regional Product, which is also known as value added, is equal to gross industry output (i.e., sales or gross revenues) less its intermediate inputs (i.e., the consumption of goods and services purchased from other US industries or imported)
IMPLAN	A software and database program that estimates input-output models based on data and assumptions of social accounting and multipliers.
Indirect Effect	The indirect effects include the backward-linked industry suppliers for any goods and services used by the directly affected activities.
Induced Effect	The induced effect occurs from household expenditures or consumer spending associated with workers' earnings from both direct and indirect labor income.
Input-output analysis	An economic model that allows the assessment of change in overall economic activity as a result of some corresponding change in one or several activities.
Labor Income	Labor income represents all forms of employment earnings. In IMPLAN's regional economic model, it is the sum of employee compensation and proprietor income.

Local Purchase Coefficient	The Local Purchase Coefficient or the geographic capture rate is the portion of USACE spending on industries (sales) captured by industries located within the impact area.
Margins	Represents the difference between producer and purchaser prices in a retail or wholesale environment. The margin provides an allocation of spending to the appropriate manufacturing, retail and wholesale, and transportation industries.
Method of Accomplishment	The MOA code is a field within the USACE Financial Management System /Operations and Maintenance Business Information Link (CEFMS/OMBIL) databases which identifies inhouse labor (I2), inhouse other resources (I1), contract inside government (C1), and contract outside government (C2).
Multiplier	A factor that quantifies the change in total economic activity as compared to the injection of capital investments or revenues.
Regional Purchase Coefficients	Ratios (from 0 to 1) that represent the portion of regional production value used to satisfy local demand.
Secondary Effects	Secondary effects refer to the indirect and induced multiplier effects.
Trade Flows	The IMPLAN National Trade Flows Model utilizes a doubly constrained gravity model using IMPLAN's county-level estimates of commodity demand and supply. The Trade Flows model provides IMPLAN estimates of the Regional Purchase coefficients (RPCs). In the RECONS, the RPC is also referred to as the geographic capture rate.
Value-Added Components	These payments made by industry to workers, which also include interest, profits, and indirect business taxes. In IMPLAN, value added component consist of employee compensation, proprietary income, other property type income, and indirect business taxes. Value-added is an estimate of the Gross Regional or State Product.



## Appendix C: FTE Industry Ratios

FTE Ratios by Industry Applied to the Direct Employment Impacts (Source: IMPLAN)

IND	IMPLAN Description	FTE
1	Oilseed farming	0.85676
2	Grain farming	0.85676
3	Vegetable and melon farming	0.85676
4	Fruit farming	0.85676
5	Tree nut farming	0.85676
6	Greenhouse, nursery, and floriculture production	0.85676
7	Tobacco farming	0.85676
8	Cotton farming	0.85676
9	Sugarcane and sugar beet farming	0.85676
10	All other crop farming	0.85676
11	Cattle ranching and farming	0.85676
12	Dairy cattle and milk production	0.85676
13	Poultry and egg production	0.85676
14	Animal production, except cattle and poultry and eggs	0.85676
15	Forest nurseries, forest products, and timber tracts	0.879884
16	Logging	0.879884
17	Fishing	0.879884
18	Hunting and trapping	0.879884
19	Support activities for agriculture and forestry	0.879884
20	Oil and gas extraction	0.986395
21	Coal mining	0.982143
22	Iron ore mining	0.982143
23	Copper, nickel, lead, and zinc mining	0.982143
24	Gold, silver, and other metal ore mining	0.982143
25	Stone mining and quarrying	0.982143
26	Sand, gravel, clay, and ceramic and refractory minerals mining and quarrying	0.982143
27	Other nonmetallic mineral mining and quarrying	0.982143
28	Drilling oil and gas wells	0.986254
29	Support activities for oil and gas operations	0.986254
30	Support activities for other mining	0.986254
31	Electric power generation, transmission, and distribution	0.987342
32	Natural gas distribution	0.987342
33	Water, sewage and other systems	0.987342
34	Construction of new nonresidential commercial and health care structures	0.966756

35	Construction of new nonresidential manufacturing structures	0.966756
36	Construction of other new nonresidential structures	0.966756
37	Construction of new residential permanent site single- and multi-family structures	0.966756
38	Construction of other new residential structures	0.966756
39	Maintenance and repair construction of nonresidential maintenance and repair	0.966756
40	Maintenance and repair construction of residential structures	0.966756
41	Dog and cat food manufacturing	0.967475
42	Other animal food manufacturing	0.967475
43	Flour milling and malt manufacturing	0.967475
44	Wet corn milling	0.967475
45	Soybean and other oilseed processing	0.967475
46	Fats and oils refining and blending	0.967475
47	Breakfast cereal manufacturing	0.967475
48	Sugar cane mills and refining	0.967475
49	Beet sugar manufacturing	0.967475
50	Chocolate and confectionery manufacturing from cacao beans	0.967475
51	Confectionery manufacturing from purchased chocolate	0.967475
52	Nonchocolate confectionery manufacturing	0.967475
53	Frozen food manufacturing	0.967475
54	Fruit and vegetable canning, pickling, and drying	0.967475
55	Fluid milk and butter manufacturing	0.967475
56	Cheese manufacturing	0.967475
57	Dry, condensed, and evaporated dairy product manufacturing	0.967475
58	Ice cream and frozen dessert manufacturing	0.967475
59	Animal (except poultry) slaughtering, rendering, and processing	0.967475
60	Poultry processing	0.967475
61	Seafood product preparation and packaging	0.967475
62	Bread and bakery product manufacturing	0.967475
63	Cookie, cracker, and pasta manufacturing	0.967475
64	Tortilla manufacturing	0.967475
65	Snack food manufacturing	0.967475
66	Coffee and tea manufacturing	0.967475
67	Flavoring syrup and concentrate manufacturing	0.967475
68	Seasoning and dressing manufacturing	0.967475
69	All other food manufacturing	0.967475
70	Soft drink and ice manufacturing	0.967475
71	Breweries	0.967475
72	Wineries	0.967475
73	Distilleries	0.967475
74	Tobacco product manufacturing	0.967475

75	Fiber, yarn, and thread mills	0.969789
76	Broadwoven fabric mills	0.969789
77	Narrow fabric mills and schiffli machine embroidery	0.969789
78	Nonwoven fabric mills	0.969789
79	Knit fabric mills	0.969789
80	Textile and fabric finishing mills	0.969789
81	Fabric coating mills	0.969789
82	Carpet and rug mills	0.969789
83	Curtain and linen mills	0.969789
84	Textile bag and canvas mills	0.969789
85	All other textile product mills	0.969789
86	Apparel knitting mills	0.969349
87	Cut and sew apparel contractors	0.969349
88	Men's and boys' cut and sew apparel manufacturing	0.969349
89	Women's and girls' cut and sew apparel manufacturing	0.969349
90	Other cut and sew apparel manufacturing	0.969349
91	Apparel accessories and other apparel manufacturing	0.969349
92	Leather and hide tanning and finishing	0.969349
93	Footwear manufacturing	0.969349
94	Other leather and allied product manufacturing	0.969349
95	Sawmills and wood preservation	0.97757
96	Veneer and plywood manufacturing	0.97757
97	Engineered wood member and truss manufacturing	0.97757
98	Reconstituted wood product manufacturing	0.97757
99	Wood windows and doors and millwork	0.97757
100	Wood container and pallet manufacturing	0.97757
101	Manufactured home (mobile home) manufacturing	0.97757
102	Prefabricated wood building manufacturing	0.97757
103	All other miscellaneous wood product manufacturing	0.97757
104	Pulp mills	0.980263
105	Paper mills	0.980263
106	Paperboard Mills	0.980263
107	Paperboard container manufacturing	0.980263
108	Coated and laminated paper, packaging paper and plastics film manufacturing	0.980263
109	All other paper bag and coated and treated paper manufacturing	0.980263
110	Stationery product manufacturing	0.980263
111	Sanitary paper product manufacturing	0.980263
112	All other converted paper product manufacturing	0.980263
113	Printing	0.978091
114	Support activities for printing	0.978091
115	Petroleum refineries	0.982609

116	Asphalt paving mixture and block manufacturing	0.982609
117	Asphalt shingle and coating materials manufacturing	0.982609
118	Petroleum lubricating oil and grease manufacturing	0.982609
119	All other petroleum and coal products manufacturing	0.982609
120	Petrochemical manufacturing	0.982609
121	Industrial gas manufacturing	0.983759
122	Synthetic dye and pigment manufacturing	0.983759
123	Alkalies and chlorine manufacturing	0.983759
124	Carbon black manufacturing	0.983759
125	All other basic inorganic chemical manufacturing	0.983759
126	Other basic organic chemical manufacturing	0.983759
127	Plastics material and resin manufacturing	0.983759
128	Synthetic rubber manufacturing	0.983759
129	Artificial and synthetic fibers and filaments manufacturing	0.983759
130	Fertilizer manufacturing	0.983759
131	Pesticide and other agricultural chemical manufacturing	0.983759
132	Medicinal and botanical manufacturing	0.983759
133	Pharmaceutical preparation manufacturing	0.983759
134	In-vitro diagnostic substance manufacturing	0.983759
135	Biological product (except diagnostic) manufacturing	0.983759
136	Paint and coating manufacturing	0.983759
137	Adhesive manufacturing	0.983759
138	Soap and cleaning compound manufacturing	0.983759
139	Toilet preparation manufacturing	0.983759
140	Printing ink manufacturing	0.983759
141	All other chemical product and preparation manufacturing	0.983759
142	Plastics packaging materials and unlaminated film and sheet manufacturing	0.98543
143	Unlaminated plastics profile shape manufacturing	0.98543
144	Plastics pipe and pipe fitting manufacturing	0.98543
145	Laminated plastics plate, sheet (except packaging), and shape manufacturing	0.98543
146	Polystyrene foam product manufacturing	0.98543
147	Urethane and other foam product (except polystyrene) manufacturing	0.98543
148	Plastics bottle manufacturing	0.98543
149	Other plastics product manufacturing	0.98543
150	Tire manufacturing	0.98543
151	Rubber and plastics hoses and belting manufacturing	0.98543
152	Other rubber product manufacturing	0.98543
153	Pottery, ceramics, and plumbing fixture manufacturing	0.992032
154	Brick, tile, and other structural clay product manufacturing	0.992032
155	Clay and nonclay refractory manufacturing	0.992032

156	Flat glass manufacturing	0.992032
157	Other pressed and blown glass and glassware manufacturing	0.992032
158	Glass container manufacturing	0.992032
159	Glass product manufacturing made of purchased glass	0.992032
160	Cement manufacturing	0.992032
161	Ready-mix concrete manufacturing	0.992032
162	Concrete pipe, brick, and block manufacturing	0.992032
163	Other concrete product manufacturing	0.992032
164	Lime and gypsum product manufacturing	0.992032
165	Abrasive product manufacturing	0.992032
166	Cut stone and stone product manufacturing	0.992032
167	Ground or treated mineral and earth manufacturing	0.992032
168	Mineral wool manufacturing	0.992032
169	Miscellaneous nonmetallic mineral products	0.992032
170	Iron and steel mills and ferroalloy manufacturing	0.978118
171	Steel product manufacturing from purchased steel	0.978118
172	Alumina refining and primary aluminum production	0.978118
173	Secondary smelting and alloying of aluminum	0.978118
174	Aluminum product manufacturing from purchased aluminum	0.978118
175	Primary smelting and refining of copper	0.978118
176	Primary smelting and refining of nonferrous metal (except copper and aluminum)	0.978118
177	Copper rolling, drawing, extruding and alloying	0.978118
178	Nonferrous metal (except copper and aluminum) rolling, drawing, extruding and alloying	0.978118
179	Ferrous metal foundries	0.978118
180	Nonferrous metal foundries	0.978118
181	All other forging, stamping, and sintering	0.979513
182	Custom roll forming	0.979513
183	Crown and closure manufacturing and metal stamping	0.979513
184	Cutlery, utensil, pot, and pan manufacturing	0.979513
185	Handtool manufacturing	0.979513
186	Plate work and fabricated structural product manufacturing	0.979513
187	Ornamental and architectural metal products manufacturing	0.979513
188	Power boiler and heat exchanger manufacturing	0.979513
189	Metal tank (heavy gauge) manufacturing	0.979513
190	Metal can, box, and other metal container (light gauge) manufacturing	0.979513
191	Ammunition manufacturing	0.979513
192	Arms, ordnance, and accessories manufacturing	0.979513
193	Hardware manufacturing	0.979513
194	Spring and wire product manufacturing	0.979513
195	Machine shops	0.979513

196	Turned product and screw, nut, and bolt manufacturing	0.979513
197	Coating, engraving, heat treating and allied activities	0.979513
198	Valve and fittings other than plumbing	0.979513
199	Plumbing fixture fitting and trim manufacturing	0.979513
200	Ball and roller bearing manufacturing	0.979513
201	Fabricated pipe and pipe fitting manufacturing	0.979513
202	Other fabricated metal manufacturing	0.979513
203	Farm machinery and equipment manufacturing	0.98406
204	Lawn and garden equipment manufacturing	0.98406
205	Construction machinery manufacturing	0.98406
206	Mining and oil and gas field machinery manufacturing	0.98406
207	Other industrial machinery manufacturing	0.98406
208	Plastics and rubber industry machinery manufacturing	0.98406
209	Semiconductor machinery manufacturing	0.98406
210	Vending, commercial, industrial, and office machinery manufacturing	0.98406
211	Optical instrument and lens manufacturing	0.98406
212	Photographic and photocopying equipment manufacturing	0.98406
213	Other commercial and service industry machinery manufacturing	0.98406
214	Air purification and ventilation equipment manufacturing	0.98406
215	Heating equipment (except warm air furnaces) manufacturing	0.98406
216	Air conditioning, refrigeration, and warm air heating equipment manufacturing	0.98406
217	Industrial mold manufacturing	0.98406
218	Metal cutting and forming machine tool manufacturing	0.98406
219	Special tool, die, jig, and fixture manufacturing	0.98406
220	Cutting tool and machine tool accessory manufacturing	0.98406
221	Rolling mill and other metalworking machinery manufacturing	0.98406
222	Turbine and turbine generator set units manufacturing	0.98406
223	Speed changer, industrial high-speed drive, and gear manufacturing	0.98406
224	Mechanical power transmission equipment manufacturing	0.98406
225	Other engine equipment manufacturing	0.98406
226	Pump and pumping equipment manufacturing	0.98406
227	Air and gas compressor manufacturing	0.98406
228	Material handling equipment manufacturing	0.98406
229	Power-driven handtool manufacturing	0.98406
230	Other general purpose machinery manufacturing	0.98406
231	Packaging machinery manufacturing	0.98406
232	Industrial process furnace and oven manufacturing	0.98406
233	Fluid power process machinery	0.98406
234	Electronic computer manufacturing	0.986646
235	Computer storage device manufacturing	0.986646
236	Computer terminals and other computer peripheral equipment	0.986646

	manufacturing	
237	Telephone apparatus manufacturing	0.986646
238	Broadcast and wireless communications equipment	0.986646
239	Other communications equipment manufacturing	0.986646
240	Audio and video equipment manufacturing	0.986646
241	Electron tube manufacturing	0.986646
242	Bare printed circuit board manufacturing	0.986646
243	Semiconductor and related device manufacturing	0.986646
244	Electronic capacitor, resistor, coil, transformer, and other inductor manufacturing	0.986646
245	Electronic connector manufacturing	0.986646
246	Printed circuit assembly (electronic assembly) manufacturing	0.986646
247	Other electronic component manufacturing	0.986646
248	Electromedical and electrotherapeutic apparatus manufacturing	0.986646
249	Search, detection, and navigation instruments manufacturing	0.986646
250	Automatic environmental control manufacturing	0.986646
251	Industrial process variable instruments manufacturing	0.986646
252	Totalizing fluid meters and counting devices manufacturing	0.986646
253	Electricity and signal testing instruments manufacturing	0.986646
254	Analytical laboratory instrument manufacturing	0.986646
255	Irradiation apparatus manufacturing	0.986646
256	Watch, clock, and other measuring and controlling device manufacturing	0.986646
257	Software, audio, and video media reproducing	0.986646
258	Magnetic and optical recording media manufacturing	0.986646
259	Electric lamp bulb and part manufacturing	0.983721
260	Lighting fixture manufacturing	0.983721
261	Small electrical appliance manufacturing	0.983721
262	Household cooking appliance manufacturing	0.983721
263	Household refrigerator and home freezer manufacturing	0.983721
264	Household laundry equipment manufacturing	0.983721
265	Other major household appliance manufacturing	0.983721
266	Power, distribution, and specialty transformer manufacturing	0.983721
267	Motor and generator manufacturing	0.983721
268	Switchgear and switchboard apparatus manufacturing	0.983721
269	Relay and industrial control manufacturing	0.983721
270	Storage battery manufacturing	0.983721
271	Primary battery manufacturing	0.983721
272	Communication and energy wire and cable manufacturing	0.983721
273	Wiring device manufacturing	0.983721
274	Carbon and graphite product manufacturing	0.983721
275	All other miscellaneous electrical equipment and component manufacturing	0.983721

276	Automobile manufacturing	0.988934
277	Light truck and utility vehicle manufacturing	0.988934
278	Heavy duty truck manufacturing	0.988934
279	Motor vehicle body manufacturing	0.988934
280	Truck trailer manufacturing	0.988934
281	Motor home manufacturing	0.988934
282	Travel trailer and camper manufacturing	0.988934
283	Motor vehicle parts manufacturing	0.988934
284	Aircraft manufacturing	0.988842
285	Aircraft engine and engine parts manufacturing	0.988842
286	Other aircraft parts and auxiliary equipment manufacturing	0.988842
287	Guided missile and space vehicle manufacturing	0.988842
288	Propulsion units and parts for space vehicles and guided missiles	0.988842
289	Railroad rolling stock manufacturing	0.988842
290	Ship building and repairing	0.988842
291	Boat building	0.988842
292	Motorcycle, bicycle, and parts manufacturing	0.988842
293	Military armored vehicle, tank, and tank component manufacturing	0.988842
294	All other transportation equipment manufacturing	0.988842
295	Wood kitchen cabinet and countertop manufacturing	0.97561
296	Upholstered household furniture manufacturing	0.97561
297	Nonupholstered wood household furniture manufacturing	0.97561
298	Metal and other household furniture (except wood) manufacturing <sup>1</sup>	0.97561
299	Institutional furniture manufacturing	0.97561
300	Wood television, radio, and sewing machine cabinet manufacturing <sup>1</sup>	0.97561
301	Office furniture and custom architectural woodwork and millwork manufacturing <sup>1</sup>	0.97561
302	Showcase, partition, shelving, and locker manufacturing	0.97561
303	Mattress manufacturing	0.97561
304	Blind and shade manufacturing	0.97561
305	Surgical and medical instrument manufacturing	0.969743
306	Surgical appliance and supplies manufacturing	0.969743
307	Dental equipment and supplies manufacturing	0.969743
308	Ophthalmic goods manufacturing	0.969743
309	Dental laboratories	0.969743
310	Jewelry and silverware manufacturing	0.969743
311	Sporting and athletic goods manufacturing	0.969743
312	Doll, toy, and game manufacturing	0.969743
313	Office supplies (except paper) manufacturing	0.969743
314	Sign manufacturing	0.969743
315	Gasket, packing, and sealing device manufacturing	0.969743



316	Musical instrument manufacturing	0.969743
317	All other miscellaneous manufacturing	0.969743
318	Broom, brush, and mop manufacturing	0.969743
319	Wholesale trade	0.963663
320	Retail - Motor vehicle and parts	0.871001
321	Retail - Furniture and home furnishings	0.870653
322	Retail - Electronics and appliances	0.870653
323	Retail - Building material and garden supply	0.870653
324	Retail - Food and beverage	0.870408
325	Retail - Health and personal care	0.870653
326	Retail - Gasoline stations	0.870653
327	Retail - Clothing and clothing accessories	0.870653
328	Retail - Sporting goods, hobby, book and music	0.870653
329	Retail - General merchandise	0.870626
330	Retail - Miscellaneous	0.870653
331	Retail - Nonstore	0.870653
332	Air transportation	0.947047
333	Rail transportation	0.945545
334	Water transportation	0.938462
335	Truck transportation	0.946259
336	Transit and ground passenger transportation	0.944954
337	Pipeline transportation	0.95
338	Scenic and sightseeing transportation and support activities for transportation	0.945319
339	Couriers and messengers	0.945319
340	Warehousing and storage	0.945455
341	Newspaper publishers	0.917611
342	Periodical publishers	0.917611
343	Book publishers	0.917611
344	Directory, mailing list, and other publishers	0.917611
345	Software publishers	0.917611
346	Motion picture and video industries	0.825974
347	Sound recording industries	0.825974
348	Radio and television broadcasting	0.980896
349	Cable and other subscription programming	0.980896
350	Internet publishing and broadcasting	0.980896
351	Telecommunications	0.980896
352	Data processing, hosting, and related services	0.936556
353	Other information services	0.980896
354	Monetary authorities and depository credit intermediation	0.962336
355	Nondepository credit intermediation and related activities	0.962336
356	Securities, commodity contracts, investments, and related activities	0.961364

357	Insurance carriers	0.968683
358	Insurance agencies, brokerages, and related activities	0.968683
359	Funds, trusts, and other financial vehicles	0.966292
360	Real estate	0.911521
361	Imputed rental value for owner-occupied dwellings	0
362	Automotive equipment rental and leasing	0.906344
363	General and consumer goods rental except video tapes and discs	0.906344
364	Video tape and disc rental	0.906344
365	Commercial and industrial machinery and equipment rental and leasing	0.906344
366	Lessors of nonfinancial intangible assets	0.906344
367	Legal services	0.945236
368	Accounting, tax preparation, bookkeeping, and payroll services	0.945119
369	Architectural, engineering, and related services	0.945119
370	Specialized design services	0.945119
371	Custom computer programming services	0.945215
372	Computer systems design services	0.945215
373	Other computer related services, including facilities management	0.945215
374	Management, scientific, and technical consulting services	0.945119
375	Environmental and other technical consulting services	0.945119
376	Scientific research and development services	0.945119
377	Advertising and related services	0.945119
378	Photographic services	0.945119
379	Veterinary services	0.945119
380	All other miscellaneous professional, scientific, and technical services	0.945119
381	Management of companies and enterprises	0.97287
382	Employment services	0.923086
383	Travel arrangement and reservation services	0.923086
384	Office administrative services	0.923086
385	Facilities support services	0.923086
386	Business support services	0.923086
387	Investigation and security services	0.923086
388	Services to buildings and dwellings	0.923086
389	Other support services	0.923086
390	Waste management and remediation services	0.966102
391	Elementary and secondary schools	0.891369
392	Junior colleges, colleges, universities, and professional schools	0.891369
393	Other educational services	0.891369
394	Offices of physicians, dentists, and other health practitioners	0.897431
395	Home health care services	0.897431
396	Medical and diagnostic labs and outpatient and other ambulatory care services	0.897431
397	Hospitals	0.937695

398	Nursing and residential care facilities	0.897592
399	Child day care services	0.862203
400	Individual and family services	0.862203
401	Community food, housing, and other relief services, including rehabilitation services	0.862203
402	Performing arts companies	0.84486
403	Spectator sports	0.84486
404	Promoters of performing arts and sports and agents for public figures	0.84486
405	Independent artists, writers, and performers	0.84486
406	Museums, historical sites, zoos, and parks	0.84486
407	Fitness and recreational sports centers	0.844749
408	Bowling centers	0.844749
409	Amusement parks, arcades, and gambling industries	0.844749
410	Other amusement and recreation industries	0.844749
411	Hotels and motels, including casino hotels	0.915381
412	Other accommodations	0.915381
413	Food services and drinking places	0.793822
414	Automotive repair and maintenance, except car washes	0.847376
415	Car washes	0.847376
416	Electronic and precision equipment repair and maintenance	0.847376
417	Commercial and industrial machinery and equipment repair and maintenance	0.847376
418	Personal and household goods repair and maintenance	0.847376
419	Personal care services	0.847376
420	Death care services	0.847376
421	Dry-cleaning and laundry services	0.847376
422	Other personal services	0.847376
423	Religious organizations	0.847376
424	Grantmaking, giving, and social advocacy organizations	0.847376
425	Civic, social, professional, and similar organizations	0.847376
426	Private households	0.847376
427	Postal service	0.8125
428	Federal electric utilities	0.8125
429	Other Federal Government enterprises	0.8125
430	State and local government passenger transit	0.974122
431	State and local government electric utilities	0.974122
432	Other state and local government enterprises	0.974122
437	Employment and payroll for SL Government Non-Education	0.856726
438	Employment and payroll for SL Government Education	0.794036
439	Employment and payroll for Federal Non-Military	0.929298
440	Employment and payroll for Federal Military	0.685943

## Appendix D: FTE Work Activity Ratios for Indirect and Induced Employment Impacts

Source: Analysis run by LBG, described in IMPLAN Data and Modifications Section

Work Activity ID	Work Activity Title	Indirect FTE Ratio	Induced FTE Ratio
1	Legal Services	0.90748	0.87771
2	Erosion Control and Earthwork Activities	0.93522	0.88071
3	Planning, Environmental, Engineering and Design Studies and Services	0.91397	0.88058
4	General New Construction	0.93522	0.88071
5	Repair and Maintenance Construction Activities	0.91713	0.88058
6	Water and Wastewater Infrastructure New Construction	0.93522	0.88071
7	Water and Wastewater Infrastructure Repair and Major Maintenance Construction Activities	0.91713	0.88058
8	Labor or Staff Augmentation	NA	0.88319
9	Employee Training and Certification	0.91631	0.88058
10	IT Product Development	0.91812	0.88019
11	Purchase of Equipment, Materials and Supplies	0.92758	0.87668
12	Crane Rehabilitation	0.94704	0.88265
13	Land Surveys and Boundary Management Activities	0.90286	0.88081
16	Pumping Station Rehabilitation or Construction	0.93062	0.88058
17	Studies and Investigations for Emergency Management	NA	0.88053
18	Repair Construction during Emergency Response/Recovery	0.91713	0.88058
19	New Construction during Emergency Response/Recovery	0.93522	0.88071
20	Emergency Supply and Distribution	0.92825	0.88156
21	Vocational Training	0.91631	0.88058
22	Ecosystem and Habitat Restoration or Improvement, Non-Construction Activities	0.90558	0.88144
23	Invasive Species Management - Plant and Animal Control	0.90558	0.88144
24	Remediation Activities and Services	0.92128	0.87912

25	Environmental Planning Services	0.91397	0.88058
26	Construction of Fish Facilities at Dams	0.93522	0.88071
27	Ground Water Recharge Sites Construction	0.93522	0.88071
28	Fish Hatcheries, Wildlife Facilities, and Sanctuaries Maintenance and Upgrades	0.91713	0.88058
29	Cultural Resources Survey and Mapping Activities	0.91397	0.88058
30	Natural Resources Inventories, Habitat or Forestry Assessments	0.91397	0.88058
31	Cultural Resources Protection Activities	0.92153	0.88099
32	Invasive Species Management - Education and Outreach	0.91631	0.88058
33	Construction Activities for Ecosystem and Habitat Restoration or Improvements	0.93267	0.87984
34	Repair and Maintenance of Levees and Floodwalls	0.91713	0.88058
35	Levee Inspection Services	0.90286	0.88081
36	Electrical Repair	0.91038	0.87949
37	Repair and Maintenance of Flood Risk Management Dams and Gates	0.91713	0.88058
38	Construction and Major Repairs of Earth Levees	0.92352	0.87990
39	Construction and Major Repairs of Floodwalls	0.92432	0.88062
40	Construction or Major Repair of Earth Dams and Spillways	0.92563	0.88116
41	Structural Activities for Channel Maintenance (does not include dredging)	0.92554	0.88096
42	Floodway Control Construction Projects	0.92914	0.88124
43	Construction or Major Repair of Concrete Dams and Spillways	0.93011	0.88127
44	Spillway and Intake Gate Repairs	0.91038	0.87949
45	General Operations and Routine Maintenance Activities of Hydropower Facilities	0.91038	0.87949
46	Motor Control Center Replacement and Installation	0.95175	0.88184
47	Spillway and Intake Gate Fabrication and Installation	0.94013	0.88026
48	Transformer Supply	0.94637	0.88050
49	Turbine Rehabilitation	0.94396	0.88064
50	Generator Rehabilitation	0.94396	0.88149

51	Transformer Installation	0.93367	0.87987
52	Ancillary Electrical Replacement	0.95175	0.88027
53	Turbine Repair	0.91438	0.88191
54	Placement Area Construction and Rehabilitation	0.93522	0.88071
55	Construction and Repair of Concrete / Wooden Breakwaters and Jetties	0.93522	0.88071
56	Structural Activities for Channel Maintenance (does not include dredging)	0.93522	0.88071
57	Repair and Maintenance of Locks	0.91038	0.87949
58	Repair and Maintenance of Navigation or Multi-Purpose Dams	0.91038	0.87949
59	Lock construction of On-site features	0.92787	0.88122
60	Lock or dam gate fabrication and installation	0.94030	0.88043
61	New Construction or Major Repair of Navigation or Multi-Purpose Dams	0.93016	0.88022
62	Construction and Repair of Large Stone Breakwaters and Jetties	0.92361	0.88081
63	Dredging Hopper	0.93318	0.88128
68	Dredging Large Mechanical_Gulf Coast and Lower Mississippi	0.00000	0.88214
69	Dredging Large Mechanical_Southeast	0.92785	0.88118
70	Dredging Large Mechanical_West Coast	0.00000	0.88214
71	Dredging Large Mechanical_Northeast and Mid_Atlantic	0.00000	0.88214
72	Dredging Large Mechanical_Alaska and Hawaii	0.93299	0.88142
73	Dredging Small Mechanical_Gulf Coast and Lower Mississippi	0.92745	0.88065
74	Dredging Small Mechanical_Southeast	0.92813	0.88084
75	Dredging Small Mechanical_Great Lakes	0.92964	0.88129
76	Dredging Small Mechanical_Northeast and Mid_Atlantic	0.92478	0.88139
77	Dredging Small Mechanical_West Coast	0.92478	0.88139
78	Dredging Small Mechanical_Alaska and Hawaii	0.92478	0.88139
79	Dredging Pipelines_Gulf Coast and Lower Mississippi	0.93895	0.88122
80	Dredging Pipelines_Southeast	0.93930	0.88150
81	Dredging Pipelines_Great Lakes	0.93930	0.88167
82	Dredging Pipelines_Northeast and Mid_Atlantic	0.94124	0.88120
83	Dredging Pipelines_West Coast	0.94102	0.88143

84	Dredging Pipelines_Alaska and Hawaii	0.94035	0.88133
85	General Operations and Routine Maintenance of Recreation Areas	0.91711	0.88019
86	New Construction in Recreation Areas	0.93522	0.88071
87	Repair and Maintenance Construction in Recreation Areas	0.91713	0.88058
88	Environmental and Technical Consulting Services	0.91397	0.88058
89	Dredging Large Mechanical_Central Inland Waterways	0.92982	0.88116
90	Dredging Small Mechanical_Central Inland Waterways	0.92891	0.88101
91	Dredging Pipelines_Central Inland Waterways	0.00000	0.88214
92	FUSRAP	0.92115	0.87995
93	USACE Labor	NA	0.88053
94	USACE Admin	0.90146	0.88010
95	Purchase and Installation of Non-Technical Equipment and Structures - Miscellaneous Equipment	0.93746	0.88124
96	Purchase and Installation of Non-Technical Equipment and Structures - Playground Equipment	0.92618	0.88125
97	Purchase and Installation of Non-Technical Equipment and Structures - Plumbing Fixtures	0.93200	0.88126
98	Purchase and Installation of Non-Technical Equipment and Structures - Pre-fabricated Metal Structures	0.92480	0.88102
99	Purchase and Installation of Technical Equipment - Channels	0.95177	0.88122
100	Purchase and Installation of Technical Equipment - Generator	0.94099	0.88109
101	Purchase and Installation of Technical Equipment - Piezometers and other Technical Equipment	0.93494	0.88105
102	Purchase of Equipment, Materials and Supplies - Air Compressor	0.93588	0.88001
103	Purchase of Equipment, Materials and Supplies - Boats	0.92133	0.88002
104	Purchase of Equipment, Materials and Supplies - Buoy	0.91704	0.87996
105	Purchase of Equipment, Materials and Supplies - Concrete Security Barriers	0.93222	0.87999
106	Purchase of Equipment, Materials and Supplies - Construction and Maintenance Machinery and Equipment	0.94742	0.88002

107	Purchase of Equipment, Materials and Supplies - Digital Line Relays	0.92852	0.88003
108	Purchase of Equipment, Materials and Supplies - Dump Truck and other Motor Vehicles	0.94538	0.88003
109	Purchase of Equipment, Materials and Supplies - Elevator	0.93413	0.88002
110	Purchase of Equipment, Materials and Supplies - Equipment for Testing Electricity and Electrical Signals	0.92824	0.88005
111	Purchase of Equipment, Materials and Supplies - Filters/Screens	0.93390	0.88003
112	Purchase of Equipment, Materials and Supplies - Furnace	0.94069	0.88004
113	Purchase of Equipment, Materials and Supplies - Gearboxes	0.93502	0.88003
114	Purchase of Equipment, Materials and Supplies - Generator	0.94427	0.88004
115	Purchase of Equipment, Materials and Supplies - Gravel	0.94190	0.87986
116	Purchase of Equipment, Materials and Supplies - Handrails	0.94612	0.88000
117	Purchase of Equipment, Materials and Supplies - HVAC	0.93593	0.88003
118	Purchase of Equipment, Materials and Supplies - Load-sensing Safety Equipment	0.93342	0.88004
119	Purchase of Equipment, Materials and Supplies - Log Booms	0.88842	0.87968
120	Purchase of Equipment, Materials and Supplies - Miscellaneous Electricity Equipment	0.93508	0.88003
121	Purchase of Equipment, Materials and Supplies - Miscellaneous Equipment	0.93498	0.87990
122	Purchase of Equipment, Materials and Supplies - Motors	0.94296	0.88002
123	Purchase of Equipment, Materials and Supplies - Piezometers and other Technical Equipment	0.93494	0.88004
124	Purchase of Equipment, Materials and Supplies - Pre-fabricated Metal Structures	0.92480	0.88001
125	Purchase of Equipment, Materials and Supplies - Publications	0.91856	0.87992
126	Purchase of Equipment, Materials and Supplies - Pumps	0.94344	0.88002
127	Purchase of Equipment, Materials and Supplies - Radio Emergency Equipment and GPS Equipment	0.93668	0.88003



128	Purchase of Equipment, Materials and Supplies - Rock and Crushed Stone	0.95496	0.87984
129	Purchase of Equipment, Materials and Supplies - SCADA Communications Equipment	0.93173	0.88003
130	Purchase of Equipment, Materials and Supplies - Security System and Camera	0.93173	0.88003
131	Purchase of Equipment, Materials and Supplies - Steel Doors	0.93413	0.88002
132	Purchase of Equipment, Materials and Supplies - Stop Logs	0.93835	0.88004
133	Purchase of Equipment, Materials and Supplies - Street Cleaner	0.93637	0.88002
134	Purchase of Equipment, Materials and Supplies - Tainter Gate Parts	0.94218	0.88002
135	Purchase of Equipment, Materials and Supplies - Thrust Bearing Oil Coolers	0.94218	0.88002
136	Purchase of Equipment, Materials and Supplies - Toe Drain	0.92963	0.88002
137	Purchase of Equipment, Materials and Supplies - Tractor or other Industrial Machinery	0.93839	0.88003
138	Purchase of Equipment, Materials and Supplies - Transformer	0.94223	0.88004
139	Purchase of Equipment, Materials and Supplies - Video Equipment	0.94336	0.88002
140	Purchase and Installation of Non-Technical Equipment and Structures - Construction and Maintenance Machinery and Equipment	0.94335	0.88108

## **Appendix E: Generic Multipliers by Industry for Each Type of Region**

The following table provides the generic multipliers for four different types of regions: large scale, metropolitan, micropolitan, and rural. Each multiplier is provided for each \$1 million in direct output.

[Generic Multipliers forManual.xlsx](#)

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## **Appendix F: USACE Program Codes Mapped to Local and State/Multi State Impact Area**

The following table provides the USACE program codes and names and the mapping to the local/regional and state/multistate impact areas and model numbers.

[ProgCode&ModelName\\_ForManual.xlsx](#)

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## **Appendix G: Local/Regional Impact Areas and Included Counties**

The following table provides counties included in each of the local/regional impact areas.

[Model Counties Included For Manual.xlsx](#)

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## Appendix H: Multi-State Impact Areas and Included States

The following table provides the states included in the multi-state impact areas.

[States Impact Areas For Manual.xlsx](#)

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## Appendix I: Civil Works Budget Spending Profiles

Work Activity ID	Business Line and/or Appropriation Account – Title of Profile	IMPLAN Sector	Spending Category Name	Percentage
1001	Environment for CW Budget	171	Metals and Steel Materials	1.4
		19	Support Activities for Agriculture and Forestry	3.4
		26	Aggregate Materials	0.8
		36	Construction of Other New Nonresidential Structures	20.7
		39	Repair and Maintenance Construction Activities	5.7
		365	Industrial and Machinery Equipment Rental and Leasing	2.1
		369	Architectural, Engineering, and Related Services	0.7
		371	IT Product Development	0.2
		375	Planning, Environmental, Engineering and Design Studies and Services	13.1
		376	Scientific Research and Development Services	0.2
		386	USACE Overhead	8.1
		390	Remediation Services	22
		393	Other Education Services	0.3
		439	USACE Wages and Benefits	16.4
5001	Private Sector Labor or Staff Augmentation	4.9		
1002	FRM for CW Budget	171	Metals and Steel Materials	1.2
		26	Aggregate Materials	3.4
		36	Construction of Other New Nonresidential Structures	9.1
		365	Industrial and Machinery Equipment Rental and Leasing	11.5
		375	Planning, Environmental, Engineering and Design Studies and Services	3.6
		39	Repair and Maintenance Construction Activities	24.2
		5001	Private Sector Labor or Staff Augmentation	12.8
		439	USACE Wages and Benefits	20.3
		386	USACE Overhead	10
		369	Architectural, Engineering, and Related Services	3.9
	Hydropower for CW	222	Turbine equipment and parts	2.4

1003	Budget	266	Power, Distribution, and Specialty Transformer Equipment	2.4		
		268	Switchgear and Switchboard Apparatus Equipment	3.3		
		36	Construction of Other New Nonresidential Structures	0.7		
		369	Architectural, Engineering, and Related Services	0.3		
		375	Planning, Environmental, Engineering and Design Studies and Services	3.1		
		39	Repair and Maintenance Construction Activities	10.8		
		5001	Private Sector Labor or Staff Augmentation	8.2		
		439	USACE Wages and Benefits	39.5		
		386	USACE Overhead	19.4		
		171	Metals and Steel Materials	3		
		205	Construction Machinery Manufacturing	2.6		
		417	Industrial Machinery and Equipment Repair and Maintenance	4.3		
		1004	Navigation for CW Budget	115	Dredging Fuel	6.1
				171	Metals and Steel Materials	4.3
				198	Textiles, Lubricants, and Metal Valves and Parts (Dredging)	2.1
				268	Switchgear and Switchboard Apparatus Equipment	0.3
				290	Hopper Equipment and Repairs	1.9
365	Industrial and Machinery Equipment Rental and Leasing			7.3		
5001	Private Sector Labor or Staff Augmentation			15.3		
69	All Other Food Manufacturing			1.9		
375	Planning, Environmental, Engineering and Design Studies and Services			4.6		
201	Pipeline Dredge Equipment and Repairs			5.2		
26	Aggregate Materials			2.9		
36	Construction of Other New Nonresidential Structures			13.6		
39	Repair and Maintenance Construction Activities			4.1		
417	Industrial Machinery and Equipment Repair and Maintenance			10.5		

		439	USACE Wages and Benefits	13.3
		386	USACE Overhead	6.6
1005	Recreation for CW Budget	36	Construction of Other New Nonresidential Structures	17.6
		39	Repair and Maintenance Construction Activities	36.7
		5001	Private Sector Labor or Staff Augmentation	3.9
		439	USACE Wages and Benefits	28
		386	USACE Overhead	13.8
1006	Water Supply for CW Budget	375	Planning, Environmental, Engineering and Design Studies and Services	5.1
		439	USACE Wages and Benefits	63.6
		386	USACE Overhead	31.3
1008	Regulatory for CWB	439	USACE Wages and Benefits	67
		386	USACE Overhead	33
1009	Expenses for CWB	439	USACE Wages and Benefits	67
		386	USACE Overhead	33
1010	Emergency Management for CWB	439	USACE Wages and Benefits	31
		39	Repair and Maintenance Construction Activities	30
		36	Erosion Control and Earthwork Activities	20
		5001	Private Sector Labor or Staff Augmentation	3
		386	USACE Overhead	16
1011	Environment Construction for CW Budget	171	Metals and Steel Materials	2.9
		19	Support Activities for Agriculture and Forestry	4.6
		26	Aggregate Materials	1.6
		36	Construction of Other New Nonresidential Structures	39.7
		365	Industrial and Machinery Equipment Rental and Leasing	4.3
		375	Planning, Environmental, Engineering and Design Studies and Services	10
		39	Repair and Maintenance Construction Activities	8.4
		5001	Private Sector Labor or Staff Augmentation	9.7
		386	USACE Overhead	6.2
		439	USACE Wages and Benefits	12.6
1012	FRM Construction for CW Budget	171	Metals and Steel Materials	2.3
		26	Aggregate Materials	5.8
		36	Construction of Other New Nonresidential Structures	11.8



		365	Industrial and Machinery Equipment Rental and Leasing	20.1
		375	Planning, Environmental, Engineering and Design Studies and Services	1.5
		39	Repair and Maintenance Construction Activities	22.5
		5001	Private Sector Labor or Staff Augmentation	20.3
		439	USACE Wages and Benefits	10.5
		386	USACE Overhead	5.2
1013	Hydropower Construction for CW Budget	222	Turbine equipment and parts	9.2
		266	Power, Distribution, and Specialty Transformer Equipment	18.3
		268	Switchgear and Switchboard Apparatus Equipment	12.1
		36	Construction of Other New Nonresidential Structures	6.4
		369	Architectural, Engineering, and Related Services	2
		375	Planning, Environmental, Engineering and Design Studies and Services	7.8
		39	Repair and Maintenance Construction Activities	16.8
		5001	Private Sector Labor or Staff Augmentation	12.9
		439	USACE Wages and Benefits	9.7
		386	USACE Overhead	4.8
1014	Navigation Construction for CW Budget	115	Dredging Fuel	3.9
		171	Metals and Steel Materials	9.5
		198	Textiles, Lubricants, and Metal Valves and Parts (Dredging)	1.5
		201	Pipeline Dredge Equipment and Repairs	3.5
		26	Aggregate Materials	4.6
		268	Switchgear and Switchboard Apparatus Equipment	1.1
		290	Hopper Equipment and Repairs	2
		36	Construction of Other New Nonresidential Structures	16.6
		365	Industrial and Machinery Equipment Rental and Leasing	11.6
		375	Planning, Environmental, Engineering and Design Studies and Services	4.6
		39	Repair and Maintenance Construction Activities	3.1
		417	Industrial Machinery and Equipment Repair and	7.5

			Maintenance	
		5001	Private Sector Labor or Staff Augmentation	18.4
		69	Dredging Food and Beverages	1.3
		439	USACE Wages and Benefits	7.2
		386	USACE Overhead	3.6
1015	Environment-FUSRAP for CW Budget	375	Planning, Environmental, Engineering and Design Studies and Services	4.1
		390	Remediation Services	87.2
		439	USACE Wages and Benefits	5.8
		386	USACE Overhead	2.9
1016	Environment Investigations for CW Budget	371	IT Product Development	2.7
		375	Environmental and Other Technical Consulting Services	44.6
		5001	Private Sector Labor or Staff Augmentation	2
		439	USACE Wages and Benefits	34
		386	USACE Overhead	16.7
1017	FRM Investigations for CW Budget	375	Planning, Environmental, Engineering and Design Studies and Services	44.6
		439	USACE Wages and Benefits	37.1
		386	USACE Overhead	18.3
1018	Navigation Investigations for CW Budget	375	Planning, Environmental, Engineering and Design Studies and Services	43.6
		439	USACE Wages and Benefits	37.8
		386	USACE Overhead	18.6
1019	Environment Operations and Maintenance for CW Budget	19	Support Activities for Agriculture and Forestry	6.1
		36	Construction of Other New Nonresidential Structures	6.7
		369	Architectural, Engineering, an Related Services	3.8
		375	Planning, Environmental, Engineering and Design Studies and Services	21.5
		376	Scientific Research and Development Services	1.1
		39	Repair and Maintenance Construction Activities	8.2
		390	Remediation Services	1
		393	Other Education Services	1.8
		439	USACE Wages and Benefits	33.4
		386	USACE Overhead	16.4
1020	FRM Operations and Maintenance for CW Budget	26	Aggregate Materials	1.1
		36	Construction of Other New Nonresidential Structures	6.6

		365	Industrial and Machinery Equipment Rental and Leasing	2.4
		369	Architectural, Engineering, an Related Services	8.6
		375	Planning, Environmental, Engineering and Design Studies and Services	3.3
		39	Repair and Maintenance Construction Activities	27.7
		5001	Private Sector Labor or Staff Augmentation	5
		439	USACE Wages and Benefits	30.4
		386	USACE Overhead	14.9
1021	Hydropower Operations and Maintenance for CW Budget	171	Metals and Steel Materials	3.4
		205	Construction Machinery Manufacturing	3
		222	Turbine Equipment and Parts	1.4
		268	Switchgear and Switchboard Apparatus Equipment	2
		375	Planning, Environmental, Engineering and Design Studies and Services	2.4
		39	Repair and Maintenance Construction Activities	9.9
		417	Industrial Machinery and Equipment Repair and Maintenance	4.9
		5001	Private Sector Labor or Staff Augmentation	7.5
		439	USACE Wages and Benefits	43.9
		386	USACE Overhead	21.6
1022	Navigation Operations and Maintenance for CW Budget	115	Petroleum Refining	7
		171	Metals and Steel Materials	2.4
		198	Textiles, Lubricants, and Metal Valves and Parts (Dredging)	2.4
		201	Pipeline Dredge Equipment and Repairs	5.9
		26	Aggregate Materials	2.3
		290	Hopper Equipment and Repairs	1.9
		36	Construction of Other New Nonresidential Structures	12.7
		365	Industrial and Machinery Equipment Rental and Leasing	5.8
		375	Planning, Environmental, Engineering and Design Studies and Services	4
		39	Repair and Maintenance Construction Activities	4.6
		417	Industrial Machinery and Equipment Repair and	11.8

			Maintenance	
		5001	Private Sector Labor or Staff Augmentation	14.3
		69	All Other Food Manufacturing	2.1
		439	USACE Wages and Benefits	15.3
		386	USACE Overhead	7.5
1023	Recreation Operations and Maintenance for CW Budget	36	Construction of Other New Nonresidential Structures	17.6
		39	Repair and Maintenance Construction Activities	36.7
		5001	Private Sector Labor or Staff Augmentation	3.9
		439	USACE Wages and Benefits	28
		386	USACE Overhead	13.8
1024	Water Supply Operations and Management for CW Budget	375	Planning, Environmental, Engineering and Design Studies and Services	5.1
		439	USACE Wages and Benefits	63.6
		386	USACE Overhead	31.3
1025	Hydropower Investigations for CW Budget	439	USACE Wages and Benefits	59
		386	USACE Overhead	29
		375	Planning, Environmental, Engineering and Design Studies and Services	12
1026	Water Supply Construction for CW Budget	439	USACE Wages and Benefits	6.7
		386	USACE Overhead	3.3
		36	Construction of Other New Nonresidential Structures	90
1027	Water Supply Investigations for CW Budget	439	USACE Wages and Benefits	17.4
		386	USACE Overhead	8.6
		375	Planning, Environmental, Engineering and Design Studies and Services	74
1028	Recreation Construction for CW Budget	439	USACE Wages and Benefits	26.8
		386	USACE Overhead	13.2
		36	Construction of Other New Nonresidential Structures	6
1029	Recreation Investigations for CW Budget	439	USACE Wages and Benefits	12.1
		386	USACE Overhead	5.9
		375	Planning, Environmental, Engineering and Design Studies and Services	82