Methodology Manual

Stemming-From Effects of USACE Programs and Infrastructure

RECONS MODEL

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

Contents

Introduction

The U.S Army Corps of Engineers (USACE) Institute for Water Resources is currently developing an economic impact tool, called Regional Economic System (RECONS) that will provide accurate and defensible estimates of local job creation and retention and other economic measures such as value added, income and sales. RECONS will be utilized as a means to document and manage the performance of direct investment spending of the USACE as directed by the American Recovery and Reinvestment Act (ARRA). It will also allow the USACE to evaluate direct investment spending associated with the annual Civil Work budget of the eight business lines managed by the USACE.

A second focus of the effort is to extend RECONS to evaluate the economic contribution of industries and activities that are dependent on or benefit from USACE programs and infrastructure; these downstream effects are termed "stemming from effects." An analysis was undertaken to determine the feasibility of estimating these stemming-from effects associated with all eight business lines. A summary of this process is provided in the Stemming-From Effects Feasibility Analysis Document. Evaluation of stemming from effects associated with the USACE programs and infrastructure is focused on the economic activities of primary users or beneficiaries.

In a study of stemming from effects associated with U.S. Forest Service products and services, the Forest Service described this relationship as "sawmills and veneer mills were identified as primary users of Forest Service stumpage" (USFS, 2003). The Forest Service states: "The extent to which forward linkages (or stemming from effects) were included in the evaluation was limited to primary users of forest outputs and service, since these users are so clearly associated with these products" (USFS, 2003). The authors explained that evaluating further stemming from effects associated with forest projects and services was problematic because the use of projects by secondary users is uncertain and the relative contribution of forest output to secondary production is quite small.

Stemming from effects can be estimated for the following business lines: navigation, hydropower, environment/FUSRAP, and recreation. Of these, navigation (port and inland waterway industries), environment/FUSRAP, and recreation stemming from effects have been determined to be conducive to estimation in the interactive economic modeling tool, RECONS. The focus of this document is to describe the methodology for the development of the RECONS modules for stemming for each of these business units.

Stemming from effects were also evaluated for navigation inland-waterway dependent industries, hydropower marketing and distribution activities, hydropower or low-cost electricity-dependent industries. These stemming from effects are not included in RECONS, but are analyzed in separate documents.

Navigation

The objective of the USACE's Navigation Business Line is to provide safe, reliable, and efficient waterborne transportation systems. This includes inland waterways, and coastal and lake harbors and channels. The USACE accomplishes this mission through a combination of capital improvements and the operation and maintenance of existing facilities and waterways. There are clear stemming from effects associated with the USACE program and infrastructure. These effects include: 1) economic contribution of the port and inland waterway industries that utilize infrastructure maintained by the USACE (cargo handling, warehousing, barges); and 2) industries that benefit from the port and waterway infrastructure and utilize the waterways to ship their products (port- and inland waterway-dependent users).

This section will describe the methodology for two RECONS modules: port industries and inland waterway industries. The stemming from effects associated with the inland waterway depending users is provided in a separate document.

Coastal and Great Lake Port Industries

A thorough literature review of other models and studies that have evaluated stemming from effects associated with navigation infrastructure uncovered a model that was developed by the U.S. Department of Transportation Maritime Administration (MARAD) (U.S. Department of Transportation, 2000). Port Kit was developed by the MARAD Administration more than a decade ago for coastal and Great Lakes ports. The model makes the link between cargo tonnage and spending at a port and the employment and income generated by industries using those facilities. According to the MARAD Port Kit User's manual, Port Kit is capable of:

- Quantification of the economic value of deep-draft port activities in readily understandable terms, such as employment, income, and tax revenues generated;
- Shows how a deep-draft port is linked to other industries;
- Can be used to investigate "what if" policy simulations (such as shifting trade patterns and dredging policies); and
- Assesses the economic implications of potential investments and changes in business activity.

The Port Kit model has found widespread use in the Deep Draft Port Industry but is now somewhat out-dated. There are efforts underway to update the model with fresh economic information that reflects changes in wages, expenditures and cargo handling technology. Work on the model is being done by Rutgers University. A new version has been completed but must be vetted by MARAD prior to release to the public. In addition, the updated MARAD version will not permit the user to regionalize the impacts but will produce impacts on a national level only. In order to derive regional results, the model must be customized by Rutgers staff. The updated Port Kit is currently being used to generate economic impact estimates for the St. Lawrence Seaway, which is funded by the Great Lakes Maritime Research Institute and is being conducted by the Labovitz School of Business at the University of Minnesota at Duluth (Dorn et al., 2009). Port Kit is currently aligned with RIMSII industries. The project team used the

currently available version of Port Kit as a basis for developing the RECONS module that applies to ports.

Stemming from effects associated with USACE navigation programs and infrastructure associated with ports are a function of how much cargo is moving in and out of the port. USACE port infrastructure supports the current level and composition of cargo, which is a user input into RECONS to estimate current economic contribution. Additionally, a project that promises to raise the level of cargo moving in and out of the port holding all other influences (such as prices and income) constant, could also be evaluated using this RECONS module but with a slightly different approach (approximation of impacts can be derived using an accurate projection of the potential increase in cargo). This would occur if, for example, the project permits access of larger, more cost-efficient vessels into the port and therefore raises its attractiveness to shippers and carriers.

The RECONS port module will estimate the economic contribution of cargo shipments within ports for various types of cargo[1] (for example, dry bulk, automobiles, containers, etc.). This includes various port industries, such as port services, fuel services, cargo handling and packing, supplies and warehousing and storage services. Inland modes of transportation are also provided in the RECONS module, including rail, air, barge, pipeline, and short and long-distance trucking. Port kit provides the default expenditures for the port service and inland transportation per ton of cargo shipped. The inland modal shares are provided by the Freight Analysis Framework (FAF[2]); these are default values provided for each type of cargo and can be modified with better information from the port. The cargo type and volumes will need to be provided by the RECONS user.

The process of estimating stemming from effects from coastal and Great Lakes ports is depicted in the following diagram. The various aspects to estimate the stemming from effects of the port industries based on a modified version of Port Kit consist of the following, each of which is further described below:

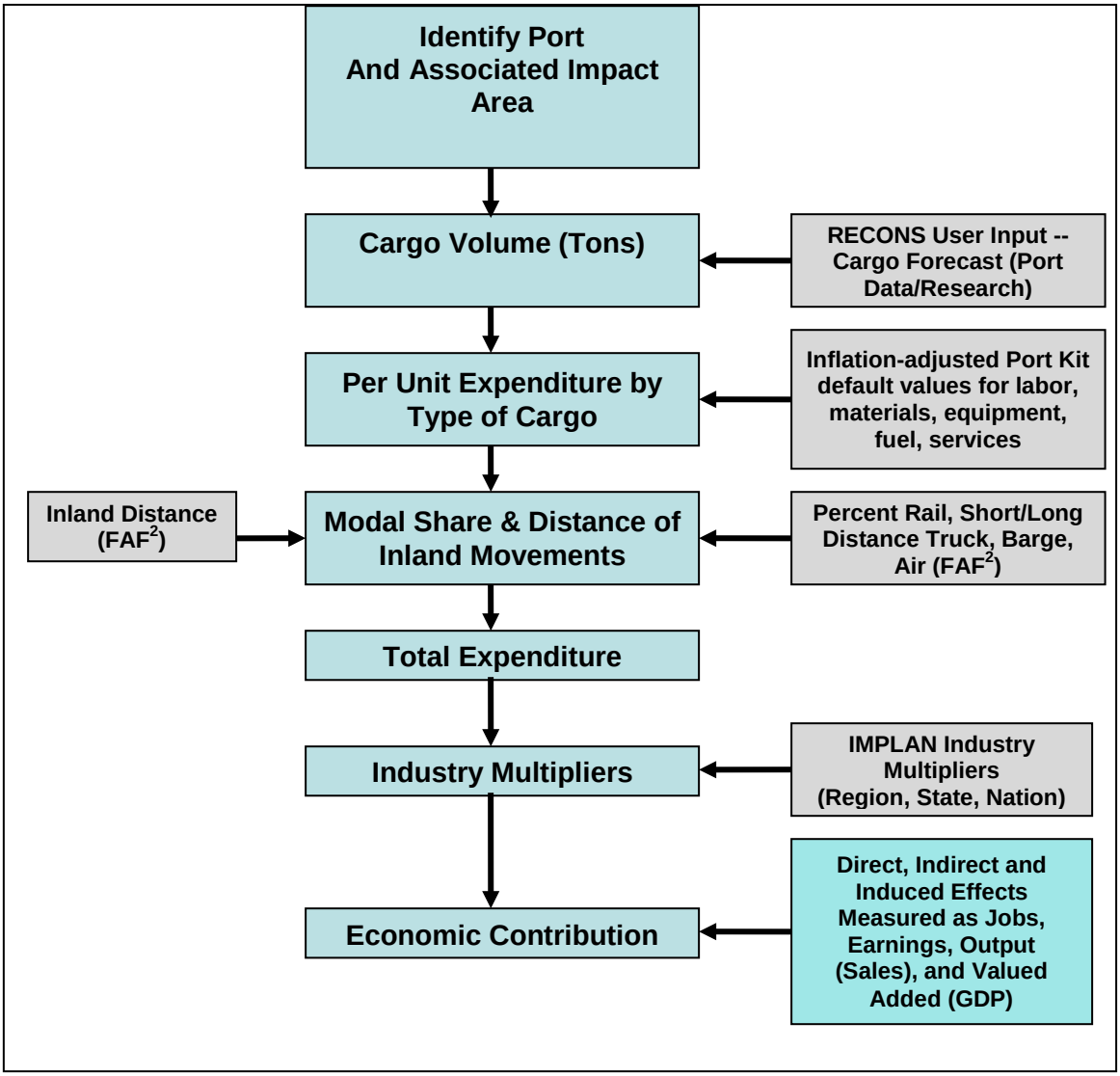
- Port locations and impact areas

[1] Port Kit contains six types of cargo:

- Automobiles are handled at many ports and are usually carried on specialized roll-on/roll-off ships.
- Break bulk cargo is typically material stacked on wooden pallets and lifted into and out of the hold of a vessel by cranes on the dock or aboard the ship itself. The volume of break bulk cargo has declined dramatically worldwide as containerization has grown. A safe and secure way to secure break bulk and freight in containers is by using Dunnage Bags.
- Dry bulk cargo, such as salt, oil, tallow, and Scrap metal, is usually defined as commodities that are neither on pallets nor in containers. Bulk cargoes are not handled as individual pieces, the way heavy-lift and project cargoes are. Alumina, grain, gypsum, logs and wood chips, for instance, are bulk cargoes.
- Liquid bulk cargo includes products such as oil, chemical, or liquefied petroleum gas.
- Containers are the largest and fastest growing cargo category at most ports worldwide. Containerized cargo includes everything from auto parts, machinery and manufacturing components to shoes and toys to frozen meat and seafood.
- Project cargo and the heavy lift cargo include items like manufacturing equipment, air conditioners, factory components, generators, wind turbines, military equipment, and almost any other oversized or overweight cargo which is too big or too heavy to fit into a container.

- Mapping of RIMSII industries to IMPLAN industries; extracting relevant industry economic multipliers derived from IMPLAN
- Port default expenditures by sector for cargo
- Identify cargo tonnage
- Modal shares and distance for inland movements

Figure 1. Flow Diagram of Ports Industries Stemming From Effects



Port Impact Areas

In general, coastal and Great Lakes ports serve national markets as well as their own. Shippers and carriers generally make decisions to call a particular port based on the full cost of transport from ultimate origin to ultimate destination. These costs would include cargo handling costs, vessel-voyage costs and inland transport costs. Although there are differences across ports in efficiency, work rules, hours of operation and technology, they are generally not sufficient to sway shipper/carrier decisions on their own. Therefore it is the routing costs rather than the individual port costs that define the market. This feature means that on some routes, for example, the Port of New York and New Jersey competes directly with the Port of Los Angeles and Long Beach in spite of being on opposite sides of the country. The total economic contribution of a port is therefore dispersed nationally. However, from the perspective of the labor required to move the goods, the geographic market is concentrated immediately around the port.

The project team concluded that the impact area be defined as the Metropolitan Statistical Area (MSA) or micropolitan statistical area in which the port lies. MSA's are where the majority of the US population resides and they account for the majority of economic activity within a region. If a port does not reside in an MSA or micropolitan area, a functional economic analysis was undertaken to identify the appropriate single or multiple county region. This methodology is consistent with the impact areas in other RECONS modules and is further described in the Methodology Manual for RECONS for Federal Spending. In most cases, the coastal and Great Lakes ports lie within an MSA. In some cases, multiple ports lie within a single MSA. The use of MSA's for defining labor markets is a standard practice for identified economic impact regions.

There were 123 principal coastal and Great Lakes ports, as identified by the Navigation Data Center, were utilized in the ports module of RECONS. The inland waterway ports were excluded from the list as they were included in the inland waterway RECONS module. Table 1 lists all the coastal and Great Lakes ports that are included in RECONS.

Table 1. Ports Included in RECONS

State	Port Names
Alaska	Valdez, Nikiski, Kivilina, Anchorage, Unalaska
Alabama	Mobile
California	Long Beach, Los Angeles, Richmond, Oakland, San Diego, Redwood City, San Francisco, Sacramento, Port Hueneme
Connecticut	New Haven, Bridgeport, Stamford
Delaware	New Castle, Wilmington
Florida	Tampa, Port Everglades, Jacksonville, Miami, Panama City, Port Manatee, Port Canaveral, Palm Beach, Pensacola
Georgia	Savannah, Brunswick
Hawaii	Honolulu, Barbers Point, Kahului, Hilo, Kawaihae Harbor, Nawiliwili
Illinois	Chicago
Indiana	Indiana Harbor, Gary, Burns Waterway Harbor, Buffington
Louisiana	Port of South Louisiana, New Orleans, Lake Charles, Port of Plaquemines
Massachusetts	Boston, Fall River
Maryland	Baltimore
Maine	Portland, Searsport
Michigan	Detroit, Presquie Isle, St. Clair, Stoneport, Escanaba, Calcite, Port Inland, Alpena, Port Dolomite, Muskegon, Charlevoix, Marquette, Drummond Island, Grand Haven, Monroe, Marine City
Minnesota	Duluth-Superior, Silver Bay
Mississippi	Pascagoula, Biloxi, Gulfport
North Carolina	Wilmington, Morehead City
New Hampshire	Portsmouth
New Jersey	Paulsboro, Camden-Gloucester, Trenton
New York	New York, Buffalo, Port Jefferson, Hempstead
Ohio	Toledo, Cleveland, Ashtabula, Conneaut, Marblehead, Sandusky, Lorain, Fairport Harbor, Huron
Oregon	Portland, Coos Bay
Pennsylvania	Philadelphia, Marcus Hook, Chester
Rhode Island	Providence
South Carolina	Charleston
Texas	Houston, Corpus Christi, Beaumont, Texas City, Port Arthur, Freeport, Galveston, Matagorda Port Lv Pt Com, Brownsville, Victoria, Sabin Pass
Virginia	Norfolk Harbor, Newport News, Richmond, Hopewell
Washington	Tacoma, Seattle, Anacortes, Vancouver, Longview, Everett, Grays Harbor, Port Angeles
Wisconsin	Milwaukee, Green Bay

Shipment Expenditures

Port Kit contains default expenditures from 2005 that were adjusted for inflation in the RECONS module. The project team adjusted the prices using the Producer Price Index at the 6-digit NAICS code level provided by the US Bureau of Labor Statistics. The inflation-adjusted costs for types of cargo included in the RECONS modeule are provided Appendix B.

The cost elements associated with the port include port services, cargo handling, fuel service, vessel and crew supplies, cargo storage, cargo packing and unpacking, crew leave and finally, inland transport costs. The NAICS codes were provided by the Port Kit for each port industry or activity. These sectors were mapped to the appropriate IMPLAN sector, as shown in Appendix B, Table 23. IMPLAN's 2007 NAICS to IMPLAN industry bridge table was utilized for this mapping.[2]

The costs were then aggregated by IMPLAN sector for each type of cargo. Table 2 summarizes the costs for the various types of cargo by type of cost, with the appropriate IMPLAN industry noted.

Table 2. Port Activity Costs by Type of Cargo (2008$)

Type of Port Activity	IMPLAN Industry	Containers ($/TEU)	Break Bulk ($/ton)	Autos ($/auto)	Dry Bulk ($/ton)	Liquid Bulk ($/ton)	Project Cargo ($/ton)
Short Haul Trucking	335	252.88	11.24	39.34	11.24	22.48	22.48
Long Haul Trucking	335	558.61	27.93	55.86	27.93	52.51	39.10
Rail	333	326.18	3.85	39.14	3.85	6.64	7.12
Barge	334	11.65	1.37	2.06	1.37	1.37	1.37
Port Services	338	123.85	12.18	42.53	2.29	24.02	0.82
Fuel	115	21.22	2.64	4.23	2.47	2.64	2.64
Warehousing	340	19.43	3.70	52.31	0.00	24.97	0.13
Security	387	2.15	6.45	0.12	0.00	6.45	0.00
Lodging	411	0.00	0.08	0.12	0.08	0.08	0.08
Supplies	319	1.57	0.20	1.08	0.05	0.20	0.05

IMPLAN industries receiving less than 0.5 percent of the cost were combined into one IMPLAN industry, wholesale trade.

[2] The IMPLAN Bridge table is available at: http://implan.com/v3/index.php?option=com_docman&task=doc_download&gid=110&Itemid=138.)

The geographic capture rate or local purchase coefficient (LPC) was set to 100 percent for the following port activities: port services, warehousing, security, lodging, and supplies. For the remaining activities, trucking, rail, barge, and fuel, the RECONS ports module utilized IMPLAN's RPCs as the geographic capture rate.

Inland Modal Shares and Distances

The modal shares are used to distribute the inland transport expenditures between trucking, rail, air and inland barge. RECONS contain default data on modal shares of inland movements obtained from the Freight Analysis Framework (FAF^2) dataset. FAF^2 is a US Department of Transportation product that provides estimates of US freight tonnage movements by origin and destination, by mode and by commodity including movements associated with international trade. The data is taken from a variety of sources including the US Census Commodity Flow Survey. The public version of FAF^2 contains only aggregate geographic and commodity information. It is sufficient to provide estimates of point-to-point distances between the seaport of entry and ultimate inland destination on the import side or ultimate US origin to port of exit on the export side.

The project team provided these estimates as RECONS modal share defaults for trucking, rail, barge and air distances, and are summarized in Table 2. If the user has better information on the inland modal shares for a specific port, he/she can modify the default percentages.

Table 3. Port Activity Costs by Type of Cargo (2008$)

Type of Port Activity	Containers ($/TEU)	Break Bulk ($/ton)	Automobiles ($/auto)	Dry Bulk ($/ton)	Liquid Bulk ($/ton)	Project Cargo ($/ton)
Short Haul Trucking	40%	70%	5%	0%	0%	70%
Long Haul Trucking	50%	15%	45%	20%	0%	0%
Rail	10%	15%	50%	65%	90%	20%
Barge	0%	0%	0%	15%	10%	10%
Total	100%	100%	100%	100%	100%	100%

Source: US Department of Transportation, Freight Analysis Framework

Summary

The RECONS ports module will enable the USACE to estimate the economic contributions generated by port and transportation activity associated with any coastal or Great Lakes seaport. The module will contain adjusted default expenditure inputs based on the original MARAD Port Kit and provide other inputs such as modal share and average inland transport distances from the FAF^2 data, each of which will be tied to the port of interest. The USACE user will need to provide input data on the type and volume of cargo at each port (in short tons, containers, or number of automobiles) in order to estimate economic contribution of the port of interest.

Inland Waterway Industries

Similar to the port activities, the inland waterway industries and activities include waterway transportation, tow boats, assessorial activities, and transportation legs to and from the waterway. Assessorial activities include cargo handling, loading and unloading, terminal operations, and other related support activities. These are the industries that operate on or are directly associated with moving cargo on the inland waterways. There are also industries that utilize the waterways – paying the waterway industries to ship their goods on the inland waterways. The economic contribution of these waterway-dependent industries is analyzed in a separate document.

The RECONS inland waterways module, similar to the ports module, utilizes sample cargo shipper costs per ton of commodity shipped and the significant data input for estimating economic contribution of water ways. These waterway shipper rates are routinely collected by USACE for input into the USACE Navigation Investment Model (NIM) and include costs and volumes for loading at the ultimate origin, haul to the waterside (by truck, rail, conveyor, pipe), trans-loading onto the barge, barge line-haul, unloading, and trans-loading to another mode, if applicable (Langdon, 2010).[3] These rates are currently available for the Ohio River System (ORS), which includes the Ohio River and its tributaries. If the ORS movement also moves on non-ORS segments, these costs are also included. Current rate data from other waterway systems is yet to be determined.

The shipper rates were utilized to estimate impacts to waterborne transportation and support industries by the eight different commodities (and one generic category). Transportation legs have been excluded from this module as the location of their impacts is often difficult to identify. The data has also been parsed, such that the user can choose to analyze only an origin or destination shipment or an origin and destination shipment. Specific aspects of the methodology are further described in this section.

Shipper Costs

The sample shipper rates were obtained from experts at the Navigation Planning Center. The rate data was identified by the following fields:

1. Waterway line-haul (waterborne transportation)
2. Assessorial – these are the support activities, including terminal operations, port operation facilities, loading and unloading services, etc.
3. Transportation legs to waterway from origin and from waterway to destination:
    a. Rail;
    b. Truck;
    c. Pipeline; and/or
    d. Conveyor.

[3] These sample rates were obtained from Buddy Langdon at the Navigation Planning Center on July16, 2010. The sample rates were based on 2004 movements at 2007 prices.

The primarily cost drivers of these rates are: 1) the type of commodity (e.g., WCSC 5-digit codes which are typically aggregated into nine commodity groups); and 2) volume or amount shipped.

Inland modes of transportation (i.e., rail, trucking, pipeline) were not considered in the inland waterway industries RECONS module due to the broad and dispersed nature of this activity, and the resulting uncertainty of the location of the spending and employment impacts. Economic impacts are estimated associated with both the assessorial and waterline haul costs by commodity.

The RECONS user will be able to identify if the assessorial costs should include **only** origin **or** destination loading and handling impacts, or **both** the origin **and** destination costs. Therefore, the shipper rate data was analyzed to reflect these differences. If the user chooses both origin and destination assessorial costs, then the chosen impact area should be broad to capture both origin and destination locations.

The water line haul and assessorial costs were identified by the type of commodity; costs were also identified for a generic commodity, for use if the RECONS user does not have information regarding the commodity being shipped. Table 4 and 5 summarize the cost profiles by tons of commodity shipped as defaults in RECONS.

Table 4. Shipper Costs per Ton, includes Origin AND Destination Loading and Handling Costs

Commodity	Water Line Haul Costs ($/ton)	Loading, Unloading, and Handling Costs ($/ton)
Ores and Minerals	$25.05	$4.88
Coal	$7.20	$4.09
Petroleum	$39.06	$2.59
Crude Petroleum	$61.80	$1.50
Aggregates	$6.90	$2.50
Grains	$12.32	$5.44
Chemicals	$53.82	$2.72
Iron and Steel	$18.17	$8.07
All Commodities	**$17.97**	**$4.23**

Source: USACE Navigation Investment Model, Sample Data from the Ohio River System (Langdon, 2010).

Table 5. Shipper Costs per Ton, includes Origin Ohio River Destination Loading and Handling Costs

Commodity	Water Line Haul Costs	Loading, Unloading, and Handling Costs
Ores and Minerals	$25.05	$2.40
Coal	$7.20	$2.04
Petroleum	$39.06	$1.29
Crude Petroleum	$61.80	$0.75
Aggregates	$6.90	$1.25
Grains	$12.32	$2.72
Chemicals	$53.82	$1.36
Iron and Steel	$18.17	$4.03
All Commodities	$17.97	$2.12

Source: USACE Navigation Investment Model, Sample Data from the Ohio River System (Langdon, 2010).

Table 6 identifies the IMPLAN sectors and spending categories that are utilized in the analysis.

Table 6. Shipper Costs per Ton, includes Origin OR Destination Loading and Handling Costs

Spending Category	IMPLAN Sector	IMPLAN Name
Water Line Haul Costs	334	Water transportation
Loading, Unloading, and Handling Costs	338	Scenic and sightseeing transportation and support activities for transportation

The RECONS user is able to adjust the LPCs if better information is available. Since loading, unloading, and handling impacts are typically local to the port, terminal or dock, the default LPC for this sector is customized to 100 percent. IMPLAN's RPCs for the Waterborne Transportation sector are utilized for the default capture rates.

Impact Areas

The user is able to choose a number of impact areas on which to estimate the economic impacts of inland waterway industries. Large river stretches have been included for many of the inland waterways. Their impact areas include counties adjacent to the river as well as additional metropolitan and micropolitan counties.

The following large scale waterways are included:

1. Ohio River Mainstem
2. Tennessee River
3. Cumberland River
4. Ohio River System -- Ohio River Mainstem, Kanawha, Monongahela, Tennessee, and Cumberland River Tributaries
5. Black Warrior and Tombigbee Rivers
6. Alabama and Coosa Rivers
7. Tennessee-Tombigbee Rivers, only in Mississippi

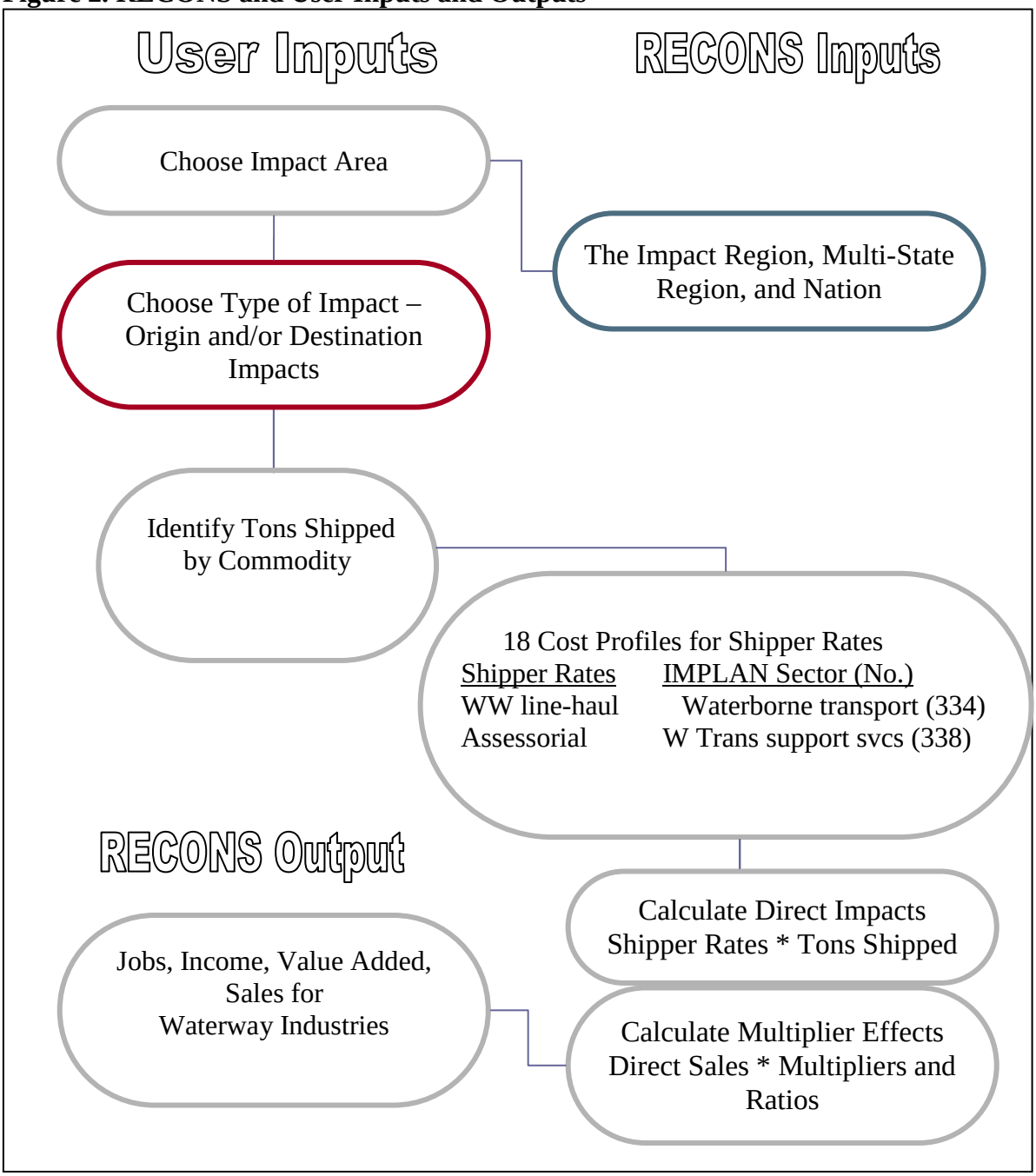
8. Tennessee-Tombigbee Rivers, Mississippi and Alabama
9. Tenn-Tom and Black Warrior and Tombigbee
10. Ohio River System and Tenn-Tom River
11. Upper Mississippi, North of Ohio
12. Lower Mississippi, South of Ohio
13. Illinois River
14. Illinois River and Upper Mississippi
15. Illinois River and Lower Mississippi
16. Lower and Upper Mississippi
17. Ohio River Mainstem and Lower Mississippi
18. Ohio River Mainstem and Upper Mississippi
19. Ohio River System and Upper Mississippi
20. Ohio River System and Lower Mississippi
21. Columbia River System

Additionally, the RECONS user can choose a relevant state as an impact area, or a generic rural, micropolitan, metropolitan region, or large-scale region. If a river reach or state is identified as the impact are, the shipment activity (either origin and/or destination) should fall within the geographic region.

Estimation of Inland Waterway Economic Impacts

Figure 2 summarizes the user inputs, RECONS inputs and calculations, and output provided by the RECONS stemming from effects module for inland waterways.

Figure 2. RECONS and User Inputs and Outputs



Formally Utilized Sites Remedial Action Program

In 1997, Congress directed the U.S. Army Corps of Engineers (USACE) to conduct assessment, remedial action, and site closure activities for Formally Utilized Sites Remedial Action Program (FUSRAP) sites. The Department of Energy's (DOE) Office of Legacy Management (LM) retains responsibility for determining eligibility for site cleanup under FUSRAP and for long-term surveillance and maintenance (LTSM).[4]

When remedial action is nearing completion at a FUSRAP site, USACE and LM begin coordinating transfer of the site to LM for LTSM. USACE provides site documentation and records to LM. LM may conduct a site visit and meet with regulators, local stakeholders, and the property owners.[5] Figure 3 illustrates the process a FUSRAP site undertakes to achieve designation, remediation, transfer and final use.

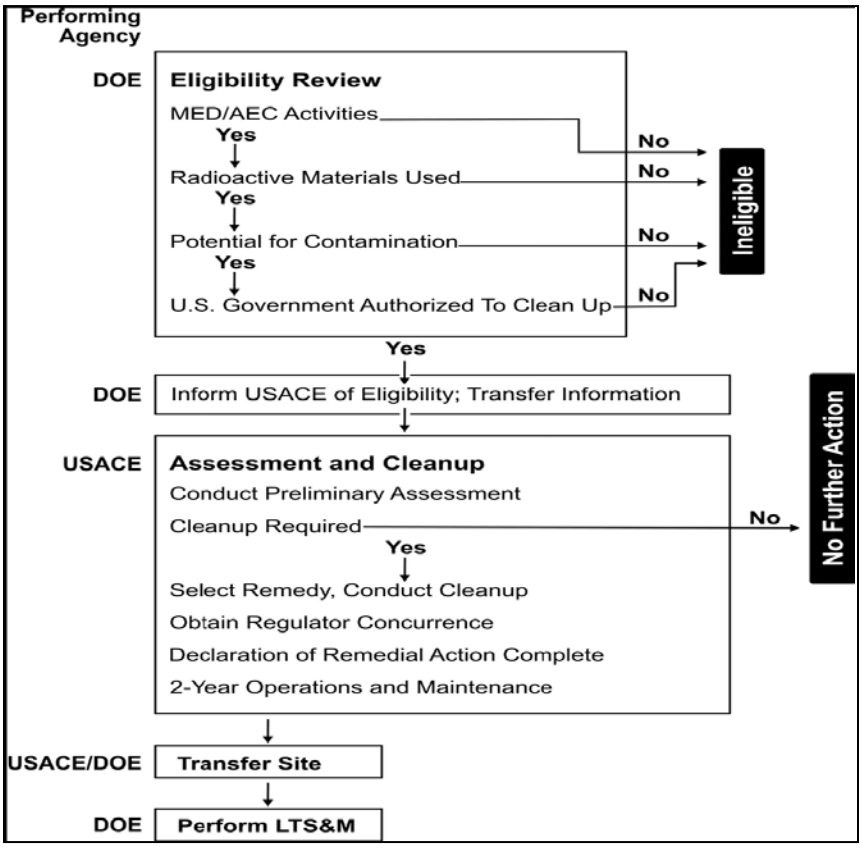
Before a site is transferred, the regulator must concur that the selected remedy is operating successfully, which indicates the site is protective of human health and the environment. If residual radioactive contamination will remain on a site, such as in ground water or inaccessible soil areas, LTSM requirements may include environmental monitoring, inspections, or management of institutional controls to ensure protectiveness. In these instances, USACE conducts a 2-year-long Operations and Maintenance period to demonstrate the site hazards are controlled. During this time, LM develops an LTSM plan for the site.

One goal of the Office of Legacy Management, as laid out in its Strategic Plan, is to place a DOE legacy property in its most beneficial use consistent with DOE's mission requirements. LM considers environmentally-sound land uses for properties under its custody, directing a significant effort to evaluating possible land reuse options. Where possible, LM makes lands and facilities available for government, public, and private use consistent with the tenets of sustainability and good land management practices. As LM conducts LTSM activities for these sites, focus is also on land reuse.

[4] MEMORANDUM OF UNDERSTANDING BETWEEN THE U.S. DEPARTMENT OF ENERGY AND THE U.S. ARMY CORPS OF ENGINEERS REGARDING PROGRAM ADMINISTRATION AND EXECUTION OF THE FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM (FUSRAP), 1999.

[5] Process for Transition of Responsibilities for Formerly Utilized Sites Remedial Action Program Sites from the U.S. Army Corps of Engineers to the U.S. Department of Energy for Long-Term Surveillance and Maintenance, *WM '06 Conference, February 26-March 2, 2006, Tucson, AZ.*

Figure 3. DOE and USACE Interaction



Types of reuse under consideration at LM sites include:

- Disposition, the preferred reuse option
- Energy-related reuse, e.g., wind and solar power development.
- Conservation reuse, e.g., partnerships with organizations for habitat protection or improvement.
- Commercial and industrial reuse, e.g., reuse of buildings or land for commercial purposes.
- Community reuse, e.g., opportunities for recreational, open space, or other community-driven activities.
- Agricultural reuse, e.g., extending grazing opportunities from adjacent lands.

LM seeks to build partnerships with other Federal or state agencies, national organizations, local development commissions or groups, and, in particular, local groups that have specific resource experience and knowledge. These options are evaluated on a site-specific basis for compatibility with the primary objective of long-term protection of human health and the environment. A chosen reuse for a particular site will often include use restrictions or “institutional controls” to assure that these objectives are met.

The following provides greater detail regarding the types of reuse pursued for LM sites. It should be noted that many actual reuses combine several types of the uses listed below.

Disposition: DOE's preferred reuse option is property disposition, or selling the land. Under this category, all property that can be released without any restrictions would be dispositioned through the General Services Administration or other appropriate disposition pathway. Removing remediated LM properties from DOE administration by disposition is DOE's primary goal in property reuse. In addition, because some properties are located near or adjacent to urban areas, these properties may be of value to the surrounding community.

Renewable Energy: Most states have enacted requirements for utility companies to use renewable energy resources. Wind energy is currently used throughout the United States on a limited basis, and private and Federal entities are conducting research to expand its use.Research also continues on solar energy, although there has been a more limited development of solar energy as a provision of renewable energy. DOE's National Renewable Energy Laboratory (NREL) evaluated LM sites for potential as wind, solar, and geothermal energy development.

Recent discussions with private sector experts in the area of renewable energy development have shown preference toward using private lands for commercial power generation projects due to fewer environmental restrictions and regulations on private land. Accordingly, renewable energy projects undertaken on private lands typically cost less for the developer and take less time to complete as compared to similar projects on Federal land. However, LM continues to be committed to pursuing renewable energy development on its sites and finding innovative means to work with private entities to alleviate this concern.

Conservation: Potential conservation uses include natural resource protection, habitat development and enhancement, and wildlife management options at LM sites. Creating partnerships with adjacent landowners or conservation groups allows for larger-scale approaches to conservation, which can often provide greater value than small, project-sized ecological plans. Discussions continue with the Nature Conservancy and other conservation entities to determine whether non-profit conservation organizations are interested in managing several LM sites for habitat preservation.

Commercial and Industrial: This reuse includes the use of existing facilities for business or economic development. Possible partnerships with local economic development commissions could be explored that would enhance business opportunities in local areas. Industrial uses include refurbishing existing buildings for factory uses or other industrial proposals.

Community: LM works with local community leaders, planners, and the public to identify appropriate public or private uses of LM land. Community uses include:

- Open-space preservation: Partnerships with local entities who may wish to utilize open space for parks or to provide a natural setting for wildlife.
- Recreational uses: Improvement of recreation, such as the development of nature trails for hiking or biking.
- Community use of facilities: Partnerships with local entities to reuse existing site infrastructure to further their mission.

- Development of educational opportunities: Partnerships with local school districts or universities to utilize historical or natural resources present at the site for educational curriculum.

The LM established LTSM requirements for remediated FUSRAP sites. DOE evaluates the final site conditions of a remediated site on the basis of risk for different future uses. DOE then confirms that LTSM requirements will maintain protectiveness. Most FUSRAP sites are remediated to conditions that pose no risk to human health and the environment under any future use scenario.

The project team developed a module within RECONS that can be used to estimate the stemming from effects of the FUSRAP program at a regional level. In the case of the FUSRAP sites, these stemming from effects are those that are associated with economic activity sustained, enabled, or generated by the completion of the FUSRAP project. Due to the hazard of people being exposed to radiological residues left from past atomic projects, many of the FUSRAP sites have had limited use without remediation. However, after the USACE remediates the site it is available for reuse or redevelopment and demonstrate the benefits of this program.

Although the operational activities that can occur after a FUSRAP is not fully defined, reasonable assumptions can be made to provide a variety of reuse and redevelopment scenarios to provide the RECONS user an approach to estimate the potential economic impacts. The assumptions can include continued use, where the facility being remediated continues to operate, or is redeveloped , where construction activity takes place, assessing the operational activities of already completed FUSRAP sites, and others.

Approach

There are two aspects of the FUSRAP stemming from effects module of RECONS:

1. Construction and (re)development of the site
2. Operational activities once development (or without development) has occurred.

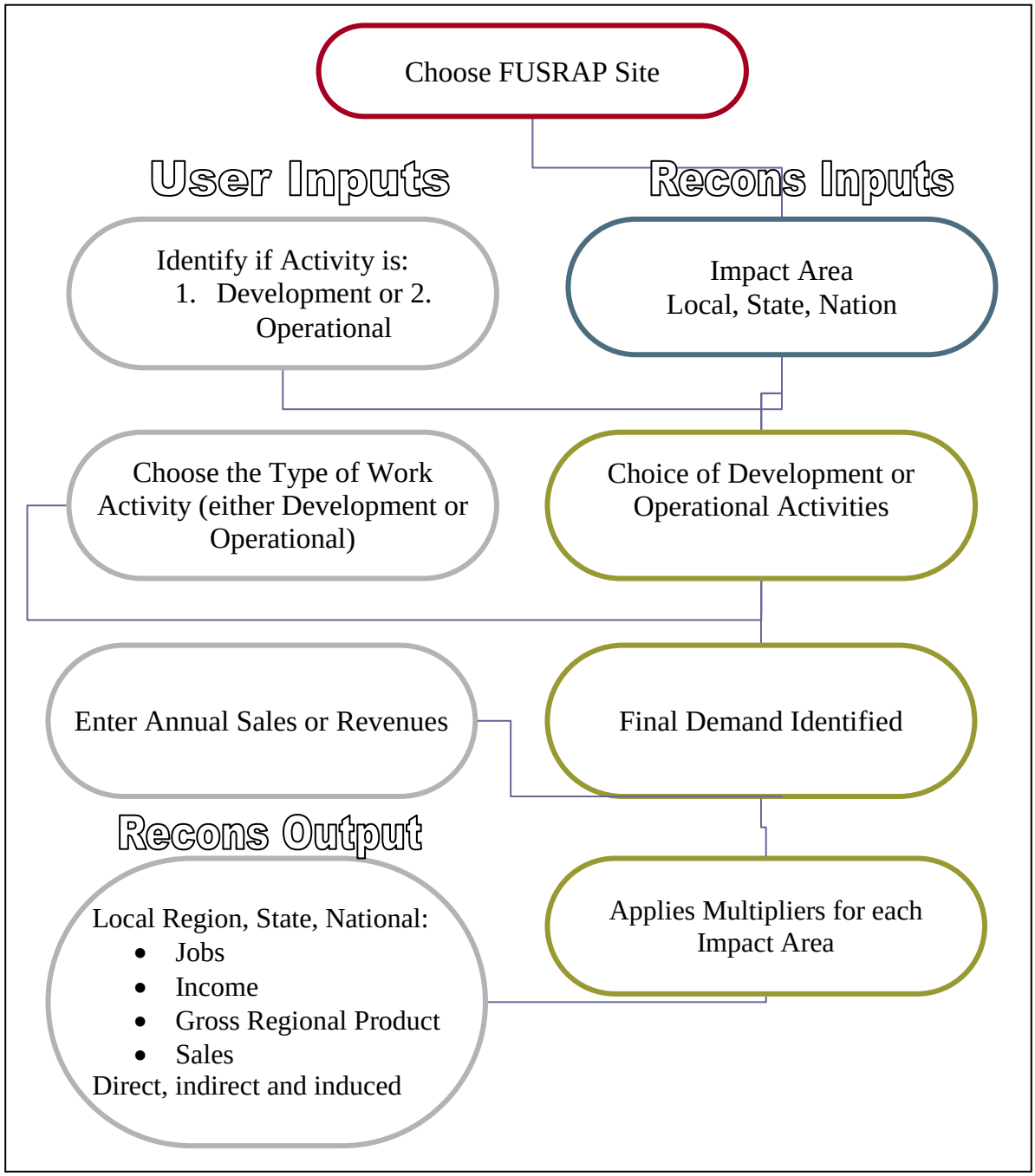
Once the FUSRAP site has been transferred to the LM, it may need construction and other development activities prior to the use or reuse of the site. Since these construction costs will vary by the site and potential use, the USACE user will be able to identify the appropriate type of construction in RECONS. The user will need to know the approximate cost of the construction activity, identify the type of construction, and RECONS estimates the jobs, income, and sales associated with this development activity in the local region, state, and nation.

Identifying the operational activities on future remediated FUSRAP sites was based on collecting information from a number of sources, including identifying previous uses of the current FUSRAP sites, identifying the uses and operational activities of already completed (and relevant) FUSRAP sites, and interviews with FUSRAP project managers. The USACE user will be able to choose from the list of potential operational activities for the site and will need to enter annual

expected sales or revenue into RECONS module (associated with the operational activity), and RECONS will estimate the economic contribution for this operational activity.

The process for evaluating stemming from effects of FUSRAP projects using RECONS will involve several steps. First, users will be required to identify the location of a FUSRAP site of interest; RECONS will then tie this site to an impact area associated with each of the FUSRAP sites. Next, users will identify the types of development and/or operational activities (industries) that will be relevant for the FUSRAP site. Following this step, the user will need to estimate the final demand (i.e., construction cost, sales or employment) that will be generated once the FUSRAP project is completed and the site begins production again or construction plans are formulated. These steps are further described in this document and summarized in Figure 4.

Figure 4. FUSRAP Stemming From Effects Economic Impact Tool Approach



To illustrate the economic contribution of completed and remediated FUSRAP sites, four case studies are provided in Appendix B on relevant completed sites.

FUSRAP Site Development Activities

New operational activities on remediated FUSRAP sites may include a total or partial redevelopment of the site. It may be the case that the site needs to be redeveloped for a new use that is completely different than the intended use prior to the FUSRAP site remediation. This is currently taking place at the B&T Metals facility in Columbus, Ohio. The facility is being renovated into LEED certified condominiums.[7] In this instance, there will be considerable construction activity associated with the site.

The FUSRAP RECONS user will be presented with various types of construction activity to choose from, consistent with the sectors in the regional economic model. These construction sectors will include:

- New commercial and health care structure construction
- New non-residential manufacturing structure construction
- Other new non-residential structures
- New residential structures (single and multi-family)
- Other new residential structures
- Architectural and engineering design services

Operational Activities on Completed FUSRAP Sites

To determine the type of operational activities that will occur on a completed FUSRAP site, information from previous sites was compiled and reviewed. Table 7 illustrates previously remediated FUSRAP sites. A variety of industries that include heavy industrial manufacturing activities, research and development, education, warehousing, and landfills were identified. Although many of the sites are being utilized they may not be pertinent with the potential activities on future FUSRAP sites. One example is the research facilities of college campuses, which is not represented in anticipated FUSRAP sites.

Table 7: Completed FUSRAP Sites

DOE LM Site Name	Pre-LM Name	Fiscal Year Transfer Date
Acid/Pueblo Canyon, NM	Acid/Pueblo Canyon	2004
Adrian, MI	General Motors	2004
Albany, OR	Albany Research Center	2004
Aliquippa, PA	Aliquippa Forge	2004
Bayo Canyon, NM	Bayo Canyon	2004
Berkeley, CA	University of California	2004
Beverly, MA	Ventron	2004
Buffalo, NY	Bliss & Laughlin Steel	2002
Chicago North, IL	National Guard Armory	2004
Chicago South, IL	University of Chicago	2004
Chupadera Mesa, NM	Chupadera Mesa	2004
Columbus East, OH	B & T Metals	2004
Fairfield, OH	Associate Aircraft	2004
Granite City, IL	Granite City Steel	2004
Hamilton, OH	Herring - Hall Marvin Safe Co.	2004
Indian Orchard, MA	Chapman Valve	2004
Jersey City, NJ	Kellex/Pierpont	2004
Madison, IL	Madison	2002
Middlesex North, NJ	Middlesex Municipal Landfill	2004
New Brunswick, NJ	New Brunswick Site	2004
New York, NY	Baker and Williams Warehouses	2004
Niagara Falls Vicinity Properties, NY	Niagara Falls Storage Site Vicinity Properties	2004
Oak Ridge, TN, Warehouses Site	Elza Gate	2004
Oxford, OH	Alba Craft Laboratories	2004
Seymour, CT	Seymour Specialty Wire	2004
Springdale, PA	C.H. Schnorr	2004
Toledo, OH	Baker Brothers	2004
Tonawanda North, NY Unit 1	Ashland Oil #1	2009
Tonawanda North, NY Unit 2	Ashland Oil #2	2009
Wayne, NJ	Wayne Site	2007

Source: DOE Office of Legacy Management LM Site Management Guide 2009

To establish the type of operational activities that may occur on a completed FUSRAP site, a list of anticipated FUSRAP sites completed was assembled. The sites are listed in Table 8 below. Based on an assessment of activities at completed FUSRAP sites as described by the DOE[6] and operational activities that are expected to occur after the completion of FUSRAP[7] remediation activities, potential operational activities at remediated FUSRAP sites include heavy industrial manufacturing, warehousing, and landfills.

[6] Activities listed in the fact sheets of the completed FUSRAP sites are presented by the DOE's Office of Legacy Management: http://www.lm.doe.gov/pro_doc/references/framework.htm#fusrap

[7] Activities are described in fact sheets provided by USACE Districts that are completing the various FUSRAP projects

Table 8. Anticipated FUSRAP Projects Being Completed

Year of Transfer	LM Site Name	Pre-LM (USACE) Name
2014	Iowa Army Ammunition Plant, IA, Site	Iowa Army Ammunition Plant
2014	Painesville, OH, Site	Painesville
2015	Attleboro, MA, Site	Shpack Landfill (sometimes referred to as Norton, MA)
2015	Combustion Engineering, CT, Site	CE, Combustion Engineering
2015	Latty Avenue Properties, MO, Site	Hazelwood Interim Storage Site/Latty Ave.
2015	St. Louis Airport, MO, Site	St. Louis Airport Site
2016	Guterl Specialty Steel, NY, Site (2)	Guterl Specialty Steel Corp
2016	Harshaw Chemical Company, OH, Site (2)	Harshaw Chemical Company
2016	Joslyn Manufacturing & Supply Company, IN, Site (2)	Joslyn Manufacturing & Supply Company
2016	St. Louis Airport Vicinity Properties, MO, Site	St. Louis Airport Site Vicinity Properties
2016	St. Louis Downtown, MO, Site	St. Louis Downtown Site
2016	Superior Steel, PA, Steel (2)	Superior Steel
2016	Sylvania-Corning, NY, Site (2)	Sylvania-Corning Plant Site
2016	W. R. Grace Co., MD, Site	W.R. Grace and Company
2017	Colonie, NY, Site (3)	Colonie
2018	E.I. Du Pont, NJ, Site	DuPont & Company
2018	Linde Air Products Division, NY, Site	Linde Air Products
2018	Parks Township Shallow Land Disposal Area, PA, Site	Parks Township - SLDA
2020	Middlesex Sampling Plant, NJ, Site (2) (3)	Middlesex Sampling Plant
2020	Niagara Falls Storage Site, NY (3)	Niagara Falls Storage Site
2020	Staten Island Warehouse, NY, Site (2) (4)	Richmond Terrace, NY
2022	Maywood, NJ, Site (3)	Maywood Chemical Works
2022	Seaway Industrial Park, NY, Site	Seaway Industrial Park
2027	Luckey, OH, Site	Luckey
2029	Tonawanda Landfill, NY, Site (2)	Tonawanda Landfill Vicinity Property

Several previous FUSRAP site work activities are directly comparable[8] to anticipated FUSRAP site activities. The work activities include iron and steel mills (NAICS 331), warehousing (NAICS 493), and landfills (NAICS 562) and are listed below in Table 9.

[8] Comparable assumptions are based on the historical FUSRAP project descriptions, by the type of activity that was conducted at the site prior that caused the need for remediation. Descriptions of previous site activities (warehousing of fissionable material, iron and steel smelting with radioactive materials, making various components from radioactive materials, or places where radioactive wastes were stored) are compared with future sites to derive the most relevant cases.

Table 9. Comparable Completed FUSRAP Projects

LM Site Name	Pre - LM Name	Current Workers[9]
Aliquippa, PA, Site	Aliquippa Forge[10]	10-19
Buffalo, NY, Site	Bliss & Laughlin Steel [11]	100-249
Columbus East, OH, Site	B & T Metals [12]	N/A[13]
Granite City, IL, Site	Granite City Steel [14]	N/A[15]
Middlesex North, NJ, Site (2)	Middlesex Municipal Landfill	N/A
New York, NY, Site	Baker and Williams Warehouses	N/A
Niagara Falls Vicinity Properties, NY, Site	Niagara Falls Storage Site Vicinity Properties	N/A
Seymour, CT, Site	Seymour Specialty Wire [16]	N/A

Current FUSRAP Sites: Previous Operational Activities

Based on the businesses that currently exist on the already completed FUSRAP sites, it can be assumed that after the FUSRAP is completed and remediated, some of the previous operational activities will continue to occur after remediation and/or development activity. An inventory of potential operational activities can be assembled by reviewing the industries presented in Table 8.

These operational activities, based on an analysis of Table 2, are:

- Warehousing
- Iron and Steel Manufacturing
- Chemical manufacturing
- Weapons and Ordinance Manufacturing
- Waste Sites (Landfills)

[9] Uses 2007 Zip Code Level County Business Pattern Employment data for the appropriate NAICS Code

[10] Based on a conversation with Beaver County Economic Corporation who indicated that the site is currently occupied by a steel manufacturer (Personal Communication with James Palmer at Beaver County Economic Corporation.

[11] http://www.em.doe.gov/bemr/BEMRSites/blls.aspx

[12] http://permanent.access.gpo.gov/lps20085/www.em.doe.gov/bemr96/btme.html

[13] B&T Metals Site is currently being developed into condominiums http://columbus.bizjournals.com/columbus/stories/2009/05/18/story2.html

[14] http://www.em.doe.gov/bemr/BEMRSites/mdsn.aspx

[15] As of October 2009, most of the buildings at the former General Steel plant, including the old Commonwealth foundry, at 1417 State Street, Granite City, Illinois have been demolished. About half of the General Office Building, originally built by Commonwealth Steel circa 1926, remains standing. On the north end of the property, there are still several buildings currently occupied and in use. http://en.wikipedia.org/wiki/General_Steel_Industries

[16] http://permanent.access.gpo.gov/lps20085/www.em.doe.gov/bemr96/coen.html

Relevant IMPLAN Sectors

Anticipated development and operational activities have been identified associated with the methods described above as well as general types of reuse under consideration at LM sites.

Reviews of the facilities that will be remediated by the USACE indicate that there is a variety of operational activities and associated IMPAN sectors that can be applied. In addition, the applicable type of construction that can occur after the FUSRAP is completed can also be applied to projects. A list of potential IMPLAN sectors is illustrated in Table 10 and Table 11 for development and operational activities, respectively.

Table 10. Anticipated Construction IMPLAN Sector for Completed FUSRAP Projects

IMPLAN Sector	Activity Description	2007 NAICS
34	Construction of new nonresidential commercial and health care structures	23
35	Construction of new nonresidential manufacturing structures	23
36	Construction of other new nonresidential structures	23
37	Construction of new residential permanent site single- and multi-family structures	23
38	Construction of other new residential structures	23
369	Architectural, engineering, and related services	5413

Table 11. Anticipated Operational IMPLAN Sector for Completed FUSRAP Projects

Operational Activity	IMPLAN Sector	IMPLAN Name	2007 NAICS
Grain Farming	2	Grain farming	11113-6, 11119
Cattle Ranching and Farming	11	Cattle ranching and farming	11211, 11213
Power Generation	31	Power generation, transmission, and distribution	2211
Chemical Manufacturing	126	Other basic organic chemical manufacturing	32519
Steel Product Manufacturing	171	Steel product manufacturing from purchased steel	33121, 33122
Iron and Steel Mills Manufacturing	170	Iron and steel mills and ferroalloy manufacturing	3311
Ferrous Metal Foundries	179	Ferrous metal foundries	33151
Non-ferrous Metal Foundries	180	Nonferrous metal foundries	33152
Forging, Stamping, and Sintering	181	All other forging, stamping, and sintering	332111, 332117
Weapons and Ordinance Manufacturing	192	Arms, ordnance, and accessories manufacturing	332994-5
Warehousing	340	Warehousing and storage	493
Waste Sites and Landfills	390	Waste management and remediation services	562
Retail Stores	330	Retail -- Miscellaneous	454
General Business Operations	386	Business Support Services	5614

Impact Areas

Based on the list of expected completed FUSRAP sites provided by the LM the respective metropolitan areas have been identified. Table 12 lists the FUSRAP projects, the site's name, and their corresponding metropolitan statistical area.

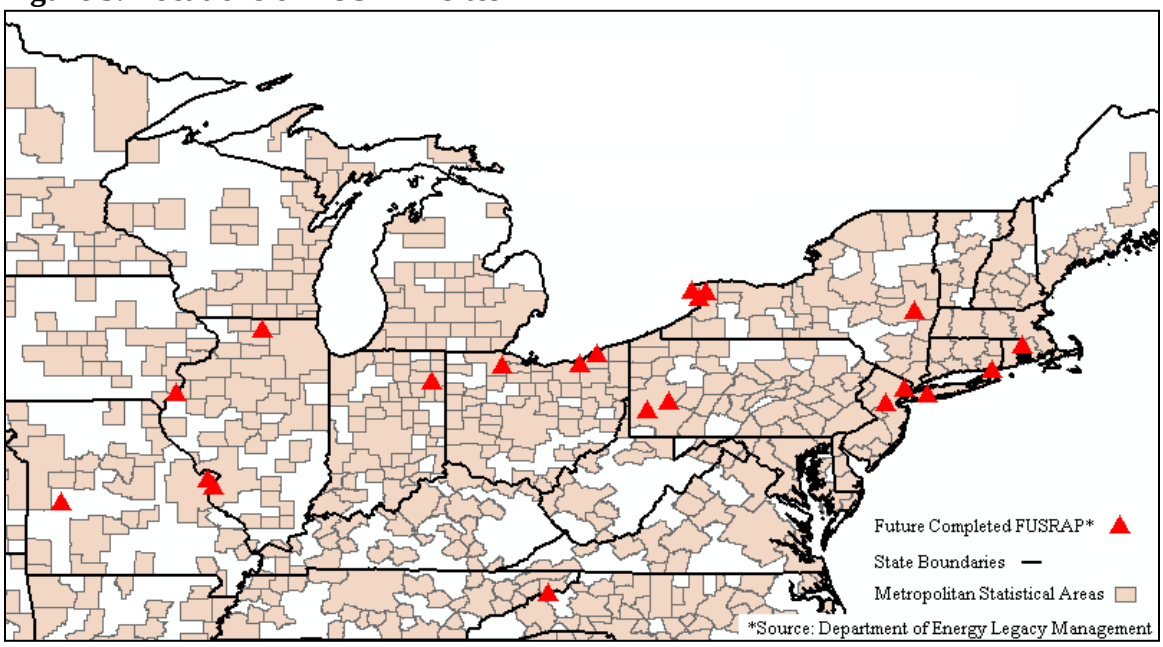
Table 12. Names of Future Completed FUSRAP Projects and Corresponding MSA

Pre-LM (USACE) Name	MSA
Iowa Army Ammunition Plant	Burlington, IA-IL
Painesville	Cleveland-Elyria-Mentor, OH
Shpack Landfill (sometimes referred to as Norton, MA)	Providence-New Bedford-Fall River, RI-MA
CE, Combustion Engineering	Norwich-New London, CT
Hazelwood Interim Storage Site/Latty Ave.	St. Louis, MO-IL
St. Louis Airport Site	St. Louis, MO-IL
Guterl Specialty Steel Corp	Buffalo-Niagara Falls, NY
Harshaw Chemical Company	Cleveland-Elyria-Mentor, OH
Joslyn Manufacturing & Supply Company	Fort Wayne, IN
St. Louis Airport Site Vicinity Properties	St. Louis, MO-IL
St. Louis Downtown Site	St. Louis, MO-IL
Superior Steel	Pittsburgh, PA
Sylvania-Corning Plant Site	New York-Northern New Jersey-Long Island, NY-NJ-PA
W.R. Grace and Company	Johnson City, TN
Colonie	Albany-Schenectady-Troy, NY
DuPont & Company	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
Linde Air Products	Buffalo-Niagara Falls, NY
Parks Township - SLDA	Pittsburgh, PA
Middlesex Sampling Plant	New York-Northern New Jersey-Long Island, NY-NJ-PA
Niagara Falls Storage Site	Buffalo-Niagara Falls, NY
Richmond Terrace, NY	New York-Northern New Jersey-Long Island, NY-NJ-PA
Maywood Chemical Works	New York-Northern New Jersey-Long Island, NY-NJ-PA
Seaway Industrial Park	Buffalo-Niagara Falls, NY
Luckey	Toledo, OH
Tonawanda Landfill Vicinity Property	Buffalo-Niagara Falls, NY

Source: DOE Office of Legacy Management LM Site Management Guide 2009, Louis Berger 2010

The locations are shown in Figure 5.

Figure 5. Locations of FUSRAP sites



Source: Department of Energy Legacy Management 2009

FUSRAP Module Inputs

The FUSRAP RECONS module will estimate the jobs, income, sales, and value added of development (i.e., construction) and/or operational activities. RECONS is populated with the various FUSRAP sites locations (Table 12). The FUSRAP RECONS user specifies whether construction or operational activities are to be evaluated. A variety of construction or operational activities will be provided and the RECONS user should enter the appropriate sales or revenues figures (see Table 10 and Table 11).

Once the industry or activity is chosen, the FUSRAP RECONS user needs to enter the annual final demand change, which equals the annual amount of sales the industry (company) anticipates to generate once the site begins operation. Or, it is also the estimate of the annual construction cost of development or redevelopment of the site.

Recreation

Stemming-from effects of the USACE recreation programs are measured by the spending and associated economic activity generated by visitors to USACE lakes and reservoirs. The Recreation Economic Assessment System (REAS) model was designed to estimate these impacts. For this study, the REAS model has been updated to 2009 and extended to cover impacts of marinas and docks on USACE projects. The RECONS recreation module can be used to estimate economic significance or impacts of existing recreation use or to estimate impacts of a change in use. Significance measures cover all visitor spending, while impact analyses will focus on spending by visitors from outside the local region.

The RECONS recreation module can be used for the following:

A. To estimate impacts of current visitors, the user selects a USACE project. The number of visits to the project, the visitor segment mix, average party sizes, spending averages, and multipliers for the region are retrieved from the recreation project database, loaded into the model and impacts are calculated. The user may edit any of the input data if they have better local information and impact results will reflect these changes.
B. If estimating impacts of a change in visitor numbers or types, the user enters the increase or decrease in visitors resulting from the action being evaluated. When estimating impacts of a change in visits, users may choose the default segment mix and spending profiles for the project or edit these.
C. A separate module is included to estimate impacts of boats stored at marinas or designated private or community docks. The numbers of boats at marinas or docks is retrieved from the RECONS database or entered directly by the user. A default distribution of boats by size class is retrieved along with national average spending profiles. As with the visitor spending routine, users may edit any of the input data.

Options A , B, and C follow the same basic steps, which are described in this section. Additional description of the marina/dock follows.

Estimating Impacts of General Visitor Spending

Step 1: Input the number of recreation visitors by eight segments.

Impacts and spending rest heavily on the number and types of visitors. Visitor segments were used to help explain differences in spending across projects that attract different mixes of visitors. The number of recreation visits for each project was obtained from the U.S. Army Corps of Engineers Financial Management System/Operations and Maintenance Business Information Link (CEFMS/OMBIL) databases for FY2009. If estimating impacts of a change in visits, the user can directly enter the change in visits. Consistent with USACE data, visits are typically estimated in person trips to the project.

Eight segments were used to capture differences in spending.

- Local visitors – visitors living within 30 miles of the project
- Non-local visitors on day trips – visitors from beyond 30 miles not staying overnight in the area
- Campers – visitors staying in USACE campgrounds
- Other Overnight visitors – visitors staying overnight in motels, campgrounds or private homes within 30 miles of the project

To capture differences in spending of boaters and non-boaters, each of the above segments is identified as boating and non-boating yielding eight general recreation visitor segments.

The segment mix for a given project was estimated based on CEFMS/OMBIL data, USACE campground reservation data, and simple models to estimate the local and other overnight percentages.

The percent of visitors from the local region (within 30 miles) was estimated for each project based on the size of the population within 30 miles of the project compared to populations within 60 miles and 90 miles. Visitation was based on the relative likelihood of visitors traveling from different distances to visit a particular project[17]. Segment parameters were set to fit the local visitor percentages at Norfork, Bull Shoals and Table Rock Lakes, as estimated in a recent visitor survey (Kasul, et al, 2010).

The percent of visitors boating at the project was obtained from the CEFMS/OMBIL database and is assumed to be the same across all segments.

The percent of camping visitors at the project was estimated from USACE camp reservation data obtained from the National Recreation Reservation System (NRRS) maintained by the U.S. Army Corps of Engineers. The number of camping party trips at each project was converted to camping person visits by multiplying by the camping party size. Camping person visits were then divided into overall visits to estimate the camping share of overall visits.

Subtracting local visitors and campers from total visits leaves non-local day and overnight visitors. These visits were divided between day trips, not involving an overnight stay and visitors staying overnight within 30 miles of the project. The percent of non-local visitors staying overnight in the area was estimated for each project based on sales in the lodging sector within 30 miles of the project location. Hotel sales within 30 miles of each project was estimated from ESRI Business Analyst databases. For Norfork, Bull Shoals and Table Rock Lakes, similar to the estimation of the local visitor percentages, a simple model was estimated to yield the proportions of local day trip and overnight person trips based on information in a recent survey (Kasul et al, 2010).

While the database for estimating the segment mix is missing some information at the project level, these new estimates of the segment mix yield better spending and impact estimates than if

[17] The analysis assumed visit propensity for visitors living 30 to 60 miles is 0.20 times the visit propensity for visitors within 30 miles. Visit propensity for visitors traveling between 60 and 90 miles is 0.05 times the visit propensity of those living within 30 miles.

one assumes an average spending profile across all visitors. Users may adjust the segment mix based on local information, when available. As the USACE completes future visitor surveys, the models for estimating segment mixes can be readjusted to reflect the updated information.

The local visitor segments have been added to the RECONS recreation module so that users may omit spending by local residents when estimating impacts. Local visitors are excluded from the spending and impact estimates by setting the number of local visitors to zero so they are not counted in the spending or impact estimates. This assumes that spending of local visitors does not yield a net impact for the local region. Local visitor segments may be included when estimating the economic contribution or significance of all visitor spending.

The overall visitor count for the chosen project is entered in person visits for general recreation visitors and as the number of boats at marinas and docks for the marina/dock module. Users have the option of entering total visits and applying the segment mix percentages for the project to allocate visits to segments or directly entering the number of visits by each segment. The latter may be preferred when estimating impacts of changes in use or the impacts to a particular segment, like campers.

Since spending in the RECONS recreation module is measured on a party day/night basis, person visits were converted to party visits. Visits (in person visits) were converted to visitor parties by dividing by an average party size for each segment. For campers, the average party size was obtained from the USACE's campground reservation database and varies for each project (Kasul et al, 2010). For all other visitors (considered as day visits to the project), the average party size for each project was estimated as a weighted average of persons per vehicle for each counter location and season, which is currently 2.08 people per trip for each project as estimated with data from the Visitation Estimation Reporting System (VERS). As noted above, for visitors on overnight trips one night of spending was counted for each recorded visit. For visitors staying in USACE campgrounds, camping use was measured in party nights.

The result of step 1 is an estimate of the number of visits in party days/nights for each visitor segment.

Step 2: Input spending profile for the eight segments.

National average spending profiles for each segment have been estimated and are stored in the RECONS database. The spending profiles were estimated from surveys of USACE visitors (Kasul, et al, 2010, and Chang, et al, 2003), supplemented with recreation spending data from studies at similar types of recreation facilities (White and Stynes 2010). The spending profiles estimate spending for the eight segments within 30 miles of the project on a per party day/night basis. Profiles are also available for spending economic impacts on state or national regions. Visitor spending is categorized into ten types of expenditures, as shown in Table 13.
.

Table 13. Visitor Spending in Local Area by Segment ($ per party per day, 2009$)

Category	Segment							
	Local Boat	Local NonB	Day/ Boater	Day/ NonB	Camp/ Boater	Camp/ NonB	OVN/ Boater	OVN/ NonB
Motel, Hotel Cabin or B&B	0.00	0.00	0.00	0.00	4.72	2.25	43.87	46.74
Camping Fees	0.00	0.00	0.00	0.00	14.58	22.97	0.18	0.26
Restaurants & Bars	6.93	4.78	8.30	8.30	15.25	26.27	34.58	40.65
Groceries, Take-out Food/Drinks	9.30	4.42	6.52	3.40	22.52	16.81	20.42	11.59
Gas & Oil	15.21	5.64	16.91	5.64	20.64	16.82	25.90	13.86
Other Auto expenses	0.31	0.07	0.61	0.07	0.77	3.90	0.26	1.88
Other Boat Expenses	3.87	0.39	16.32	0.39	8.20	0.74	12.75	0.55
Recreation Fees	0.58	1.91	0.74	1.91	5.82	22.03	13.46	34.73
Sporting Goods	4.72	3.50	9.00	2.08	2.84	4.22	5.04	2.55
Souvenirs and Other Expenses	2.10	2.79	9.33	2.79	4.78	11.86	10.35	22.75
Total	43.03	23.52	67.74	24.59	100.13	127.87	166.82	175.56

Note: Spending is within 30 miles of the lake or project.

The national spending profiles can be adjusted to the local area. The current RECONS recreation module offers three profiles for each segment -- high, average, and low. The high spending profile is 30 percent higher than the average, while the low profiles are 30 percent less than the average.[18] The user may also adjust spending profiles by a given percent or edit the spending profiles directly. Users may edit and adjust the spending profiles based on local knowledge or unique characteristics of a particular area or intended application.

Consumer price indices for 2000 to 2009 for each spending category are used to price adjust spending profiles to a given year. Spending profiles are in 2009 dollars. Price indices for 2010 and beyond will be added when these become available from the Bureau of Labor Statistics (generally in February of the following year).

[18] Some judgment was required to develop spending profiles for USACE visitors from the available data. The USACE surveys are dated and some are based on small samples. The surveys at Table Rock, Norfork and Bull Shoals are more recent and involve larger samples, but they illustrate some of the variations in the segment mix and spending across distinct projects that are difficult to fully capture in a general model. All spending data was price adjusted to 2009 using CPI's by spending category. Resulting profiles were then compared to arrive at the final profiles.

More recent and better spending data is available for national forest and national park visitors, although the settings, locations, and activities vary somewhat from those at USACE sites. Across all of these studies, spending varies most clearly across the trip segments that we propose. The variation across locations is more difficult to predict, but falls within fairly consistent ranges across the various site-specific studies. The high, medium and low profiles capture this range.

Step 3: Estimate total spending in the local region.

Total spending is estimated for each segment by multiplying the number of visits (in party days/nights) times the average spending. Summing across segments yields the total spending for each of the ten spending categories. The spending totals by category represent the final demand vector that is applied to the IMPLAN multipliers. If the application includes marinas or docks, annual expenses for slips, storage, insurance and repairs, which was estimated by multiplying the number of boats times the boat spending profile, annually per boat.

Table 14. Sample Total Spending (Thousands, 2009$)

	Local Boat	Local NonB	Day/ Boat	Day/ NonB	Camp/ Boat	Camp/ NonB	OVN/ Boat	OVN/ NonB	Total
Motel, Hotel, Cabin	0	0	0	0	31	15	520	2,217	2,783
Camping Fees	0	0	0	0	95	150	2	13	260
Restaurants & Bars	1,643	567	3,937	2,264	100	172	410	1,928	11,021
Groceries	2,207	524	3,094	928	147	110	242	550	7,802
Gas & Oil	3,608	669	8,024	1,539	135	110	307	657	15,050
Other Auto Expenses	74	9	290	20	5	25	3	89	514
Other Boat Expenses	918	47	7,743	108	54	5	151	26	9,052
Recreation Fees	138	227	353	522	38	144	160	1,648	3,229
Sporting Goods	1,120	416	4,268	566	19	28	60	121	6,597
Other Expenses	498	331	4,425	760	31	78	123	1,079	7,325
Total	10,206	2,789	32,135	6,706	655	836	1,978	8,328	63,634

Step 4: Choose the region and associated multipliers.

Users can select the multipliers associated with the region, state, or nation. The regional multipliers are associated with a specific project, which is typically a region with a 30 mile radius of the project. Most spending directly associated with visits to USACE projects occur within 30 miles of the project.

Thirty-mile impact areas have been defined for each USACE recreation project, which includes all counties within 30 miles. Sector-specific multipliers for the region were extracted from IMPLAN models using 2008 county economic data. The RECONS recreation module uses 26 IMPLAN sectors. Retail purchases were margined using retail and wholesale margins for purchases of fuel, groceries, clothing, sporting goods, and souvenirs (other expenses). Margins were assigned to the appropriate retail and wholesale trade, and producer price sectors. These sectors are shown in Table 15. For the marina and dock segments, annual craft-related spending was allocated across five categories, which were associated with the IMPLAN sectors as indicated in Table 15.

Table 15. Spending Profile and IMPLAN Sectors

Spending Category	IMPLAN Sector, and Margin Sector
Motel, hotel, cabin, B&B	411
Camping	412
Restaurants and bars	413
Groceries, take out foods	Retail margin 324, wholesale margin 319, producer price 69
Auto gas and oil	Retail margin 326, wholesale margin 319, producer price 115
Boat gas and oil	Retail margin 326, wholesale margin 319, producer price 115
Other auto/boat expenses	414
Recreation fees	410
Sporting goods	Retail margin 328, wholesale margin 319, producer price 321
Souvenirs and other expenses	Retail margin 329, wholesale margin 319, producer price 317
Craft-Related Spending	
Slip Fees	340
Boat Storage	340
Boat Insurance	358
Maintenance and repair of boats	414
Maintenance and repair of docks	39

The IMPLAN household spending retail and wholesale trade margins were used for groceries, gas, clothing, sporting goods and souvenirs/others. However, the IMPLAN wholesale margin on fuel was modified to five percent based on the Census of Wholesale Trade. IMPLAN has a wholesale margin of 37.35 percent on fuel purchases, presumably because fuel taxes are included as part of the wholesale margin. However, the wholesale trade sector an aggregated sector so the percentage of wholesale sales assigned to indirect business taxes for all wholesalers is significantly less than for fuel wholesalers. Assigning 37.35 percent of fuel purchases to the wholesale trade sector therefore inflates estimates of employment and income in wholesale trade. Using five percent as the wholesale margin in effect shifts the fuel taxes from wholesale trade to the petroleum refining sector, where they will have a much smaller distorting effect on job estimates. Local impacts of fuel purchases stem primarily from the retail margins on fuel purchases. These margins are shown in Table 16.

Table 16. Margins on Retail Purchases

Spending Category	Retail margin	Wholesale margin
Grocery stores	27.0%	9.0%
Gas stations	22.0%	5.0%
Clothing retail	39.0%	11.0%
Sporting goods retail	39.0%	15.0%
Other retail	39.0%	11.0%

Source: IMPLAN ver 3.0, except for the gas wholesale margin which is from 2008 Census of Wholesale Trade.

Margins were applied to retail purchases, and each spending category is matched to a single IMPLAN production sector. Multipliers for these sectors are applied to spending in each category to estimate direct and secondary effects.

Step 5: Estimate impacts.

Impacts are estimated by multiplying total spending in each category from step 3 by the multipliers for the region (state or nation) selected in Step 4. All multipliers are from IMPLAN (vers 3.0) models using 2008 county data for counties within 30 miles of each project. The multiplier database includes the following ratios and multipliers for each sector:

- Direct jobs/sales ratio
- Direct labor income to sales ratio
- Direct value added to sales ratio
- (Direct + Indirect sales)/direct sales (Type I sales multiplier)
- Total sales/direct sales (Type SAM)
- Total jobs/direct sales
- Total labor income/direct sales
- Total value added/direct sales
- Regional Purchase Coefficient (RPC)

The following general information about the region and model is also included in the RECONS multiplier database:

- Year of model
- Population of region
- Area of region
- Counties included
- Sales and employment by 2 digit NAICS codes

These multipliers permit calculation of direct effects in terms of sales, jobs, labor income and value added for individual sectors. Retail and wholesale margins on retail purchases are reported as part of the direct effects under grocery stores, gas stations, other retail trade, and wholesale trade sectors. Local manufacturing sectors are aggregated, since most goods purchased by visitors are not made locally and the itemization of retail purchases and the associated manufacturing sectors within IMPLAN are not fine enough to reliably estimate local manufacturing effects. Secondary effects, indirect and induced effects, are reported in the aggregate. Table 17 provides a sample set of multipliers.

Table 17. Sample Set of Multipliers

Sect #	Sector	Direct effects				Total effects multipliers				
		Jobs/ MM Sales	Labor Income/Sales	VA/ Sales	Sales Type II	Jobs/ MM Sales	Labor inc/ Sales	VA/ Sales	Sales I	RPC
36	New nonresidential construction	8.47	0.31	0.32	1.60	13.85	0.52	0.67	1.32	0.98
39	Maintenance and repair, nonresidential structures	11.83	0.46	0.48	1.59	17.33	0.66	0.82	1.25	0.90
69	All other food manufacturing	3.41	0.15	0.19	1.53	7.58	0.32	0.49	1.35	0.07
88	Mens and boys cut and sew apparel manufacturing	9.13	0.17	0.23	1.51	13.36	0.35	0.53	1.32	0.00
115	Petroleum refineries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
281	Motor home manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
282	Travel trailer and camper manufacturing	6.27	0.18	0.13	1.44	9.58	0.33	0.38	1.28	0.00
291	Boat building	4.12	0.19	0.21	1.47	8.28	0.36	0.49	1.28	0.00
292	Motorcycle, bicycle, and parts manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
311	Sporting and athletic goods manufacturing	5.05	0.20	0.27	1.45	8.61	0.35	0.53	1.25	0.03
317	All other miscellaneous manufacturing	6.34	0.26	0.33	1.42	9.84	0.40	0.57	1.21	0.19
319	Wholesale trade businesses	4.65	0.38	0.66	1.54	9.53	0.57	0.98	1.23	0.94
324	Retail Stores - Food and beverage	17.53	0.41	0.63	1.57	22.77	0.60	0.97	1.25	0.64
326	Retail Stores - Gasoline stations	13.51	0.30	0.69	1.48	18.00	0.46	0.98	1.21	0.75
328	Retail Stores - Sporting goods, hobby, book and music	20.56	0.38	0.63	1.56	25.72	0.56	0.97	1.25	0.87
329	Retail Stores - General merchandise	17.67	0.44	0.65	1.56	22.91	0.62	0.99	1.24	1.00
336	Transit and ground passenger transportation	25.54	0.40	0.57	1.47	30.04	0.56	0.84	1.16	0.23
338	Trans. Support; Scenic and sightseeing transportation	9.70	0.69	0.89	1.53	14.83	0.86	1.20	1.07	0.79
340	Warehousing and storage	15.10	0.59	0.80	1.55	20.47	0.77	1.14	1.13	0.81
358	Insurance agencies, brokerages,	8.67	0.37	0.48	1.87	17.58	0.67	0.97	1.51	0.99
362	Automotive equipment rental and leasing	5.01	0.23	0.49	1.67	10.82	0.45	0.88	1.39	0.63
410	Other amusement and recreation industries	8.91	0.19	0.33	1.65	14.92	0.40	0.71	1.42	0.61
411	Hotels and motels, including casino hotels	16.27	0.32	0.59	1.57	21.51	0.51	0.91	1.28	0.05
412	Other accommodations	11.59	0.27	0.50	1.60	17.56	0.47	0.85	1.33	0.01
413	Food services and drinking places	20.10	0.31	0.47	1.57	24.91	0.49	0.79	1.30	0.97
414	Automotive repair and maintenance	13.12	0.37	0.54	1.52	18.07	0.54	0.85	1.22	0.87

Generic multiplies are also available for impact areas whose multipliers are not included in the database. Four generic impact areas were classified by population size, as shown in Table 18. The generic multipliers are the averages for all impact area models within the given population size class, after omitting sectors that were not present in a given model.

Table 18. Generic Multipliers by Population

Type of Region	Population
Rural	Population <50,000
Small cities	Population 50,001 – 100,000
Smaller Metro regions	Population 100,001- 500,000
Larger Metro region	Population 500,00 -1.5 million

Step 6: View and/or print results.

Total spending is estimated by multiplying the spending category and visitor segment (Table 2). Impacts are reported in terms of sales, labor income, value added, and jobs. Direct effects are itemized by primary sector. Secondary effects are reported in the aggregate.

Table 19. Sample Impact Table – Impacts of Visitor Spending

Sector/Spending category	Sales ($ Thousands)	Jobs	Labor Income ($ Thousands)	Value Added ($ Thousands)
Direct Effects				
Motel, hotel cabin	243	2.2	42	75
Other Lodging	54	0.5	9	17
Restaurants & bars	982	9.0	171	302
Auto repair	31	0.3	5	9
Boat repair and maint.	195	8.4	51	78
Recreation fees	393	3.6	69	121
Other services	0	0.0	0	0
Grocery stores	128	2.2	54	83
Gas stations	167	2.2	50	116
Clothing retail	0	0.0	0	0
Sporting goods retail	121	3.2	46	75
Other retail	181	3.1	79	118
Wholesale trade	21	0.3	7	13
Local Manufacturing	0	0.0	0	0
Total Direct Effects	**2,517**	**34.9**	**586**	**1,007**
Secondary Effects	**272**	**2.6**	**77**	**150**
Total Effects	**2,789**	**37.5**	**663**	**1,157**

Marina and Dock Model

The marina and dock impact model is located on a separate "Marina" page within the RECONS recreation module. The RECONS recreation module directs users to either the general visitor model, the marina model, or both.

For the marina model, the user enters the number of boats in marinas and/or docks. If estimating impacts of current users, these numbers are retrieved from the RECONS database. Marina and dock boats are divided between three size categories: (1) less than 20 feet; (2) 21 to 30 feet; and (3) greater than 30 feet. The size mix is populated with the default percentages based on the 1999 USACE marina and dock studies (Anderson, et al, 2008; Amsden, et al, 2008; Kasul et al, 2008; Lee, et al, 2008; Perales, et al, 2008; Propst, et al, 2008a; Propst, et al, 2008b; Propst, et al, 2008c), as shown in Table 19, but some of these were altered to reflect the specific application. Trip and especially annual craft-related spending varies considerably by size category.

Table 20. Default Distributions of Marina and Dock Boats by Size Category

Size class	Marina	Dock
Less than 20 Feet	60%	70%
21 to 30 Feet	30%	25%
Over 31 Feet	10%	5%
Total	100%	100%

National average trip and craft spending profiles are provided for the three marina and three dock size classes, as shown in Table 21 and Table 22. These were estimated by price adjusting profiles from the USACE 1999 marina and dock boater surveys. As with the general visitor spending profiles these may be edited to better fit local conditions. The number of trips by boats kept at marinas or docks is then estimated by multiplying the number of boats times an average number of trips per year.

Marina trip spending is slightly higher than general visitor trip spending, although it is difficult to directly compare the two. General visitor spending profiles include local, camping, non-local day trips and other overnight trips, while marina and dock spending profiles report spending by size of the boat. We were not able to obtain information on the types of trips by boaters using marinas and docks.

Table 21. Trip Spending Averages for Boats at Marinas and Docks ($ per boat per day)

	Marina by size category			Dock by size category		
CATEGORY	**Mar<20**	**Mar 21-30**	**Mar 31+**	**Dock<20**	**Dock 21-30**	**Dock 31+**
Hotel	2.23	6.09	1.32	1.04	0.96	0.21
Camp	1.22	1.95	0.03	0.22	0.82	0.02
Restaurants and Bars	17.56	21.41	14.32	16.35	24.51	27.67
Groceries	13.68	19.43	26.45	19.40	22.38	23.05
Gas and oil	46.74	62.49	62.97	34.40	44.29	70.28
Other auto	6.09	3.47	6.42	1.25	0.93	3.18
Other boat	14.26	18.17	32.75	8.41	8.11	12.11
Attractions	1.15	1.55	1.46	4.70	7.86	2.59
Sporting goods	1.06	4.55	1.66	4.24	4.51	5.66
Other	5.12	6.29	5.33	7.56	7.76	4.81
Total within 30 miles	**109.11**	**145.40**	**152.72**	**97.57**	**122.14**	**149.57**
Beyond 30 miles	16.04	26.44	20.38	22.58	25.27	37.95
Total trip	125.15	171.84	173.09	120.15	147.41	187.52
Percent Within 30 Miles	87%	85%	88%	81%	83%	80%

Table 22. Annual Craft-related Spending for Boats in Marinas or Docks ($ per boat per year)

	Marina by size category			Dock by size category		
Spending category	**Mar<20**	**Mar 21-30**	**Mar 31+**	**Dock<20**	**Dock 21-30**	**Dock 31+**
Slip rental	1,142	1,670	3,169			
Storage fees	91	232	281	89	125	370
Insurance payments	275	453	963	259	296	554
Boat repair/maintenance	374	745	1,921	265	389	1,329
Dock repair/maintenance				450	496	962
Total	**1,882**	**3,101**	**6,334**	**1,063**	**1,305**	**3,215**
Boat days per year	29	29	37	56	60	88

Potential Double Counting Issues

There is a potential for double counting of trip spending by boaters using marinas and docks if estimating spending for both general visitors and those using marinas and docks in the same analysis. In this case, it is recommended that the user the general visitor analysis and not separately estimate trip spending of marina/dock trips. The annual craft-

related spending for these boats can be estimated and added to the trip spending estimates without any double counting.

One could also estimate the number of visits attributable to trips to boats at marinas or docks and subtract these from the overall visit estimates, taking into account how many of these visits may actually be counted at a given project. The trip spending profiles for marina/dock boating trips, as shown in Table 22, could then be applied to the number of days of use for boats at marinas/docks, while the general trip spending profiles are applied to all other visits. This procedure would yield slightly higher trip spending, as the profiles for marina/dock boat trips are slightly higher than the general trip spending profiles.

When estimating impacts of a change in recreation use, the RECONS recreation module user must be careful not to double count trip spending of boaters using marinas or docks. Typically, this will not be a problem as most applications will involve either a change in boats at a marina/dock or a change in general recreation use. The double counting problem only surfaces if estimating both changes in the same analysis, and it is easily avoided by being careful not to include trips to boats at marinas/docks in the general visitor analysis if also including marina/dock trip spending as part of the marina/dock analysis.

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Appendix A: Port Kit Expenditures for Port Services and Transportation

Table 23 summarizes the Port Kit expenditures for each of the types of port services, including modes of transportation. These costs have been inflated to represent 2008 dollars.

Table 23. Pork Kit Expenditures by Type of Port Service, Mapped to IMPLAN Industries (2008$)

Inflation Adjusted Prices				Containers	Break Bulk	Automobiles	Dry Bulk	Project Cargo	Liquid Bulk
Type of Port Service	NAICS Code	IMPLAN Industry	IMPLAN Industry Name	Cost in $/Container (1 TEU=8.5 Short-Tons)	Cost in $/Short-Tons	Cost in $/Vehicle	Cost in $/Short	Tons	Cost in $/Short
Port Services									
Tugs	488330	338	Scenic and sightseeing transportation and support activities for transportation	3.40	0.54	2.98	0.35	0.54	0.35
Pilots	488330	338	Scenic and sightseeing transportation and support activities for transportation	4.46	0.48	14.32	0.45	0.48	0.37
Line handling	488310	338	Scenic and sightseeing transportation and support activities for transportation	1.75	0.72	1.31	0.02	0.31	0.01
Launch	488310	338	Scenic and sightseeing transportation and support activities for transportation	0.76	0.29	0.24	0.04	0.29	0.02
Radio/Radar	488330	338	Scenic and sightseeing transportation and support activities for	0.05	0.06	0.00	0.06	0.06	0.00

			transportation						
Surveyor	488320	338	Scenic and sightseeing transportation and support activities for transportation	0.16	0.05	0.00	0.07	0.05	0.01
Dockage	488310	338	Scenic and sightseeing transportation and support activities for transportation	2.94	0.19	1.91	0.90	0.19	0.01
Lighterage	488320	338	Scenic and sightseeing transportation and support activities for transportation	0.00	0.00	0.00	0.00	0.00	0.01
Other	488	338	Scenic and sightseeing transportation and support activities for transportation	0.00	0.00	0.00	0.00	0.00	0.00
Total Port Services				13.52	2.32	20.77	1.89	1.91	0.79
Fuel Services									
Bunkers									
Oil	454310	331	Retail - Nonstore	21.13	2.64	4.23	2.46	2.64	2.64
Water		331	Retail - Nonstore	0.09	0.00	0.00	0.01	0.00	0.00
Other		331	Retail - Nonstore						
Total Fuel Service				21.22	2.64	4.23	2.47	2.64	2.64
Cargo Handling									
Stevedoring	488320	338	Scenic and sightseeing transportation and support activities for transportation	101.69	9.77	21.71	0.37	21.71	0.00
Clerking and Checking	488320	338	Scenic and sightseeing transportation and support activities for transportation	0.96	0.04	0.00	0.00	0.04	0.00
Watching	488320	338	Scenic and sightseeing transportation and	0.12	0.00	0.00	0.00	0.00	0.00

			support activities for transportation						
Cleaning/Fitting	488320	338	Scenic and sightseeing transportation and support activities for transportation	0.00	0.00	0.00	0.00	0.33	0.00
Equipment Rental	488320	338	Scenic and sightseeing transportation and support activities for transportation	1.19	0.00	0.00	0.00	0.00	0.00
Agency Fee	488510	338	Scenic and sightseeing transportation and support activities for transportation	0.28	0.03	0.05	0.03	0.03	0.03
Total Cargo Handling				104.24	9.85	21.76	0.40	22.11	0.03
Supplies									
Chandler/Provisions	424990	319	Wholesale trade	1.23	0.08	1.01	0.04	0.08	0.05
Laundry	8123	421	Dry-cleaning and laundry services	0.05	0.00	0.00	0.00	0.00	0.00
Medical	CPI	394	Offices of physicians, dentists, and other health practitioners	0.27	0.03	0.08	0.01	0.03	0.00
Waste	562219	390	Waste management and remediation services	0.02	0.09	0.00	0.00	0.09	0.00
Security	561612	387	Investigation and security services	2.15	6.45	0.12	0.00	6.45	0.00
Other		338	Scenic and sightseeing transportation and support activities for transportation	0.00	0.00	0.00	0.00	0.00	0.00
Total Supplies				3.72	6.65	1.20	0.05	6.65	0.05
Inland Movement									
Long Distance Trucking	484122	LD 335	Truck transportation	558.61	27.93	55.86	27.93	39.10	52.51

Short Distance Trucking	484110	SD 335	Truck transportation	252.88	11.24	39.34	11.24	22.48	22.48
Barge	483211	334	Water transportation	0.00	0.00	0.00	1.37	0.00	1.37
Air	481112	332	Air transportation	0.00	0.00	0.00	0.00	0.00	0.00
Rail	482111	333	Rail transportation	326.18	3.85	39.14	3.85	7.12	6.64
Pipeline	48611	337	Pipeline transportation	0.00	0.00	0.00	0.00	0.00	0.00
Freight Arrangement	488510	338	Scenic and sightseeing transportation and support activities for transportation	0.00	0.00	0.00	0.00	0.00	0.00
Total Inland Movement				1137.66	1137.66	134.34	134.34	68.70	83.00
In-Transit Storage									
Wharfage	488310	338	Scenic and sightseeing transportation and support activities for transportation	18.45	2.23	0.00	0.00	3.26	0.13
Yard Handling	488310	338	Scenic and sightseeing transportation and support activities for transportation	0.84	0.00	0.00	0.00	21.71	0.00
Demurrage	488310	338	Scenic and sightseeing transportation and support activities for transportation	0.08	0.92	8.14	0.00	0.00	0.00
Warehousing	493110	340	Warehousing and Storage	0.02	0.55	22.09	0.00	0.00	0.00
Auto and Truck Storage	493110	340	Warehousing and Storage	0.00	0.00	22.09	0.00	0.00	0.00
Grain Storage	493130	340	Warehousing and Storage	0.00	0.00	0.00	0.00	0.00	0.00
Refrigerated Storage	493120	340	Warehousing and Storage	0.04	0.00	0.00	0.00	0.00	0.00
Wholesale Durable	493110	340	Warehousing and Storage	0.00	0.00	0.00	0.00	0.00	0.00
Wholesale Non-Durable	493110	340	Warehousing and Storage	0.00	0.00	0.00	0.00	0.00	0.00

Other	493110	340	Warehousing and storage	0.00	0.00	0.00	0.00	0.00	0.00
Total Storage				19.43	3.70	52.31	0.00	24.97	0.13
Cargo Packaging									
Export Packing	488320	338	Scenic and sightseeing transportation and support activities for transportation	0.14	0.02	0.00	0.00	0.00	0.00
Container Stuffing/ Stripping	488321	338	Scenic and sightseeing transportation and support activities for transportation	5.77	0.00	0.00	0.00	0.00	0.00
Cargo Manipulation	488322	338	Scenic and sightseeing transportation and support activities for transportation	0.16	0.00	0.00	0.00	0.00	0.00
Other	488323	338	Scenic and sightseeing transportation and support activities for transportation	0.00	0.00	0.00	0.00	0.00	0.00
Total Cargo Packing				6.08	0.02	0.00	0.00	0.00	0.00
Crew Leave Spending		411	Hotels and motels, including casino hotels	0.00	0.08	0.12	0.08	0.08	0.08

Source: Port Kit; adjusted for inflation with Using US Bureau of Labor Statistics PPI.

Appendix B: FUSRAP Case Studies

This appendix highlights examples of economic impact of former FUSRAP Sites.

B&T Metals

Currently B&T Metals factory is being refurbished to supply artist lofts (residential space) as a means of redeveloping the surrounding neighborhood. The developer is investing $23 million in the Columbus, Ohio Metropolitan Statistical Area (MSA) region. This construction spending was run through IMPLAN sector 38, Construction of Other New Residential Buildings in the 8-county MSA region. The economic impact of the development of the B&T Metals site is listed in Table 24.

Table 24. B&T Metals Redevelopment Impact

Type of Impacts	Jobs	Labor Income	Value Added	Output
Direct Effect	179	$5,855,134	$6,202,942	$23,000,000
Indirect Effect	90	$3,885,775	$6,054,748	$10,246,693
Induced Effect	65	$2,597,586	$4,799,982	$8,085,414
Total Effect	335	$12,338,495	$17,057,670	$41,332,108

Bliss & Laughlin Steel

Bliss & Laughlin Steel currently has between 100 to 249 employees according to the Census in the Buffalo MSA region. According to the companies' records, the plant can produce an annual capacity of 120,000 tons of cold rolled steel.[19] According to metalprices.com a 6 month average cold rolled steel prices was $609 between April and September 2009, which provides an estimate for the Bliss and Laughlin Steel site at nearly $73 million in final steel goods sold if the facility is working at full capacity. Table 8 lists the economic impacts of the plant running at full capacity in the 2-county Buffalo MSA. The direct effect of $73 million was run through IMPLAN sector 170, iron and steel mills and ferroalloy manufacturing. Any change in capacity that has occurred due to the completion of a FUSRAP could be gauged from the full capacity estimates.

Table 25. Bliss and Laughlin Steel Economic Impacts

Type of Impacts	Jobs	Labor Income	Value Added	Output
Direct Effect	66	$5,692,693	$9,985,769	$73,000,000
Indirect Effect	184	$12,371,841	$20,625,020	$40,351,976
Induced Effect	116	$4,684,312	$8,352,134	$14,294,976
Total Effect	367	$22,748,844	$38,962,920	$127,646,952

[19] http://www.niagaralasalle.com/facilities/buffalo.shtml

Aliquippa Forge

In the late 1940s, Aliquippa Forge (previously Vulcan Crucible) was a supplier of rolled uranium rods used in Hanford's reactors. The AEC operated a rolling mill, two furnaces and cutting and extrusion equipment at Vulcan. Work at the site ended after decontamination efforts were finalized by the operator in 1950.

Operations ceased in 1950. However, a subsequent radiological survey of the facility performed in May 1978 identified uranium contamination throughout several areas of the facility. From 1986 through 1988, phase one of a FUSRAP cleanup was begun and the area was isolated from access until 1993 when phase two was begun and completed in 1994. According to the former site owners, the Beaver County Economic Corporation, the site is currently active in producing steel.

Aliquippa Forge currently has between 10 to 19 employees according to the Census. The site is located in the 7-county Pittsburg MSA. Using the average annual employment as an input into sector 170, iron and steel mills and ferroalloy manufacturing, the IMPLAN model estimated the economic impacts, summarized in Table 26.

Table 26. Aliquippa Forge Economic Impacts

Type of Impacts	Jobs	Labor Income	Value Added	Output
Direct Effect	15	$2,102,657	$3,677,128	$18,010,100
Indirect Effect	48	$3,548,112	$6,071,450	$12,156,345
Induced Effect	43	$1,853,139	$3,305,222	$5,693,617
Total Effect	107.2	$7,503,908	$13,053,800	$35,860,060

Baker and Williams Warehouses

The Baker and Williams Warehouses are located on the west side of Manhattan and consist of three buildings each with a 9,200 square foot print and seven to eleven stories with basements. The site has been converted to artist lofts and galleries[20] and has recently become "hot property" due to the completion of the High Line Walkway along the west side of Manhattan.

Given the dimensions of the buildings and an estimation of $237.50 per square foot[21] to renovate the warehouse into the lofts for at least seven floors per building the total construction cost would be $45.8 million. Although this is a high cost for the conversion of the warehouse to artist lofts, it took decades to complete and was most likely not done all at once. Table 10 summarizes the economic impacts associated with the development of the warehouses into lofts assuming this construction cost was all incurred within one

[20] http://art-collecting.com/galleries_ny_chelsea.htm
[21] http://www.professional-services.com/pricingcosts.html

year. Sector 38, Other New Residential Construction, was utilized for the analysis, and the study area was the 23-county New York, northern New Jersey, Long Island MSA.

Table 27. Baker and Williams Economic Impacts

Type of Impacts	Jobs	Labor Income	Value Added	Output
Direct Effect	310	$15,313,256	$16,221,990	$45,800,000
Indirect Effect	116	$8,134,113	$12,670,280	$22,003,310
Induced Effect	115	$7,020,950	$12,568,800	$20,444,906
Total Effect	542	$30,468,318	$41,461,060	$88,248,216