

**Research Report from
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Report

Special Multiplier Study for Drinking Water Systems Infrastructure

Prepared for
the Northern Great Plains and Rocky Mountain Consortium Study

by

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Introduction

Consortia states and states throughout the nation received substantial ARRA funding from the U.S. Environmental Protection Agency for drinking water systems infrastructure. These funds in turn are distributed by states for a variety of local projects to improve drinking water system infrastructure such as spending on water well fields, water meters, water lines, water basins, variable frequency pumps, and water treatment plans. Funding is distributed to the largest cities within states, mid-sized communities, and even small towns and villages.

In Nebraska, ARRA funds were combined with annual funding the state receives to fund local projects. Nebraska ARRA funding of \$19,500,000 was combined with a similar amount of annual funding for projects to support a total of \$44,452,048 of planned spending. We note that \$4,095,962 of ARRA funding is officially listed as “Green Infrastructure;” however, all funding went to projects that ultimately contribute to a safer drinking water system.

This study will identify the appropriate economic multipliers for United States EPA funding for drinking water systems infrastructure, and will calculate the economic impact of that funding for the State of Nebraska. The study, which is based on the template of our companion *Special Multiplier Study for Wastewater Systems Infrastructure*, only considers the economic impact of the \$19,500,000 in ARRA funding. Our assumption is that the additional \$19,500,000 in ARRA funding allowed additional projects to be funded. Thus, it is appropriate to assume that all \$19,500,000 in funding leads to a gross increase in economic activity within states. It is true that some of the \$44,452,048 million in projects funded with a combination of ARRA and regular annual funding would have taken place without the ARRA funding. However, it is unknown which projects would have been funded. Therefore, it is our strategy to consider all projects that received some ARRA funding.

Methods of ARRA funding also support the consideration of all \$19,500,000 in ARRA funds. In Nebraska, half of ARRA funds are provided for “principal relief.” These projects were essentially grants to support funded projects. The remainder of funds was given as subsidized loans. These funds will eventually be repaid to the state and become part of the state’s revolving loan fund to support future projects. Thus, even though the loans are not grants, the loan portion of ARRA funding still permanently brings new funding into the state of Nebraska to support drinking water systems infrastructure projects. Therefore, the impact of these funds should be counted just as with grants, and analysis will consider the economic impact of all \$19,500,000 in funding.

Selecting a Sector

A naïve analysis of the economic impact of ARRA spending on drinking water systems infrastructure would place all ARRA spending into Sector 36 of the IMPLAN model. IMPLAN Sector 36 is entitled Construction of Other New Nonresidential Structures. The primary components of this sector include spending on construction of water, sewer, or other systems and spending on construction of roads, bridges, and highways. As a result, IMPLAN Sector 36 represents a broader set of construction expenditures that includes drinking water systems but encompasses a variety of activities.

The choice of IMPLAN Sector 36 would be appropriate for a significant share of the U.S. Environmental Protection Agencies ARRA funding for state drinking water systems infrastructure. But, the choice of Sector 36 also would be inappropriate for a significant share of the spending. This is because not all of the funding is spent with firms engaged in the construction activities encompassed by IMPLAN Sector 36. For example, several million dollars of spending goes to support programs to install water meters on homes and buildings within water utility service territories. This activity is more appropriately classified in IMPLAN Sector 40, Maintenance and Repair of Residential Structures. To give another example, a portion of the spending would go to the basic engineering activities required to plan and scope out specific drinking water infrastructure projects. This spending is more appropriately classified in IMPLAN Sector 369, Architecture, Engineering, and Related Services.

Our analysis allocated the ARRA drinking water infrastructure funds for the case of Nebraska into IMPLAN Sector 36, but also into IMPLAN Sector 39, IMPLAN Sector 369 and other impacted sectors. To allocate spending into sectors, we obtained a complete Summary Project List for the 26 drinking water projects that received partial or full funding for ARRA projects. The data was obtained from personnel at the Nebraska Department of Health and Human Services (NDHHS). Eleven of the 26 projects received nearly full funding from ARRA, and the other 15 received partial funding. The NDHHS also provided descriptions of the purpose of each project that received the funding, and the share of spending that was spending on architecture and engineering services.

Table 1 below shows the IMPLAN sectors that received ARRA funding for drinking water infrastructure projects, and an estimate of the funding received by each sector. The largest share, 79.1%, did go to IMPLAN Sector 36. However, the remaining one-fifth of ARRA drinking water funds were passed through to firms in other industries. Engineering firms in IMPLAN Sector 369 also received 11.5% of funding, while construction firms that install water meters, which are classified in IMPLAN Sector 40, received 8.7% of funding. The remaining funds went to support painting of a water tower.

Table 1
Sectors where ARRA Drinking Water Funds were Spent

Sector Number	Sector Description	Spending	Percent Spending
36	Construction of other new nonresidential structures	\$15,422,403	79.1%
39	Maintenance and repair of nonresidential structures	\$145,484	0.7%
40	Maintenance and repair of residential structures	\$1,689,900	8.7%
369	Architecture, Engineering, and Related Services	\$2,242,213	11.5%
Total		\$19,500,000	100.0%

Input-Output Model Results

We used the percentages in Table 1 to calculate aggregate economic multipliers for ARRA funds for drinking water infrastructure. The multipliers show the direct and total output, direct and total labor income, and direct and total employment impacts per \$1,000,000 in funding for ARRA drinking water funds. Total impacts are the sum of the direct, indirect, and induced impacts. Multiplier estimates reflect that while four-fifths of direct spending occurs in IMPLAN Sector 36, the remaining spending is split among other sectors, specifically IMPLAN Sectors 39, 40, and 369.

Table 2 contains overall economic multipliers for drinking water funding in Nebraska. These aggregate multipliers are a weighted average of the spending in the IMPLAN Sectors listed in Table 1. Results indicate that each \$1,000,000 in spending for drinking water projects leads to a direct impact of 7.3 jobs and a total impact of 13.0 jobs. These estimates are 3% higher than the direct impact of 7.1 jobs and total impact of 12.6 jobs per million dollars of spending in Nebraska for IMPLAN Sector 36. This 3% difference suggests that our careful modeling ARRA drinking water spending by industry led to slightly higher economic multiplier estimates, and therefore, slightly higher estimates of economic impact.

Table 2
Economic Multipliers for ARRA Drinking Water Spending in Nebraska

	Output	Labor Income	Employment
Spending	\$1,000,000	\$1,000,000	\$1,000,000
Direct Impact	\$1,000,000	\$387,844	7.3
Indirect and Induced	\$690,145	\$230,740	5.7
Total Impact	\$1,690,145	\$618,584	13.0
Multipliers Per Dollar of Spending			
Direct Multiplier	1.00	0.39	0.0000073
Indirect and Induced	0.69	0.23	0.0000057
Total Multiplier	1.69	0.62	0.0000130

Economic Impacts of Nebraska’s ARRA Drinking Water Projects

Economic impact estimates for ARRA Drinking Water spending are presented in Table 3. Specifically, the table shows the total economic impact in Nebraska from the \$19,500,000 in ARRA funds that the United States Environmental Protection Agency provided to the State of Nebraska for distribution to priority drinking water projects in the state. The total impact on the state economy was \$33.0 million in economic activity. The total employment impact was 253 jobs *for a period of one-year*. It is possible, of course, that fewer jobs could have been supported for more than one year or that a much larger number of jobs could have been supported during a 4 to 6 month construction period. Of these, 141.4 jobs were created directly at the projects funded by U.S. Environmental Protection Agency spending. The remaining 111.6 jobs were generated at businesses throughout the Nebraska economy including retail businesses, service businesses, and others.

The jobs generated \$12.1 million in labor income in Nebraska, including \$7.6 million in direct labor income spread over the 141.4 direct jobs created at the projects supported by the U.S. EPA. This is the equivalent of \$53,500 in labor income per jobs, reflecting the relatively high pay of the construction jobs created in projects to improve drinking water systems. There also was \$4.5 million indirect and induced labor income spread over the 111.6 induced and indirect jobs created by the ARRA funding. These jobs paid an average of \$40,300, which is also higher wage employment. These findings indicate that the ARRA drinking water funding not only created several hundred jobs in the State of Nebraska but that the funds also supported higher wage employment in terms of both direct employment and indirect and induced employment.

Table 3
Economic Impact of ARRA Drinking Water Spending in Nebraska

	Output	Labor Income	Employment
Spending	\$19,500,000	\$19,500,000	\$19,500,000
Direct Impact	\$19,500,000	\$7,562,963	141.4
Indirect and Induced	\$13,457,829	\$4,499,423	111.6
Total Impact	\$32,957,829	\$12,062,386	253.0

Summary

This study provides an in-depth economic analysis of ARRA funds provided by the U.S. Environmental Protection Agency to the Nebraska Department of Health and Human Services (NDHHS). These funds were allocated by NDHHS to priority drinking water infrastructure projects in towns and

cities around Nebraska. The research team examined the specific investment projects funded by the NDHHS and the specific industries that received funding for these investments. Around four-fifths of the funding went to firms which are part of IMPLAN Sector 36 (construction of other new nonresidential structures). But around one-fifth of funds went to businesses in other industries, primarily engineering and design firms (IMPLAN Sector 369) and firms that install water meters (IMPLAN Sector 40). These findings show that it is inappropriate to assume that 100% U.S. Environmental Protection Agency funding for drinking water infrastructure are allocated to firms in IMPLAN Sector 36. Our results show that a better approximation for states would be to precisely follow the shares we report in Table 1, or to assume 80% would be allocated to firms in IMPLAN Sector 36, 10% to firms in IMPLAN Sector 369, and 10% to firms in IMPLAN sector 40. Doing so will yield estimated economic multipliers and economic impacts that are 3% higher than those obtained by naively assuming all funding goes to IMPLAN Sector 36.

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