



The Economic Impact of the

# Archie Bray Foundation for the Ceramic Arts

Final Report

July 2013

Prepared By  
Bureau of Business and Economic Research  
University of Montana  
Missoula, MT 59823



## Acknowledgements

This report was produced and authored by Patrick Barkey, director of the Bureau of Business and Economic Research at The University of Montana. The research was supported by the Archie Bray Foundation. All statements and conclusions of the report are those of the author and do not represent the position of The University of Montana. The author would like to acknowledge the cooperation and support of Marcia Eidel and Steven Lee who provided helpful information for this report. All errors and omissions, of course, remain my own.

## Table of Contents

Introduction and Summary .....	4
The Archie Bray Foundation for the Ceramic Arts .....	5
Policy Analysis with the REMI Model .....	6
The Direct Economic Contribution of Archie Bray .....	9
The Economic Impact of Archie Bray .....	12
Conclusion .....	18
References.....	19
Appendix and REMI Tables.....	20

## Introduction and Summary

This report contains a detailed assessment of the economic impacts of the on-going operations of the Archie Bray Foundation for the Ceramic Arts, located in Helena, Montana. The Bureau of Business and Economic Research at The University of Montana, using a state-of-the-art policy analysis model, analyzed the employment, income, production, and other economic flows that are realized in the Montana economy because of the presence of Archie Bray. The analysis indicates that the facility's production and sale of art, its ongoing education and workshops, as well as the significance of Archie Bray as a destination for cultural tourists to Montana combine to produce an impact that is significantly larger than the budget of the institution itself.

The Bureau of Business and Economic Research is the primary research unit of the School of Business Administration at The University of Montana. Founded in 1948, its mission is to "serve the general public ... by providing an understanding of the economic environment in which Montanans live and work." This research report quantifies how the diverse activities of an artistically focused institution affect income, employment and sales for Montana as a whole.

## Summary of Findings

Based upon a comparison of the baseline economy to levels of economic activity that would occur if Archie Bray did not exist, we find that the state economy is larger, more prosperous and more populous due to its operations. The impacts recur year after year, growing substantially larger in years when special events -- such as the 60 year anniversary festival held in 2011 -- take place. Specifically we find that on an ongoing basis the Montana economy is larger by:

- 26 year-round jobs, of which 23 are private sector jobs, spread across a wide spectrum of industries and occupations, predominantly in the Helena area.
- more than \$1.4 million in annual income received collectively by Montana households, of which about \$1.2 million is after-tax income available for household spending;
- 36 people, including workers and families who relocate, attracted by job opportunities; and
- more than \$2.8 million in annual sales realized by Montana businesses.

For an organization that has a \$1.2 million annual budget this is a remarkable result. As this report details, different facets of its operations, particularly those which draw non-resident visitors to auctions and events, combine to bring it about.

In years which special events such as the Anniversary Festival occur, these impacts are higher. Specifically we find that in such years the operations of the Bray ultimately support:

- 38 (year-round equivalent) jobs,
- \$2.1 million in income to Montana households, and
- more than \$4 million in sales recorded by Montana businesses.

Table 1  
The Economic Impact of Archie Bray Operations  
Impacts Summary

Category	Units	Impact	
		Recurring	Festival
Total Employment	Jobs	26	38
Private Sector	Jobs	23	34
Personal Income	\$ Thousands	1,432	2,128
Disposable Pers. Income	\$ Thousands	1,232	1,776
Output	\$ Thousands	2,865	4,071
Population	People	36	53

We document and detail these findings in the remainder of this report. After a brief description of Archie Bray, we describe the analytic flow of this research and document the economic model used to produce the results. We then lay out the key assumptions concerning the economic activities which produce these outcomes. The fourth section gives the results of the study in greater detail, followed by a conclusion and references. More detailed output is contained in an appendix.

## 1. The Archie Bray Foundation for the Ceramic Arts

The Archie Bray Foundation for the Ceramic Arts is a public, nonprofit, educational institution founded in 1951 by brickmaker Archie Bray, who intended it to be "a place to make available for all who are seriously and sincerely interested in any of the branches of the ceramic arts, a fine place to work." Its primary mission is to provide an environment that stimulates creative work in ceramics.

Listed on the National Register of Historic Places, the Bray is located three miles from downtown Helena, Montana, on the site of the former Western Clay Manufacturing Company. Set against the wooded foothills of the Rocky Mountains, the 26-acre former brickyard is internationally recognized as a gathering place for emerging and established ceramic artists. The nearby mountains and brick factory ruins provide a backdrop for the creative environment; more important is the dynamic arts community created by the resident artists that come to the Bray to work, share experiences, and explore new ideas.

## 2. Policy Analysis with the REMI Model

Economic impacts occur because of events or activities that create new expenditures. Spending that is new – which is over and above existing expenditures and does not simply displace spending elsewhere in the region – not only adds to economic activity in its own right, but it also induces further spending as the recipients of wages, sales and tax revenues spend a portion of their income in the local economy. Changes in the path of investment, migration, and prices and wages are possible as well.

The basic tool used in this study to assess the economic impacts of Archie Bray is an economic model, calibrated to represent the interactions in the Montana economy, leased from Regional Economic Models, Inc.. The REMI model is one of the best known and most respected analytical tools in the policy analysis arena and has been used in more than a hundred previous studies as well as dozens of peer-reviewed articles in scholarly journals. It is a state-of-the-art econometric forecasting model that incorporates dynamic feedbacks between economic and demographic variables. The REMI model forecasts employment, income, expenditures and populations for counties and regions based on a model containing over 100 stochastic and dynamic relationships as well as a number of identities. A full explanation of the design and operation of the model can be found in Treyz (1988).

The model used in this study disaggregated the state economy into five regions: Northwest, Southwest, North Central, South Central, and Eastern. It explicitly recognizes trade flows that exist between these regions, as well as between the regions and the rest of the world. The definition of the regions is shown in Figure 2.1 below.

Figure 2.1  
Economic Regions

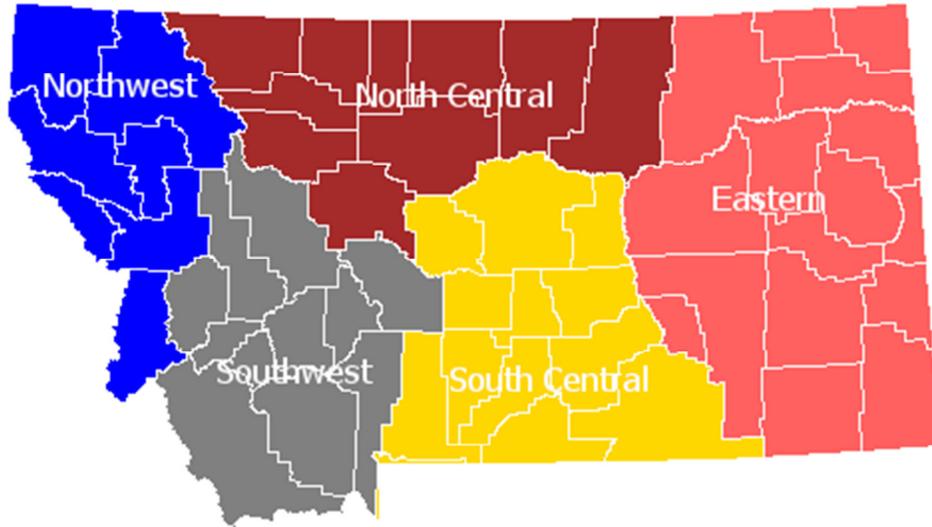
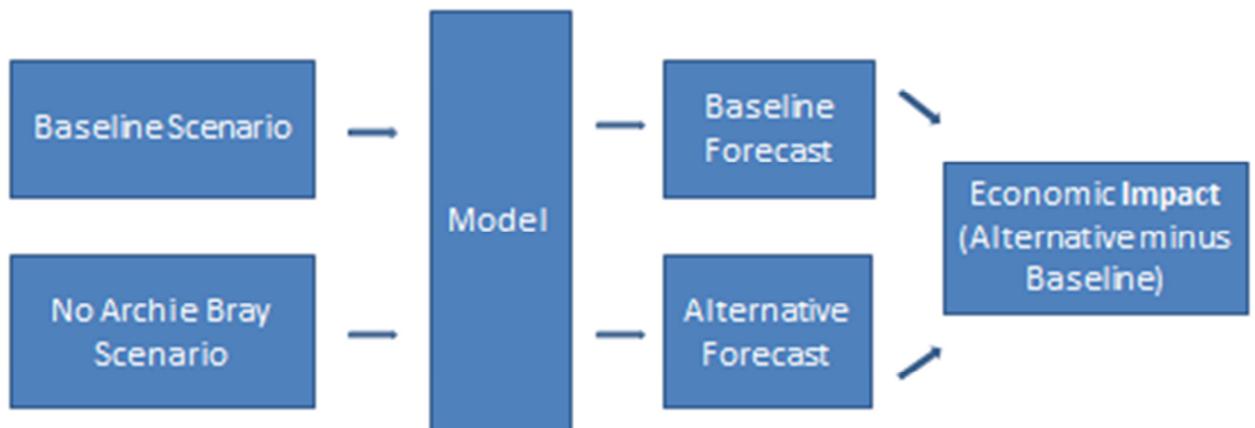
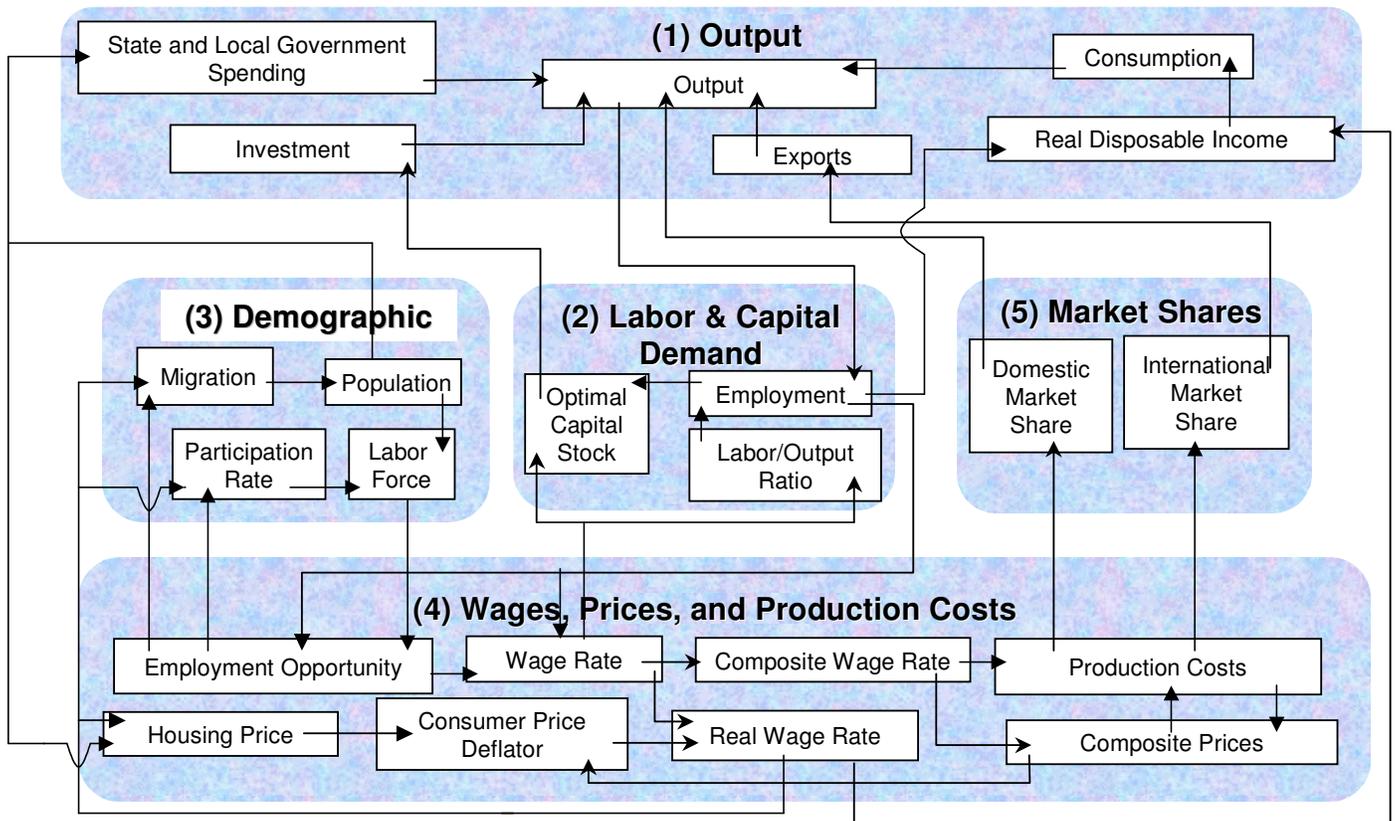


Figure 2.2  
Policy Analysis with the REMI Model



The use of the model to derive the results of this study is illustrated graphically in Figure 2.2. First, a baseline projection of the economy is produced using the model, utilizing inputs and assumptions which extrapolate growth and conditions of recent history. The model is then used a second time, with identical inputs – except that in this alternative scenario, the spending, payroll, income and other flows associated with Archie Bray operations are removed. Thus the activities of Archie Bray represent a change that ultimately produces a different economy, reflecting not only the operations themselves, but also how the rest of the economy reacts to those income flows. The difference between the baseline and alternative scenarios of the economy represents the economic impact of Archie Bray operations.

## REMI Model Linkages (Excluding Economic Geography Linkages)



### 3. The Direct Economic Contribution of Archie Bray

Spelling out all of the ways that the diverse operations of Archie Bray directly impact the Montana economy is a challenging task. Its national and international reputation raises the profile of the entire state, bringing artists, students, and visitors to western Montana who may have otherwise never come. To quantify how the goodwill, exposure, and knowledge created and fostered by its continued operations flow into income, jobs and output of the economy is difficult, yet the contributions it makes are real.

The approach taken by this study is to focus on the aspects of Archie Bray which do lend themselves to verifiable quantification. Specifically we have attempted to capture three different dimensions of Archie Bray operations:

#### (i) Operations

Archie Bray is an organization in the business of making ceramic art as well as distributing ceramic art supplies. It produces and sells products, pays vendors and suppliers, and employs a full and part-time workforce. For purposes of analysis, it is classified in an industrial category with NAICS (North American Industry Classification System) code 32711, with gross revenues of about \$1.2 million per year, employing 14 workers with total compensation of just under \$500,000.

#### (ii) Education

Archie Bray is also an educational facility, hosting workshops and artists-in-residence programs. Its contributions to the skills and abilities of those receiving instruction and inspiration are undoubtedly sizable but difficult to precisely estimate. What can be measured is the spending of out-of-state artists and students who take part in these activities, which is new to the state economy and directly attributable to the presence of Archie Bray.

#### (iii) Cultural tourism

Archie Bray serves as a draw to out-of-area visitors, attracted to its reputation as well as its specific activities. These include both its regular exhibits as well as its occasional festivals. The most recent example of the latter was its 60<sup>th</sup> anniversary event held in 2011. The literature on "cultural tourism" suggests that those who visit areas for cultural attractions tend to stay longer and spend more than visitors as a whole.

Two different levels of activity at Archie Bray are studied in this project. The first includes those activities which recur every year. The second adds to that the activities associated with the occasional festivals which have taken place in the past.

### *Recurring Direct Contributions*

Information on the spending and other income and product flows directly associated with Archie Bray were obtained for a reference historical year (2010). This information is representative of what is typically associated with the activities of the institution during any given year. This included:

- the production of approximately \$1.2 million per year in products and services, including artwork, art materials and educational services;
- the employment of 14 people, including 5 full time workers;
- total compensation of approximately \$500,000;
- attendance of 31 out-of-area visiting, year-round and seasonal visiting artists and 66 workshop participants;
- attendance of out-of-town visitors to regular art exhibits,

The spending of those from out-of-area in Helena whose presence is attributable to Archie Bray represents a direct impact of the latter's operations. Actual spending data were not available, but were estimated as follows:

- Resident artist spending was estimated using spending profiles of University of Montana – Missoula students for which survey data were available. These data imply total monthly spending of approximately \$1,500 per month on a range of items including rent, utilities, food, transportation and entertainment.
- Workshop participant and out-of-area art exhibit visitor spending was estimated using spending profiles for Montana visitors developed by the University of Montana Institute for Tourism and Recreational Research, adjusted for the additional spending of cultural tourists reported by the National Assembly of State Arts Agencies.

### *Festival Direct Economic Contributions*

During years such as 2011, when the 60 year anniversary of Archie Bray's founding took place, there can be special events which add to the contributions listed above. Using the anniversary event as a reference, we included:

- an additional 358 out-of-area visitors attending festivals;
- the production and sale of approximately \$500,000 worth of art;
- the sale of approximately \$250,000 of additional merchandise and services.

If it were not for the existence of Archie Bray, none of these activities would take place, and the income, production and sales flows would be lost to the state economy. How much smaller the overall economy would be as a result of this loss can be estimated using an economic model, as described in the previous section. We describe those findings in the next section.

#### 4. The Economic Impact of Archie Bray

As described in the second section, the impact that the operations of Archie Bray produces in the Montana economy is estimated as the difference between two different scenarios for the state economy. The first is a status quo scenario which reflects current operations. The second scenario is one where the activity and the associated spending described in the previous section do not take place. Since the jobs and spending associated directly with Archie Bray represent income which generates additional jobs and spending, those activities ultimately produce increases in economic activity that are greater.

The REMI model was used to produce both the status quo and no-Archie Bray scenarios for the Montana economy. The difference between these two projections – in terms of jobs, income, production and other measures of economic activity – in any given year is the economic impact of Archie Bray. A second analysis was also conducted to estimate the economic impact during festival years.

Table 4.1  
The Economic Impact of Archie Bray Operations  
Impacts Summary

Category	Units	Impact	
		Recurring	Festival
Total Employment	Jobs	26	38
Private Sector	Jobs	23	34
Personal Income	\$ Thousands	1,432	2,128
Disposable Pers. Income	\$ Thousands	1,232	1,776
Output	\$ Thousands	2,865	4,071
Population	People	36	53

#### *Summary of Findings*

The results of this research show that the Montana economy is significantly impacted by the operations of Archie Bray. On an ongoing basis, we find that presence of Archie Bray results in:

- 26 more jobs,
- \$2.9 million in output, or gross sales,
- \$1.4 million in personal income, and
- 36 more people

existing in the state economy. The preponderance of these impacts occur in the Helena area.

The impacts are significantly larger than the footprint of Archie Bray itself. That is for at least two reasons. First, the presence of Archie Bray attracts people to Helena – cultural tourists, resident artists and workshop participants – who would otherwise not be there. Thus their spending on everything from accommodations to health care to entertainment represents new spending for the state economy due to Archie Bray.

The second reason is the propagation of that spending – both Archie Bray itself and visitor spending – through the local economy. Simply put, the additional spending shows up as income to local merchants and vendors, some portion of which is spent again in the community. These effects are captured using the economic model, which tracks the interrelationships in the area economy and produces an estimate of total impact.

During festival years these impacts are larger, due to the higher production and sales of ceramic art and the spending of out-of-area visitors who are attracted to the events. Using the 60<sup>th</sup> anniversary event as an example, we estimate that the festival year overall produces impacts of:

- 38 jobs,
- \$2.1 million in personal income received by Montana households, and
- \$4.0 million in gross sales

in the area economy. The jobs estimate is a year-round equivalent figure, representing a mixture of full time jobs and a larger number of seasonal jobs associated with the event.

### *Personal Income Impacts*

Personal income is the payment (including cash and benefits) received by households who live in Montana. This includes both wage and salary income as well as income derived from assets. As can be seen from Table 4.2, most of the Archie Bray's impact on Montana personal income comes in the form of earnings. But significant contributions also come in the form of rental and financial income as well.

Of the \$1.4 million in increased annual income received by Montanans, roughly a million is in the form of earnings net of social security taxes. In this context, earnings includes benefits. Subtracting (primary federal) income taxes, this means that Archie Bray is responsible for about \$1.2 million of after-tax income to Montanans, available for spending or any other use.

Table 4.2  
The Economic Impact of Archie Bray Operations  
Personal Income Impacts (\$ thousands)

Category	Impact	
	Recurring	Festival
Total Earnings by Place of Work	1,156	1,708
Total Wage and Salary Disbursements	864	1,276
Supplements to Wages and Salaries	311	458
Employer contributions for employee pension and insurance funds	201	296
Employer contributions for government social insurance	110	163
Proprietors' income with inventory valuation and capital consumption adjustments	8	15
Less: Contributions for government social insurance	209	309
Employee and self-employed contributions for government social insurance	99	146
Employer contributions for government social insurance	110	163
Plus: Adjustment for residence*	-4	-6
Gross In	18	27
Gross Out	22	32
Equals: Net earnings by place of residence	1,052	1,558
Plus: Rental, interest, and dividend income	294	437
Plus: Personal current transfer receipts	87	134
Equals: Personal Income	1,432	2,128
Less: Personal current taxes	198	293
Equals: Disposable personal income	1,232	1,836

\* Total earnings data are derived from records of employers who are located in Montana. Since some Montana workers are employed by out-of-state firms, and some Montana firms employ workers from other states, the adjustment for residence nets out these two impacts to produce an estimate of Montana residents' income.

### *Personal Consumption Impacts*

Increased spending by both Montana-based and out-of-area consumers in the Montana economy occurs as a result of the operations of Archie Bray, as shown in Table 4.3. This spending does not include the spending of Archie Bray itself or other business or government spending. Some of the categories of spending, such as housing and medical care, have a very high locally-produced component. Others, such as motor vehicles, are for products or services where most of the value-added occurs outside the state.

In terms of consumer spending, Archie Bray operations cause an increase of about \$1.6 million over spending levels that would have occurred if the center did not exist. During festival years the increase is almost \$2.3 million. These spending levels exceed the increase in after-tax income presented above due to the additional spending of out-of-area visitors.

**Table 4.3**  
**The Economic Impact of Archie Bray Operations**  
**Personal Consumption Impacts (\$ thousands)**

Category	Impacts	
	Recurring	Festival
Vehicles & Parts	76.5	102.5
Computers & Furniture	37.1	53.9
Other Durables	99.0	135.5
Food & Beverages	129.5	175.5
Clothing & Shoes	78.1	102.8
Gasoline & Oil	60.3	80.9
Fuel Oil & Coal	0.6	0.9
Other Non-Durables	84.0	120.5
Housing	323.0	451.0
Household Operation	43.8	60.1
Transportation	57.6	82.5
Medical Care	209.0	304.0
Other Services	431.0	619.0
<b>Total Consumption</b>	<b>1629.5</b>	<b>2289.0</b>

The category that sees the largest increase in consumer spending due to Archie Bray is Other Services, a composite category that includes recreation, accommodations, purchased meals and personal services. This is followed by housing and medical care.

### *Output Impacts*

An alternative way of examining spending is to look at output, or gross sales, by type of business. Exactly as was the case for consumer spending, output in some industries has a higher local-produced component than others. The output impacts displayed in Table 4.4 represent the changes in gross sales for businesses located in Montana that are due to the operations of Archie Bray.

**Table 4.4**  
**The Economic Impact of Archie Bray Operations**  
**Output Impacts (\$ thousands)**

Category	Impact	
	Recurring	Festival
Utilities	43	58
Construction	225	342
Manufacturing	1,572	2,152
Wholesale Trade	95	131
Retail Trade	177	256
Transportation and Warehousing	3	5
Information	12	17
Finance and Insurance	6	8
Real Estate and Rental and Leasing	98	135
Professional, Scientific, and Technical Services	43	62
Administrative and Waste Management Services	33	49
Educational Services	5	8
Health Care and Social Assistance	130	190
Arts, Entertainment, and Recreation	16	30
Accommodation and Food Services	119	215
Other Private	39	58
State and Local Government	250	359
<b>TOTAL</b>	<b>2,865</b>	<b>4,071</b>

The largest output contribution of Archie Bray is in manufacturing. This is due to the fact that Archie Bray's own output is classified under that major industry heading. But the table makes clear that the impacts of Archie Bray propagate extensively throughout the economy, particularly in construction, health care and government. During festival years the gross sales of Montana companies is higher by more than \$4 million because of the operations of Archie Bray. For an organization with an approximate \$1.2 million annual budget, this is a remarkable outcome.

### *Summary*

A comparison of the actual economy to an economy as it might exist if Archie Bray operations did not take place shows that the organization supports a significant number of jobs and a sizable flow of income to Montana households. It also makes a contribution to the sales of a broad spectrum of Montana businesses. Those contributions are larger during year in which festivals, such as the recent 60<sup>th</sup> anniversary event held in 2011, take place. The size of the impacts is partly due to Archie Bray's role as an attraction to non-resident artists, workshop participants and attendees at its exhibits and other artistic-oriented events.

## 5. Conclusion

The Archie Bray Foundation for the Ceramics Arts is dedicated to providing an environment for ceramic artists to work and thrive. As detailed in this report, accomplishing that mission has brought about another outcome as well. That is to create jobs and generate income in the Montana economy.

Using an approach that compares the actual Montana economy to what it would look like if Archie Bray did not exist, we find that:

- the center operates simultaneously as a creator and seller of art works, a distributor of art supplies, and educator to developing artists, and a host and producer of events drawing visitors from around the country and beyond.
- the operations of the facility, including its role as a producer of art, an educator of artists, and a destination point for out-of-area visitors with an interest in ceramics, produce a total impact on the economy that is significantly larger than its own direct contribution;
- the activities of Archie Bray create permanent jobs and recurring income streams in the Montana economy.

The results cited in this report pertain to the Montana economy as a whole, but the overwhelming proportion of those benefits are reaped by the Helena area.

It is doubtless a fact that the economic contribution of Archie Bray to the local economy was not the primary reason for its founding more than 60 years ago. Nonetheless, as it has grown in size and stature, those contributions have become considerable, and this report has been an effort to analyze and document that fact.

## 6. References

Regional Economic Modeling: A Systematic Approach to Economic Forecasting and Policy Analysis; George I. Treyz, 1993. Norwell: Kluwer Academic Publishers.

“Design of a Multiregional Policy Analysis Model,” George I. Treyz, *Journal of Regional Science*, Volume 20, Issue 2, pp. 191-206, May 1980.

“The REMI Economic-Demographic Forecasting and Simulation Model,” George I. Treyz, Dan S. Rickman, and Gang Shao, *International Regional Science Review*, Volume 14, pp. 221-253, December 1991.

“Visitors of Arts, Culture and Outdoor Recreation to Bozeman,” D. Snepenger, M. Snepenger and N. Nickerson, Institute for Tourism and Recreational Research, University of Montana, March 2007.

“The Economic Impact of the Wadsworth Atheneum Museum of Art,” Fred V. Carstensen, Stanley McMillen and Murat Arik, Connecticut Center for Economic Analysis, University of Connecticut, December 2002.

“Ontario Arts and Culture Tourism Profile,” Research Resolutions and Consulting, Ltd., Ontario Arts Council, November 2012.

“Evaluating the Economic Impact of the Eastern States Exposition on Western Massachusetts,” Regional Economic Models, Inc., Eastern States Exposition, August 2008.

APPENDIX  
REMI Tables

# Report1

## Economic Summary

C:\Users\Pat.Barkey\Documents\REMI\PI+ Montana Regions v1.4.3 (Build 3072)\Workbooks\Archie Bray Second Try.rwb

Regional Simulation 2 compared to Standard Regional Control — Difference

Region = All Regions

Economic Summary

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total Employment	Individuals (Jobs)	+27	+28	+28	+28	+28	+27	+27	+27	+26	+26
Total Employment as % of Nation	Percent	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Private Non-Farm Employment	Individuals (Jobs)	+25	+26	+26	+26	+26	+25	+24	+24	+24	+23
Private Non-Farm Employment as % of Nation	Percent	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Gross Domestic Product	Thousands of Fixed (2013)	+1340	+1428	+1484	+1500	+1500	+1496	+1484	+1476	+1484	+1496
Gross Domestic Product (GDP) as % of Nation	Percent	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Output	Thousands of Fixed (2013)	+2560	+2728	+2808	+2848	+2864	+2840	+2840	+2816	+2832	+2840
Value Added	Thousands of Fixed (2013)	+1364	+1452	+1508	+1520	+1528	+1524	+1516	+1508	+1508	+1520
Personal Income	Thousands of Fixed (2013)	+868	+1024	+1128	+1196	+1252	+1288	+1316	+1340	+1372	+1404
Personal Income as % of Nation	Percent	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Disposable Personal Income	Thousands of Fixed (2013)	+752	+884	+976	+1036	+1080	+1108	+1132	+1152	+1184	+1208
Disposable Personal Income as % of Nation	Percent	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
PCE-Price Index	2005=100 (Nation)	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Real Disposable Personal Income	Thousands of Fixed (2013)	+732	+852	+932	+984	+1020	+1044	+1068	+1088	+1112	+1116
Real Disposable Personal Income as % of Nation	Percent	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Population	Individuals	+6	+12	+17	+21	+24	+27	+30	+32	+33	+35
Population as % of Nation	Percent	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0

# Report1

## Economic Summary

C:\Users\Pat.Barkey\Documents\REMI\PI+ Montana Regions v1.4.3 (Build 3072)\Workbooks\Archie Bray Second Try.rwb

Regional Simulation 2 compared to Standard Regional Control — Difference

Region = All Regions

Economic Summary

2023	2024	2025
+26	+26	+26
+0	+0	+0
+23	+23	+23
+0	+0	+0
+1508	+1528	+1552
+0	+0	+0
+2872	+2888	+2928
+1532	+1552	+1576
+1432	+1464	+1500
+0	+0	+0
+1232	+1264	+1296
+0	+0	+0
+0	+0	+0
+1148	+1184	+1208
+0	+0	+0
+36	+37	+37
+0	+0	+0

# Report1

## Personal Income

C:\Users\Pat.Barkey\Documents\REMI\PI+ Montana Regions v1.4.3 (Build 3072)\Workbooks\Archie Bray Second Try.rwb

Regional Simulation 2 compared to Standard Regional Control — Difference

Region = All Regions

Personal Income

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total Earnings by Place of Work	Thousands of Fixed (201	+1020	+1126	+1180	+1202	+1206	+1192	+1176	+1158	+1156	+1152
Total Wage and Salary Disbursements	Thousands of Fixed (201	+730	+804	+848	+868	+874	+872	+862	+854	+858	+860
Supplements to Wages and Salaries	Thousands of Fixed (201	+223	+243	+257	+268	+276	+282	+287	+292	+298	+304
Employer contributions for employee pe	Thousands of Fixed (201	+143	+156	+165	+172	+178	+182	+185	+188	+193	+197
Employer contributions for government	Thousands of Fixed (201	+80	+87	+92	+96	+98	+101	+102	+104	+106	+108
Proprietors' income with inventory valua	Thousands of Fixed (201	+91	+101	+101	+93	+81	+67	+53	+39	+27	+17
Less: Contributions for Government Social	Thousands of Fixed (201	+162	+177	+187	+193	+197	+199	+200	+201	+204	+207
Employee and Self-Employed Contributor	Thousands of Fixed (201	+82	+90	+96	+98	+99	+98	+98	+97	+98	+98
Employer contributions for government s	Thousands of Fixed (201	+80	+87	+92	+96	+98	+101	+102	+104	+106	+108
Plus: Adjustment for Residence	Thousands of Fixed (201	-3	-4	-4	-4	-4	-4	-4	-4	-4	-4
Gross In	Thousands of Fixed (201	+16	+17	+18	+19	+19	+18	+18	+18	+18	+18
Gross Out	Thousands of Fixed (201	+19	+21	+22	+22	+23	+22	+22	+22	+22	+22
Equals: Net Earnings by Place of Residenc	Thousands of Fixed (201	+930	+1028	+1078	+1096	+1100	+1090	+1072	+1054	+1052	+1050
Plus: Rental, Personal Interest, and Person	Thousands of Fixed (201	+35	+67	+99	+129	+158	+186	+213	+241	+260	+277
Plus: Personal Current Transfer Receipts	Thousands of Fixed (201	-95	-73	-51	-28	-6	+14	+33	+48	+63	+76
Equals: Personal Income	Thousands of Fixed (201	+868	+1024	+1128	+1196	+1252	+1288	+1316	+1340	+1372	+1404
Less: Personal current taxes	Thousands of Fixed (201	+120	+140	+154	+164	+173	+179	+185	+190	+193	+195
Equals: Disposable personal income	Thousands of Fixed (201	+752	+884	+976	+1036	+1080	+1108	+1132	+1152	+1184	+1208

# Report1

## Personal Income

C:\Users\Pat.Barkey\Documents\REMI\PI+ Montana Regions v1.4.3 (Build 3072)\Workbooks\Archie Bray Second Try.rwb

Regional Simulation 2 compared to Standard Regional Control — Difference

Region = All Regions

Personal Income

2023	2024	2025
+1156	+1160	+1172
+864	+870	+880
+311	+318	+325
+201	+206	+210
+110	+113	+115
+8	+2	-4
+209	+213	+216
+99	+100	+101
+110	+113	+115
-4	-4	-4
+18	+18	+18
+22	+22	+22
+1052	+1056	+1068
+294	+309	+324
+87	+98	+108
+1432	+1464	+1500
+198	+201	+205
+1232	+1264	+1296

# Report1

## Output and Demand | Output | Private Non-Farm | Sector Level

C:\Users\Pat.Barkey\Documents\REMI\PI+ Montana Regions v1.4.3 (Build 3072)\Workbooks\Archie Bray Second Try.rwb

Regional Simulation 2 compared to Standard Regional Control — Difference

Region = All Regions

Sector Level

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Forestry, Fishing, and Related Activities	Thousands of Fixed (201	+0	+0	0	0	0	0	0	-1	-1	-1
Mining	Thousands of Fixed (201	+7	+7	+6	+4	+4	+2	+1	+0	0	-1
Utilities	Thousands of Fixed (201	+53	+54	+54	+52	+51	+48	+47	+46	+45	+44
Construction	Thousands of Fixed (201	+171	+249	+292	+308	+309	+298	+284	+266	+252	+237
Manufacturing	Thousands of Fixed (201	+1392	+1408	+1423	+1433	+1449	+1465	+1482	+1500	+1522	+1546
Wholesale Trade	Thousands of Fixed (201	+82	+87	+90	+91	+92	+93	+93	+92	+93	+93
Retail Trade	Thousands of Fixed (201	+147	+159	+167	+172	+172	+172	+173	+174	+174	+175
Transportation and Warehousing	Thousands of Fixed (201	+9	+8	+7	+7	+6	+5	+4	+4	+4	+3
Information	Thousands of Fixed (201	+12	+13	+13	+13	+13	+12	+12	+12	+12	+11
Finance and Insurance	Thousands of Fixed (201	+20	+20	+19	+16	+15	+12	+10	+9	+7	+6
Real Estate and Rental and Leasing	Thousands of Fixed (201	+129	+143	+148	+146	+140	+132	+123	+114	+107	+102
Professional, Scientific, and Technical Ser	Thousands of Fixed (201	+53	+56	+55	+53	+51	+48	+46	+44	+44	+44
Management of Companies and Enterprise	Thousands of Fixed (201	+1	+1	+0	+0	0	0	-1	-1	-1	-1
Administrative and Waste Management Se	Thousands of Fixed (201	+35	+36	+36	+35	+35	+34	+33	+33	+32	+33
Educational Services	Thousands of Fixed (201	+2	+3	+3	+4	+4	+4	+5	+5	+5	+5
Health Care and Social Assistance	Thousands of Fixed (201	+98	+105	+110	+112	+114	+115	+116	+117	+122	+125
Arts, Entertainment, and Recreation	Thousands of Fixed (201	+17	+18	+18	+17	+17	+17	+16	+16	+16	+16
Accommodation and Food Services	Thousands of Fixed (201	+107	+111	+113	+115	+115	+115	+115	+116	+116	+117
Other Services, except Public Administrati	Thousands of Fixed (201	+35	+37	+39	+40	+40	+39	+39	+40	+40	+41

# Report1

## Output and Demand | Output | Private Non-Farm | Sector Level

C:\Users\Pat.Barkey\Documents\REMI\PI+ Montana Regions v1.4.3 (Build 3072)\Workbooks\Archie Bray Second Try.rwb

Regional Simulation 2 compared to Standard Regional Control — Difference

Region = All Regions

Sector Level

2023	2024	2025
-1	-1	-1
-2	-2	-2
+43	+43	+43
+225	+217	+214
+1572	+1594	+1622
+95	+96	+97
+177	+179	+182
+3	+2	+2
+12	+12	+12
+6	+5	+4
+98	+94	+92
+43	+46	+48
-1	-1	-1
+33	+33	+34
+5	+6	+6
+130	+135	+140
+16	+16	+16
+119	+120	+121
+42	+43	+45

# Report1

## Output and Demand | Output | Government

C:\Users\Pat.Barkey\Documents\REMI\PI+ Montana Regions v1.4.3 (Build 3072)\Workbooks\Archie Bray Second Try.rwb

Regional Simulation 2 compared to Standard Regional Control — Difference

Region = All Regions

Government

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
State and Local Government	Thousands of Fixed (201	+194	+213	+226	+231	+237	+238	+240	+241	+243	+247
Federal Civilian	Thousands of Fixed (201	0	0	0	0	0	0	0	0	0	0
Federal Military	Thousands of Fixed (201	0	0	0	0	0	0	0	0	0	0

# Report1

## Output and Demand | Output | Government

C:\Users\Pat.Barkey\Documents\REMI\PI+ Montana Regions v1.4.3 (Build 3072)\Workbooks\Archie Bray Second Try.rwb

Regional Simulation 2 compared to Standard Regional Control — Difference

Region = All Regions

Government

2023	2024	2025
+250	+254	+258
0	0	0
0	0	0

# Report1

## Industries | Private Non-Farm Industries

C:\Users\Pat.Barkey\Documents\REMI\PI+ Montana Regions v1.4.3 (Build 3072)\Workbooks\Archie Bray Second Try.rwb

Regional Simulation 2 compared to Standard Regional Control — Difference

Region = All Regions

Private Non-Farm Industries

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Private Non-Farm Employment	Individuals (Jobs)	+25	+26	+26	+26	+26	+25	+24	+24	+24	+23
Private Non-Farm Employment as % of N	Percent	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Intermediate Demand Employment	Individuals (Jobs)	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2
Local Consumption Demand Employment	Individuals (Jobs)	+5	+5	+5	+6	+6	+6	+6	+6	+6	+6
Government Demand Employment	Individuals (Jobs)	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Investment Activity Demand Employment	Individuals (Jobs)	+2	+3	+3	+3	+3	+3	+3	+3	+2	+2
Total Export Employment	Individuals (Jobs)	+0	+0	0	0	-1	-1	-1	-1	-1	-1
Exports to Multiregions Employment	Individuals (Jobs)	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
Exports to Rest of Nation Employment	Individuals (Jobs)	0	-1	-1	-1	-1	-1	-2	-2	-2	-2
Exports to Rest of World Employment	Individuals (Jobs)	0	0	0	0	0	0	0	0	0	0
Exogenous Industry Sales Employment	Individuals (Jobs)	+14	+14	+14	+14	+14	+14	+14	+14	+14	+14
Exogenous Industry Demand Employment	Individuals (Jobs)	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
Relative Composite Price	Proportion	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Relative Composite Labor Costs	Proportion	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Relative Fuel Costs	Proportion	0	0	0	0	0	0	0	0	0	0
Relative Capital Costs	Proportion	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Relative Composite Input Costs	Proportion	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Relative Delivered Price	Proportion	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Relative Cost of Production	Proportion	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Relative Labor Intensity	Proportion	0	0	0	0	0	0	0	0	0	0
Labor Access Index	2010=1	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Commodity Access Index	2010=1	0	0	0	0	0	0	0	0	+0	0
Regional Purchase Coefficient	Proportion	+0	+0	+0	+0	+0	+0	0	0	0	0
Average Annual Wage Rate	Thousands of Current Dc	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Average Annual Compensation Rate	Thousands of Current Dc	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Average Annual Earnings Rate	Thousands of Current Dc	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Demand	Thousands of Fixed (201	+2768	+3104	+3328	+3464	+3552	+3600	+3632	+3656	+3704	+3744
Intermediate Demand	Thousands of Fixed (201	+1180	+1248	+1288	+1304	+1308	+1308	+1304	+1300	+1304	+1304
Local Consumption Demand	Thousands of Fixed (201	+1084	+1196	+1280	+1344	+1384	+1420	+1452	+1476	+1508	+1540

# Report1

## Industries | Private Non-Farm Industries

C:\Users\Pat.Barkey\Documents\REMI\PI+ Montana Regions v1.4.3 (Build 3072)\Workbooks\Archie Bray Second Try.rwb

Regional Simulation 2 compared to Standard Regional Control — Difference

Region = All Regions

Private Non-Farm Industries

2023	2024	2025
+23	+23	+23
+0	+0	+0
+2	+2	+2
+6	+6	+6
+0	+0	+0
+2	+2	+2
-1	-1	-1
+1	+1	+1
-2	-2	-2
0	0	0
+14	+14	+14
+1	+1	+1
+0	+0	+0
+0	+0	+0
0	0	0
+0	+0	+0
+0	+0	+0
+0	+0	+0
+0	+0	+0
0	0	0
+0	+0	+0
0	0	+0
0	0	0
+0	+0	+0
+0	+0	+0
+0	+0	+0
+3800	+3848	+3928
+1316	+1328	+1344
+1580	+1612	+1648

# Report1

## Industries | Private Non-Farm Industries

Category	Units	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Government Demand	Thousands of Fixed (201	+21	+23	+24	+25	+26	+26	+26	+27	+27	+27
Investment Activity Demand	Thousands of Fixed (201	+311	+457	+555	+614	+648	+665	+673	+677	+684	+690
Total Imports	Thousands of Fixed (201	+1796	+1980	+2116	+2212	+2284	+2336	+2384	+2416	+2464	+2520
Imports from Multiregions	Thousands of Fixed (201	+81	+89	+93	+95	+96	+96	+95	+95	+95	+96
Imports from Rest of Nation	Thousands of Fixed (201	+1456	+1604	+1712	+1788	+1844	+1884	+1916	+1940	+1972	+2004
Imports from Rest of World	Thousands of Fixed (201	+257	+287	+311	+329	+345	+360	+373	+385	+402	+417
Self Supply	Thousands of Fixed (201	+976	+1122	+1208	+1252	+1268	+1260	+1252	+1236	+1232	+1228
Total Exports	Thousands of Fixed (201	+68	+52	+28	-4	-24	-52	-72	-88	-100	-116
Exports to Multiregions	Thousands of Fixed (201	+81	+89	+93	+95	+95	+96	+95	+95	+96	+96
Exports to Rest of Nation	Thousands of Fixed (201	-14	-36	-60	-92	-112	-136	-152	-168	-180	-192
Exports to Rest of World	Thousands of Fixed (201	-1	-3	-5	-7	-10	-12	-15	-17	-18	-20
Exogenous Industry Sales	Thousands of Fixed (201	+1327	+1340	+1355	+1366	+1382	+1400	+1417	+1435	+1458	+1483
Exogenous Industry Demand	Thousands of Fixed (201	+178	+178	+178	+178	+178	+178	+178	+179	+179	+179
Output	Thousands of Fixed (201	+2368	+2512	+2584	+2616	+2624	+2608	+2600	+2576	+2584	+2592
Value-Added	Thousands of Fixed (201	+1240	+1320	+1364	+1376	+1380	+1372	+1364	+1356	+1356	+1364
Wage and Salary Disbursements	Thousands of Fixed (201	+641	+699	+733	+747	+751	+748	+741	+733	+736	+737
Compensation	Thousands of Fixed (201	+814	+886	+929	+951	+960	+958	+956	+952	+958	+962
Earnings by Place of Work	Thousands of Fixed (201	+898	+980	+1022	+1036	+1034	+1020	+1004	+986	+982	+976
Labor Productivity	Thousands of Fixed (200	0	0	0	0	0	0	0	0	0	0
Industrial Mix Index	2010=1	0	+0	+0	+0	+0	+0	+0	+0	+0	+0
National Deflator	2005=1 (Nation)	0	0	0	0	0	0	0	0	0	0

# Report1

## Industries | Private Non-Farm Industries

2023	2024	2025
+28	+28	+29
+696	+706	+726
+2568	+2616	+2672
+97	+98	+100
+2040	+2068	+2112
+435	+448	+460
+1228	+1236	+1252
-128	-136	-140
+98	+98	+99
-204	-212	-216
-21	-23	-23
+1509	+1533	+1559
+180	+180	+180
+2616	+2632	+2672
+1376	+1392	+1412
+741	+746	+754
+974	+984	+994
+980	+980	+988
0	0	0
+0	+0	+0
0	0	0