



Economic Impact of the 2021 Woolly Worm Festival in Beattyville, KY

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EKU'S Division of Regional Economic Assessment and Modeling (DREAM) recently conducted an economic impact study of visitor expenditures at the 2021 Beattyville Woolly Worm Festival. Results indicated that:

- The festival generated an estimated \$738,000 in expenditures in Beattyville, Lee County, and the surrounding area, \$246,000 of which represents new funds brought into the area by visitors.
- Festival attendees' expenditures support an estimated \$41,320 in local wages. This is a conservative measure of the festival's economic impact.
- A notable 91% of attendees reported attending the festival at least once before, demonstrating the strong pull and local appeal of the festival.
- The most popular festival events were the live music shows, Woolly Worm Raceway, and Woolly Worm Car Show.



Methodology

Activity Studied

This study examined the economic impact of the 2021 Beattyville Woolly Worm Festival (abbreviated as BWWF in this report) and the experiences of attendees to this event. The event occurred October 22-24th. The BWWF functions as a community-building and homecoming event for Beattyville and Lee County.

Study Area

Beattyville is the county seat of Lee County, Kentucky. For the purposes of this study, the study area is defined as being within 35 miles of Beattyville. This includes expenditures related to the event in Lee, Perry, Clay, Wolfe, Breathitt, Owsley, Jackson, and Estill Counties. That said, the bulk of expenditures are expected to occur in Beattyville and Lee County where the festival occurred.

Visitation Estimates

Beattyville/Lee County Tourism provided an estimate of 30,000 visits to the BWWF. This figure includes the option to visit the festival more than once and includes both residents of the study area and visitors. Note that mean expenditures later in this study are built around visits rather than persons, which means multiple visits are accounted for as a possibility.

Data Collection

This study used an online survey containing questions examining visitor expenditures, event participation, and other measures relating to their travel and stay for attending the BWWF. This survey is available upon request. Variables are summarized and described throughout the report by topic. In all, 68 persons initiated and completed the survey past the consent page. Their responses are included up to the point that they either completed the survey or stopped answering questions.

Data Cleaning

Data cleaning is required specifically for the economic impact variables to ensure conservative, reliable estimates. These include the following common methodological steps of excluding persons with abnormal stays (operationalized as three standard deviations from the mean, here over 11 nights, which is 1 case), groups with eight or more persons (1 case). Additional steps to reduce overestimation include recoding retail purchases of \$500 or higher as missing data.

The Beattyville Woolly Worm Festival (BWWF) is a tradition rooted in Lee County's culture. The woolly worm is believed to forecast the weather for the coming winter season; the worm's body has 13 segments each corresponding to a week in winter. If a segment is light brown, that means the week will be mild. If a segment is black, that means a harsh, cold week. The worm acted as a weather predictor for many old time farmers as they planned harvesting crops and cutting firewood in preparation for the upcoming winter. Over the past 34 years, the festival has hosted a variety of special activities such as woolly worm races, craft displays, parade, pet show, festival food, car show and live entertainment.



Demographics

Table One summarizes demographic variables from the survey. Except for age, the variables are *dichotomously coded*. This means a one equals the presence of the trait being studied and a zero equals the absence of this trait. The result is the results can be interpreted as percentages. For example, in the table below, we see that .72 (or 72%) of respondents indicated being female.

Festival attendees reported have diverse educational experiences: 21% indicated having an associate's or bachelor's college degree, while another 22% indicated having advanced degrees. Most attendees in the study reported incomes of less than \$50k, with 15% indicating a personal income \$50k+ and 8% earning \$99k+. The mean respondent age was 45. Note that persons under the age of 18 did not qualify to participate in this study which certainly impacts this variable. Finally, 16% of respondents reported owning their own business.

Variable	N	Min	Max	Mean	SD
Respondent Sex (1=Female, 0=Male)	46	0	1	0.72	0.455
Respondent age	39	18	69	45.79	13.227
Currently enrolled in College	72	0	1	0.19	0.399
Has Associates or Bachelor's College degree	72	0	1	0.21	0.409
Has Advanced degree	72	0	1	0.22	0.419
Personal income greater than \$50K	66	0	1	0.15	0.361
Personal income greater than \$99K	66	0	1	0.08	0.267
Respondent owns business	43	0	1	0.16	0.374

Participant Experiences

Table Two describes festival participants' experiences, including group size and satisfaction. Group sizes were typically small with a mean of two persons and a maximum of seven. Respondents were overwhelmingly from the Beattyville area (79%), with a notable 91% of respondents having previously attended the BWWF.

Overall, respondents were pleased with the festival based on a 5 point scale where 5=very satisfied. Festival music (mean of 4.06) and food (mean of 4.13) were the highest rated activities followed by festival events (3.96). Attendees were mostly satisfied with retailers, although this variable may have been impacted by the pandemic and fewer vendors traveling to the festival.

Variable	N	Min	Max	Mean	SD
Number of people in group attending WWF	63	1	7	2.24	1.411
Respondent's hometown is Beattyville/Lee Coun	62	0	1	0.79	0.410
Respondent has attended festival before	66	0	1	0.91	0.289
Satisfaction with music	47	1	5	4.06	1.169
Satisfaction with food	47	1	5	4.13	0.875
Satisfaction with retail vendors	48	1	5	3.73	0.917
Satisfaction with festival events	47	1	5	3.96	0.932

Festival and Community Activities

Participation in festival activities is detailed below in Table Three. This table lists a raw count of respondents' indication of attendance to events; this figure was used to approximate a proportional percentage of general festival participation in each event. Live music shows by far were most frequented, with 60% of respondents having attended. Following popularity, the Woolly Worm Raceway and Woolly Worm Car Show both totaled 15% attendance each.

Table Three: Participation in Festival Activities (N=33)

Variable	N	Percent
Woolly Worm Raceway	5	0.15
Moonshiners Tent and Tales	1	0.03
Lee County Youth Pet Show	-	-
Woolly Worm 5K	-	-
Woolly Worm Festival Parade	1	0.03
Woolly Worm Car Show	5	0.15
Live music shows	20	0.61

Table Four similarly lists respondents' participation in activities in the surrounding community while in the area for the festival. The most popular included visiting Natural Bridge State Park (13%), driving for pleasure (13%), viewing natural features and/or wildlife (8%), and visiting the Daniel Boone National Forest (8%).

Table Four: Participant Activities (frequency count)

Variable	Total N=27	
Visited Daniel Boone National Forest	6	0.08
Visited Natural Bridge State Park	10	0.13
Participated in trail work/trail building	0	0.00
Hiking or walking	4	0.05
Backpacking	2	0.03
Camping in a developed site	3	0.04
Camping in a primitive site	1	0.01
Viewing natural features	6	0.08
Driving for pleasure	10	0.13
Viewing wildlife	6	0.08
Visiting nature centers	3	0.04
Studying nature	3	0.04
Visiting historic sites	4	0.05
Gathering forest products	1	0.01
Visiting local wineries, breweries, or distilleries	1	0.01
Fishing	3	0.04
Hunting	2	0.03
Cycling	1	0.01
Mountain biking	2	0.03
OHV/ATV use	2	0.03
Horseback riding	1	0.01
Motorized water activities	1	0.01
Paddling	1	0.01
Swimming	1	0.01
Rock climbing	3	0.04

Economic Impact: Visitor Expenditures

Table Five also includes estimates of visitor spending patterns. Due to a low number of responses from persons residing out of town, the tables include the expenditure patterns of all respondents to better establish a typical mean expenditure. Nearly all expenditure were concentrated in the immediate Beattyville area. These include general retail non-food expenditures and BWFF non-food purchases (\$9.60), fast food purchases (\$6.11), fuel purchases (\$5.07), groceries (\$2.39), and dine-in restaurants (\$1.43) created by attending the festival.

Due to both a low response rate from persons staying overnight and the high use of free lodging (such as staying with family) for this event, the researchers could not offer an adequate mean expenditure for lodging and this is treated as zero in the analysis.

In sum, the results indicate the average BWFF attendee spent around \$24.60 as a result of their visit. Recall again to create usable estimates, the researchers had to include local expenditures as well due to a low survey sample. Although it is conjecture, past studies in the region have largely indicated that local residents generally spend less than visitors to the region. As such, these expenditure patterns are potentially on the conservative side and may be higher had a larger sample of respondents taken the survey. This is something that could be verified in future studies, however.

Table Five: Participant Travel and Stay Expenditures within Beattyville Region

Variable	N	Min	Max	Mean	SD
Length of Stay	21	0	7	2.43	1.363
Other Retail purchases in Beattyville area	47	0	120	9.60	24.387
Fast food	47	0	70	6.11	14.915
Dine-in restaurants	46	0	20	1.43	4.425
Groceries	46	0	100	2.39	14.785
Fuel	46	0	55	5.07	12.673
Stayed overnight	62	0	1	0.42	0.497



Economic Impact: Terminology

In the coming pages, the research team employs IMPLAN, the leading economic impact estimator software, to create economic impact estimates for what visitors contributed to the study area economy during the 2021 Woolly Worm Festival. IMPLAN (or Impacts for Planning) uses input-output modeling to establish economic impact by exploring what happens when attendees spend money in specific sectors (such as food, lodging, and retail). The analysis follows approaches used in prior peer-reviewed research.

In the following paragraphs, the researchers use three terms to describe economic impact: direct effect, indirect effect, and induced effect. *Direct effect* is the economic result created by the money spent as a result of visitors being present in the study area. This direct effect can generate further change in the local economy via indirect and induced effects. *Indirect effect* is economic activity created when local businesses purchase goods and services from other local industries to support their business operations as a result of the initial direct effect. For example, indirect effect could include a local restaurant buying vegetables to create future meals for sale. Finally, *induced effect* is the estimated expenditures by local households and employees as a result of the initial direct impact. For example, a local restaurant employee may choose to spend his/her wages at another local business, creating additional rounds of local economic activity as the initial money spent multiplies throughout the study area.

These three terms can also be further divided by their employment impact in the region, value added to the local economy, and output. Labor income impact is measured by the estimated labor income (for employees and proprietors) created by the economic activity in the region. Labor income impact is a conservative estimate of economic impact and is the approach highlighted in this report. Value added indicates the true economic wealth added to the local economy after subtracting the cost of inputs needed to conduct everyday business. Value added includes expenditures in profit, employment compensation, and taxes. Finally, output is value added plus total revenues and sales from economic activity.



Economic Impact: Results

Crafting economic impact estimates examines how expenditure patterns (see Table Five) and visitation estimates generate changes in the study area's economy. Economic impact studies focus on new expenditures in the region created by persons living outside the study area. Based on survey results and the Beattyville/Lee County Tourism estimate of 30,000 visits to the festival, the researchers allotted 1/3 (or 10,000) of the visits to the festival as *visitors* to the region. Visitors are anyone not living in the study area, which includes persons with family ties to Beattyville or the surrounding region coming home for the festival but live elsewhere as well as persons who have no ties to the area and live outside the designated study area. These estimates would indicate the WWF created \$738,000 in expenditures in the region, \$246,000 of which would be considered *new expenditures* in the study area. Note that new expenditures are the focus of economic impact studies.

Table Six examines how the \$246,000 of estimated expenditures by persons living outside the study area creates economic change in the study region. The table lists three economic impact estimates with labor income being the most conservative and output being the most liberal. The researchers find that visitor expenditures from the BWFF supported \$41,320 in labor income in the region. When accounting for the total economic value of the event minus the costs of businesses conducting their transactions and services, this equates to roughly \$68,923 in economic impacts. Finally, the output, the value added plus revenues and sales, equals \$157,198. Although not explored in the below table, wages created by the BWFF are primarily focused in the fast food restaurant, gas and convenience store, and full service restaurant industries.

Table Six: Economic Impact of Woolly Worm Festival

Impact	Labor Income	Value Added	Output
Direct	\$30,187.63	\$50,031.07	\$115,560.46
Indirect	\$7,276.53	\$11,593.35	\$27,883.74
Inducted	\$3,855.88	\$7,299.45	\$13,753.88
Total	\$41,320.03	\$68,923.87	\$157,198.09



Limitations

As with all economic impact research, there are instances where economic impact study designs or the absence of better data could limit the broad applicability of the study. The following sections share instances where limitations could be addressed in future studies.

1. Economic impact studies are snapshot estimates of a particular activity at a single moment in time. As such, the economic impact of any outdoor recreation activity will certainly vary from year to year based on weather, spending patterns, local business availability, and other variables. As such, the results in this study can be best understood as a scientific estimate of what expenditures would generally look like in a typical year barring major changes to the study area economy and its related activities.
2. Economic impact studies are limited in their ability to demonstrate directly observable activities in the study area due to the aggregated use of mean expenditure patterns. For example, if IMPLAN estimates expenditures create \$1,000 in induced expenditures, observing or pinpointing that sum in the economy is not possible. Rather, these models operate on predictions of what would happen given the expenditure data available.
3. Economic impact studies are not *cost-benefit analyses* or *feasibility studies*. Cost-benefit studies relate how expenditures required to trigger a specific activity relate to specific quantitative benefits of the activity occurring. Feasibility studies examine if the funding for a specific event creates a desired economic effect.
4. This study does not attempt to account for changes created by the current Covid-19 global pandemic. The pandemic has created unpredictable changes in things like visitation patterns that will likely not be understood for years. As such, revisiting the study again at some future point could address this issue.
5. This study experienced a low response rate. It may be useful in future years (particularly outside of pandemic conditions) to repeat the study and examine how results changed.



CONTACT INFORMATION FOR FUTURE STUDIES

EKU's Division of Regional Economic Assessment and Modeling (DREAM) offers highly valuable but affordably-priced services in your region, including:

Economic impact studies

Feasibility studies

Visitor experience studies

Marketing studies

Needs assessments

Recreation studies

Tourism studies

Cost-benefit analyses

Place-attachment studies

Motivation studies

Please contact DREAM Director, Dr. James Maples, with questions and ideas at james.maples@eku.edu

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