

GOT FIVE ON IT: Economic Impacts and Observations of the Abandoned Mine Land Economic Revitalization Program Five Years In

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1. INTRODUCTION

The Abandoned Mine Land Economic Revitalization (AMLER) Program¹ was established in 2016 to return abandoned mine lands (AMLs) to productive use through economic and community development. The program focuses on mines abandoned prior to 1977, when the federal Surface Mining Control and Reclamation Act was passed. The AMLER Program provides grants to the Appalachian states and Indian Tribes with the most significant resource needs to reclaim AMLs. Each year since its inception, Congress has funded the AMLER Program, and the Office of Surface Mining Reclamation and Enforcement (OSMRE) has allocated grants to eligible states. Several states are five years in, while other states and tribes are four or six years in. Sufficient information exists to begin to evaluate the program’s progress.

The AMLER Program is distinct from the AML Program that was initiated in the 1970s. The AML Program is funded by a per-ton tax on mined coal and is used to reclaim AMLs and to address related problems directly caused by unreclaimed AMLs. In contrast, the AMLER Program’s intent is to return AMLs to sustainable, productive uses. Projects are required to have a connection—or nexus—between AML reclamation and the proposed economic and community development. Projects like a new rail-trail on an AML may incorporate economic and community development–related activities. Other projects, like the reclamation of an AML property for the future expansion of an industrial park, prepare sites for potential development.

As illustrated in Table 1, \$655 million in AMLER funds have been distributed to six states and three tribes from 2016 through 2021. Two states—Pennsylvania and West Virginia—have received the most funding: \$155 million each. The Crow Tribe, Hopi Tribe, and Navajo Nation have received \$13.3 million each.

Table 1: Number of AMLER projects and grant allocations by state and tribe (million \$)

	2016	2017	2018	2019	2020	2021	Total
State							
Alabama	NIP	\$10	\$10	\$10	\$10	\$10	\$50
Kentucky	\$30	\$25	\$25	\$25	\$25	\$10	\$140
Ohio	NIP	\$10	\$10	\$10	\$10	\$25	\$65
Pennsylvania	\$30	\$25	\$25	\$25	\$25	\$25	\$155
Virginia	NIP	\$10	\$10	\$10	\$10	\$10	\$50
West Virginia	\$30	\$25	\$25	\$25	\$25	\$25	\$155
Tribe							
Crow Tribe	NIP	NIP	\$3.3	\$3.3	\$3.3	\$3.3	\$13.3
Hopi Tribe	NIP	NIP	\$3.3	\$3.3	\$3.3	\$3.3	\$13.3
Navajo Nation	NIP	NIP	\$3.3	\$3.3	\$3.3	\$3.3	\$13.3
Total	\$90	\$105	\$115	\$115	\$115	\$115	\$655

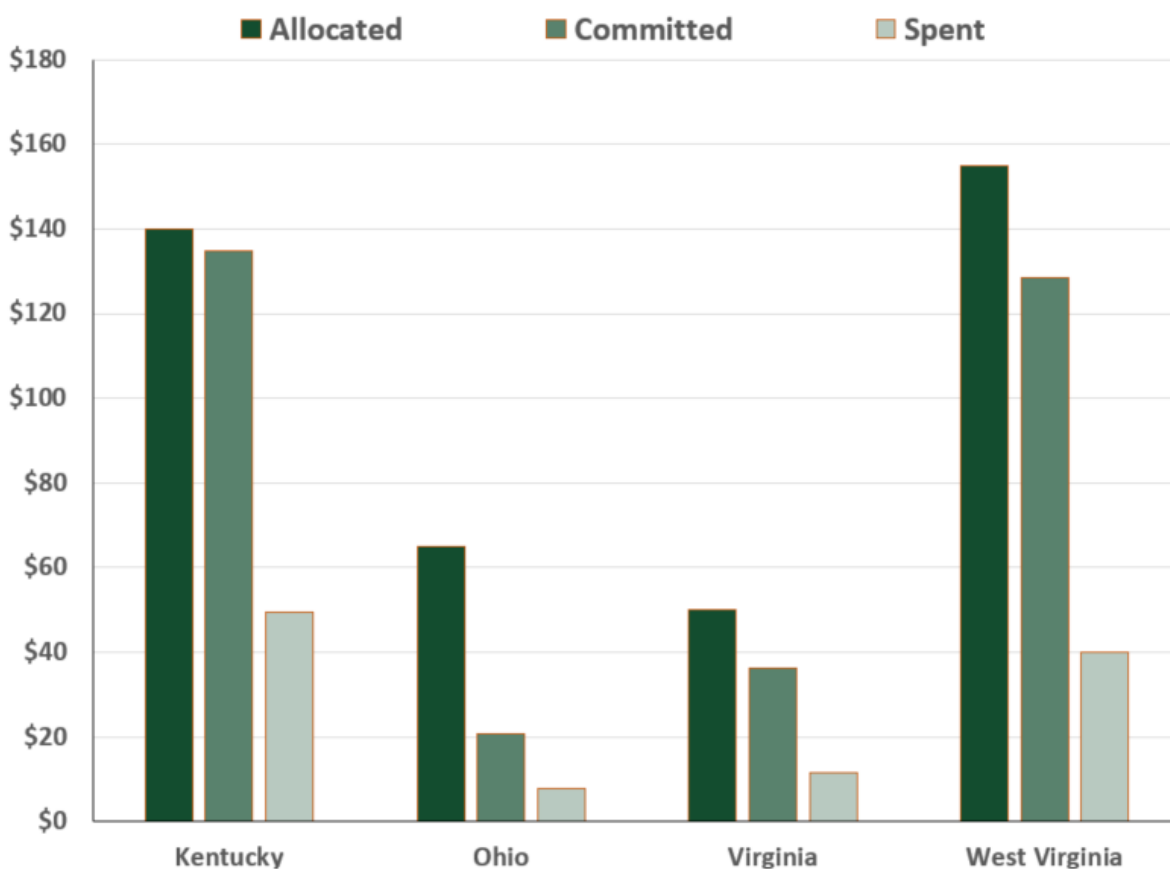
Source: OSMRE (2022). Note: NIP = Not in program.

¹ This program was previously known as the Abandoned Mine Land Pilot Program.

Many AMLER projects had very long timelines. In this report, we assess the challenges encountered in moving projects through the process from application through implementation, with a focus on the Planning Phase—the phase in which the most significant delays have been documented (See Chapter 2 for a description of the AMLER phases).

We also utilize economic impact models to estimate the economic benefits of AMLER projects in the states in which they are located. We find that the economic benefits have been, and should continue to be, substantial.

Figure 1: AMLER funds allocated to states, committed to projects, and spent on projects (million \$)



Source: Downstream Strategies (2022). Note: Data from 2016-2021.

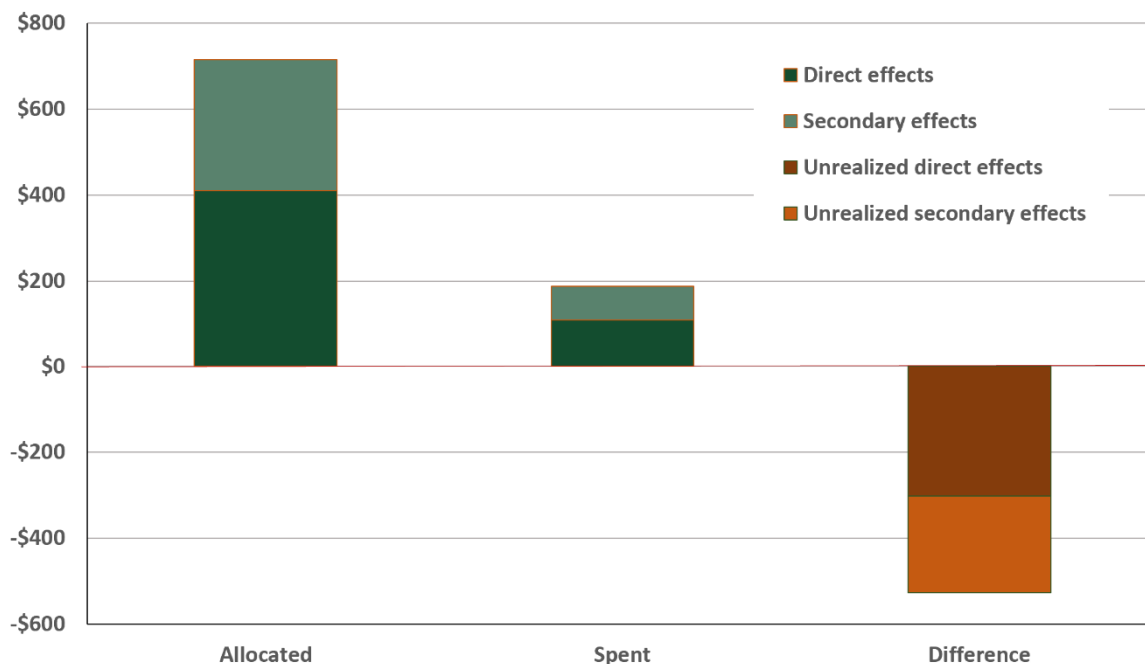
This report focuses on four states: Kentucky, Ohio, Virginia, and West Virginia. As illustrated in Table 1, A total of \$410 million has been allocated to these four states. After AMLER grants are allocated, states and tribes have their own processes for selecting specific projects. In these four states, we have identified \$324 million in AMLER funds that state agencies have committed to projects through 2021. The committed funds are shown as the middle bars for each of the four states in Figure 1. However, local economic benefits only begin to accrue when these committed funds are spent. We have identified nearly \$109 million in spending in the four states of interest, depicted as the right-most bars in Figure 1.

As described in detail in Chapter 4, we create scenarios to a model the local economic benefits of AMLER grant expenditures. If the entire \$410 million in AMLER grants allocated to these states had been spent, the projects would have had a local economic impact of approximately \$715 million and would have generated approximately 4,142 full- and part-time annual jobs. This potential impact is

depicted in Figure 2 as the left-most bar, with the AMLER grant allocations shown in dark green and the additional impacts shown in light green.

The full potential impact of the AMLER funds allocated to these four states has not been realized; only \$109 million has been spent through the end of 2021. This spending is estimated to have generated \$187 million in local economic benefits (See the middle bar in Figure 2) and 1,096 jobs. The unrealized difference between the potential and actual benefits is shown as the right-most bar.

Figure 2: AMLER direct and secondary effects (million \$)



Source: Allocated from OSMRE (2022). Spent from Downstream Strategies (2022). Impacts calculated from IMPLAN economic impact analysis by the authors. Note: This figure is for Kentucky, Ohio, Virginia, and West Virginia. Data from 2016-2021.

These estimates of the potential and actual impacts are conservative because they only account for the direct spending and the ripple effects of that spending through the local economy. Additional benefits are generated if AMLER funding is matched by other funding sources, if projects lead to the siting of new businesses on AMLs, if projects lead to increases in tourism, or for other reasons. These additional benefits are not quantified in this report.

Chapter 2 of this report provides additional background on the AMLER process. In Chapter 3, we focus on the Planning Phase of the AMLER process to identify reasons why this phase takes so much longer than other phases. Chapter 4 provides more details on the local economic benefits of AMLER projects. Finally, in Chapter 5, we provide conclusions and recommendations.

2. BACKGROUND ON THE AMLER PROCESS

2.1 AMLER phases and milestones

State and tribes administer their own AMLER grant processes, and the processes and terms they use differ. However, at a high level, administration of AMLER grants go through four common phases before completion: application, vetting, planning, and implementation. These phases, along with the milestones between the phases, are depicted in Figure 3.

First, an application is made with the appropriate state agency for review. During the Application Phase, the agency works with the applicant to develop the AMLER project proposal. The Application Phase is complete when the state agency submits the proposal to OSMRE for vetting.

The Vetting Phase involves coordination between the OSMRE field office, federal agencies in Washington, D.C., and state agencies. During this phase, OSMRE identifies potential concerns about the eligibility of the project. After a successful vetting, OSMRE issues its Preliminary Approval.

Next, the project proceeds to the Planning Phase. Here, initial grant funds may be used to develop detailed project designs, conduct technical analyses, and address regulatory requirements. The completed designs and additional documentation are submitted for a National Environmental Policy Act (NEPA) review, where the project site is assessed for environmental impacts. Depending on the state, the assessment may be conducted by the state agency or by the applicant. Then the designs and the NEPA assessment are submitted to OSMRE for review.

After receiving an Authorization to Proceed from OSMRE, projects may begin the Implementation Phase. During this phase, construction projects are put out to bid, and contracts for construction are awarded before development begins. Finally, once the project is completed, grantees are required to complete a final summary and evaluation of the project.

2.2 Compliance with the National Environmental Policy Act

In many projects, a considerable hurdle in the Planning Phase is the NEPA review (See Figure 4). The intent of this review is for federal agencies to evaluate the potential environmental impacts and consequences of a project before proceeding with an action. For a NEPA review, there are generally three types of analysis that are progressively more involved: 1) categorical exclusion, 2) environmental assessment (EA), and 3) environmental impact statement (EIS).

Categorical exclusions may be granted for projects that are statutorily or explicitly excluded from further environmental analysis because they are minor in scope. Because AML projects inherently cause environmental impacts, most AMLER projects will not be granted a categorical exclusion.

Without a categorical exclusion, an EA is required. An EA determines whether the project has the potential to cause “significant environmental impact”.² An applicant will consult multiple agencies and knowledgeable experts to discuss the likelihood of significant environmental impacts and alternatives to the proposed action or project. If OSMRE determines the project will not have significant environmental impacts, it will issue a Finding of No Significant Impact (FONSI) that presents OSMRE’s conclusions. With a FONSI, the NEPA review is complete.

However, if a FONSI is not issued and the EA determines the environmental impacts of the project will be significant, an EIS must be prepared. An EIS is prepared if a project is determined to

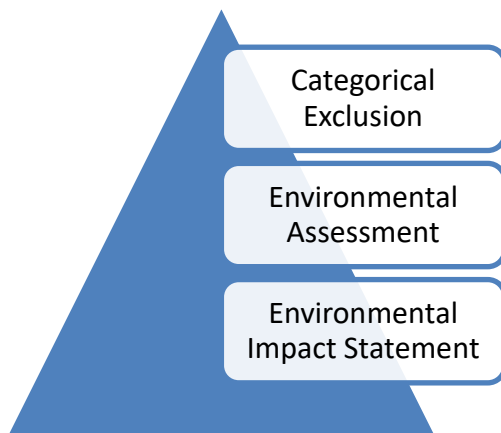
² 40 U.S.C. § 1508.1(h)

“significantly affect the quality of the human environment”.³ Consequently, the requirements for an EIS are far more detailed, rigorous, and time-consuming than for an EA.

Figure 3: AMLER phases and milestones



Figure 4: National Environmental Policy Act processes



³ 42 U.S.C. § 4332(c)

2.3 Projects by grant amount

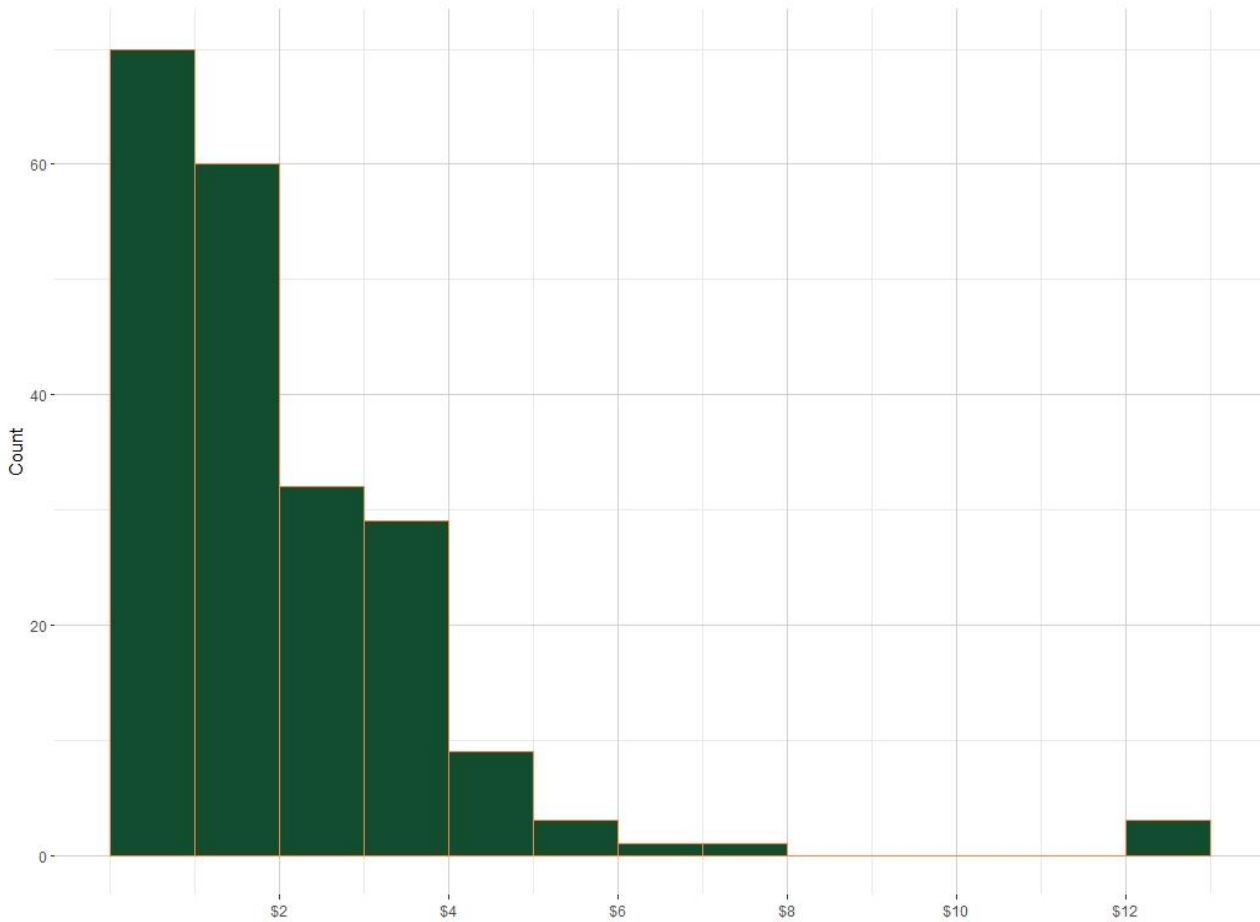
In the six years since the start of the AMLER Program, funds have been committed for hundreds of projects. Our analysis is informed by a database of 208 AMLER projects over six states and the one tribe that we are aware of with vetted projects in the program (Downstream Strategies, 2022). This database includes a significant amount of data from OSMRE (2020), supplemented with state-specific data provided by agencies in Kentucky (Kentucky Energy and Environment Cabinet, 2022), Ohio (Ohio Department of Natural Resources, 2022), Virginia (Virginia Department of Energy, 2022), and West Virginia (West Virginia Department of Environmental Protection, 2022). We have also supplemented the database with other information provided from state agencies (Ohio Department of Natural Resources, 2020), via conversations with AMLER project managers (Boettner, 2022; Hatcher, 2022; Stroud, 2022), anecdotal observations, and internet searches. The database includes project names, locations, grant allocations, expenditures, and dates for key AMLER milestones. The projects in this database account for \$431 million in grant commitments to projects.

In the four states that are the focus of this report—Kentucky, Ohio, Virginia, and West Virginia—the database includes \$324 million in grant commitments and \$109 million in expenditures. Outside of these four states, most of the other projects in the database are in Pennsylvania.

As illustrated in Figure 5, 130 of the 208 projects in the database were awarded grants of \$2 million or less. Only 62 projects were awarded grants of between \$2 and \$4 million, and very few larger projects were funded.

The smallest project—the County Cabin II Facility Improvements project in Virginia—received \$47,420 in committed funds. In contrast, three projects received commitments of \$12.5 million each: the Appalachian Wildlife Center project in Kentucky, the Mountain State Broadband Expressway project in West Virginia, and the Timber Tech project, also in West Virginia. As of the end of 2021, OSMRE had not yet issued its Preliminary Approval for the Timber Tech project.

Figure 5: Distribution of AMLER project commitments by size of grant (million \$)



Source: Downstream Strategies (2022). Note: Data from 2016-2021.

2.4 Projects by state

As illustrated in Table 2, AMLER projects average \$2.16 million per project in Kentucky, Ohio, Virginia, and West Virginia. West Virginia committed the highest average dollars per grant, \$2.67 million, and Virginia allocated the lowest: \$1.17 million.

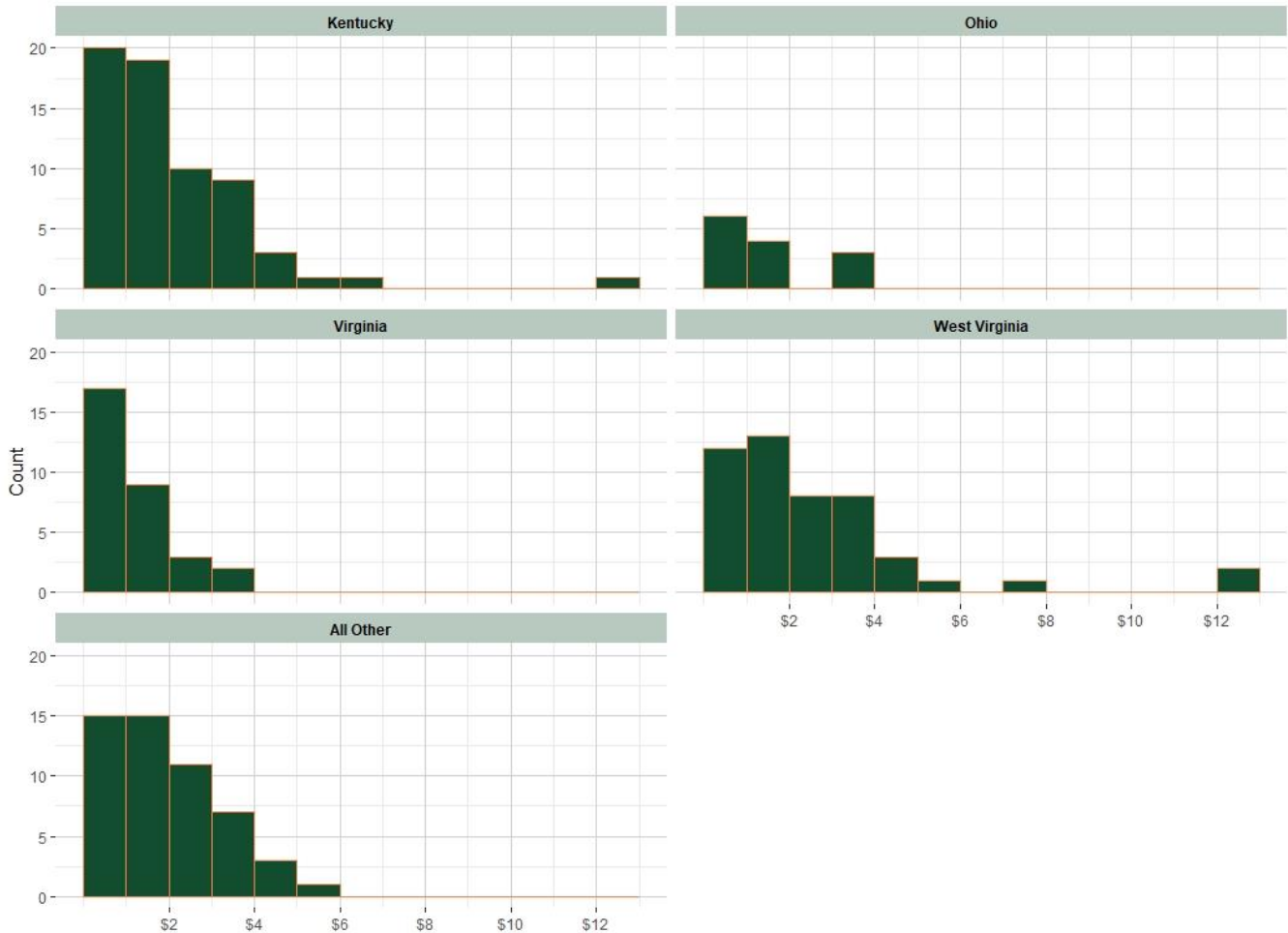
Table 2: AMLER project commitments by state (million \$)

State	Count	Minimum	Maximum	Median	Average	Variation
Kentucky	64	\$0.20	\$12.50	\$1.50	\$2.16	\$1.97
Ohio	13	\$0.28	\$4.00	\$1.15	\$1.59	\$1.33
Virginia	31	\$0.05	\$3.50	\$0.98	\$1.17	\$0.93
West Virginia	48	\$0.24	\$12.50	\$1.92	\$2.67	\$2.55
All Others	53	\$0.05	\$12.50	\$1.50	\$2.07	\$2.04
Total	156	\$0.20	\$12.50	\$1.50	\$2.16	\$1.97

Source: Downstream Strategies (2022). Note: Variation measures the dispersion of the observations in the dataset using the standard deviation statistical method for a sample. Data from 2016-2021.

Figure 6 and Figure 7 provide additional context regarding project commitments. Kentucky and West Virginia are the only two states with projects over \$6 million. However, even in these two states, projects are spread across a variety of sizes, with a significant concentration of projects below \$4 million. Ohio and Virginia have very compact distributions, with no single large projects identified.

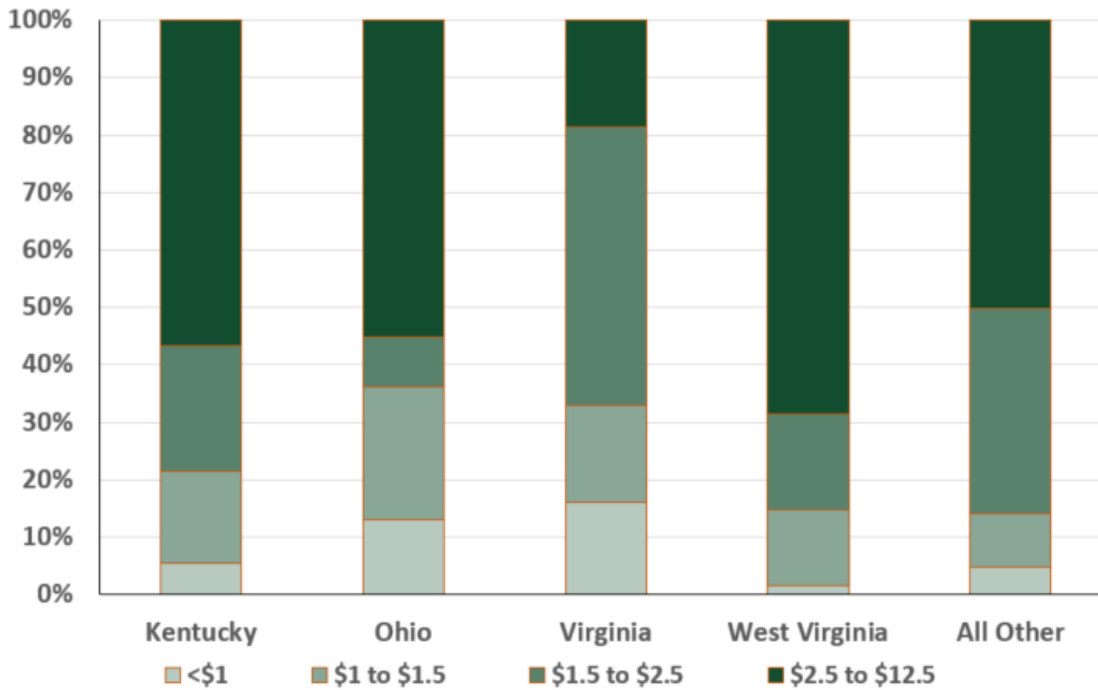
Figure 6: Distribution of AMLER project commitments by size of grant and state (million \$)



Source: Downstream Strategies (2022). Note: Data from 2016-2021.

Figure 7 illustrates differences by state based on the percent of funds committed. Approximately two-thirds of total grant commitments in West Virginia have been committed to projects of \$2.5 million or larger. This contrasts with Virginia, where less than 20 percent of total commitments were provided to these large projects.

Figure 7: Distribution of total project commitments by project size (percent of funds committed)



Source: Downstream Strategies (2022). Note: Data from 2016-2021.

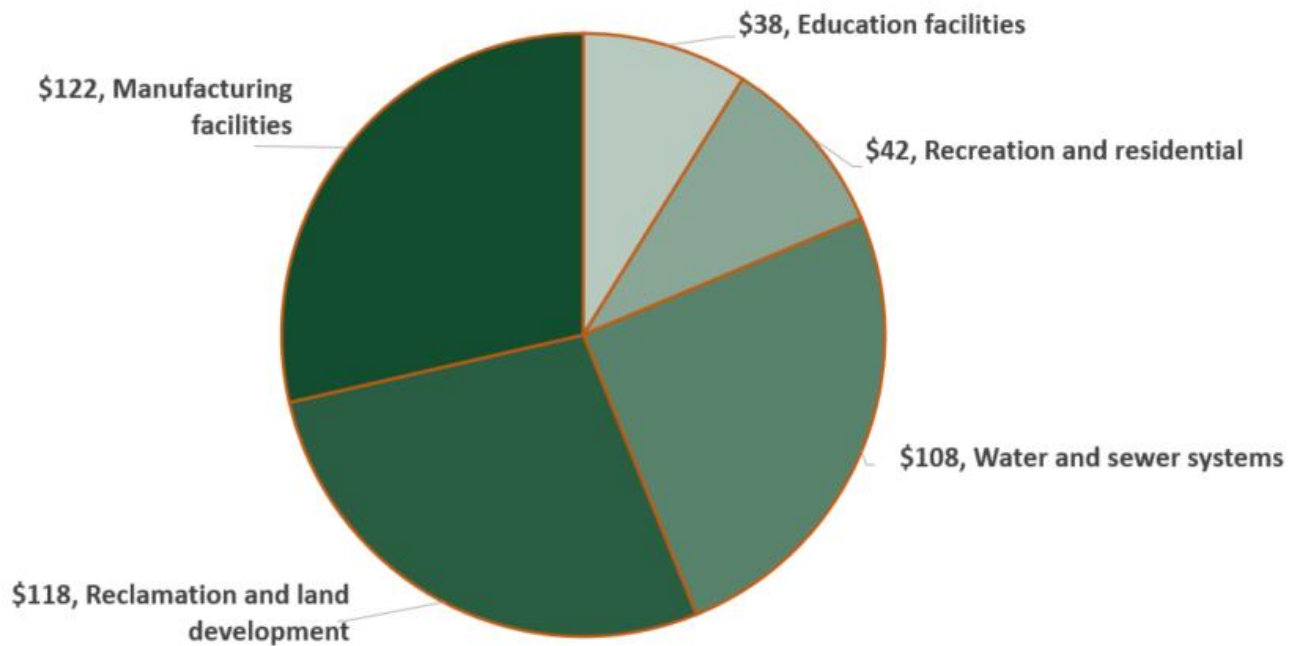
2.5 Projects by type

In addition to size, we also classify AMLER projects into five types. This identification is based on project names, internet searches, publications about the projects, and, when possible, discussions with AMLER project managers. Project types and typical examples are as follows:

1. **Education.** The Claudia L. Workman Wildlife Education Center: open space, classroom with facilities, construction.
2. **Manufacturing.** Kentucky Enterprise Industry Park Speculative Building: open space with energy supplies and load-bearing walls and floors.
3. **Reclamation and land development.** Powelson Wildlife Area Highwall: stabilizing highwalls, coal refuse piles, and mine portals, as well as earth moving.
4. **Recreation and residential.** The Wilds Campground Recreation Project: land and trail preparations and gazebo, outhouse, and small facility construction.
5. **Water and sewer systems.** Paintsville Sewer Expansion: land work as well as purchases of pumps and pipes.

As illustrated in Figure 8, \$122 million have been committed to manufacturing projects—the largest commitment among the five types of AMLER projects. These 46 manufacturing projects averaged \$2.7 million each (See Table 3). While the 65 reclamation and land development projects accounted for the next largest total, these projects were generally smaller, averaging \$1.8 million per project. The 45 water and sewer system projects averaged \$2.5 million per project.

Figure 8: Distribution of committed funds by type (million \$)

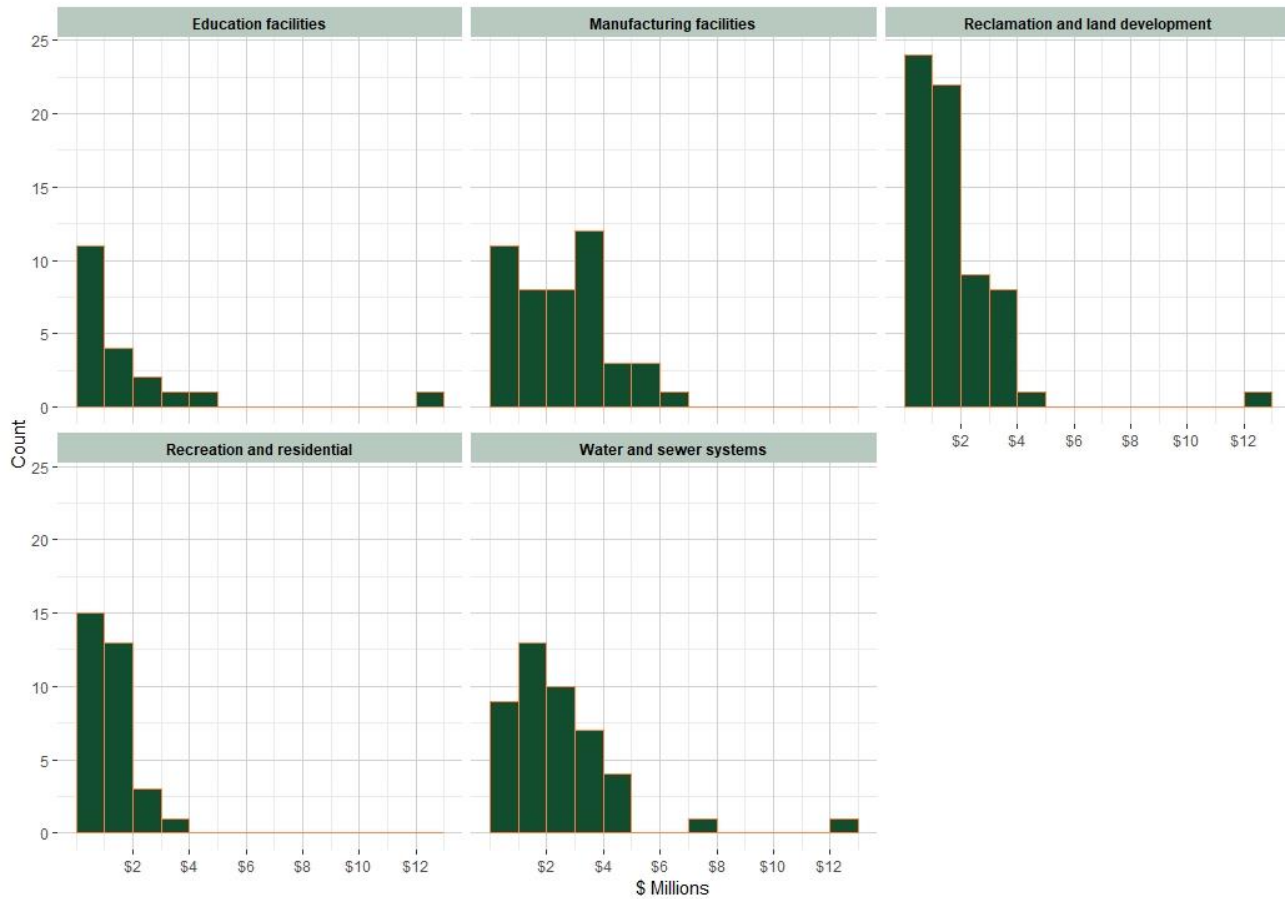


Source: Downstream Strategies (2022). Note: Data from 2016-2021.

Figure 9 reveals that the three largest projects, each of which is \$12.5 million, fall into three different categories: education facilities, remediation and land development, and water and sewer systems. The next largest project—the Harper/Eccles Sewer Extension project with \$7.6 million committed—falls into the water and sewer system category.

Also apparent in Figure 9 is that more AMLER projects fall into the reclamation and land development category than any of the other four categories. Table 10 in Appendix B provides detailed counts by project type.

Figure 9: Distribution of AMLER project commitments by type (million \$)



Source: Downstream Strategies (2022). Note: Data from 2016-2021.

Table 3: AMLER project commitments by type (million \$)

	Education facilities	Reclamation and land develop.	Manufacturing facilities	Recreation and residential	Water and sewer systems	All
Project count	20	65	46	32	45	208
Average	\$1.9	\$1.8	\$2.7	\$1.3	\$2.5	\$2.1
Largest	\$12.5	\$12.5	\$6.5	\$3.3	\$12.5	\$12.5
Smallest	\$0.2	\$0.1	\$0.3	\$0.0	\$0.2	\$0.0
Variance	\$2.8	\$1.8	\$1.6	\$0.8	\$2.1	\$1.9
Total	\$37.8	\$117.6	\$122.1	\$41.9	\$111.4	\$430.9

Source: Downstream Strategies (2022). Note: Data from 2016-2021.

3. CHALLENGES IN COMPLETING THE PLANNING PHASE

This chapter focuses on the amount of time it takes AMLER projects to complete the Planning Phase, the third of four phases for AMLER projects (See Figure 3). We focus on the Planning Phase because the time spent in this phase, 323 days on average, is almost four times greater than the time spent in the Vetting Phase (85 days) and twice as long as the time spent in the Implementation Phase (161 days).⁴

Also, of the 208 projects in our database, 109 have completed the Planning Phase, providing a large dataset to analyze. In contrast, only 32 projects have completed the Implementation Phase (See Table 9 in Appendix B for counts of projects that have completed each phase).

To better understand why the Planning Phase takes so long, we consider several potential factors:

- the size of the project,
- the state in which the project is located, and
- the type of project.

3.1 Differences by grant amount

The Planning Phase generally takes longer for projects receiving the largest AMLER grant commitments. Table 4 divides the projects in the AMLER database into two categories: those with commitments larger and smaller than \$5 million. Of the 10 larger grants, seven have completed the Planning Phase. For these projects, the Planning Phase took 413 days on average. Of the 198 smaller grants, 101 have completed the Planning Phase and took 316 days on average—about three quarters as long as the larger projects.

The difference is more striking when using the median instead of the average. The median number of days in the Planning Phase for the largest projects was almost double that of the smaller projects. As compared with the average, the median is less sensitive to outliers. More details on the 10 largest projects are presented in Table 5. Appendix A provides descriptions of the five largest projects that have completed the Vetting Phase.

Table 4: Days in the Planning Phase by size of grant commitment

Size of grant commitment	Total	Completed Planning Phase	Average size (million \$)	Days in Planning Phase (average)	Days in Planning Phase (median)
\$5 million and greater	10	7	\$7.89	413	376
Less than \$5 million	198	101	\$1.78	316	205

Source: Downstream Strategies (2022). Note: Average size and average and median days in Planning Phase are calculated only for those projects that have completed the Planning Phase. Data from 2016-2021.

⁴ Time spent in the Application Phase cannot be calculated because start dates for this phase are not available.

Table 5: The 10 largest AMLER projects

Name	Grant commitment (million \$)	Project year	State	Days in Planning Phase
Mountain State Broadband Expressway (Phase 1)	\$12.5	2016	WV	299
Appalachian Wildlife Center	\$12.5	2016	KY	613
Timber Tech Development	\$12.5	2020	WV	N/A
Harper/Eccles Sewer Extension	\$7.6	2019	WV	N/A
Project Core (Dajcor)	\$6.5	2018	KY	162
Grand River Technology Park	\$6.0	2017	AL	341
Kentucky Enterprise Industrial Park Speculative Building	\$6.0	2017	KY	N/A
Patriot Guardens Apple Production (Phase 1)	\$5.3	2016	WV	422
Marion Branch Industrial Park	\$5.0	2016	KY	376
Patriot Guardens Apple Production (Phase 2)	\$5.0	2018	WV	681

Source: Downstream Strategies (2022). Note: The Timber Tech Development project has not completed the Vetting Phase and therefore has not entered the Planning Phase. The Harper/Eccles Sewer Extension project has not completed the Planning Phase. The start and end dates for the Planning Phase for the Kentucky Enterprise Industrial Park Speculative Building are unavailable, although the project has been completed. Data from 2016-2021.

3.2 Differences by state

Differences in the amount of time spent in the Planning Phase are also apparent by state. As illustrated in Figure 10, the Planning Phase generally takes the longest time in Kentucky. The 14 projects identified in Kentucky averaged 430 days in this phase, as indicated by the white dot. The median, indicated by the vertical line through the box, is also the greatest in Kentucky. Outliers are projects that took an extraordinarily long amount of time to complete the Planning Phase and are indicated by the dots outside of the boxes in Figure 10. The outlier in Kentucky is the Rush Off Road Park project.

Unplanned and unexpected delays are often encountered that impact the amount of time it takes to complete the Planning Phase. One example is the Appalachian Wildlife Center in eastern Kentucky, which was awarded a \$12.5-million AMLER grant in 2016, and which took 613 days to complete the Planning Phase. In March 2019, officials announced that construction had begun, and visitors were expected in 18–20 months (James, 2019). Delays were caused by “construction challenges on the reclaimed mine site and a request by federal authority for an additional environmental assessment” (Dunlop, 2020) as well as delays related to COVID-19. The center is now expected to open in 2022 (Kenning, 2021).

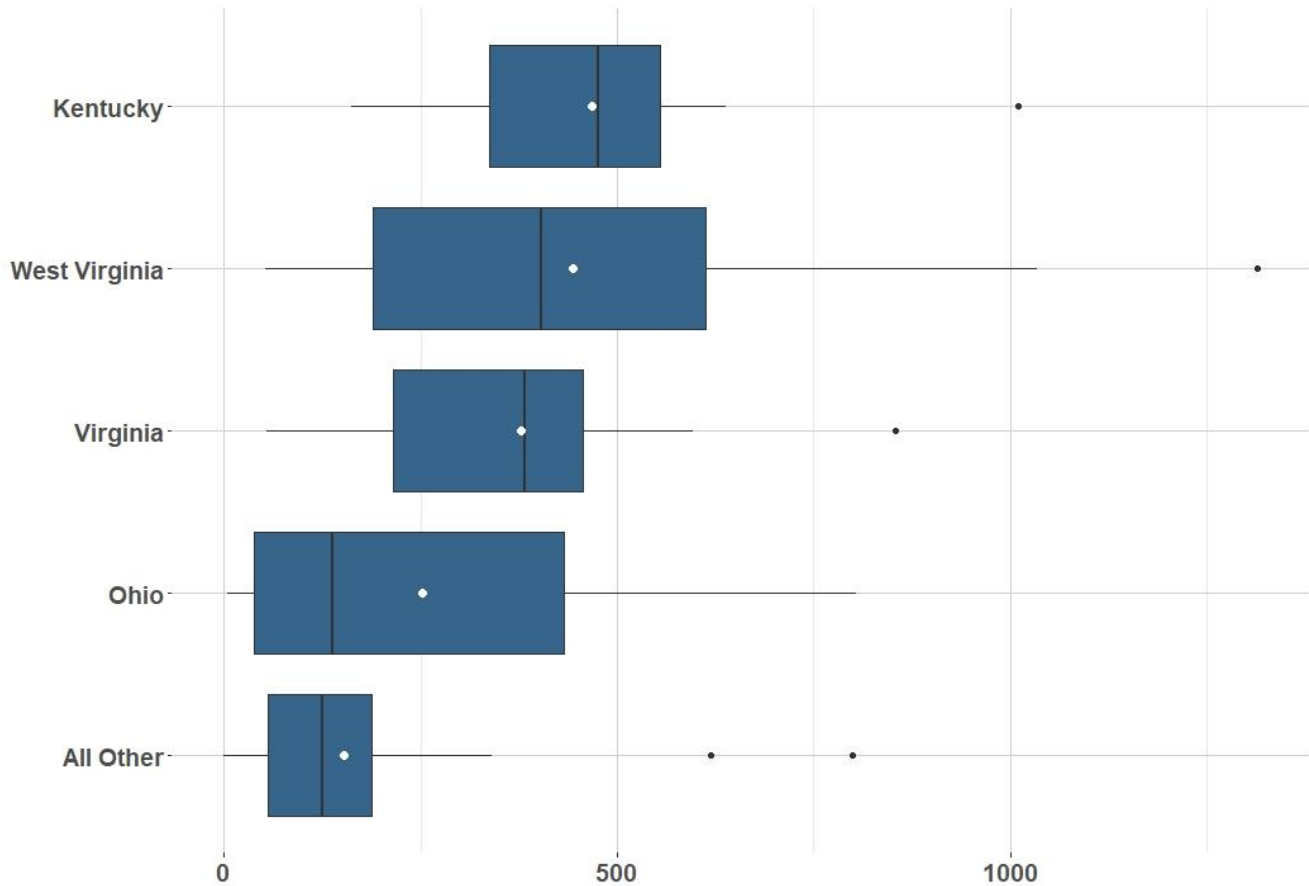
The number of days in the Planning Phase was slightly lower in West Virginia as compared with Kentucky. Of all the projects in all states, the Clear Fork Rail Trail project in West Virginia took the longest amount of time in the Planning Phase: 1,315 days. Delays were encountered because an endangered species might have been present on the site, and this species could only be identified in the spring. The COVID-19 pandemic also delayed interactions with the U.S. Fish & Wildlife Service. Further, a number of potential impacts to waterways along the trail needed to be addressed in the NEPA process. (Hatcher, 2022)

Another West Virginia project that took an especially long time in the Planning Phase was the Blue Acre Appalachian Aquaponics project, which took 612 days. Several factors contributed to delays for this project, including grant management challenges for this outside-the-box type of construction project. The timing was also impacted by the discovery of additional open mine portals and the

unexpected need to reposition a natural gas pipeline. Other unexpected issues included a change in the original plan to use mine water in a geothermal system and the need to replace water pipes so as not to damage the health of the fish. (Boettner, 2022)

In Virginia, 14 projects in our database completed the Planning Phase in 378 days on average—slightly shorter than the average for Kentucky and West Virginia. The Dante Community Redevelopment project took 854 days to complete this phase and is identified with an outlier dot in Figure 10.

Figure 10: Days in the Planning Phase by state



Source: Downstream Strategies (2022). Data from 2016-2021.

Compared with the other three states, Ohio projects generally moved through the Planning Phase more quickly. On average, Ohio projects took only 252 days to proceed through this phase. This average was influenced by the Friendship Park Highwall, which took 804 days.⁵ This relatively long time period was counterbalanced by the Beaver Creek State Park project, which took only four days—the shortest amount of time in the four states analyzed separately.

One reason why Ohio AMLER projects generally took less time in the Planning Phase is that state agency staff played a more active role in Ohio projects as compared with other states. For example,

⁵ This project does not show up as a dot in Figure 10 because it is within the whisker in the box-and-whisker plot.

staff often helped shape applications before submitting them to OSMRE for vetting, and staff also took responsibility for some of the planning tasks, rather than relying solely on the grantee.

3.3 Differences by type

A third possible explanation for the amount of time spent in the Planning Phase is the project type. We divide the AMLER projects into five broad project types:

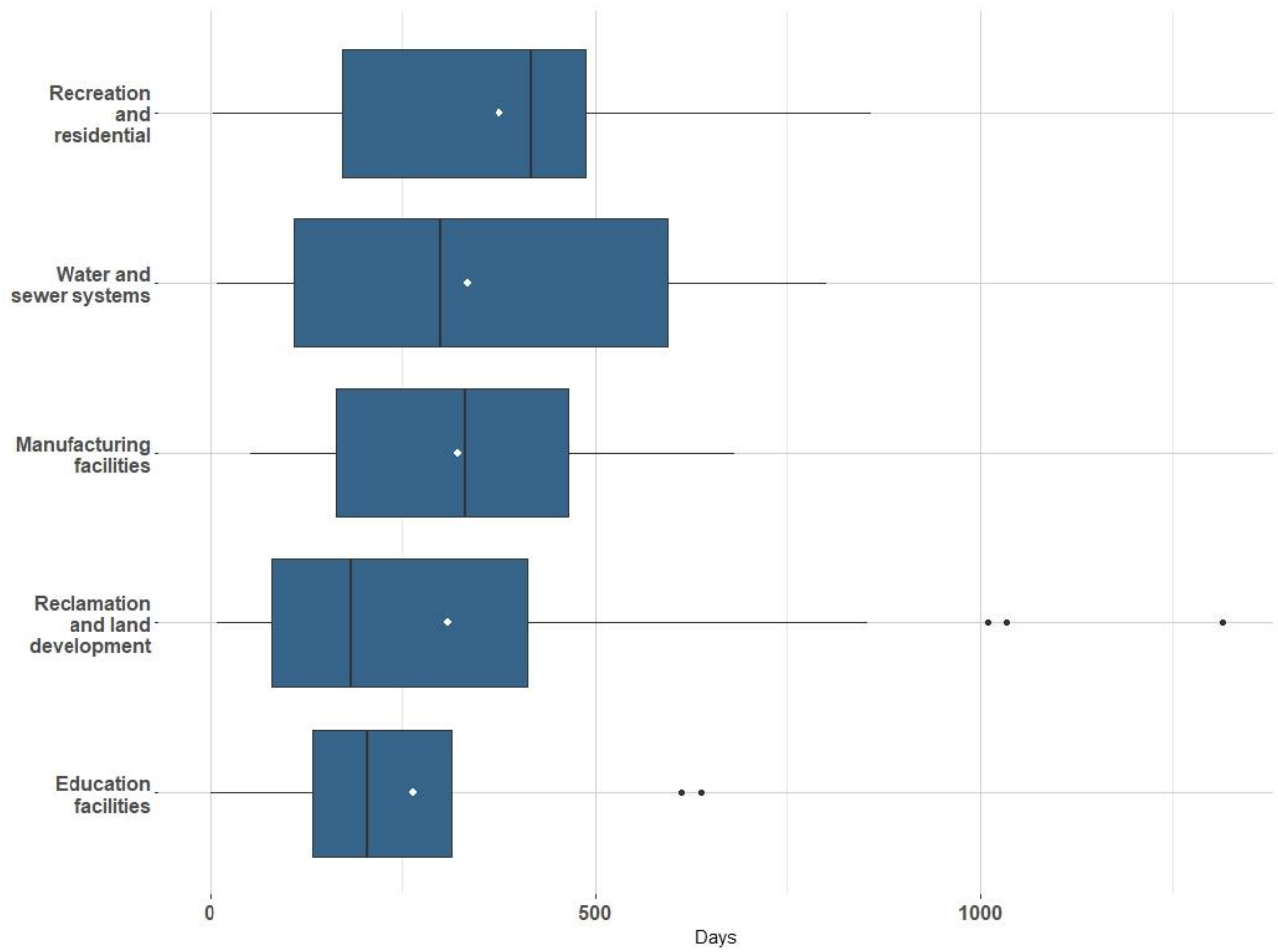
- education facilities,
- reclamation and land development,
- manufacturing facilities,
- recreation and residential, and
- water and sewer systems.

As illustrated in Figure 11, the nine education facilities projects took the shortest amount of time to complete the Planning Phase: 264 days on average. In contrast, the 16 recreation and residential projects took the longest amount of time: 375 days on average.

The largest variance, 325 days, is seen in the reclamation and land development category. This variance, as well as the 308-day average, are driven by the five projects that took more than 800 days to complete the Planning Phase. One of these—the Clear Fork Rail Trail project in West Virginia, discussed above—included the removal of coal refuse and land work, and is therefore categorized as a reclamation and land development project.

If the five projects with the most days in the Planning Phase were removed from the reclamation and land development category, the average would decrease to 200 days and the variance would decrease to 165 days. The remaining non-outlier projects are likely to be relatively easy to structure and plan because they mostly require straightforward land reclamation work. While these projects are important and valuable for the environment, many do not have explicit economic revitalization components and presumably could have been funded through traditional AML grants.

Figure 11: Days in the Planning Phase by type



Source: Downstream Strategies (2022). Data from 2016-2021.

4. ECONOMIC BENEFITS OF AMLER PROJECTS

Impact multipliers are the ratio of the full impact on the state versus the direct activity. These multipliers vary by state. The larger the economic impact, the greater effect a given activity will have on the state. The total effect on a state depends on several factors, including the size of the state economy, the specific industries affected, the regional industrial mix, and the amount of income generated. Impacts are larger in large regions, in industries that require more inputs from the local regions, and for industries that pay higher wages.

If all \$410 million of AMLER funds allocated to Kentucky, Ohio, Virginia, and West Virginia had been spent, these projects would have spurred the creation of 4,142 full- and part-time jobs with earnings of \$250 million (See Table 6). The total impact on output (sales) in the four states would have been an estimated \$715 million.

Table 6: AMLER allocations, output multipliers, and estimate of full economic benefits (million \$)

State	Allocation	Output	Output multiplier	Value added	Labor income	Employment
Kentucky	\$140	\$243	1.74	\$125	\$82	1,453
Ohio	\$65	\$129	1.98	\$69	\$45	714
Virginia	\$50	\$88	1.77	\$49	\$31	482
West Virginia	\$155	\$255	1.64	\$135	\$91	1,493
Total	\$410	\$715	1.74	\$379	\$250	4,142

Sources: Allocations from OSMRE (2022). Output, value added, labor income, and employment are the total effects calculated from IMPLAN economic impact analysis by the authors. Note: Data from 2016-2021.

For this analysis, the different multipliers are the result of the different size of each state’s economy. Ohio’s gross domestic product in 2021 was nearly 25 percent larger than Virginia’s, 2.1 times larger than Kentucky’s, and 7.5 times larger than West Virginia’s (Bureau of Economic Analysis, 2022). When AMLER grants are spent on Ohio projects, more of the production can be met from within Ohio—as compared with the other states.

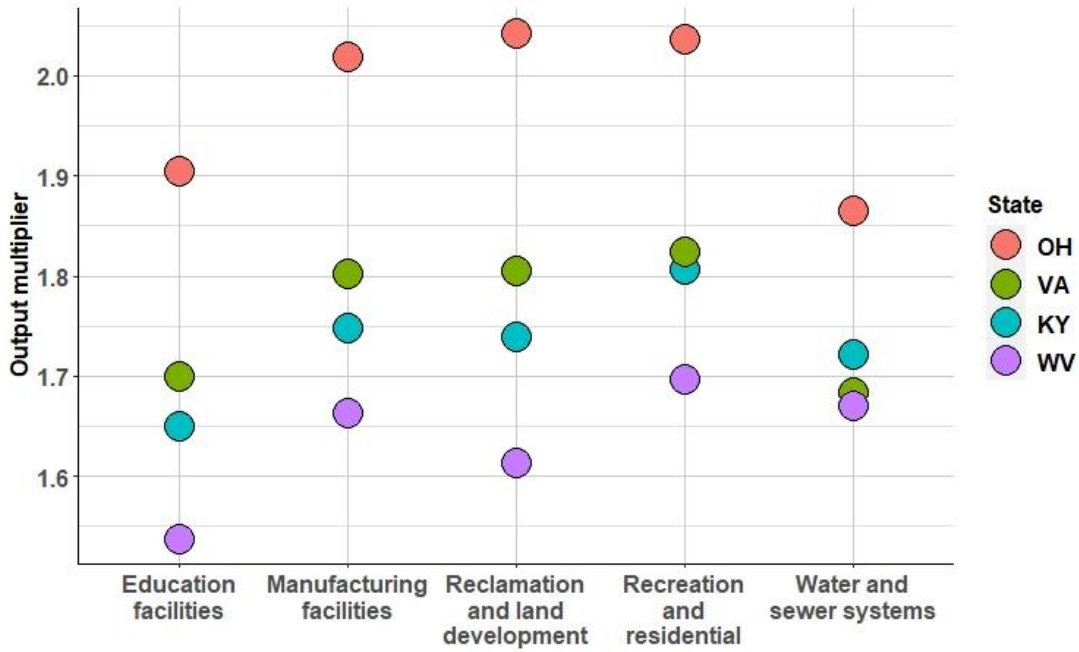
Figure 12 and Figure 13 show the output and employment multipliers for these industries in the four states. In both cases, Ohio has the highest multiplier, 17 percent higher for output and 13 percent higher for employment compared with the average of all categories for the other three states.

4.1 Impacts from AMLER expenditures

Available data show that only \$109 million of the \$410 million allocated to the four states of interest has been spent. As illustrated in Table 7, the impact from these expenditures totals \$187 million and has accounted for approximately 1,096 full- and part-time jobs with a total labor income of \$65 million.

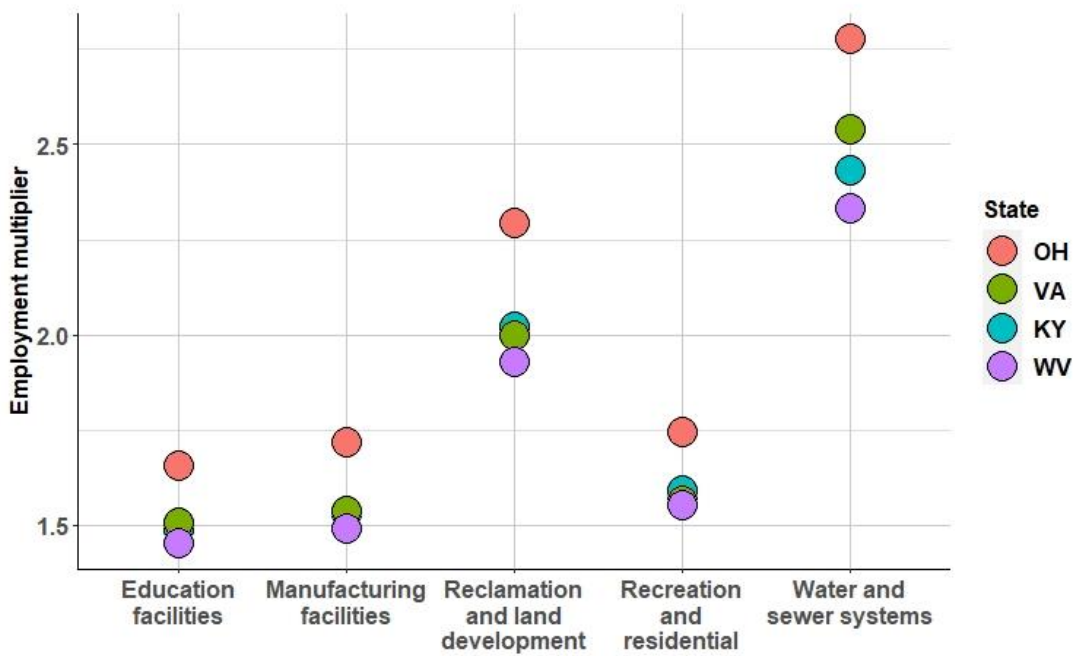
The difference between the benefits of the full AMLER allocations and the actual AMLER expenditures—\$523 million in total sales, \$183 million in labor income, and 3,038 jobs—is significant.

Figure 12: AMLER economic impact multipliers for output by state



Source: IMPLAN economic impact analysis by the authors based on Downstream Strategies (2022). Data from 2016-2021.

Figure 13: AMLER economic impact multipliers for employment by state



Source: IMPLAN economic impact analysis by the authors based on Downstream Strategies (2022). Data from 2016-2021.

Table 7: AMLER grant expenditures and estimate of full economic benefits (million \$)

State	Expenditure	Output	Value added	Labor income	Employment
Kentucky	\$49	\$86	\$44	\$29	513
Ohio	\$8	\$16	\$8	\$5	86
Virginia	\$11	\$20	\$11	\$7	111
West Virginia	\$40	\$66	\$35	\$24	385
Total	\$109	\$187	\$99	\$65	1,096

Source: Expenditures from Downstream Strategies (2022). Output, value added, labor income, and employment are the total effects calculated from IMPLAN economic impact analysis by the authors. Note: Data from 2016-2021.

4.2 Impacts from case study projects

The impacts from actual expenditures observed in Table 7 are a result of spending on all 156 projects in the database for which expenditure data are available. Of those projects, we have identified 32 completed projects, 24 of which are in Kentucky, Ohio, Virginia, and West Virginia.

To gain further insights into the AMLER process, we communicated with project managers for a number of those projects and were able to get detailed information on six: three each in Ohio and West Virginia. These six projects are reviewed in detail in Appendix C.

These projects include two manufacturing facilities: the Appalachian Abattoir and Blue Acre Appalachian Aquaponics projects in West Virginia. Two projects in Ohio—the Bailey’s Mountain Bike Trail System and Moonville Rail Trail projects—developed trail systems that will grow long-term regional tourism. The Beaver Creek Habitat project restored a trout stream ecosystem in West Virginia that will impact the creek’s entire watershed. The final project, the D.O. Hall Business Park Expansion project, stabilized land in a developing business park and provided a contiguous acreage for the full development, increasing the overall value of the development. These six projects ranged from about \$300,000 spent for the Beaver Creek Habitat project to just over \$6 million for the Bailey’s Mountain Bike Trail System project.

Table 8 summarizes the local economic benefits of these six projects. The average output multiplier for the West Virginia projects was 1.66, while the average for the Ohio projects was 2.05. These multipliers reflect the totals shown: \$19.3 million in expenditures resulted in an estimated impact of \$35.3 million in increases sales in West Virginia and Ohio.

The employment multiplier for the three West Virginia projects implies that for each job created by direct AMLER expenditures, an additional half job will be added. In Ohio, each direct job will result in another 1.18 jobs. These multipliers vary by project because of specific features of the projects that are incorporated into the impact modeling, including the unique project activities, labor costs, local-sourced goods and services, and estimates of the economic contributions from volunteer hours.

Table 8: Economic impacts from six case study AMLER projects

	Direct output	Total output	Output multiplier	Direct employment	Total employment	Employment multiplier
West Virginia						
Appalachian Abattoir	\$5.7	\$9.5	1.68	44.2	68.0	1.54
Blue Acre Aquaponics	\$4.7	\$7.7	1.64	6.8	10.2	1.50
Beaver Creek Habitat	\$0.3	\$0.6	1.87	3.9	5.8	1.49
Subtotal	\$10.7	\$17.7	1.66	54.9	84.0	1.53
Ohio						
Bailey's Mountain Bike	\$6.1	\$12.3	2.04	29.9	63.9	2.14
Moonville Rail trail	\$1.2	\$2.4	2.09	5.1	11.7	2.29
D.O. Hall Business Park	\$1.4	\$2.9	2.04	6.2	14.1	2.27
Subtotal	\$8.6	\$17.6	2.05	41.2	89.7	2.18
Total	\$19.3	\$35.3	1.83	\$96.1	\$173.7	1.81

Source: IMPLAN economic impact analysis by the authors based on Downstream Strategies (2022). Data from 2016-2021.

5. CONCLUSIONS AND RECOMMENDATIONS

Since 2016, the AMLER Program has allocated \$655 million to six states and three tribes. Almost two-thirds of these funds, \$410 million, has been allocated to the four states of interest in this report: Kentucky, Ohio, Virginia, and West Virginia.

We have compiled a database of 208 AMLER projects. In Kentucky, Ohio, Virginia, and West Virginia, the database includes \$324 million in grant commitments and \$109 million in expenditures—considerably less than the funds allocated to these states.

A sense of urgency in spending these funds would be appropriate. The AMLER Program serves regions with high unemployment and poverty rates where immediate short-term jobs can provide hope, independence, and a bridge to the future. Also, completed projects are likely to benefit the health and safety of the communities in which they are located. Many completed projects will also provide ongoing economic benefits from the productive use of sites that are now impacted by past coal mining. These types of ongoing benefits can far exceed the immediate effects examined in this report due to the influx of tourist dollars and business investments, as well as changing lifestyles and habits of the populations negatively affected by the loss of coal jobs and damaged environments.

Urgency is also warranted because inflation is continually reducing the value of the AMLER dollars allocated to the states. Given the rate of inflation seen in 2022, it is more critical than ever. Thus, the long lead times documented for AMLER grants and the local economic benefits analyses discussed in this report are tightly linked. If lead times can be shortened while still following proper processes, local economic benefits will be larger and will be felt sooner.

Despite this sense of urgency, proper processes must be followed to ensure that taxpayer dollars are wisely spent. To succeed, AMLER projects must be well thought out. OSMRE vetting provides an important mechanism to ensure that state decisions are consistent with federal requirements. The Vetting Phase, which takes only 85 days on average, is not the main cause for the long amount of time required for AMLER projects to be completed.

To shorten the Planning Phase, we offer the following recommendations:

- **Put additional effort into the Application Phase to minimize unexpected delays.** The Planning Phase will be shorter if there are fewer unexpected delays. While some delays like those stemming from COVID-19 are unavoidable, others can be minimized by putting additional effort into the Application Phase. Even in states that make AMLER awards to subrecipients, agency staff have an important role to play during the Application Phase, before submission to OSMRE for vetting.
- **Consider having state agency staff play a more active role in the Planning Phase.** In Ohio, state agency staff have played a particularly active role in the Planning Phase, which in turn reduced the time it took to complete this phase.
- **Provide smaller grants.** The largest AMLER grants tended to take longer to complete the Planning Phase than smaller grants. While one benefit of providing smaller grants is the speed with which they can be implemented, a second benefit is that smaller grants can be spread across more communities in need of investments to return AMLs to productive economic use.
- **Help applicants anticipate potential NEPA delays due to seasonality.** Sometimes, the NEPA process will require waiting until a certain season to address the potential presence of threatened or endangered species. Agency staff can proactively provide information to subrecipients to help them anticipate these delays and, where possible, complete the NEPA process during the current cycle rather than waiting for the next cycle.

If all \$410 million of AMLER funds allocated to Kentucky, Ohio, Virginia, and West Virginia had been spent, these projects would have spurred the creation of 4,142 full- and part-time jobs with earnings of \$250 million. This spending would generate \$715 million in local economic benefits.

So far, most of these local economic benefits have not been realized because only \$109 million of AMLER funds has been spent. This spending is estimated to have generated \$187 million in local economic benefits.

These estimates of local economic benefits are conservative because they only account for the direct spending and the ripple effects of that spending through the local economy. Additional benefits are generated if AMLER funding is matched by other funding sources, if projects lead to the siting of new businesses on AMLs, if projects lead to increases in tourism, or for other reasons. These additional benefits are not quantified in this report.

To provide the most significant economic benefits possible, we offer the following recommendations:

- **Use a transparent project selection process.** States are afforded flexibility in how AMLER projects are selected. However, the more transparent the process, the more likely that selected projects will be well thought out, withstand public scrutiny, and receive local community support—all of which are important for maximizing the ongoing economic benefits to communities.
- **Document the additional benefits generated by completed AMLER projects.** After AMLER projects are completed, the additional benefits generated by these projects should be documented—including the siting of new businesses on AMLs, increases in tourism, and other benefits. This will allow the long-term benefits of the AMLER Program to be evaluated.
- **Produce regular public reports on project progress and local economic benefits.** OSMRE should consider how best to compile information about the economic benefits of AMLER projects into regular public reports. These reports will be helpful in demonstrating the success of the AMLER Program and in ensuring its continued funding.
- **Consider funding projects that result in the largest local economic benefits.** Multipliers differ by project type, and project choices should be made cognizant of full benefits that could accrue.

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APPENDIX A: THE FIVE LARGEST VETTED AMLER PROJECTS

Mountain State Broadband Expressway

The Mountain State Broadband Expressway is a two-phase project. It was originally awarded \$12.5 million in 2016 and was awarded another \$3.35 million in 2017. The project includes the construction of broadband and wireless backbone towers across multiple counties in eastern West Virginia. The backbone telecommunication towers will be built on AML sites to supply affordable broadband service.

Appalachian Wildlife Center

The Appalachian Wildlife Center was awarded \$12.5 million in AMLER funds in 2016. Located on an AML in eastern Kentucky, the project consists of a visitor center for elk viewing on 246 acres. Additionally, the visitor center will include a museum and theater, over 19 square miles of trails, and a 12,000-acre wildlife and nature preserve. The project is still under construction, with an anticipated completion date in summer 2022.

Harper/Eccles Sewer Extension

The Harper/Eccles Sewer Extension project received \$7.6 million AMLER funds in 2020. The project will provide three miles of sewer line down Route 3 in West Virginia. Plan designs have not been submitted to OSMRE yet.

Project Core (Dajcor)

Project Core (Dajcor) was awarded \$6.5 million in AMLER grant funds in 2019. The project funded the purchase of an aluminum extrusion press for Dajcor Aluminum at its new location at the Coalfield Regional Industrial Park in eastern Kentucky. Additionally, the industrial park received a \$900,000 AMLER grant to install natural gas pipelines for manufacturing operations. The extrusion press was installed for Project Core in 2019.

Grand River Technology Park

In 2018, the Grand River Technology Park project was awarded \$6 million in AMLER funds. Located next to Priority 2 and Priority 3 AMLs, the project will develop 105 acres for the Southern Museum of Flight, Industrial Research and Light Manufacturing to support the regional automotive and medical industries and a residential development. In 2019, an additional \$2.2 million was awarded to reclaim a Priority 1 highwall for an expansion of the project.

APPENDIX B: ADDITIONAL DATA TABLES

Table 9: AMLER projects by state and completed phase

State	Vetting Completed	Planning Completed	Construction Started	Implementation Completed	Total
Kentucky	32	20	19	13	64
Ohio	13	11	10	6	13
Virginia	31	14	2	0	31
West Virginia	48	29	20	5	48
All Other	47	35	25	8	52
Total	171	109	76	32	208

Source: Downstream Strategies (2022). Note: Data from 2016-2021.

Table 10: AMLER projects by type and completed phase

State	Vetting Completed	Planning Completed	Construction Started	Implementation Completed	Total
Education facilities	17	9	8	3	20
Manufacturing facilities	36	24	21	9	46
Reclamation and land development	57	39	25	10	65
Recreation and residential	26	17	9	3	32
Water and sewer systems	35	20	13	7	45
Total	171	109	76	32	208

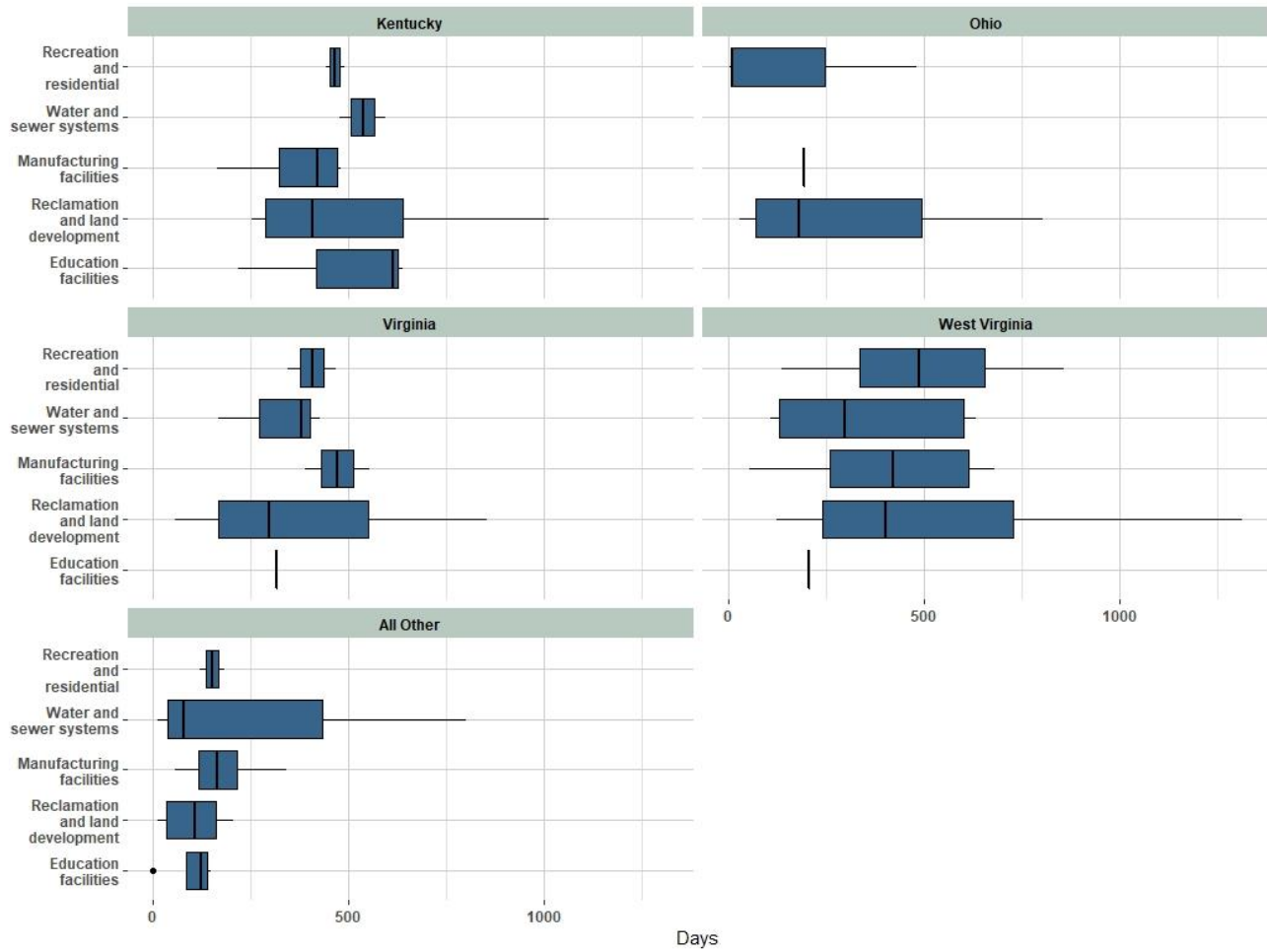
Source: Downstream Strategies (2022). Note: Data from 2016-2021.

Table 11: AMLER projects by state and application year

State	2016	2017	2018	2019	2020	2021	Total
Kentucky	9	13	12	12	9	9	64
Ohio	0	9	4	0	0	0	13
Virginia	0	4	10	8	9	0	31
West Virginia	7	11	13	10	7	0	48
All Other	14	16	21	1	0	0	52
Total	30	53	60	31	25	9	208

Source: Downstream Strategies (2022). Note: Data from 2016-2021.

Figure 14: Days in the Planning Phase by state and type



Source: Downstream Strategies (2022). Data from 2016-2021.

APPENDIX C: DETAILED IMPACTS FROM CASE STUDY PROJECTS

Appalachian Abattoir

In 2018, Buzz Foods, a locally owned and operated specialty meat company in Charleston, West Virginia, was awarded an AMLER grant to expand its operations to include a livestock slaughter and processing facility called Appalachian Abattoir. Buzz Foods partnered with Refresh Appalachia and the West Virginia Department of Agriculture, Department of Education, and Department of Commerce. The public-private partnership provided a critical piece of agricultural infrastructure that allowed West Virginia beef to stay in the state rather than being shipped away to be processed. Additionally, the project provides job training, workforce and business development, and processing services for other local farmers.

As illustrated in Table 12, the economic impact on West Virginia’s economy from the construction associated with the \$5.9 million AMLER grant was approximately \$9.5 million in total sales across the state. This increase in economic activity is estimated to generate 68 jobs and \$5 million in value added wealth in the state. Included in the \$5 million is an estimated \$4.1 million in labor income.

Table 12: Economic impacts of the Appalachian Abattoir project (million \$)

Impact	Employment	Labor income	Value added	Output
Direct	44.2	\$2.92	\$2.93	\$5.67
Indirect	7.4	\$0.45	\$0.75	\$1.47
Induced	16.4	\$0.74	\$1.32	\$2.35
Total	68	\$4.10	\$5.00	\$9.50

Source: Downstream Strategies IMPLAN model. Note: These impacts are for the state of West Virginia and are associated with the project’s construction and start-up costs. Employment estimates are jobs per person or full- and part-time jobs.

The total economic impact of this project includes the direct activity provided by the managers at Appalachian Abattoir as well as the indirect effects that are associated with the increase in production by companies across the state to prepare the site and build the facility. This increase in production includes all industry sectors that supported this construction, including architects and engineers, lawyers, fabricators for building materials, transportation and delivery, tool and equipment manufacturing, rental, and repairs. The indirect effect was estimated to require 7.4 annual jobs, which paid nearly \$60,300 on average to both employees and proprietors. The total sales associated with these indirect effects was \$1.47 million.

The induced effect reflects the estimated impact from the increase in household income through the wages and proprietors’ income paid in the direct and indirect effects. This increase in economic activity from household spending is estimated to have generated 16.4 jobs, \$740,000 in labor income, and \$1.32 million of new wealth across the state. The total sales (output) associated with the induced activity was \$2.35 million.

These economic benefits have been realized despite several unexpected setbacks. Additional mine portals and mine drainage were discovered after the project was started, and a landslide occurred just before site work was to get started. Also, delays were also encountered due to the COVID-19 pandemic: A manager was hired to run the operation, but workers could not be hired due to the pandemic. (Stroud, 2022)

Appalachian Abattoir plans to apprentice 10–25 workers per year to support its labor requirements and to encourage the development of a more highly skilled labor market in a region, which until recently has imported product from outside the area. Appalachian Abattoir will also provide training and support to West Virginia’s livestock producers to improve their capacity as well as their product quality and value. (Stroud, 2022) These labor market and training initiatives create a set of positive impacts that are not explicitly included in our analysis: community engagement, community pride, education, tourist attractions, and environmental improvements.

Blue Acre Appalachian Aquaponics

In 2016, Refresh Appalachia, a program focused on regenerative and sustainable agriculture in Central Appalachia, and the Mingo County Redevelopment Authority, were awarded an AMLER grant of \$3.6 million to develop Blue Acre Appalachian Aquaponics. Blue Acre Appalachian Aquaponics is a commercial aquaponics production and training center located in Kermit, West Virginia. Aquaponics is a system where the waste produced by farmed fish supplies nutrients for plants grown without soil. Apart from growing plants and fish, Blue Acre also offers workforce development and beginning farmer education and training opportunities.

Figure 15: The Blue Acre facility



Photo credit: Fritz Boettner.

The project was one of the first to receive an AMLER grant when the program was started in 2016. Since the start of the project’s construction, nearly \$7.7 million in sales has been generated across the state of West Virginia. This \$7.7 million increased economic activity was generated from initial construction, as well as startup and ongoing business operation costs of nearly \$4.7 million. This activity has supported over 10 jobs each year. Further, nearly seven of these jobs were directly generated in construction, consulting, and the ongoing operations at Blue Acre Appalachian Aquaponics. The total value added to West Virginia’s economy from this activity exceeded \$4.2 million, with more than \$3.1 million of that wealth going to employee compensation and proprietors’ income as identified in Table 13.

Table 13: Economic impacts of the Blue Acre Appalachian Aquaponics project (million \$)

Impact	Employment (annual)	Labor income	Value added	Output
Direct	6.8	\$2.19	\$2.59	\$4.68
Indirect	1.3	\$0.38	\$0.60	\$1.19
Induced	2.1	\$0.56	\$1.01	\$1.80
Total	10.2	\$3.13	\$4.20	\$7.66

Source: Downstream Strategies IMPLAN model. Note: These impacts are for the state of West Virginia and are associated with construction and ongoing business operation. Employment estimates are jobs per person, or full- and part-time jobs.

The total impacts include estimates of direct, indirect, and induced impacts. Generally, the direct effects, as the primary drivers, are the largest in an impact analysis. Next, the indirect effects reflect the activity associated with the increase in production in other sectors of the state’s economy to support the increase reflected in the direct effects. These indirect effects include sales of nearly \$1.2 million from other industrial sectors in the state. Finally, the induced effects account for the economic activity generated from households as their expenditures from the direct and indirect increases in production ripples out across the other industry sectors in the state and through their local economies. For this project, approximately \$1.8 million in sales and \$560,000 in labor income was generated over the six years. And on an annual basis, just over two jobs were provided.

Beaver Creek Habitat Restoration

In 2018, Canaan Valley Institute was awarded a \$295,000 AMLER grant to develop a trout fishery along Beaver Creek near Davis, West Virginia. The project included five miles of stream restoration and improved public access from Corridor H access roads and the adjacent rail-trail to the creek.

As shown in Table 14, the Beaver Creek project generated approximately \$560,000 across the state, nearly six jobs, and labor income of about \$320,000.

Table 14: Economic impacts of the Beaver Creek Habitat Restoration project (million \$)

Impact	Employment	Labor Income	Value Added	Output
Direct	3.9	\$0.24	\$0.26	\$0.30
Indirect	0.5	\$0.03	\$0.04	\$0.08
Induced	1.4	\$0.06	\$0.10	\$0.18
Total	5.8	\$0.32	\$0.40	\$0.56

Source: Downstream Strategies IMPLAN model. Note: These impacts are for the state of West Virginia and are only associated with construction activity. Employment estimates are jobs per person, or full- and part-time jobs.

Figure 16: The Beaver Creek project



Photo credit: Josh Saville.

Bailey’s Mountain Bike Trail System

In 2019, Rural Action was awarded \$1.8 million in AMLER funds to construct two trailhead locations to accommodate parking, construct bathroom facilities, and construct a spur trail to a nearby bikeway in the Wayne National Forest in Ohio. The full economic impact on Ohio from just the construction activity that was leveraged by the initial AMLER grant in 2018 is estimated to be \$12.3 million in additional output and 64 jobs (See Table 15). This increase in economic activity is generated by an initial AMLER grant of \$1.8 million, which was then supplemented with a \$3.5 million POWER grant and more than \$750,000 from other sources.

Table 15: Economic impacts of the Bailey’s Mountain Bike Trail System project (million \$)

Impact	Employment	Labor Income	Value Added	Output
Direct	29.9	\$1.99	\$2.71	\$6.05
Indirect	15.8	\$1.00	\$1.75	\$3.35
Induced	18.3	\$0.92	\$1.69	\$2.93
Total	63.9	\$3.90	\$6.14	\$12.33

Source: Downstream Strategies IMPLAN model. Note: These impacts are for the state of Ohio and are only associated with construction activity. Employment estimates are jobs per person, or full- and part-time jobs.

The total direct activity required nearly 30 employees and generated approximately \$2 million in labor income. The total increase in wealth as estimated by the model and measured through value added was \$2.7 million. The indirect effect, the impact from the increase of economic activity across the state, was estimated to be \$3.3 million, and an additional 15.8 jobs were generated from that activity. The estimate of the induced effect, the result of the increased spending by households on the labor income earned by the direct and indirect effect is nearly \$3 million and an additional 18.3 jobs.

Moonville Rail Trail

The Moonville Rail Trail has been in development since the early 1990s, when the rail company CSX pulled up the tracks and removed the bridges and trestles. The project, spearheaded by the Vinton and Athens County Commissioners, has moved forward largely from the work of a small but dedicated group of local volunteers who worked with small grants and available resources. This group used abandoned rail cars to innovatively construct the first two bridges across a stream that intersects the trail at several locations.

An AMLER grant in 2016 provided \$1.15 million to extend the trail. The project included seven high-capacity bridges to allow access to construction and emergency vehicles. With those features and with the trail complete, the Moonville Rail Trail now includes two rail tunnels and access to two abandoned historic coal towns, Zaleski State Park (the second largest state park in Ohio), Hope Iron Furnace, Forest of Honor Indian burial ground, and miles of high-quality mountain bike trails. After the section of the trail was developed, the region has seen a significant influx of new visitors as well as an expansion of businesses to support the added attention it has received from recreational tourists.

The AMLER grant provided funds to develop the trail in 2019 and 2020. An economic impact analysis of just the construction suggests that the immediate effect from that activity would have created nearly \$2.4 million in sales and 12 jobs. Approximately \$1.2 million in value added with nearly \$720,000 in labor income would have been generated in the state from the project.

The full impact is generated initially by a direct effect that requires the equivalent of just over five employees. The indirect effect generated approximately \$210,000 in labor income and an associated 3.2 additional jobs, while the spending by households across the state generated an estimated \$170,000 in additional labor income and 3.4 more jobs.

Table 16: Economic impacts of the Moonville Rail Trail project (million \$)

Impact	Employment	Labor Income	Value Added	Output
Direct	5.1	\$0.34	\$0.50	\$1.15
Indirect	3.2	\$0.21	\$0.36	\$0.71
Induced	3.4	\$0.17	\$0.31	\$0.54
Total	11.7	\$0.72	\$1.17	\$2.40

Source: Downstream Strategies IMPLAN model. Note: These impacts are for the state of Ohio and are only associated with construction activity. Employment estimates are jobs per person, or full- and part-time jobs.

D.O. Hall Business Park Expansion

In 2017, the Cambridge-Guernsey County Community Improvement Corporation, in partnership with Rural Action, received an AMLER grant to stabilize a parcel of land affected by an underground mine in the 1920s (Plain View Coal Company) and then later by surface mining. The stabilized parcel sits within a 213-acre industrial park in eastern Ohio. This stabilization would provide continuity and additional land for the park. The completed project has allowed additional development to use the existing infrastructure and utilities associated with the industrial park, which has provided for more than 500 jobs at the site (Stillion, 2021).

The immediate economic impact associated with just the remediation work of the land was approximately \$2.9 million in increased sales across the state and 14 jobs. The total increase in wealth as measured by value added was \$1.4 million, with about \$860,000 of that going to workers as labor income. This impact was driven by the direct effect of the \$1.4 million AMLER grant. This direct effect generated an estimated 6.2 jobs and about \$420,000 in labor income. The secondary effects from this activity generated nearly 8 jobs and approximately \$444,000 in labor income.

Table 17: Economic impacts of the D.O. Hall Business Park Expansion project (million \$)

Impact	Employment	Labor Income	Value Added	Output
Direct	6.2	\$0.42	\$0.61	\$1.40
Indirect	3.9	\$0.24	\$0.43	\$0.81
Induced	4.0	\$0.20	\$0.37	\$0.65
Total	14.1	\$0.86	\$1.40	\$2.86

Source: Downstream Strategies IMPLAN model. Note: These impacts are for the state of Ohio and are only associated with construction activity. Employment estimates are jobs per person, or full- and part-time jobs.