Waste Tire Program
Annual Report to the Kentucky General Assembly

Commonwealth of Kentucky

Energy and Environment Cabinet

Department for Environmental Protection

Division of Waste Management

eec.ky.gov/environmental-protection/waste

Calendar Year 2021

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ENERGY AND ENVIRONMENT CABINET MANDATE

This report has been prepared as required by KRS 224.50-872. The purpose of this report is to provide information relevant to the commonwealth's waste tire program. Specifically, it includes information pertinent to expenditures and revenues, effectiveness in developing markets, benefits of the fee in funding the Energy and Environment Cabinet's (EEC) implementation of the waste tire program, and recommendations for program improvements.

> *KRS 224.50-872 states, "The cabinet shall report to the General Assembly no later than January 15 each year on the effectiveness of the waste tire program in developing markets for waste tires, the amount of revenue generated and the effectiveness of the fee established in KRS 224.50-868 in funding the cabinet's implementation of the waste tire program, to include any waste tire amnesty program established by the cabinet as provided for in KRS 224.50-880(1)(b), whether the fee should be extended, comparative data on the number of waste tires generated each year, the number disposed of, the number of orphan tire piles, and the cost of tire disposal by counties in the Commonwealth."*

HISTORY & PURPOSE OF THE FUND

In 1990, the Kentucky General Assembly passed House Bill 32 creating the waste tire control program and establishing the Waste Tire Trust Fund (WTTF) to eliminate existing, and prevent future waste tire piles. The original program imposed a $1.00 fee on retailers of new motor vehicle tires sold in Kentucky, created requirements for tire accumulation and storage, and resulted in the removal of many tires from the environment. However, hundreds of thousands of tires continued to be stockpiled in anticipation that future waste tire markets would develop. In 1994, the General Assembly extended the program an additional four years, adding a prohibition on open burning of waste tires.

In 1998, the General Assembly repealed the waste tire control program and created a program with a renewed approach. The revised statute retained the $1.00 fee collected on new motor vehicle tires, the WTTF, and registration requirements for accumulators of waste tires. New additions to the waste tire management program included financial assurance requirements for accumulators, processors, and transporters of waste tires, grants for projects that manage waste tires, and reporting requirements for the EEC regarding the effectiveness of the program. This fee, collected from consumers by retailers, is paid monthly to the Department of Revenue (DOR). The EEC uses the fee to implement the waste tire program, which includes waste tire collection events (WTCE), cleanups, and grant funding to manage and develop markets for waste tires. The program has been extended during each General Assembly regular session since 2002 and the tire fee was increased from $1.00 to $2.00 in 2018. Additional revenue generated from the increased fee may not all be

allocated to the waste tire program. In 2020, KRS 224.50-868 was revised to extend the tire program to June 30, 2024.

In 2011, House Bill 433 established the Waste Tire Working Group (WTWG), a Division of Waste Management (DWM) committee. This committee is tasked to discuss and research topics in waste tire management, and to make recommendations to the EEC in efforts to improve Kentucky's programs. The committee is charged to convene twice annually, and its meetings are open to the public. The WTWG consists of two ex-officio members of DWM's Recycling and Local Assistance (RLA) Branch, and six appointed members. The six WTWG committee members are appointed by the governor in accordance with KRS 224.50-855.

Current membership of the WTWG:

Director, DWM or Designee.....Pending designation (ex-officio)
Manager, RLA Branch or Designee..... Darin Steen, Branch Manager, RLA (ex-officio)
Kentucky Department of Agriculture Representative.....Harlan Hatter
Kentucky Solid Waste Coordinator Representative ..... Bryan Miles (Grant County)
Kentucky Solid Waste Coordinator Representative .. Sherri McDaniel (Woodford County)
Mayor Representative .....Tracy Neice (Hyden)
County Judge/Executive Representative..... Pending appointment)
Private Retail Tire Sales Representative..... Pending appointment

The WTWG last met on November 4, 2019. This meeting provided updates and new information on the status of WTCEs, rubber-modified asphalt (RMA), and crumb rubber, including a presentation on pour-in-place walking paths and playground surfaces. A planned meeting for spring 2020 was cancelled due to COVID restrictions, and after seeing significant turnover in membership there have been some delays in the appointment of replacement members. A remote meeting is planned for early 2022 pending appointment of new members.

REVENUE

Precise data on statewide replacement tire sales are not readily available, but by reviewing national sales totals and population, gasoline consumption and vehicle registration statistics, it is estimated that Kentuckians annually purchase approximately 4.3 million new replacement tires. Over the past two years, Kentucky has received an average of $6.25 million per year from the motor vehicle retail tire fee, or approximately 72 percent of the money that could be collected. Figure 1 illustrates tire fee receipts, as well as the other revenue generated from the WTTF for the past five years.

There are several possibilities for why not all of the fees are being collected, including:

- *Not all retailers collect and remit the proper amount of tire fees;*
- *Fees are not paid by some trucking companies when large quantities of tires are purchased through fleet sales from wholesale companies;*
- *DOR is paid a flat annual fee of $50,000. Insufficient resources and a lack of incentive to monitor non-paying entities could be reduced by paying DOR a percentage of collections, reflective of several states with similar programs; and*
- *The tire fee may be collected with other taxes and fees. Some fees may be inadvertently misallocated to the wrong fund's ledger. This has occurred in at least one other state, and was detected when their collection mechanism changed.*

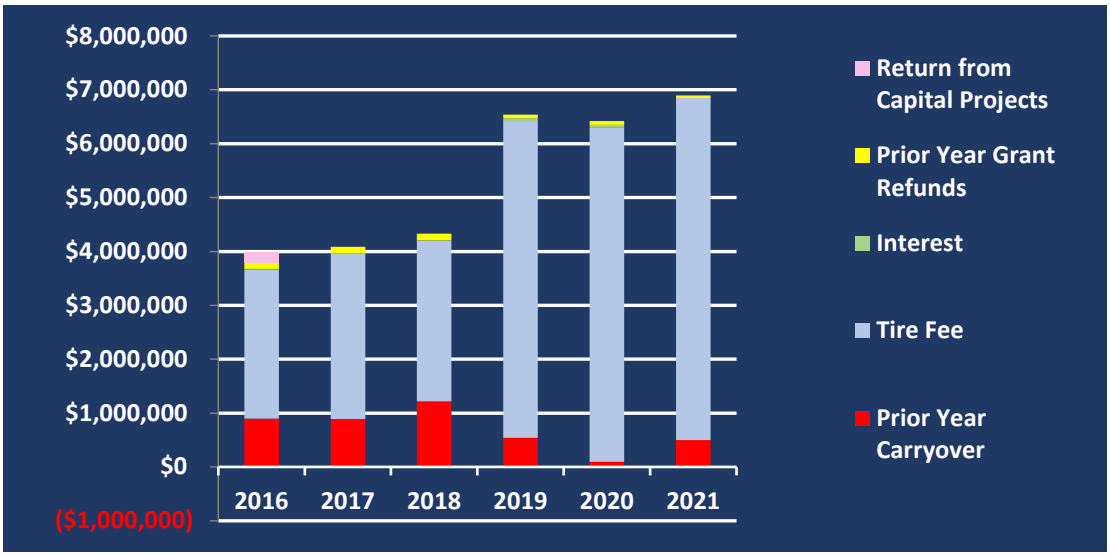

Figure 1 Waste Tire Trust Fund Revenues

EXPENDITURES

A waste tire is most commonly measured in 20-pound units or Passenger Tire Equivalents (PTEs), which is the approximate average weight of a passenger automotive tire. A light truck tire weighs approximately 30 pounds, or 1.5 PTEs, while a medium truck tire, such as a tractor trailer tire, weighs roughly 110 pounds, and is 5.5 times heavier than an automotive tire, or 5.5 PTEs. Conversion of tire units into a uniform weight basis (100 PTE = 1 ton) allows comparison of waste tire generation to markets that are tracked in tons. This average weight has historically varied from 17 to 23 pounds based on the sizes of tires used in the operating vehicle inventory. Actual data are limited, therefore 20 pounds is used in this report for mathematical uniformity.

During FY 2021, the EEC expended waste tire funds to conduct WTCEs, providing monies directly to counties for the removal of waste tires, and for remediation of tire dump sites. Collection events held by the EEC recycled 1,326,152 PTEs, costing $2,500,327.72. The EEC also spent

$143,818.09 to clean up 52,197 PTEs collected from multiple tire dump sites. Figure 2 includes this total as "Collection Events/Site Cleanups."

In addition, the EEC provided direct grants to counties totaling $404,000 that were used to recycle or dispose of 191,774 PTEs in 2021. Figure 2 includes this total as "County Tire Grants."

Kentuckians generated 51,600 tons (5.16 million PTEs) of waste tires in calendar year 2021, thus the state and counties handled 25.6 percent of the PTEs generated. The private sector handled the remaining 74.4 percent of waste tires. Figure 2 provides a five-year synopsis of expenditures for the WTTF.

A potentially substantial cost for the EEC is the cleanup of facilities after tire fires occur at sites where responsible parties are unable to remediate these sites. Tire burning results in releases of hazardous substances into the environment. Cleanup of a post-fire site is a significantly greater cost than removing the same volume of tires at a typical dump site. Regular compliance inspections of permitted waste tire accumulators can minimize the risk and magnitude of tire fires.

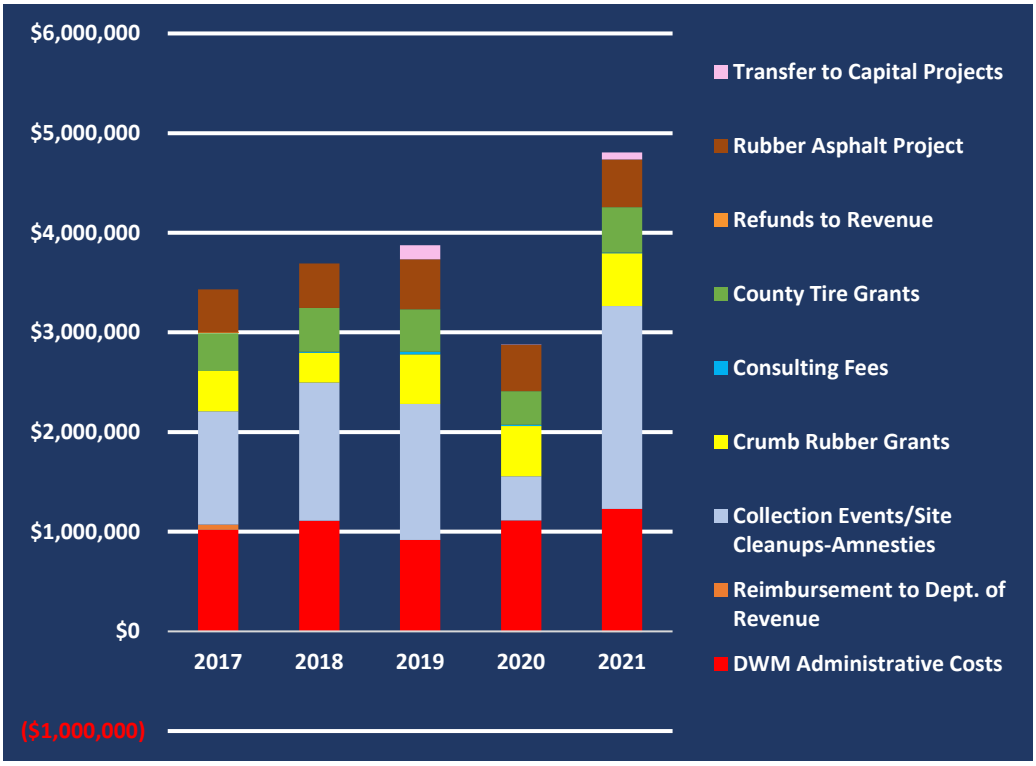

Figure 2 Waste Tire Trust Fund Expenditures

COUNTY GRANTS

WTTF receipts are used by the EEC to fund several programs, assisting in the management of waste tires. These programs include WTCEs, direct grants to counties, crumb rubber/tire-derived products (CR/TDP) grants, rubber-modified asphalt (RMA) grants, and tire dump site cleanups.

The WTCE program, formerly referred to as "tire amnesty," was established in 1998 as part of the EEC's continuing effort to clear waste tires from Kentucky's landscape. WTCEs are conducted in rotating, three-year cycles for each of Kentucky's 120 counties. Each county provides a suitable location and assists with logistics for a three day waste tire drop-off event, open to private citizens or businesses with the exception of tire dealers or automotive scrap yards. The EEC contracts for removal and delivery of recovered tires to a processor where they are recycled into products (usually tire-derived fuel or ground rubber).

Counties are also provided an annual Direct Grant to manage waste tires. This grant pays for transportation and recycling or disposal. The EEC increased the annual direct tire grant amount to counties from $3,000 to $4,000 in 2015. See Appendix A for details on the most recent cycle of Direct Tire Grants.

The CR/TDP Grant funds the purchases of tire-derived materials or products for landscaping projects, pour-in-place playgrounds, walking trails, horse trailer or stall mats, tree wells, and other products utilizing recycled Kentucky tires. See Appendix B for details on the most recent cycle of CR/TDP Grants.

RMA Grants pay for the application of RMA, requiring counties to fund the installation of an equivalent area of standard asphalt on a similar road. The performances of the standard and RMA paving are monitored and compared over a five-year period. The purpose of this grant is to encourage recycling of Kentucky tires, demonstrate the benefits of RMA, collect performance data for the different types of asphalt, and create opportunities for county governments and paving contractors to gain experience working with RMA.

In addition to the structured grants and programs above, the EEC also funds the cleanup of illegal tire dump sites in specific cases where a responsible party is either unknown or incapable of paying for cleanup.

WASTE TIRE MANAGEMENT PROGRAM

Since 1998, the RLA waste tire program has funded the removal and disposal of approximately 28.5 million PTEs at a cumulative cost of $32 million. These tires have been collected from all 120 Kentucky counties.

The EEC originally scheduled WTCEs in the spring of 2020 for the Cumberland Valley, Kentucky River and Big Sandy Area Development Districts (ADDs). Events were scheduled in the Northern

Kentucky, KIPDA and Purchase ADDs for the fall of 2020. However, the COVID pandemic caused EEC to postpone most of the spring events until the fall. After developing a specialized COVID safety protocol, all 2020 events were completed on a revised schedule in late summer and fall. These events collected a total of 1,326,152 PTEs at an overall cost of $2,500,327.72[1]. Planned WTCEs for 2022 include Lake Cumberland, Lincoln Trail, Buffalo Trace, and FIVCO ADDs.

WCTE historic charts for each ADD from the inception of the program to most recent events are included in Appendix D. All charts report a high collection total in the initial collection year. As time has progressed, the totals have trended significantly downward.

The EEC awarded $404,000 to 100 counties in 2021 Direct Tire Grants. The counties spent $242,363.36 to dispose of or recycle 191,774 PTEs. In addition, counties spent $82,298.87 of their own money toward waste tire remediation. Counties returned $206,583.54 of unspent state grant funds. This totals $526,298.87 of both state and county funding for an average cost of $1.69 per PTE.

MARKET DEVELOPMENT

The statewide recycling rate for tires was 78.4 percent for 2021 compared to 76.3 percent for 2020. This figure is slightly above the 75.8 percent national average in the U.S. for 2019[2], the latest available national data. However, national recycling rates are declining and Kentucky's 2021 rate has shown some improvement against this national trend. The commonwealth increased its recycling rate initially by working to increase the in-state tire derived fuel (TDF) market, but this market is being negatively impacted in Kentucky, and nationally, by decreased solid fuel usage in general, increased competition from low cost natural gas, international manufacturing competition, and environmental regulations unfavorable to coal and other solid fuels like TDF. In 2021, Kentucky's use of TDF actually increased by 16.2 percent in spite of the national trend due to the commitment of major users including Kosmos Cement and East Kentucky Power. The EEC has expanded and broadened its market development efforts, using grants to encourage the use of ground rubber in several major applications. While it is appropriate for the EEC to consider additional efforts to increase the reuse percentage in the future through the diversification of markets, TDF is expected to remain one of the largest end-uses of waste tires for the foreseeable future. Ground tire rubber is considered a higher-end market than TDF, because properties of the original tire are carried forward to the new product rather than use of a one-time energy value of the waste tire as TDF. Additional market development efforts for civil engineering application of tire-derived aggregate (TDA) in highway, landfill, foundation backfill, and similar projects could

[1] The pandemic resulted in cancellation of the previous spring's WCTE activities. RLA included these postponed events into this fiscal year to ensure continuity of the program. Therefore, total PTEs collected and total costs are inflated in comparison to previous years.
[2] U.S. Tire Manufacturers Association, 2019 Summary

enhance market diversification, offsetting the potential for additional future declines in TDF markets.

Figure 3 Barren County Waste Tire Collection Event
Photo by Donny Atha

TDF applications include use in boilers at paper mills, cement kilns, and utilities that use processed tires as a supplemental energy resource, displacing a small percentage of coal usage. These facilities are required to operate in full compliance with all applicable federal, state, and local environmental regulations. The largest ground rubber applications include playground safety cushioning, colored landscape mulch, and athletic fields. Rubber-modified asphalt is a smaller but growing application for ground rubber.

The EEC has conducted the following to gather information about the commonwealth's waste tire recycling markets, generation, and other data required for this report:

- Obtaining recycling market information from each major in-state processor;
- Compiling total tonnage of disposal of waste tires and processing wastes from each landfill;

- Separating tires collected in Kentucky from those collected out-of-state based on processor records and knowledge;
- Identifying and contacting out-of-state processors believed to collect tires from Kentucky and/or supplying TDF to end users in Kentucky; and
- Contacting users of the tire products to verify receipt of processed tires and landfill owners to verify disposal amounts.

Based on this analysis, a brief summary of Kentucky's major markets in 2021 compared to 2019 national markets shows:

- TDF is one of the largest Kentucky markets at 27.9 percent, below the national average of 36.8 percent in 2019.[3] Total TDF usage in Kentucky rebounded in 2021 and remained strong compared to many other regions of the country. Increased usage by East Kentucky Power Cooperative (EKPC) was attributed to improved operating and economic conditions in 2021, and is expected to remain strong in 2022. The Owensboro Municipal Utility (OMU) power boiler and New Page paper mill historically used TDF but both have been closed permanently due to competitive and economic factors. Cemex (now called Kosmos after recent sale) has continued to use TDF steadily. Large TDF users typically utilize both in- and out-of-state waste tires, so large swings in volume are not always reflected in the calculation of TDF as a percentage of the market for Kentucky generated tires;
- Kentucky's ground rubber applications became Kentucky's largest market in 2021 at 34.0 percent, significantly above the national average of 24.4 percent, for a range of applications including landscape mulch, playground cushioning, synthetic turf infill, and ground rubber;
- Kentucky's civil engineering applications used less than one percent (0.2%) compared to the national average of eight percent. This market segment offers substantial opportunity for growth, but will require technical and educational efforts;
- Limited but stable volume in reselling used tires;
- Limited exporting to other countries; and
- Landfill disposal of tires generated in Kentucky decreased slightly from 23.7 percent in 2020 to 21.6 percent in 2021 due to lower cumulative markets.

[3] U.S. Tire Manufacturers Association, 2019 Summary

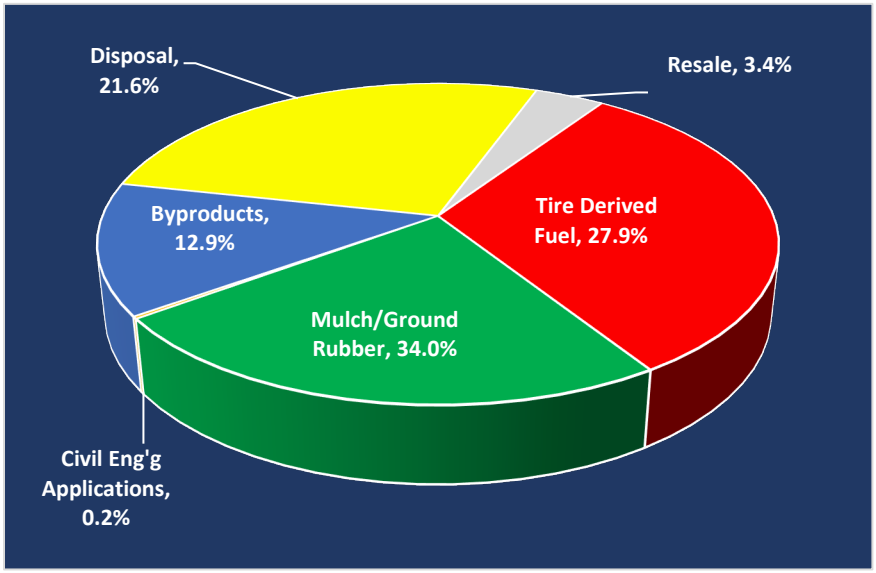

Figure 4 2021 Kentucky Waste Tire Markets

Kentucky has transitioned from no in-state markets in 2000 to a point where potentially all TDF produced in Kentucky could be consumed in constructive applications. The EEC is involved in several initiatives to encourage TDF market growth, providing both grant funding and technical assistance. There are several success stories in this field, a few mentioned below:

- In 2001, Kentucky spent $454,276 on capital equipment to assist OMU in using TDF. Although their contractual obligation expired in 2004, OMU continued to use TDF. Its consumption since 2016 has been limited by power generation equipment outages, as well as economic and other operational factors. Their boiler using TDF was permanently shut down in 2019 due to a major scheduled maintenance expense and poor economics, but the cumulative consumption of TDF to date has greatly exceeded the contractual obligation. In 2001, TDF production in Kentucky was an estimated 1.1 million tires, all shipped out of state because there were no in-state users. In 2021, TDF users in Kentucky consumed about 4.3 million PTEs, almost 2 million of which were produced from tires generated in Kentucky. Some TDF still crosses into and out of Kentucky based on regional markets and transportation logistics.
- Kosmos Cement, recently purchased by Eagle Materials, began using whole tires as TDF in 2010, and has added the use of tire chip TDF to become one of the two largest in-state users. The company uses a unique tire machine, similar to a baseball pitching machine, to toss whole tires into the center of the kiln for a more efficient burning. The reinforcing wire in the tire is incorporated into the clinker. Compliance air emission testing revealed no significant change in emissions from using waste tires and coal as opposed to only coal. In fact, nitrogen oxide emissions, a major greenhouse gas (GHG), were reduced by 37

percent when using TDF with coal.[4] By increasing the use of tire chips, in addition to whole tires, Kosmos may further increase its capacity for recovering the energy from tires, so additional growth is possible, but is dependent on competitive economics. An automated whole tire feeding system could improve economics and allow increased whole tire usage.

- Another progressive company using TDF is EKPC. The EEC submitted a letter in support of EKPC's petition to the Public Service Commission (PSC) during 2012 to use the Fuel Adjustment Clause for TDF, which was granted in 2013. Use of the provision allows for quicker recovery of TDF cost from the electrical customer and makes the use of alternative fuels more economical. EKPC has become one of the largest TDF users, potentially using up to 3 million PTEs per year to provide two to four percent of its energy requirements. The operating rates for this efficient, environmentally sound fluidized bed boiler can be impacted by low-cost natural gas boilers. EKPC has made changes to allow additional TDF usage depending on availability of the high quality TDF required in the facility.

The use of TDF helps further the use of coal as it makes the fossil fuel more environmentally friendly. According to the United States Environmental Protection Agency (EPA), GHG emissions can be reduced as a co-benefit of the use of secondary materials. Specifically, TDF combustion results in slightly lower GHG emissions per British Thermal Unit (BTU) than coal, and when considering emissions related to extraction and processing of coal, this difference becomes even more significant. Similarly, TDF combustion generates a slightly lower volume of particulate matter per BTU compared to coal.[5] Therefore, the use of TDF to reduce certain pollutants may make the long-term use of coal more viable.

Substituting TDF for coal would also help avoid an estimated 0.246 lbs./million BTUs of particulate matter associated with the extraction and processing of the coal. Multiplying the 2021 use of 43,190 tons of TDF with coal in Kentucky by these factors shows a savings of nearly 15,000 tons of carbon dioxide and 170 tons of particulate matter not emitted each year. The use of TDF to reduce certain pollutants makes the long-term use of coal more viable.

The ground rubber market has remained steady over time. Since 2004, the commonwealth has awarded 652 grants totaling close to $10 million, primarily to schools and municipalities, for projects using crumb rubber or other tire-derived products. Initially, common uses for this grant funding included crumb rubber spread on athletic fields to increase turf life and on playgrounds to reduce injuries. In October 2014, NBC News presented a story about possible health threats associated with the use of crumb rubber on athletic fields, and later presented a similar story on concerns with the use of crumb rubber mulch on playgrounds. A premise of these studies is that

[4] *Cement Kiln Burns Scrap Tires*, The Courier-Journal, November 26, 2012
[5] 76FR15494, 40 C.F.R. Part 241, EPA, Identification of Non-Hazardous Secondary Materials that Are Solid Waste, Final Rule, March 21, 2011, *Federal Register*

exposure to crumb rubber and playground mulch may result in exposure that could result in adverse health effects. In light of these concerns, and out of an abundance of caution, the EEC has not provided grant funding for loose shredded or crumb rubber on playgrounds and athletic fields as part of its grant portfolio since 2014.

Recycled Tire Crumb Rubber

In 2016 the EPA, Centers for Disease Control (CDC) / Agency for Toxic Substances and Disease Registry (ATSDR), and Consumer Product Safety Commission (CPSC) initiated the Federal Research Action Plan (FRAP) on Recycled Tire Crumb Used on Playing Fields and Playgrounds to address concerns raised by the public about the potential health risks associated with the use of crumb rubber on athletic fields. Previous, but limited studies have not shown an elevated health risk. The study consists of two parts: Part 1 - tire crumb rubber characterization, and Part 2 – exposure characterization study. On July 25, 2019, EPA released the Part 1 report with plans to release the Part 2 report at a later date. The results of Part 1 included the following: a range of chemicals were observed for both metals and organics, chemical concentrations were similar to other published studies, and both air emissions of most organic chemicals and bioacessibility of metals were low. Part 2 will include data to characterize potential human exposures to chemicals found in the tire crumb rubber material along with results from a biomonitoring study to be conducted by CDC/ATSDR. The exposure characterization portion of the study was completed in 2018. The CDC determined it needed to conduct a more robust biomonitoring study to investigate potential exposure to constituents in tire crumb rubber with field activities/data collection scheduled to begin in spring of 2020.

As the COVID-19 outbreak evolved, CDC developed recommended actions to protect people's health and for these reasons, ATSDR temporarily postponed the initiation of the Synthetic Turf Biomonitoring Study. Exposure characterization and measurement activities will resume as soon as possible. Upon completion of the biomonitoring study, the FRAP Part 2 report will be released.

The CPSC completed a playground use survey gathering information about children's behavior on playgrounds on September 5, 2019. The Playground Study by the CPSC will use data from the FRAP Report Part 1 (characterization of the chemicals and materials in tire rubber cement), released July 25, 2019 and the FRAP Report 2 (characterization of potential exposures for those who use turf fields containing tire crumb) when it is completed.

Concurrently the DWM is continuing to follow studies related to the safety of recyclable materials with a focus on tire crumb and its various potential reuse applications including athletic fields, landscaping, park/trail benches, picnic tables, and solid poured-in-place surfaces for hiking trails and playgrounds.

Figure 5 Bullitt County Illegal Tire Dump Site
Photo by Donny Atha

Manufacturing of ground rubber and mulch from Kentucky tires increased from an essentially nonexistent product in 1998 to 2.21 million PTEs in 2021. Liberty Tire Recycling, LLC, in Union County, manufactures a large quantity of colored mulch for retail outlets including Lowes, Home Depot, and Wal-Mart. Dalton Tire Recycle, in Boyd County, produces ground rubber for playgrounds and horse arenas. Porter's Tire and Auto Service, in Carter County, initiated crumb rubber and rubber mulch production in 2013.

Figure 6 Southside Park, Middlesboro Poured-in-Place Playground, Bell County
Photo by Lisa Evans

Ground tire rubber used in RMA is emerging as an important market. The EEC promotes this type of asphalt as an additional option to increase scrap tire recycling and has offered the RMA grant since 2016. This grant is applied as a reimbursement to county or urban-county government recipients for paving a segment of roadway with RMA. The recipients must match the grant by paving an equal portion of the roadway, or a similar roadway, using the same volume of traditional asphalt. The two sections are then assessed over a five year period to determine the performance of RMA compared to standard asphalt.

Since the RMA grants were initiated, the WTTF has funded 33 different road projects reimbursing $2,731,526.56 to counties for RMA paving. In 2021, $502,497.00 was paid to reimburse six grant projects, which expended approximately 3,600 tires. This grant is expected to continue in 2022, and could possibly be expanded to include additional pavement processes, contingent on sufficient funding. Appendix C includes grant recipient information. All RMA projects have passed tests in 2021 to meet existing Kentucky Transportation Cabinet (KYTC) standard specifications. These

tests, which compared RMA surfaces to conventional asphalt surfaces of similar area, included compaction density, asphalt content, voids, rutting, and performance grade (resistance to hot and cold weather under load).

Market diversity is a critical component of successful waste tire management programs. Kentucky has developed diverse product markets, producing TDF and ground rubber products, representing approximately 61.9 percent of Kentucky's waste tire generation. However, developing civil engineering markets for shredded tires could further enhance the diversity of Kentucky's markets, providing constructive applications for shredded tires that are currently landfilled. Additionally, when considering possible new areas for growth in waste tire markets, it should be noted that in 2015, Kentucky ranked third in the U.S. for car and truck production.[6] The commonwealth could consider assisting the three major Kentucky automotive manufacturers in using waste tire ground rubber in molded automotive parts to expand this important potential application.

MARKET DYNAMICS

Due to the volatile nature of the scrap tire market, it is not uncommon for tire processors to quickly accumulate more tires than they can reasonably manage during peak times, processing equipment outages, or changes in product markets. When shredded tires are improperly stored, specifically in large, deep compacted piles, the possibility of auto-ignition exists. When a large pile of whole or shredded tire material ignites, it is extremely difficult to extinguish. Permitted tire processors are required to have a bond equal to $1.00 per on-site PTE, with a minimum of $10,000. A common problem with this system is that facilities often bond for the minimum amount, then accumulate well over 10,000 tires, resulting in circumstances where their bond is inadequate to cover a required cleanup. In addition to stronger enforcement of the bonding requirement, a solution for consideration could be realized by funding remediation of tire fires to include a statutory increase in the amount of the bond required. The bond amount in KRS 224.50-862 could be increased from $1.00 per tire to $1.50 to cover cleanup costs. Similar to other states, the legislature could consider requiring an actual cost estimate for closure to determine the amount of financial assurance requirement.

A potential problem for tire processors is the maturation of national TDF markets, reflecting a general downturn in U.S. manufacturing, and reduction in coal usage. Unlike many states, Kentucky's TDF market remains robust and has ongoing potential to continue as a major use of waste tires for the commonwealth. However, use of all solid fuels, including coal and TDF, is expected to decline in the foreseeable future. Continuing efforts to further diversify markets are critical to maintaining a high rate of constructive utilizations of waste tire resources.

[6] *Auto Jobs & Economics*, Auto Alliance, www.autoalliance.org/auto-jobs-and-economics/state-facts

Figure 7 Worthington City Park, Greenup County
Photo by Lisa Evans

FUTURE OF THE FUND

The waste tire program exemplifies the EEC's mission of protecting human health and the environment by encouraging waste reduction, reuse, and recycling. The WTTF supports statewide WTCEs, remediates large tire piles, provides direct grants to counties, and promotes market development for TDF and ground rubber. If the waste tire fee is not extended, program funds will not be available to Kentucky businesses involved in tire processing, and remediation would be negatively affected.

A total of 38 states have mandated tire fees[7]. These fees are collected in different ways, but 32 of the 38 add a fee to retail tire sales. Some state fees are as low as $0.25, but most are in the $1 to $2 range. A total of five states charge a fee per vehicle registration, ranging from $1.50 to $5.00 per vehicle. Hawaii's fee is collected by an importer.

[7] https://www.tirebuyer.com/education/tire-disposal-fees-collected-by-tirebuyer

Figure 8 RMA paving project, Smith Mill Road, Hardin County
Photo by Hardin County Road Department

Over the years there have been several examples of states that discontinued their tire fee programs with negative results. Washington state and Missouri have since re-instated their tire fee to address these problems. Oregon, Wisconsin, Idaho, and Texas are examples of states that discontinued waste tire fees, and experienced problems such as increased stockpiles, decreased monitoring of processors and haulers, and decline in waste tire recycling markets leading to lower tire recycling rates.[8]

In addition to the repercussions discussed above, the following impacts could happen in Kentucky as a result, if the fee were to expire:

- Counties would not receive the $4,000 annual grant to clean up abandoned waste tires;
- Rural areas would be impacted by abandoned waste tires on farms and roadsides;
- Counties might be unable to rely on the commonwealth for tire pile remediation; and
- Market development would likely cease.

The waste tire program faces many challenges, common to similar programs throughout the country:

- It is probable that some retailers collect disposal fees and stockpile waste tires until a WTCE is conducted in their area, or otherwise mismanage their waste tires.
- Individuals have chosen to retain their waste tires to avoid additional fees charged by tire retailers for waste tire disposal, taking these tires out of the recycling stream. Some of

[8] *Waste Tire Management Program Closure-Precedents/Experience in Other States*, Terry Gray, TAG Resource Recovery, Inc, Houston, TX 2011

these tires may later be mismanaged, burdening counties with continued waste tire management issues.

It has been reported that some tire retailers charge higher tire disposal/recycling fees to discourage individuals from leaving waste tires with the retailer, compared to the average $1.50 to $2.00 fee. As an alternative, this situation could be improved by requiring the disposal price to be included separately and alongside the sale price and tire fee, or list the actual statewide average disposal rate on a notice and allow the free market to manage the situation.

Many tires collected by registered waste tire transporters are still being legally disposed of in landfills rather than being recycled. It is less capital intensive to cut or shred and landfill a tire, than to install equipment required to produce a recyclable product. Some states have corrected this problem by banning all tire material, including cut or shredded tires, from landfills except for pre-approved construction applications within landfills.

Statewide coverage by reputable tire processing facilities is essential for the free market to work. Long transportation distances translate into higher costs that keep tire recycling from being economically feasible.

Aligning the reporting schedule of the WTTF within the state budget cycle of two fiscal years, could improve the efficiency of the report. A revision to KRS 224.50-872 from annually to a two-year reporting cycle would become necessary.

KRS 224.50-868(3) authorizes the Department of Revenue (DOR) to collect the waste tire fee. The statute requires up to $50,000 per year be transferred to DOR for collection of this fee. This neither provides enough money (estimated cost of $75,000 to employ one person annually) nor incentive for DOR to enforce the collection. Awarding DOR a percentage of the total fee collected could result in higher collection rates.

In conclusion, the Energy and Environment Cabinet strongly recommends that the General Assembly extend the waste tire fee and continue the waste tire program.

CREDITS & ACKNOWLEDGEMENTS

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Deputy Secretary John Lyons

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This annual report is intended to provide a concise set of facts and measurements to support environmental decision making. We welcome your questions and comments to the contacts below:

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APPENDICES

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APPENDIX A: Fiscal Year 2021 Waste Tire Direct Grants

COUNTY	AWARD	FUNDS USED	FUNDS RETURNED	NUMBER OF PTE's
Adair Co.	$4,000.00	$5,728.14	$0	2,367
Allen Co.	$4,000.00	$11,536.25	$0	3,582
Anderson Co.	$4,000.00	$5,269.00	$0	2,373
Ballard Co.	$4,000.00	$4,084.50	$0	2,873
Barren Co.	$4,000.00	$0	$4,000.00	0
Bath Co.	$4,000.00	$6,014.00	$0	3,007
Bell Co.	$4,000.00	$936.00	$3,064.00	456
Boone Co.	$4,000.00	$0	$4,000.00	0
Bourbon Co.	N/A	N/A	N/A	N/A
Boyd Co.	$4,000.00	$6,639.00	$0	2,918
Boyle Co.	$4,000.00	$0	$4,000.00	0
Bracken Co.	$4,000.00	$4,001.38	$0	1,143
Breathitt Co.	$4,000.00	$0	$4,000.00	0
Breckinridge Co.	$4,000.00	$4,570.00	$0	1,710
Bullitt Co.	$4,000.00	$1,125.00	$2,875.00	375
Butler Co.	$4,000.00	$3,999.40	$0.60	1,161
Caldwell Co	$4,000.00	$3,915.00	$85.00	2,550
Calloway Co.	$4,000.00	$1,402.50	$2,597.50	400
Campbell Co.	$4,000.00	$8,989.00	$0	4,309
Carlisle Co.	N/A	N/A	N/A	N/A
Carroll Co.	$4,000.00	$5,157.50	$0	2,567
Carter Co.	N/A	N/A	N/A	N/A
Casey Co.	$4,000.00	$4,469.75	$0	1,847
Christian Co.	$4,000.00	$16,289.00	$0	3,953
Clark Co.	$4,000.00	$8,504.00	$0	9,458
Clay Co.	N/A	N/A	N/A	N/A
Clinton Co.	$4,000.00	$1,372.14	$2,627.86	567

COUNTY	AWARD	FUNDS USED	FUNDS RETURNED	NUMBER OF PTE's
Crittenden Co.	$4,000.00	$5,000.00	$0	1,300
Cumberland Co.	$4,000.00	$6,000.00	$0	4,200
Daviess Co.	$4,000.00	$4,667.30	$0	4,243
Edmonson Co.	$4,000.00	$0	$4,000.00	0
Elliott Co.	$4,000.00	$4,000.00	$0	1,075
Estill Co.	$4,000.00	$4,500.00	$0	800
Fayette Co.	$4,000.00	$4,000.00	$0	2,304
Fleming Co.	$4,000.00	$1,890.00	$2,110.00	540
Floyd Co.	$4,000.00	$4,009.86	$0	1,337
Franklin Co.	$4,000.00	$2,900.00	$1,100.00	700
Fulton Co.	$4,000.00	$0	$4,000.00	0
Gallatin Co.	$4,000.00	$4,986.20	$0	1,561
Garrard-Lincoln	$4,000.00	$8,060.00	$0	2,197
Grant Co.	$4,000.00	$5,281.23	$0	9,947
Graves Co.	$4,000.00	$10,500.00	$0	9,100
Grayson Co.	$4,000.00	$7,581.60	$0	3,254
Green Co.	$4,000.00	$2,180.00	$1,820.00	489
Greenup Co.	$4,000.00	$6,329.00	$0	4,756
Hancock Co.	$4,000.00	$0	$4,000.00	0
Hardin Co.	$4,000.00	$4,000.00	$0	1,346
Harlan Co.	$4,000.00	$14,150.00	$0	8,500
Harrison Co.	$4,000.00	$4,713.00	$0	2,178
Hart Co.	$4,000.00	$4,000.00	$0	1,303
Henderson Co.	$4,000.00	$4,860.00	$0	4,800
Henry Co.	N/A	N/A	N/A	N/A
Hickman Co.	$4,000.00	$1,500.00	$2,500.00	1,300
Hopkins Co.	$4,000.00	$5,898.00	$0	5,863
Jackson Co.	$4,000.00	$8,644.24	$0	3,572

COUNTY	AWARD	FUNDS USED	FUNDS RETURNED	NUMBER OF PTE's
Louisville-Jefferson Co.	N/A	N/A	N/A	N/A
Jessamine Co.	$4,000.00	$7,653.50	$0	2,031
Johnson Co.	N/A	N/A	N/A	N/A
Kenton Co.	$4,000.00	$4,775.00	$0	6,000
Knott Co.	$4,000.00	$4,023.85	$0	7,972
Knox Co.	$4,000.00	$4,073.00	$0	1,915
LaRue Co.	$4,000.00	$3,630.00	$370.00	2,200
Laurel Co.	N/A	N/A	N/A	N/A
Lawrence Co.	$4,000.00	$4,047.00	$0	1,536
Lee Co.	N/A	N/A	N/A	N/A
Leslie Co.	N/A	N/A	N/A	N/A
Letcher Co.	$4,000.00	$0	$4,000.00	0
Lewis Co.	$4,000.00	$4,618.00	$0	1,330
Livingston Co.	$4,000.00	$1,400.00	$2,600.00	1,330
Logan Co.	$4,000.00	$4,063.60	$0	1,773
Lyon Co.	$4,000.00	$4,328.70	$0	1,809
Madison Co.	$4,000.00	$4,068.00	$0	1,469
Magoffin Co.	$4,000.00	$4,200.00	$0	3,000
Marion Co.	$4,000.00	$4,317.00	$0	2,690
Marshall Co.	$4,000.00	$4,545.00	$0	2,881
Martin Co.	N/A	N/A	N/A	N/A
Mason Co.	N/A	N/A	N/A	N/A
McCracken Co.	$4,000.00	$0	$4,000.00	0
McCreary Co.	$4,000.00	$4,113.00	$0	786
McLean Co.	N/A	N/A	N/A	N/A
Meade Co.	$4,000.00	$13,161.00	$0	3,845
Menifee Co.	N/A	N/A	N/A	N/A
Mercer Co.	$4,000.00	$4,466.50	$0	2,093

COUNTY	AWARD	FUNDS USED	FUNDS RETURNED	NUMBER OF PTE's
Metcalfe Co.	$4,000.00	$2,788.00	$1212.00	572
Monroe Co.	$4,000.00	$4,302.00	$0	2,146
Montgomery Co.	N/A	N/A	N/A	N/A
Morgan Co.	$4,000.00	$2,162.50	$1837.50	857
Muhlenberg Co.	$4,000.00	$1,896.00	$2,104.00	948
Nelson Co.	$4,000.00	$22,000.00	$0	16,905
Nicholas Co.	N/A	N/A	N/A	N/A
Ohio Co.	$4,000.00	$3,995.00	$5.00	2,726
Oldham Co.	$4,000.00	$1,858.00	$2,142.00	691
Owen Co.	$4,000.00	$0	$4,000.00	0
Owsley Co.	$4,000.00	$0	$4,000.00	0
Pendleton Co.	$4,000.00	$2,350.60	$1643.40	1,766
Perry Co.	$4,000.00	$6,360.00	$0	3,025
Pike Co.	$4,000.00	$6,600.00	$0	4,400
Powell Co.	$4,000.00	$4,009.00	$0	1,546
Pulaski Co.	$4,000.00	$5,183.64	$0	2,142
Robertson Co.	$4,000.00	$4,163.00	$0	1,553
Rockcastle Co.	$4,000.00	$2,920.00	$1,080.00	1,260
Rowan Co.	$4,000.00	$5,202.00	$0	1,412
Russell Co.	$4,000.00	$2,076.36	$1,923.64	858
Scott Co.	$4,000.00	$4,085.78	$0	989
Shelby Co.	$4,000.00	$6,000.00	$0	2,237
Simpson Co.	$4,000.00	$309.00	$3,691.00	80
Spencer Co.	$4,000.00	$6,097.00	$0	458
Taylor Co.	$4,000.00	$0	$4,000.00	0
Todd Co.	$4,000.00	$0	$4,000.00	0
Trigg Co.	N/A	N/A	N/A	N/A
Trimble Co.	$4,000.00	$2,754.00	$1,246.00	705

COUNTY	AWARD	FUNDS USED	FUNDS RETURNED	NUMBER OF PTE's
Union Co.	$4,000.00	$10,150.00	$0	8,350
Warren Co.	$4,000.00	$2,108.00	$1,892.00	527
Washington Co.	$4,000.00	$4,651.30	$0	1,239
Wayne Co.	$4,000.00	$2,050.00	$1,950.00	767
Webster Co.	$4,000.00	$4,951.00	$0	5,697
Whitley Co.	N/A	N/A	N/A	N/A
Wolfe Co.	N/A	N/A	N/A	N/A
Woodford Co.	$4,000.00	$6,496.60	$0	2,630
Total	$404,000.00	$442,653.92[9]	$94,482.50	236,397

[9] Funds used exceeds grants awarded due to counties expending municipal funds in excess of grant amounts.

APPENDIX B: Calendar Year 2021 Crumb Rubber/Tire-Derived Products Grants

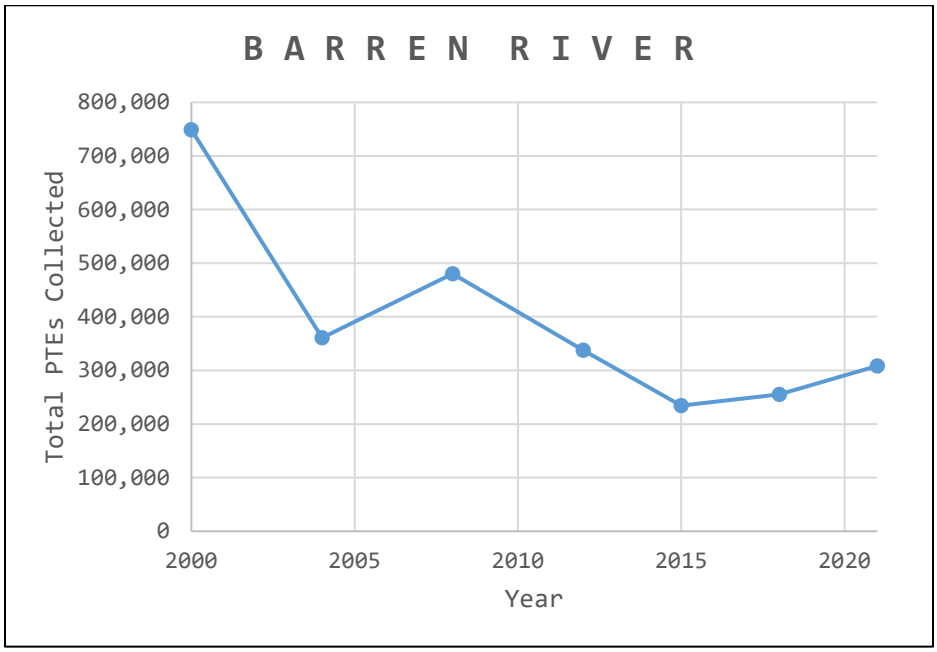
APPLICANT	PROJECT BY LOCATION	GRANT AMOUNT
Allen	Allen County Schools, Primary Center – Poured-In-Place Playground	$19,700
Barren	City of Glasgow, Weldon Park – Poured-In-Place Playground	$45,800
Bell	Bell County Tourism, Southside Park – Poured-In-Place Playground	$68,200
Campbell	City of Dayton, Sargeant Park and Jamestown Park – Park Benches	$3,430
Elliott	Elliott County Fiscal Court, Addison Field – Park Benches and Picnic Tables	$4,000
Fayette	University of Kentucky, Good Samaritan Hospital – Poured-In-Place Walkways	$13,300
Greenup	City of South Shore, City Park – Park Benches	$1,950
Greenup	City of Worthington, City Park – Park Benches and Picnic Tables	$5,650
Hardin	City of Elizabethtown, American Legion Park – Funtopia Playground – Poured-In-Place Playground	$71,860
Henderson	Henderson County Schools, 5 Elementary Schools – Poured-In-Place Playground Sections	$19,570
Henry	Henry County Board of Education, Early Childhood Center – Poured-In-Place Playground, Swing Area and Walking Path	$22,100
Laurel	City of London, Levi Jackson Wilderness Road Park – Poured-In-Place Playground	$42,800
Leslie	Leslie Board of Education, Stinnett Elementary/Middle School – Park Benches	$3,570
Lewis	Lewis County Fiscal Court, Tollesboro Lions Club Park – Poured-In-Place Playground	$70,590
Lincoln	City of Stanford, Logan's Fort Area – Picnic Tables	$4,080
Livingston	Livingston County Fiscal Court, Ledbetter Community Park – Poured-in-Place Playground	$17,000

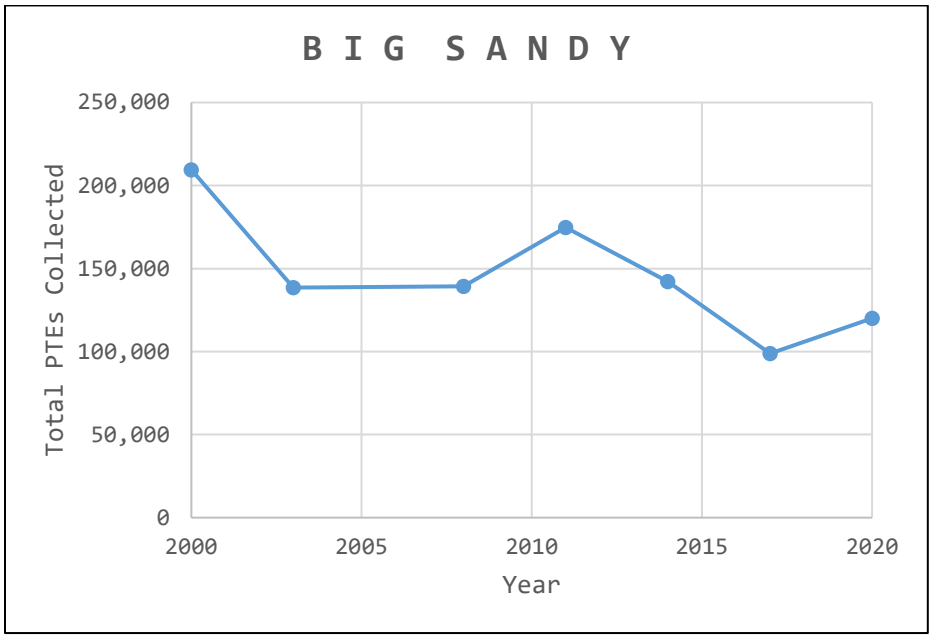
APPLICANT	PROJECT BY LOCATION	GRANT AMOUNT
McLean	McLean County Fiscal Court, County Park (Myer Creek) – Park Benches and Picnic Tables	$17,000
Pendleton	Pendleton County Education Foundation, Miracle Point Playground – Poured-In-Place Playground	$43,600
Union	Union County Fiscal Court, Moffitt Lake Recreation Area – Poured-In-Place Playground	$29,800
Total		**$529,800**

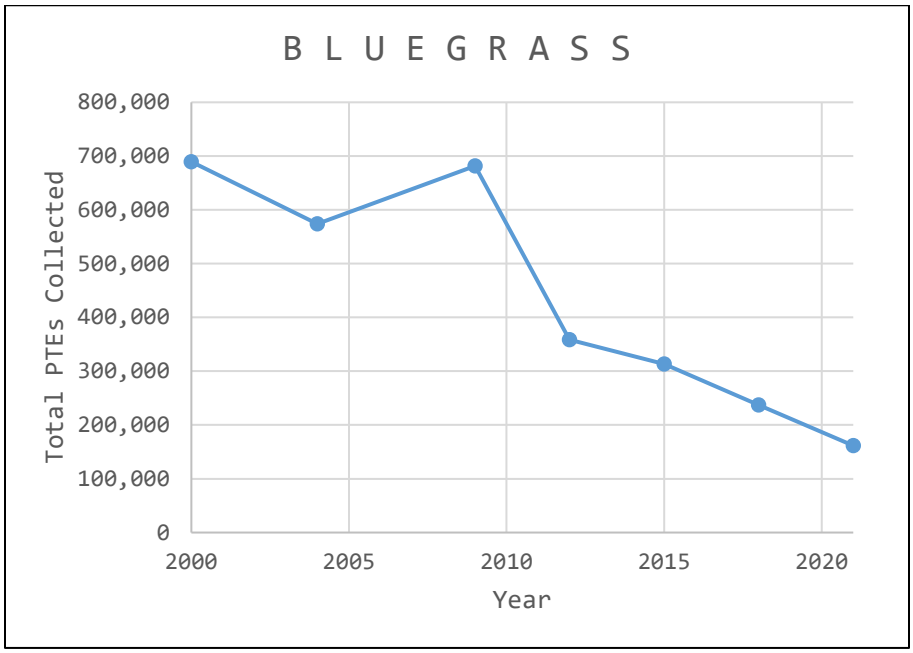
APPENDIX C: Calendar Years 2019 – 2021 Rubber Modified Asphalt Grants

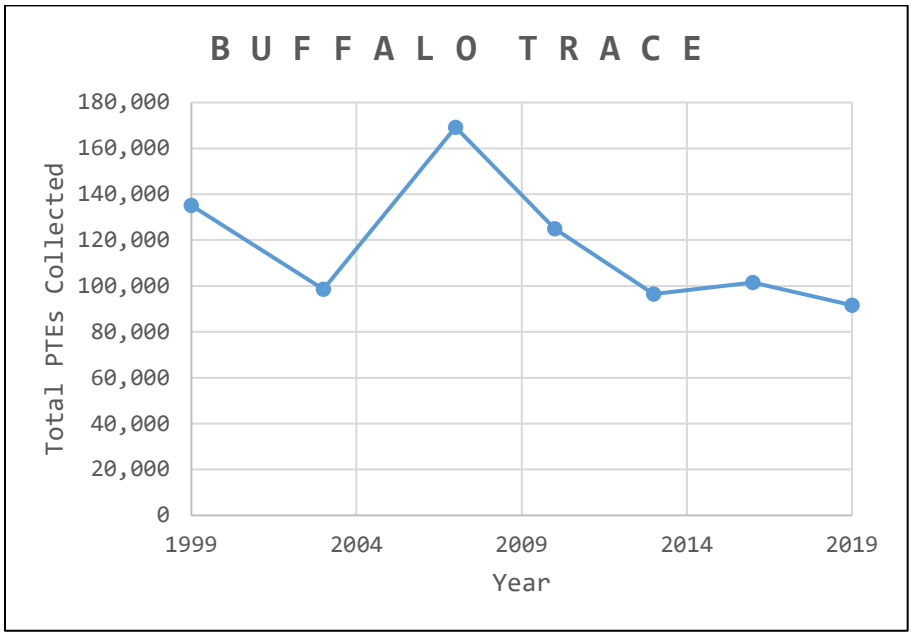
COUNTY	APPLICANT	LOCATION/ROAD	SURFACE TYPE	AWARD
CY2019 Grant Cycle				
Clark	Clark Co. Fiscal Court	Verna Hills Subdivision	Thin Overlay	$108,900.00
Fayette	LFUCG	Southland Dr.	Thin Overlay	$98,851.50
Hardin	Hardin Co. Fiscal Court	Cecilia Smith Road	Thin Overlay	$89,618.03
Hopkins	Hopkins Co. Fiscal Court	Old Morganfield Road	Thin Overlay	$102,960.00
Pulaski	Pulaski Co. Fiscal Court	Thurman Road	Thin Overlay	$101,490.00
CY2020 Grant Cycle				
Calloway	Calloway Co. Fiscal Court	Samuel 1.06/ 1.14	Chip Seal	$56,100.00
Simpson	Simpson Co. Fiscal Court	Loving Chapel / 2.24	Thin Overlay	$85,830.00
McLean	McLean Co. Fiscal Court	Troutman Hills /2mi	Thin Overlay	$85,000.00
Butler	Butler Co. Fiscal Court	Region Rd 2.5 mi	Thin Overlay	$101,430.00
Green	Green Co. Fiscal Court	Happyville Rd .5mi	Thin Overlay	$39,875.00
Hardin	Hardin Co. Fiscal Court	Thomas Rd 3.7 mi	Thin Overlay	$115,514.00
CY2021 Grant Cycle				
Allen	Allen Co. Fiscal Court	New Buck Creek Rd 1.6 mi	Thin Overlay	$115,425.00
Grayson	Grayson Co. Fiscal Court	Sulphur Wells Rd 1.0 mi	Thin Overlay	$98,947.00
Hardin	Hardin Co. Fiscal Court	Smith Mill Rd. 2.1 mi	Chip Seal	$67,500.00
Henderson	Henderson Co. Fiscal Court	Old Corydon Rd. 0.42 mi	Thin Overlay	$27,016.00
Marshall	Marshall Co. Fiscal Court	Dusty Trail 1.1 mi	Thin Overlay	$87,889.00
Muhlenberg	Muhlenberg Co. Fiscal Court	Cleaton Rd. 1.0 mi	Thin Overlay	$105,720.00

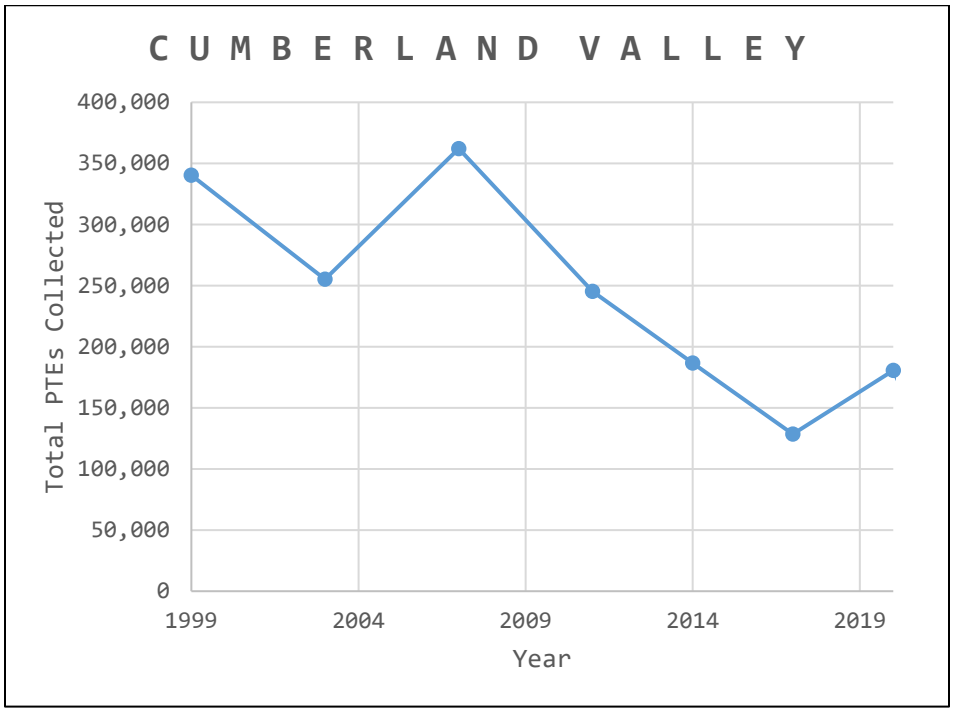
APPENDIX D: Waste Tire Collection Event Totals by Area Development District

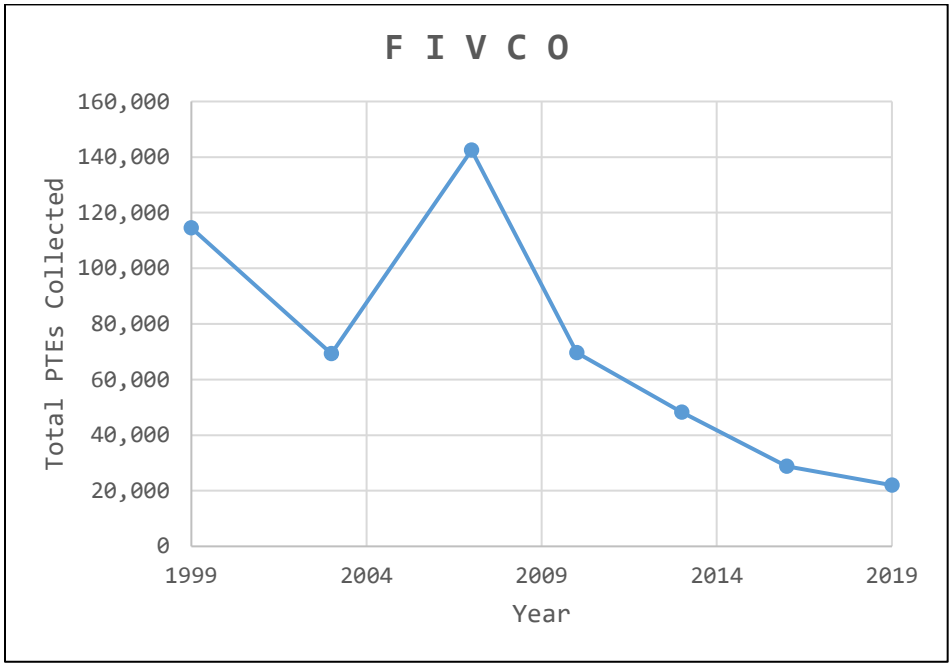


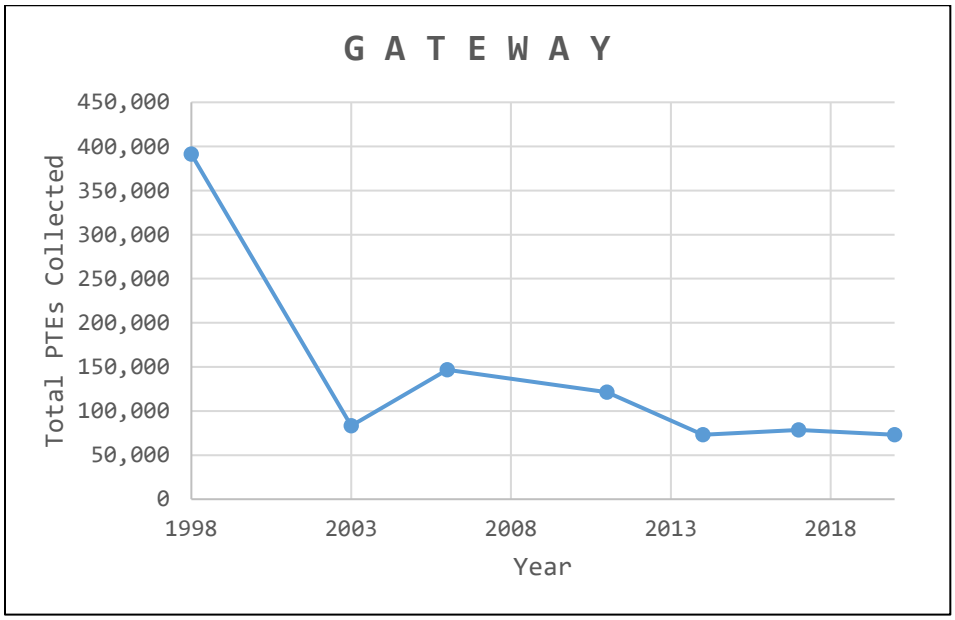


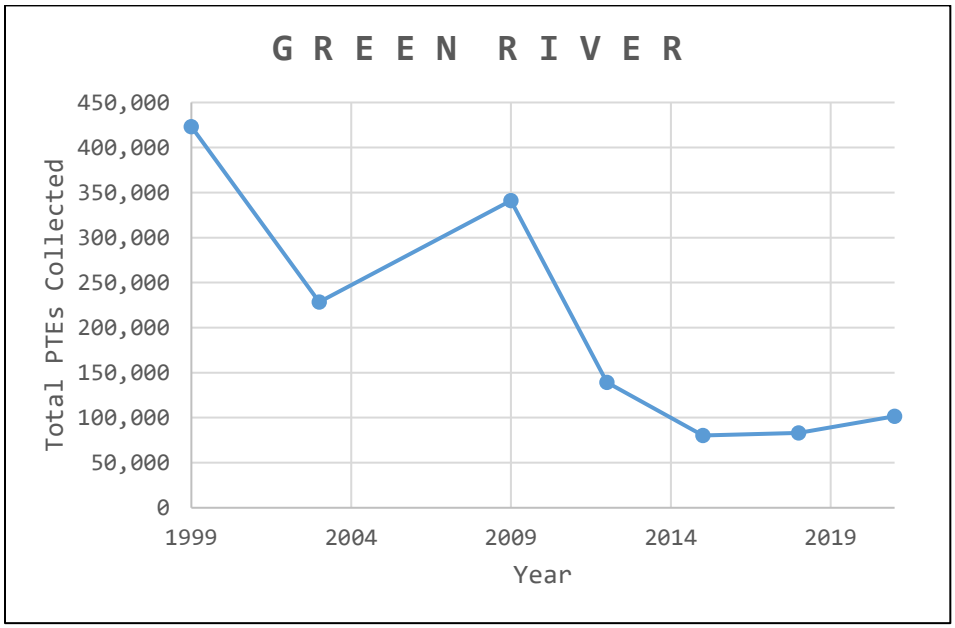

B L U E G R A S S
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Total PTEs Collected
2000
2005
2010
2015
2020
Year

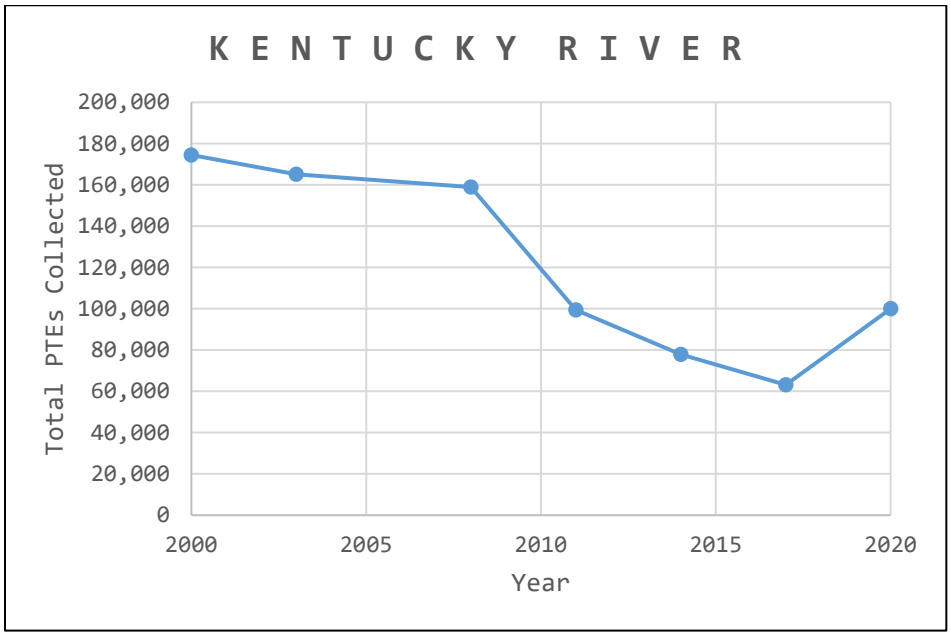

B U F F A L O T R A C E
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Total PTEs Collected
1999
2004
2009
2014
2019
Year

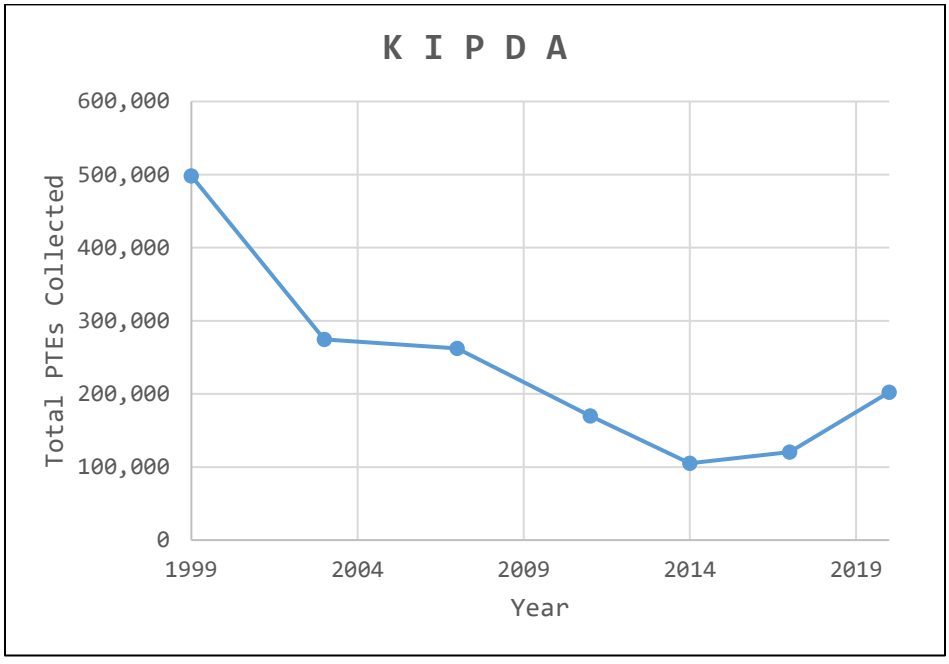

CUMBERLAND VALLEY
Total PTEs Collected
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
1999
2004
2009
2014
2019
Year


FIVCO
Total PTEs Collected
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1999
2004
2009
2014
2019
Year


GATEWAY
Total PTEs Collected
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
1998
2003
2008
2013
2018
Year


GREEN RIVER
Total PTEs Collected
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
1999
2004
2009
2014
2019
Year


KENTUCKY RIVER
Total PTEs Collected
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
2000
2005
2010
2015
2020
Year


KIPDA
Total PTEs Collected
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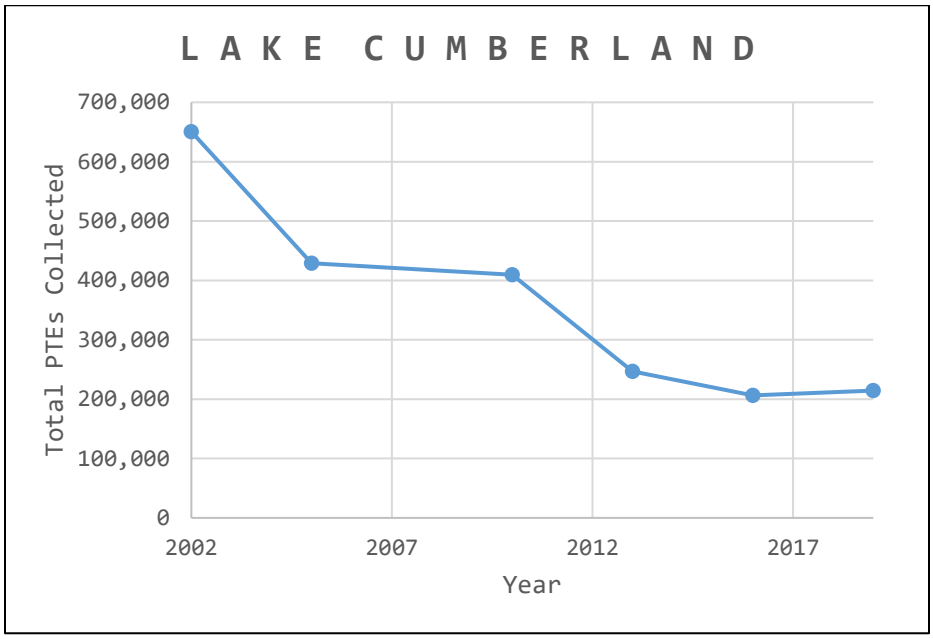
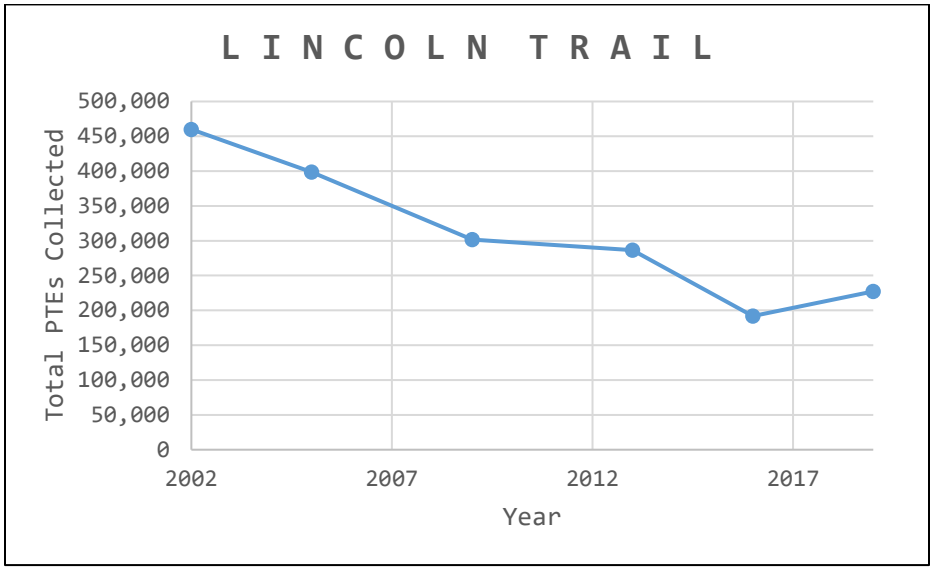
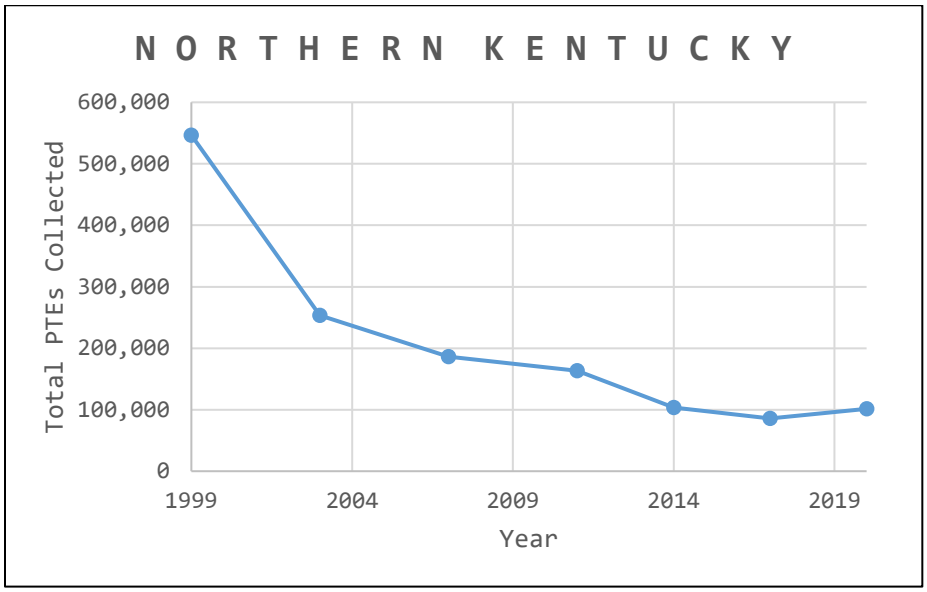
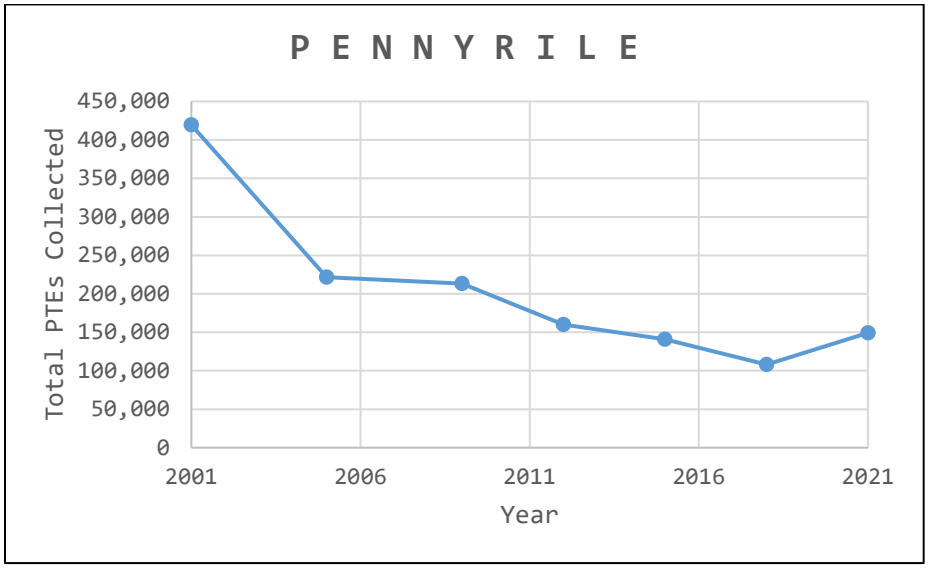
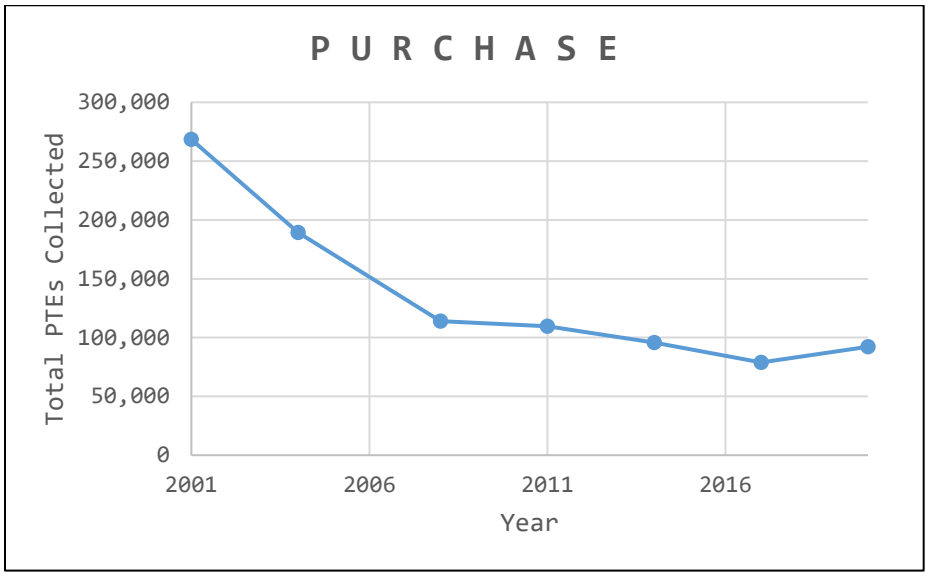
500,000
400,000
300,000
200,000
100,000
0
1999
2004
2009
2014
2019
Year


LAKE CUMBERLAND
Total PTEs Collected
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
2002
2007
2012
2017
Year


LINCOLN TRAIL
Total PTEs Collected
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2002
2007
2012
2017
Year


NORTHERN KENTUCKY
Total PTEs Collected
600,000
500,000
400,000
300,000
200,000
100,000
0
1999
2004
2009
2014
2019
Year


PENNYRILE
Total PTEs Collected
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
2001
2006
2011
2016
2021
Year


PURCHASE
Total PTEs Collected
300,000
250,000
200,000
150,000
100,000
50,000
0
2001
2006
2011
2016
Year

ACRONYMS

ADD	Area Development District
ATSDR	Agency for Toxic Substances and Disease Registry
BTU	British Thermal Unit
CDC	Centers for Disease Control
CPSC	Consumer Product Safety Commission
CR/TDP	Crumb Rubber/Tire-Derived Products
DOR	Department of Revenue
DWM	Division of Waste Management
EEC	Energy and Environment Cabinet
EKPC	East Kentucky Power Cooperative
EPA	U.S. Environmental Protection Agency
FRAP	Federal Research Action Plan
GHG	Greenhouse Gas
KYTC	Kentucky Transportation Cabinet
OMU	Owensboro Municipal Utility
PSC	Public Service Commission
PTE	Passenger Tire Equivalent
RLA	Recycling and Local Assistance
RMA	Rubber-Modified Asphalt
TDA	Tire-Derived Aggregate
TDF	Tire-Derived Fuel
WTCE	Waste Tire Collection Event
WTTF	Waste Tire Trust Fund
WTWG	Waste Tire Working Group

Kentucky Division of Waste Management
300 Sower Boulevard, Second Floor
Frankfort, KY 40601
Report an Environmental Emergency,
24 hours to Environmental Response Team
502-564-2380 or 800-928-2380