



Status of Waste Tire Recycling in Colorado

2013 Annual Report to the Transportation Legislation Review Committee

Colorado Department
of Public Health
and Environment

Submitted to the Colorado Legislature on July 1, 2014



Executive Summary

Calendar year 2013 marks the tenth year the Colorado Department of Public Health and Environment (the department) has compiled data related to the number of waste tires collected at waste tire processing, collection and storage facilities and by waste tire haulers and end users in Colorado and the status of Colorado's Waste Tire Program. Waste tire processing facilities continue to process tires into different tire-derived products that are used as tire-derived fuel, as alternative daily cover at solid waste landfills and as fencing and windbreaks, among others. Additionally, the tire salvage (or tire reuse/retread) market continues to increase, as tires are retreaded or consumers elect to buy used tires instead of new tires. This year (2014), the two largest monofills started to remove stockpiled tires for: 1) use as tire-derived fuel to power a cement kiln and 2) as a feedstock for a pyrolysis recycling process that produces diesel fuel, activated carbon, synthetic gas and steel. This will equate to the recycling of approximately 10,000 waste tires a day from these two monofills.

Additionally, the Colorado Waste Tire Program

conducted a stakeholder process to re-evaluate the current waste tire statutes. The stakeholder meetings resulted in feedback from stakeholders on the structure of the cash funds, changing the reimbursement methodology, changing the waste tire fee and removing inconsistencies in the existing statutes.

This 2013 calendar year annual report on waste tire recycling in Colorado is being transmitted to the Transportation Legislation Review Committee as required by House Bill 04-1428 and section 25-17-202.7, C.R.S. The statute requires the department to issue a report to the Transportation Legislation Review Committee on or before July 1st each year and include the total number of waste tires recycled in the state. This information is submitted to the department pursuant to the Regulations Pertaining to Solid Waste Sites and Facilities (6 CCR 1007-2, Sections 10.3.6, 10.5.7, 10.6.7 and 10.7.7).

The department gathers this information through annual reporting from waste tire processing, collection and storage facilities and waste tire haulers and end users.



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2013-2014* Waste Tire Advisory Committee Member Representatives

- James (Jim) Reid (Local Fire Authorities and Committee Chairman)
- Brian Cunningham (Tire Retailers)
- Larry Hudson (Tire Manufacturers)
- Lee Overton (Tire Haulers)
- Trent Peterson (Waste Tire Monofills)
- Joel Bolduc (Waste Tire End Users and Committee Vice-Chairman)
- Cyrus (Rusty) Hardy (Law Enforcement)
- Charles Johnson (Colorado Department of Public Health and Environment)
- Richard (Rick) Welle (Waste Tire Processors)

*The State Legislature repealed the Waste Tire Advisory Committee effective July 1, 2014

Cover Photos (left to right, top to bottom): Football field made from waste tires installed as a base layer, landscaping/playground mulch made from waste tires in use at a park, tire shreds on a conveyor entering a cement kiln to be used as an alternate fuel, tires illegally disposed of in a dry creek, foam trailer to combat waste tire fires, haystack and tire fire resulting from a controlled burn that escalated.

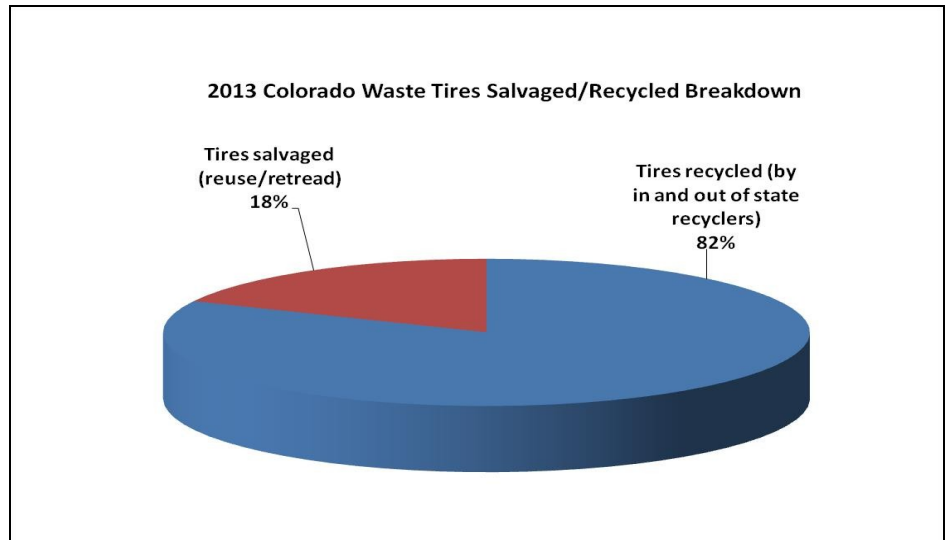
Waste Tire Update

Changes in End Use Markets

Colorado's waste tire recycling landscape is changing. In 2013, waste tire monofills and processors were preparing their operations for new recycling methods that will process greater quantities of waste tires in the coming years. These recycling methods include introducing technologies geared toward newer end use markets, causing a shift in Colorado's existing end use product market. As part of this transition, some waste tire processors have temporarily reduced or stopped producing traditional tire-derived products. Alternative daily cover (ADC) is a good example of this trend. Two of the largest ADC processors in 2012 greatly reduced or stopped producing this tire-derived product to focus on manufacturing other higher-value products. This operational change reduced the number of waste tires that could have been recycled in Colorado.

Colorado Waste Tire Generation

According to data submitted to the department by waste tire processing, end using and collection facilities; waste tire monofills; and waste tire haulers, 6,012,781 waste tires were generated in Colorado during calendar year 2013, which is 895,762 more than 2012. This is an unprecedented 17.5 percent increase over 2012 and 14 percent greater than the accepted national industry standard that predicts a rate of one waste tire/person/year. The increase was driven by an improved economy, population growth and increased collections of waste tires by



haulers. This spike affected the total number of tires that could have been recycled/salvaged in 2013.

By the Numbers

In 2013, 100 percent of the 6,012,781 waste tires generated in Colorado were salvaged or recycled (see graph above). Of that total, 18 percent were salvaged — removed from a generator's inventory for retreading or resale as a used tire — and 82 percent were recycled. Recycling facilities in Utah and Kansas processed 387,219 Colorado-generated waste tires, and 836 Colorado-generated waste tires were disposed in landfills in New Mexico and Missouri.

Meanwhile, Colorado waste tire facilities received 563,327 waste tires from neighboring states, increasing the total number of waste tires in Colorado to 6,576,108. The net result was that 100% of the Colorado generated waste tires were recycled or salvaged, while 92 percent of the total number of waste tires generated

(Colorado generated waste tire plus waste tires received from neighboring states) were recycled or salvaged. Therefore, we are doing a good job of recycling/salvaging our own waste tires, but need to improve the recycling/salvaging rate to include waste tires shipped to Colorado from neighboring states. A normal waste tire generation rate (one waste tire/person/year) plus out-of-state tires would have translated into a recycle/salvage rate of 103 percent which was consistent with the 2012 rate.

Figure 1 (Page 6) provides an annual comparison of Colorado's waste tire recycling and salvaging rates of Colorado and out-of-state waste tires for the last seven years. The waste tire recycling and salvaging rates remained relatively consistent each year until 2009 when the recycling/salvaging rate moved up sharply to levels above 90 percent. In 2012, waste tire recyclers and salvagers were able to recycle or salvage all of the waste tires generated in Colorado and in

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Waste Tire Update

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surrounding states. 2013 saw a decline in the total recycle/salvage rate compared to 2012 due not only to the unprecedented increase of waste tires generated in 2013, but also due to the following: 1) More waste tires from surrounding states came into Colorado registered and permitted facilities for storage, processing and reuse, as an additional 130,394 waste tires, or 23 percent more, came into the state in 2013 than in 2012 and 2) Two of the largest processors of alternative daily cover in 2012 greatly reduced or stopped producing this tire-derived product in order to focus on the manufacturing of other higher-value products. This includes one of the larger monofills that stopped shredding waste tires for use as ADC in 2013 so the monofill could prepare for the introduction of an alternative method that will recycle greater quantities of waste tires. So, while this monofill prepared for its own use of the waste tires they stopped recycling waste tires for external customers. Compared to 2012, the reduction of ADC production by all processors in 2013 resulted in 1.1 million waste tires that were not processed into ADC. The two largest processors of ADC in 2012 accounted for 800,000 waste tires that were not processed into ADC. If the ADC rate remained unchanged from 2012 (2,005,043 waste tires processed into ADC), an estimated 7.1 million tires would have been recycled/salvaged.

ADC production has been replaced with processors that will recycle greater quantities of waste tires in the upcoming years with a

'In 2013, waste tire monofills and processors were preparing their operations for new recycling methods that will process greater quantities of waste tires in the coming years.'

portion of these tires going to technologies that are geared toward newer end use markets. It is projected that this will increase the recycle/salvage rate by 28 percent in 2014 (assuming a normal waste tire generation rate). This upward recycling trend is expected to continue for the upcoming years with more waste tires going to end use markets.

Figure 2 (Page 6) captures the top 10 direct use and end use markets for waste tires in calendar year 2013. Of the 10 direct/end use markets identified, the top five were 1). tire-derived fuel by cement kilns; 2). resale of salvage tires for reuse or retreading; 3). tire shreds as alternative daily cover at solid waste landfills; 4). tire bales as fencing and windbreaks; 5). waste tires processed into crumb rubber for use in roadways and molded products.

Figure 3 (Page 7) reflects the number of waste tires recycled and salvaged versus the generation rate in Colorado. Since 2011, the amount of waste tires recycled or salvaged has outpaced the generation rate. This remained true until 2013 where the recycle/salvage versus tires generated in Colorado rate

was equal. As explained previously, three factors contributed to the total recycle/salvage rate. However, this is temporary as the two largest monofills recently begun processing and consuming stockpiled tires.

Figure 4 (Page 7) represents the number of waste tires added to waste storage inventories since 2007. In 2012, no additional waste tires entered waste tire storage inventories due to the removal of waste tires from one monofill and temporary storage at processing and collection facilities. In 2013, there was an increase of storage inventories by 201,740 waste tires, with the majority of these tires going into monofills.

Waste Tire End Use Outlook

2013 was a transition year as waste tire monofills and processors were in the planning and development stages to begin operations to process waste tires in a greater number and use technologies that will diversify end use markets. This transition was reflected in 2013's total recycle/salvage rate, but these numbers are expected to rebound in 2014 as these waste tire processors have begun operation and tire-derived product is going to an end use market. The increase in the recycling rate means that processors should have the capacity to recycle all of the tires generated in Colorado and from surrounding states and begin removing waste tires from storage inventories.

Waste Tire Grants

Waste Tire Cleanup Fund

The Waste Tire Cleanup Fund provides funding for the cleanup of illegal or abandoned waste tire sites and offers incentives to use waste tires in public projects. Funds are split two-thirds for cleanup and one-third for incentives.

Counties and municipalities may apply for funding year round. The department works with counties and municipalities to ensure the waste tire site fits the definition of “illegal” or “abandoned.”

Six waste tire cleanups in three counties and one municipality were completed in 2013. The total cost was \$141,995 with a total of 77,281 illegal or abandoned waste tires removed (see chart below). Cleanup project costs can vary among sites depending on where the cleanup site is located, the site’s topography and if tires are above ground or buried.

Grantee Name	Funds Spent for Cleanup	Tires Removed
Saguache County	\$63,750	27,786
City of Commerce City	\$1,490	741
Fremont County (3 sites)	\$2,025	1,055
El Paso County	\$74,730	47,669
Total:	\$141,995	77,281

Processor & End User Fund

Funds for the beneficial use of waste tires are available to both processors and end users. Monthly reimbursements are based on approved tons and available funding. Processors are eligible for reimbursements when the processed waste tires are made into a tire-derived product and the processor has end used the tire-derived product themselves or the tire-derived product has been sold for an end use and moved off-site. An end user is defined as a person who uses a tire-derived product for a commercial or industrial purpose.

For 2013, \$5,011,322 was reimbursed for an estimated 3.3 million processed approved tires an estimated 3.9 million end used approved tires.

Recycling Incentives

The Waste Tire Cleanup Fund also incentivizes the use of Colorado waste tires in public projects to promote tire-derived products around the state. Projects include playground surfacing, athletic fields and infill for existing recycled turf surfaces.

During 2013, thirteen recycling incentive grants were completed. The total amount awarded was \$505,918 using 84,230 waste tires (see chart below).

Organization	Funds Spent on Project	Tires Used (approx.)
Douglas County School District	\$50,000	15,644
Moffat Consolidated School District	\$45,000	6,267
Weld County Re-9 School District	\$34,378	6,748
Miami Yoder School District JT-60	\$50,000	5,333
Durango School District 9-R (Project 1)	\$15,600	2,002
Durango School District 9-R (Project 2)	\$39,400	4,587
Lewis Palmer School District #38	\$5,670	600
Thompson R2J School District	\$50,000	10,227
Salida School District	\$50,000	5,333
Academy School District 20	\$48,450	6,836
Town of Severance	\$46,420	7,363
City of Burlington	\$50,000	9,867
Total:	\$505,918	84,230

By the Numbers: Overview of Waste Tire Activity



Figure 1

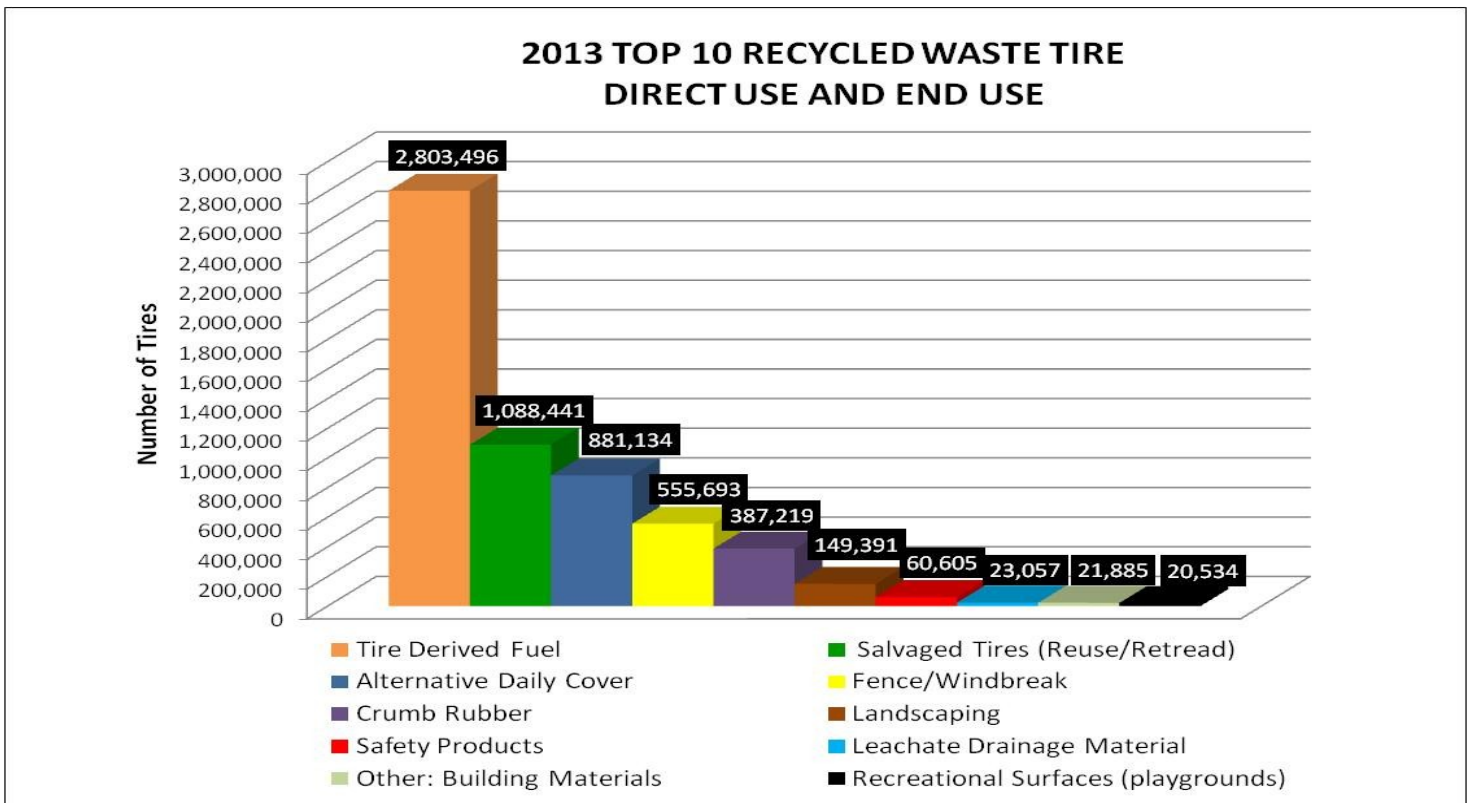


Figure 2

By the Numbers: Overview of Waste Tire Activity

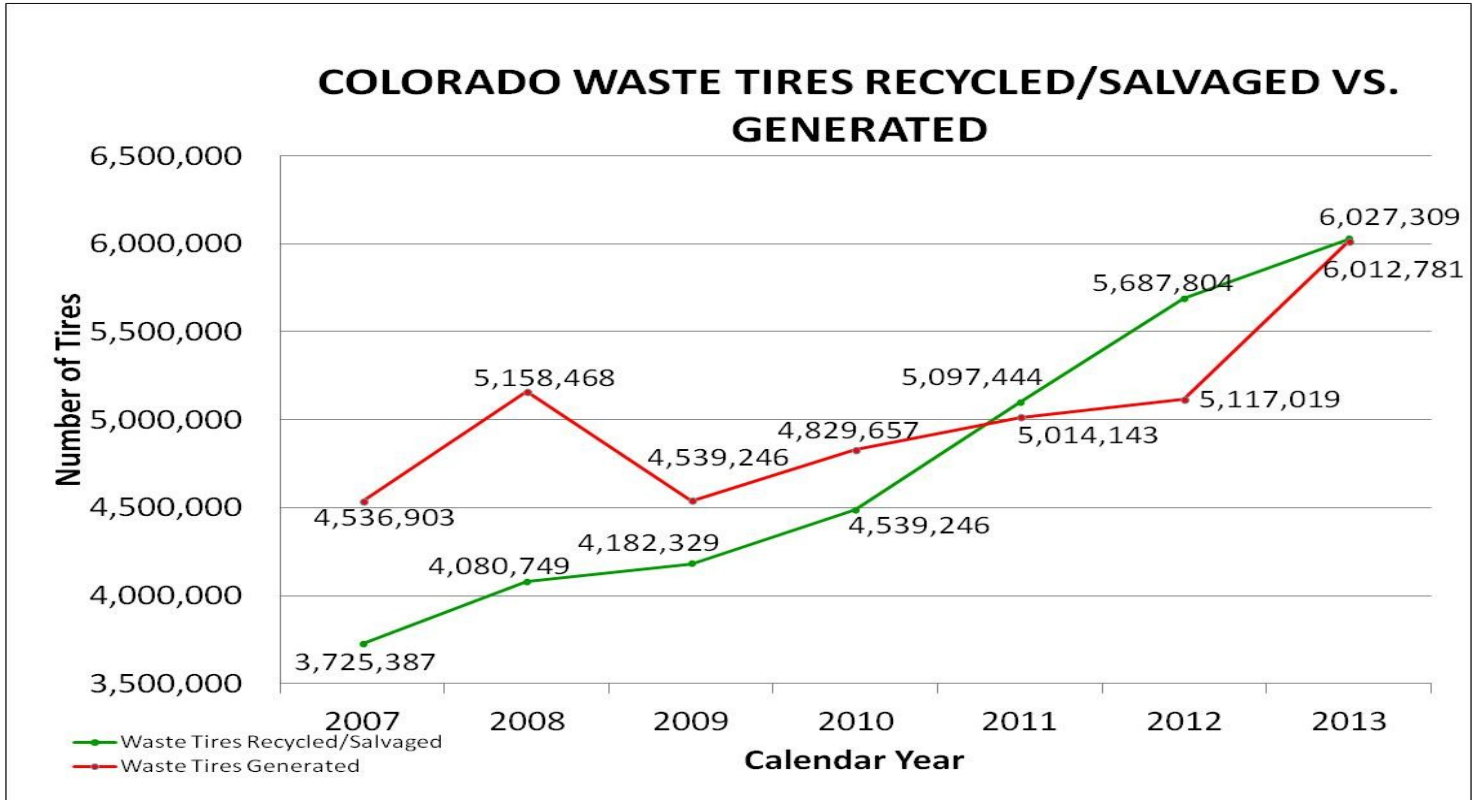


Figure 3

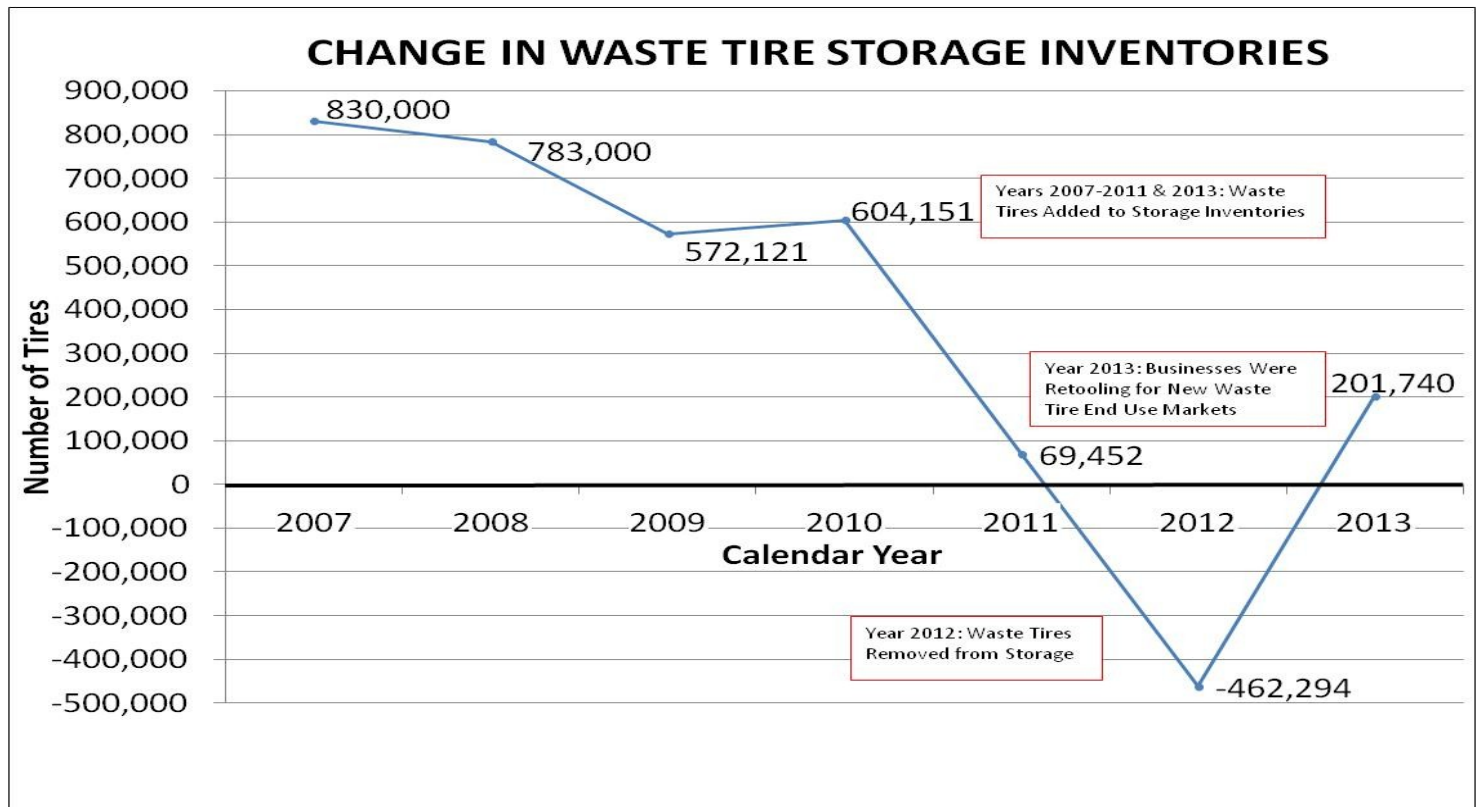


Figure 4

Waste Tire Grants

Waste Tire Fire Prevention & Law Enforcement Grant Funds

The Waste Tire Fire Prevention Fund (Tire Fire Fund) assists fire departments, fire districts and other first responder fire entities with the purchase of equipment and supplies used to extinguish waste tire fires in Colorado. The Tire Fire Fund provides funding to purchase equipment and supplies for the prevention, preparation, response to and/or handling of waste tire fires. County, municipal, state, federal, special government agency and volunteer fire departments, fire districts and first responder fire entities can apply for funding.

During 2013, nine grants were awarded to fire agencies to purchase waste tire fire equipment. The total amount awarded was \$335,800 (see chart below).

The Law Enforcement Grant Fund is available to the Colorado State Patrol, county sheriffs, police and fire departments and local health departments to assist with funding for waste tire activities. A pilot project was created to have a local health agency conduct waste tire facility inspections on behalf of the department. The project started in 2014 with funds being awarded to the Pueblo City & County Health Department. If successful the department

Grantee Name	Funds Spent on Equipment	Equipment Purchased
Colorado Springs Fire Department	\$18,635	Air monitoring meters and foam nozzles and educator
Florence Fire Department	\$47,384	Self-contained breathing apparatus and tanks
City of Grand Junction Fire Department	\$5,653	Fire suppression foam and nozzles
Greeley Office of Emergency Management*	\$47,058	Air monitor
Hanover Fire Department	\$55,047	Fire support trailer, fill station, water tanks and fire suppression foam
Julesburg Fire Protection District	\$52,119	SCBA, compressed air foam system, thermal imaging camera
Lamar Fire and Ambulance	\$2,750	Fire nozzles
Lefthand Fire Prevention District	\$17,154	Foam generator, fire suppression foam and nozzles
West Douglas County Fire Protection District	\$90,000	Foam trailer, fire suppression foam, hose and nozzles
Total:	\$335,800	

Market Development Fund

The Market Development Fund assists in developing markets for tire-derived products from waste tires.

The department awarded \$195,358 in 2012 to Tetra Tech Inc. (Tetra Tech) to create the Colorado Waste Tire Market Development Plan. Upon request of the department and the Waste Tire Advisory Committee, the plan has specific recommendations to meet the goal of recycling 100 percent of all newly generated waste tires and to reduce and eventually eliminate waste tires currently being stockpiled. The plan is a roadmap for the department and the Waste Tire Advisory Committee to move the waste tire program forward with meeting these goals. The Waste Tire Market Development Plan is available on the department's website: <http://www.colorado.gov/cdphe/wastetires>.

Tetra Tech was awarded \$207,000 in 2013 to assist the department and the Waste Tire Advisory Committee to implement many of the recommendations in the market development plan. Some of Tetra Tech's initiatives include holding a waste tire market development conference, providing technical trainings on the use of tire-derived products in highway projects and at landfills, providing technical assistance to both current and potential end users of tire-derived products, and assisting the department with the development of statutory and regulatory changes for the Waste Tire Program.

*Initially awarded funds in 2012, but was unable to purchase in equipment in 2012. Was re-awarded the requested funds in 2013.

Waste Tire Legislation

Waste tire legislation has been considered and passed during legislation sessions dating back to 2005. In 2010, House Bill 10-1018 created a new law that expanded the waste tire program by creating a “cradle-to-grave” or “cradle-to-cradle” regulatory approach for waste tires in Colorado. This tire bill specified new requirements for waste tire haulers and waste tire facilities and provided funding for various grants funds to encourage the recycling or reuse of waste tires, decrease the number of waste tires stored in Colorado and increase and diversify markets.

The department initiated a stakeholder process in July 2013 to re-evaluate the current waste tire statutes. The goal of the stakeholder process was to formulate revised waste tire statutes that change the structure of the cash funds, change reimbursement methodology, evaluate the waste tire fee on new tires sold, and remove inconsistencies in the existing waste tire statutes. Recommendations from Joint Budget Committee (JBC) staff and the Waste Tire Market Development Plan were also included as part of the re-evaluation of the waste tire statute.

The department held seven (7) waste tire stakeholder meetings that occurred from July 2013—January 2014. Stakeholders from all sectors of the tire and waste tire universe (manufacturers, retailers, waste tire haulers, processors, end users, collection facilities and monofills) were represented as well as representatives from the state legislature, JBC staff, Attorney



General’s Office, Colorado Department of Revenue, Colorado Department of Transportation, Colorado Department of Public Safety, county governments, agricultural organizations and political advocacy groups. Stakeholders discussed the current statutes and provided comments and input related to waste tire definitions, the waste tire fee, the needs and benefits

of each grant fund and the allocation percentage of funds for each grant and changes to waste tire hauler and waste tire facility requirements. Stakeholder input resulted in the development of a draft statute to be considered during the 2014 legislative session and signed into law June 6, 2014.

Trends and Accomplishments

Calendar 2013 was another busy year for the Waste Tire Program. Due to reallocation of waste tire grant funds, on July 1, 2013, the waste tire grant administrator position moved from the Division of Environmental Health and Sustainability to the Hazardous Materials and Waste Management Division. This movement allowed all waste tire activities to be housed under one Division. There were a number of highlights and accomplishments in 2013.

Beneficial Use of Waste Tires

In November 2012, the department initiated a stakeholder workgroup to focus on the beneficial use of waste tires related to agricultural activities. This stakeholder group developed a Solid Waste Compliance Bulletin in 2013 that explains the requirements for the agricultural beneficial use of waste tires including acceptance and shipment of waste tires, storage and storage limits, etc. Additionally, best management practices were developed using the new solid waste beneficial use process.

A person cannot beneficially use waste tires until the department has made a beneficial use determination. The Solid Waste Regulations provide guidance on activities that have been pre-determined by the department to constitute beneficial uses. This list of 26 pre-approved beneficial uses of whole waste tires on agriculture land was made possible by agricultural stakeholders who offered “on-the-ground” beneficial use feedback during the stakeholder process.

The stakeholder group met six times in locations such as Denver, Greeley and Fort Morgan. Stakeholders included representatives from the Colorado Livestock Association, Colorado Cattlemen’s Association, Colorado Farm Bureau, Waste Tire Advisory Committee, waste tire haulers, waste tire processors, waste tire end users and local governments.

Outreach and Publications

Waste Tire Program staff engaged in various efforts to inform the waste tire community of the regulations and the Waste Tire Program, including conducting compliance assistance outreach visits and inspections at waste tire facilities and waste tire hauler facilities. Waste tire outreach efforts also included staff presenting at the 2013 Colorado Environmental Health Education Conference and at 2013 Solid Waste Outreach meetings in Glenwood Springs, Pueblo and Durango.



Tire drag or tire harrow. Example of a pre-approved beneficial use of whole waste tires for agricultural purposes.

A waste tire fires infographic was developed to inform the community about tire fires. The infographic (back cover of this report) illustrates the issues with tire fires, tire fire prevention and fire control safety measures. The infographic was distributed to local fire agencies and municipal and county organizations, the Colorado Environmental Health Association, the State of Colorado Environmental Crimes Task Force and the Colorado Association of Code Enforcement Officers and the Institute of Scrap Recycling Industries. The infographic and related article on waste tire fires was also featured in the October 2013 issue of the Scrap Tire News.

Registration

In 2013, the department issued 243 new or updated waste tire certificate of registrations to registrants. The department had a waste tire hauler renewal rate of 100 percent for the renewal cycle and issued new waste tire hauler vehicle registration decals. Additionally, the department worked on developing an online renewal form for use for the 2014 waste tire hauler and waste tire facility renewal period. 2013 registration numbers were (through December 31, 2013):

- Waste tire generators (tire retailer, wholesaler or fleet service facility): 1,730
- Waste tire haulers: 88
- Waste tire end users: 35
- Waste tire collection facilities: 24
- Waste tire processors: 22
- Waste tire monofills: 3

Trends and Accomplishments

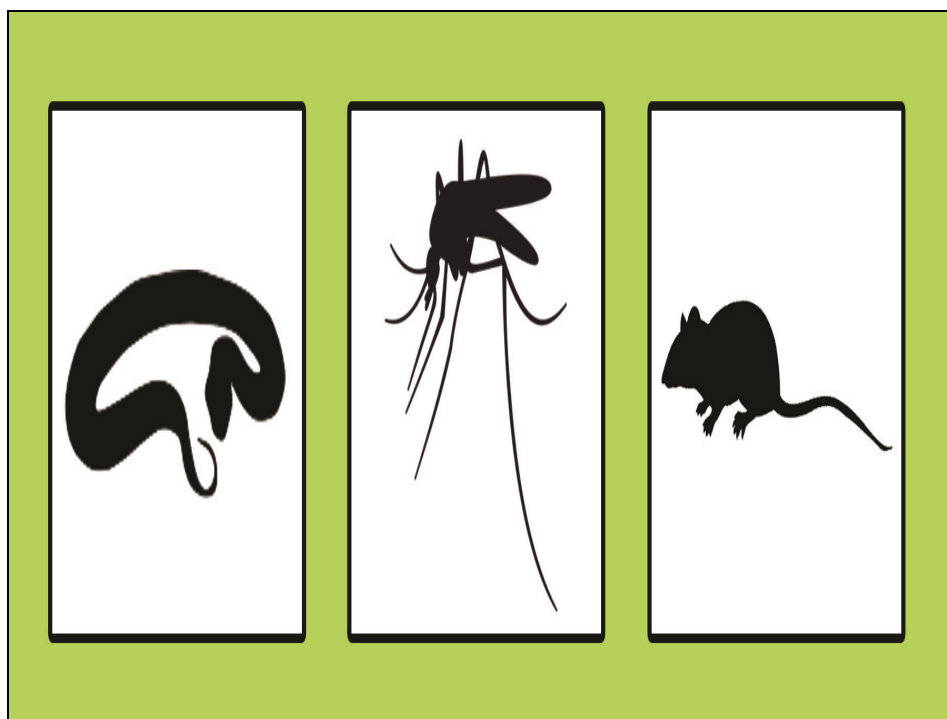
Inspection and Enforcement

One of the common requests that the Solid Waste & Materials Management Program's Waste Tire Program (WTP) receives from waste tire stakeholders is for the waste tire statutory and regulatory requirements to be enforced uniformly so that a "level playing field" is created in Colorado. Over the last year, the WTP has explored several different ways to increase its enforcement efficiency to assist with this effort.

Initially, the enforcement focus of the WTP was at the point of transportation or on illegal transporters and haulers of waste tires. The decision to place enforcement resources on "mobile" transporters was based on the receipt of calls by the WTP from registered tire facilities and haulers who were aware of or had witnessed illegal hauling activities taking place in the field. To date, the WTP has had very little success curbing illegal waste tire hauling by focusing on the point of transportation.

Prompted by discussions with waste tire stakeholders during the "Regulatory Roundtable" portion of Waste Tire Advisory Committee meetings, the WTP decided to shift its enforcement focus to the point of waste tire generation. This new enforcement focus at the point of waste tire generation effectively replaced targeting haulers of waste tires.

The WTP continued to conduct field inspections and provide customer assistance visits when needed. To increase productivity, the WTP began using standardized inspection forms, or



Improperly managed or illegally disposed tires provide shelter and a breeding ground for snakes, rodents and mosquitoes, which present a risk to public health.

inspection checklists. These checklists are specific to the type of waste tire facility or waste tire hauler. The checklist can be completed in the field and in many cases, it replaces the detailed, time-consuming, multi-page inspection reports.

Additionally, to further assist with the redirection of its enforcement focus, the WTP recently initiated its first contract with a local health department through the utilization of the Waste Tire Law Enforcement Grant Fund. The local health department will serve as an extension of the department by conducting waste tire inspections and follow up as well as routine waste tire outreach and education. The department will

monitor the effectiveness of this contract and may seek to put in place additional contracts in strategic parts of the state to help with the establishment of a "level playing field".

ADDITIONAL INFORMATION

This report and additional information not reported here are available on the Colorado Department of Public Health and Environment website. For more information, please visit: www.colorado.gov/cdphe/wastetires

Waste Tire Fires

WASTE TIRE FIRES

Tire fires are very hot and can be very destructive. They can last for months, sometimes years, polluting the air, soil and water.

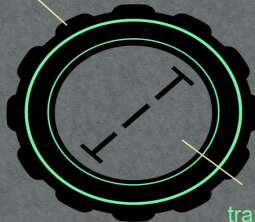


Colorado Department of Public Health and Environment

Issues



WATER REPELLENT
water and foam do not extinguish a tire fire



HOLLOW
traps oxygen and protects flames

during combustion chemicals in tires can be released into soil and ground water

natural and synthetic rubber, sulfur, sulfur compounds, phenolic resin, oil, petroleum waxes, rayon fabric, nylon fabric, polyester wire, clay, carbon black, inert material, fatty acids, zinc oxide and titanium dioxide

★ Alaska and Vermont are the only two states lacking waste tire legislation. (U.S. EPA)

Prevention

Leading Causes of Tire Fires



include lightning, arson, smoking or welding near piles, and brush fires

ENFORCEMENT MECHANISMS



Unified Enforcement

Form an environmental crimes task force with people such as hazardous materials investigators, building officials, fire officials, law enforcement and elected officials who work together to monitor tire pile sizes or to identify potential fire threats.

SOURCES:

1. Rings of Fire Revisited, State of California Office of the State Fire Marshal
2. www.colorado.gov/cdphe/wastetires

Safety

- 1983 Winchester, VA
9,000,000 tires burned
- 1986 Somerset, WI
9,000,000 tires burned
- 1987 Hudson, CO
3,000,000 tires burned
- 1990 Hagersville, Ontario
12,000,000 tires burned
- 1998 Tracy, CA
8,000,000 tires burned



COMMUNICATION
equipment and tactics



WATER SUPPLY
enough available



PROPER EQUIPMENT
extinguishers, tools, etc.



Tire fires can release toxic chemicals into the air, soil and water tables. Because of this, first responders should handle the fire as a HAZMAT incident: save lives and casualties, protect the environment, limit damage to property and restore area to normal as soon as possible.

Personal Protective Gear



Standard PPE includes: helmet, turnout coat and pants, Nomex helmet, *latex gloves, firefighting gloves, boots, self-contained breathing apparatus (SCBA) and *Tyvex suits.

*to protect against the absorption of chemicals through clothing

This infographic on waste tire fires was developed by CDPHE staff and appeared in the October 2013 Scrap Tire News and was provided to local and national fire, solid waste and environmental health organizations