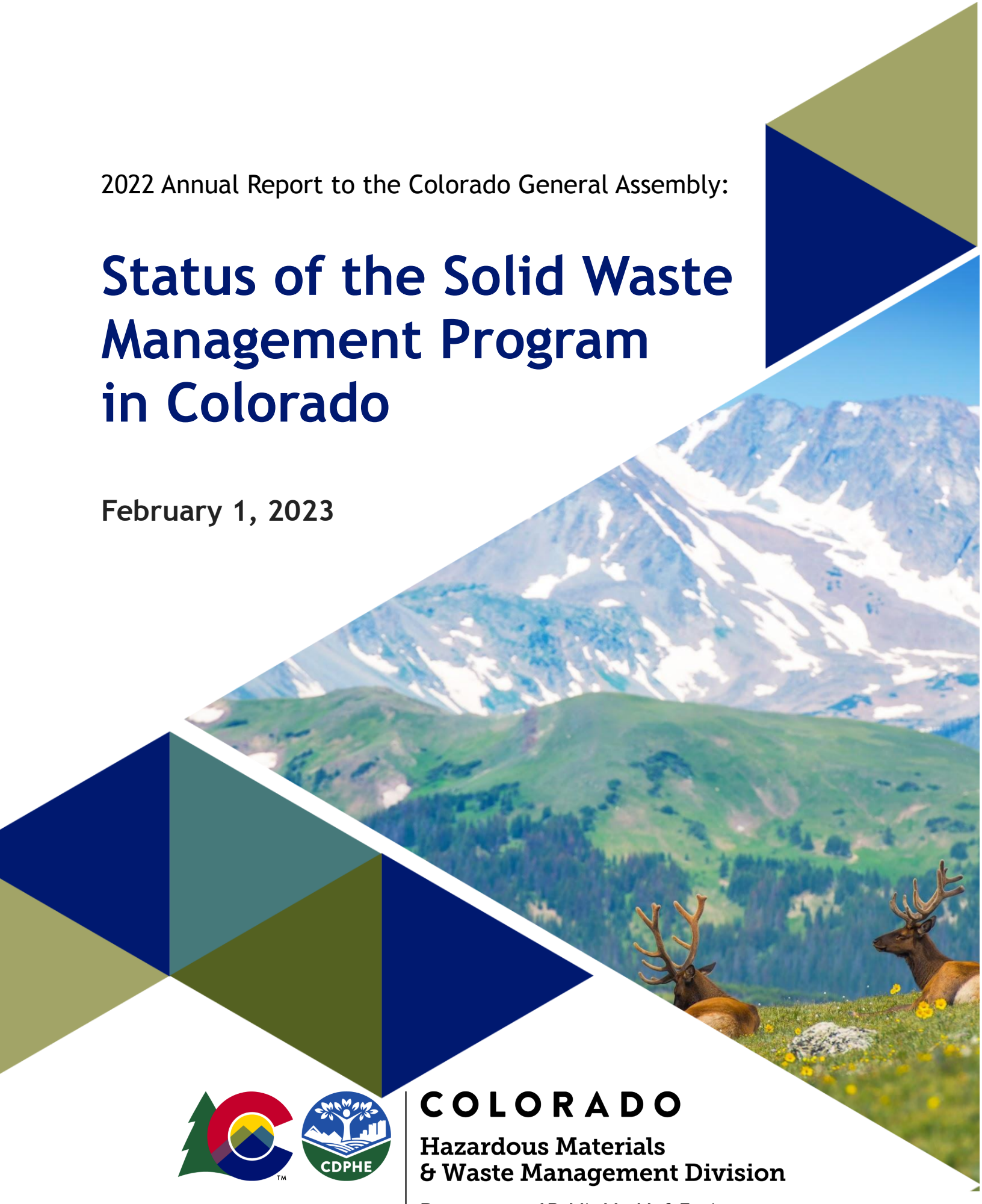
2022 Annual Report to the Colorado General Assembly:

Status of the Solid Waste Management Program in Colorado

February 1, 2023



COLORADO

Hazardous Materials
& Waste Management Division

Department of Public Health & Environment

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2022 Annual Report to the Colorado General Assembly: Status of the Solid Waste Management Program in Colorado

Introduction

Colorado's Solid Waste and Materials Management Program (the program) is responsible for ensuring compliance with laws and regulations concerning the management of solid waste. The authority for this program is in the Colorado Solid Waste Act, 30-20-100.5, *et seq.*, C.R.S, and the U.S. Environmental Protection Agency (EPA) has approved Colorado's solid waste management program. With that approval, the authority to implement requirements for managing solid waste in Colorado rests completely with the state.

The program is committed to systematically addressing health equity and environmental justice by administering its programs in a way that makes meaningful decisions concerning the environment, with the participation of affected citizens and their community. Additionally, the program places high priority on working and cooperating with local governments, investigating citizen complaints, and being available to the public through the technical assistance line.

Primary elements of the program include compliance assistance, compliance monitoring and enforcement, permitting, and materials management and recycling. Each of these program elements is discussed in the following sections.

The program currently regulates the following facilities:

Facility type	Number of facilities
Landfills	76
Municipal Solid Waste (MSW) landfills	55
Construction and demolition debris (C&D) landfills	5
Waste tire monofills	3
Coal combustion ash monofills	8
Other landfills (special wastes, landfarms)	5
Closed landfills	194
Composting facilities	35
Incinerators	4
Recycling facilities	182
Medical waste facilities	8
Solid waste impoundment facilities	128
Commercial exploration and production waste impoundments	11
Waste tire registrants (facilities, haulers and generators)	2,886

Accomplishments

Compliance assistance

A goal of the program is for all regulated facilities to be in, and stay in, compliance with state laws and regulations. The traditional inspection and enforcement program serves as one primary mechanism for reaching that goal. However, compliance assistance is another important method for obtaining and maintaining compliance. The General Assembly recognized the value and importance of compliance assistance in Section 30-20-101.5(2)(f), C.R.S., which states the department is to "establish a preference for compliance assistance with at least 10 percent of the annual budget amount being allocated to compliance assistance efforts." In fiscal year (FY) 2022, 13% of staff time was devoted to meeting regulatory entities' requests for compliance assistance.

The program has developed and continues to invest in a broad range of compliance assistance services to help the regulated community manage solid waste appropriately. These compliance assistance services include the following activities:

- Managing a part-time customer assistance and technical assistance phone line and email box. This phone line is staffed from 8 a.m. to noon, Monday through Friday, to provide information on common waste management questions and more complex or detailed regulatory guidance.

Through the technical assistance phone line/email inbox, in FY 2022 the program responded to:

444 Phone calls

187 Emails

- Providing a wide range of solid waste guidance documents, compliance bulletins, and an informative website **(https://cdphe.colorado.gov/swguidance)**.

- Maintaining an extensive set of guidance information for regulated entities online and in print.

During FY 2022, the Solid Waste Management website received:

7,561 Hits

The "exit rate" for website hits is low - 22.67%, which means that most visitors to the website found something of interest or value and clicked through to subsequent pages.

- Program inspectors routinely incorporate compliance assistance and pollution prevention into compliance inspections performed each year. In the past year, program staff have delivered compliance assistance on 90 of the 260 inspections performed, or on 35% of inspections.

Compliance monitoring and enforcement

Table 1 presents the numbers and types of inspections program staff performed.

Table 1

Facility type	Number of inspections
Landfills	69
Composting facilities	3
Medical waste facilities	5
Commercial exploration and production waste impoundments	4
Recycling facilities	7
Asbestos in soil sites	11
Beneficial use sites	5
Illegal disposal sites and complaint follow-up	16
Environmental covenant inspections	2
Construction and demolition disposal facilities	3
Other types of facilities (incinerators, closed landfills)	3
Solid waste impoundment	1
Waste tire sites (facilities and haulers)	131
Total - Inspections performed by program staff	**260**

Figure 1

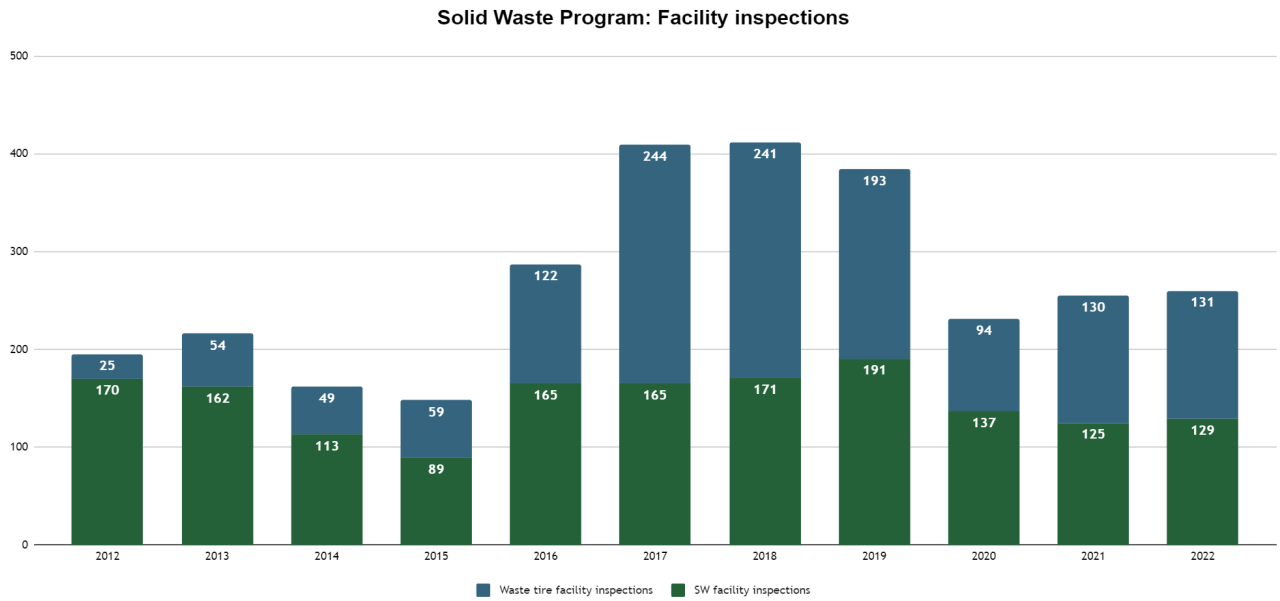


Figure 1 presents the inspections program staff performed, along with a comparison to previous years. In FY 2022, each solid waste inspector performed an average of 29 inspections.

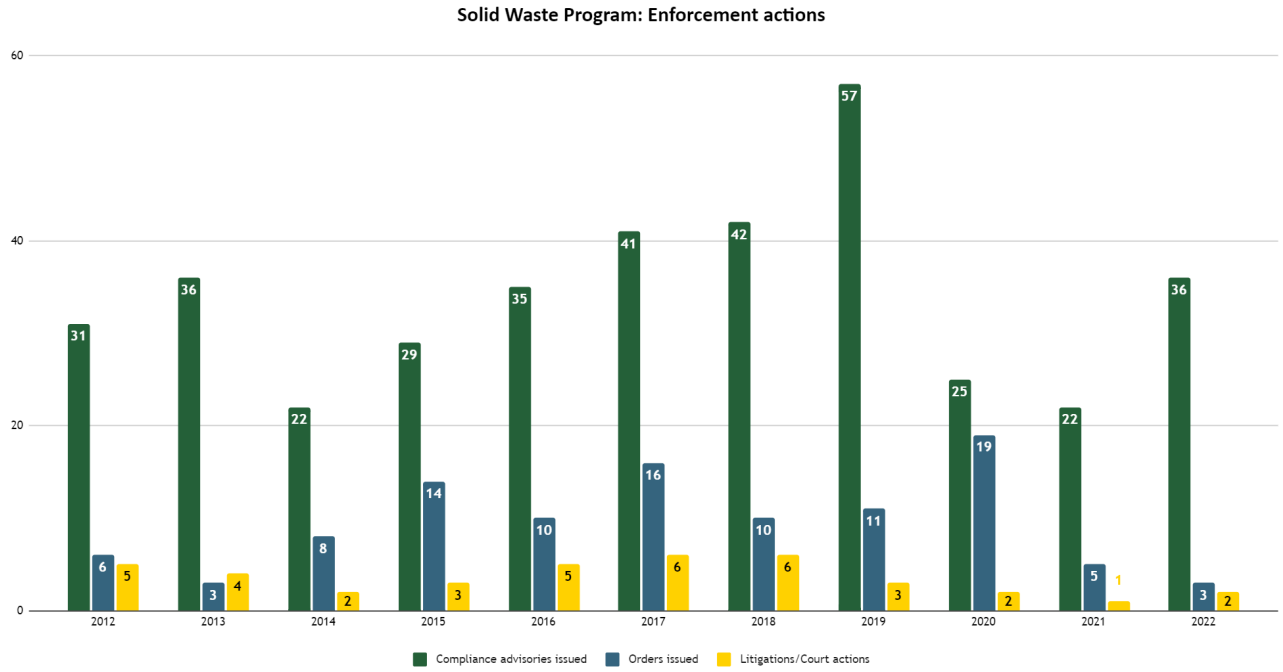
Every inspection carries administrative responsibilities, including reviewing files, preparing inspection reports, and notifying other regulatory agencies of the inspection results. Many inspections result in enforcement, which requires inspectors to track return-to-compliance activities at the facility, prepare enforcement documents, and document the facility history in the solid waste database.

The program places high priority on complaints and spill reports. In FY 2022, the program received 35 solid waste complaints. Of those, program staff investigated and/or inspected eight, and referred 27 to local governments or other agencies. In addition, the program received 167 spill reports. The program followed-up on 101 of those spills to ensure facilities

completed appropriate cleanup, and the program referred 34 spills to local governments or other agencies.

Inspections, complaints, and spill follow-ups may result in formal and informal enforcement actions. Informal actions are called Compliance Advisories, and formal actions include Compliance Orders and civil actions filed in court. Figure 2 presents the number of formal and informal enforcement actions the program completed in FY 2022 and previous years.

Figure 2



Referring to Figure 2, the program issued Compliance Advisories within 90-days 100% of the time, and the program issued 67% of the three Compliance Orders within the program's 300-day internal goal. Of the three Compliance Orders shown for FY 2022 in Figure 2, one of the orders assessed $10,000 in penalties, payable to the Colorado General Fund. The remaining orders assessed no penalties.

Small landfill compliance initiative

In FY 2022, the program continued its efforts to assist small landfills with groundwater monitoring and developing Engineering Design and Operations Plans (EDOPs) that are compliant with the solid waste regulations. For the 10 small landfills where routine groundwater monitoring is applicable, the program funded another round of groundwater sampling in FY 2022. During FY 2022, the program also continued to work with facilities to update and revise their permit documents, including the EDOPs and associated plans, and financial assurance.

Permitting

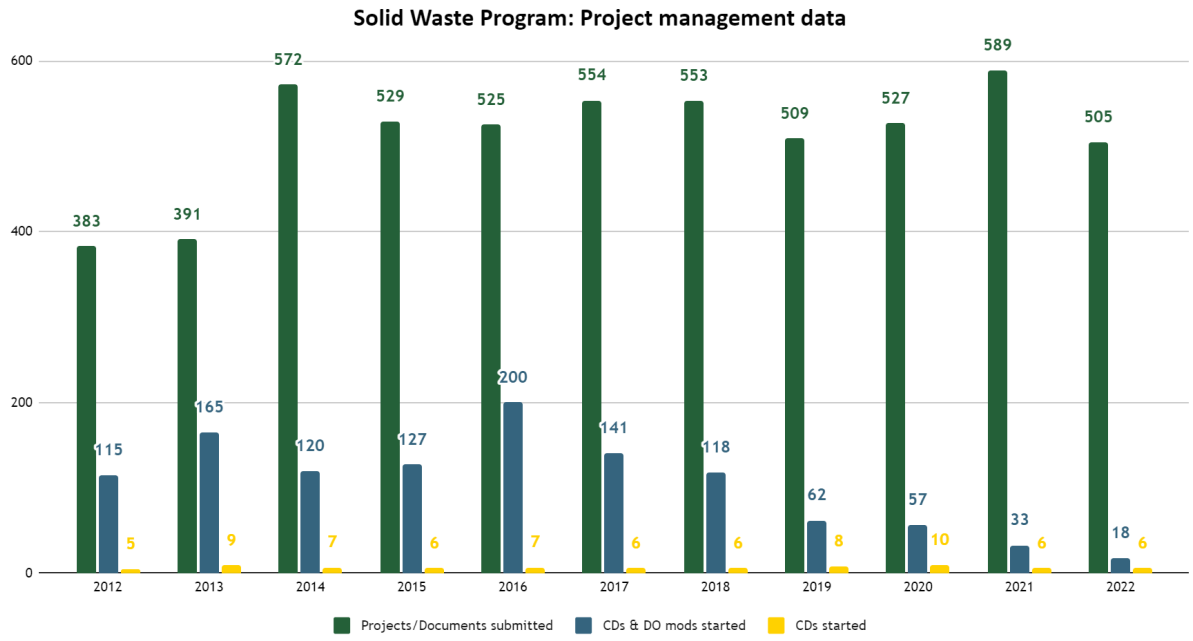
In Colorado, most solid waste disposal sites and facilities need Certificates of Designation (CDs), which local governments issue. This includes facilities that deposit and treat solid waste, including landfills, incinerators, medical waste treatment facilities, and certain subsets of waste impoundments and composting facilities. However, recycling facilities,

transfer stations, and any facility disposing of their own solid waste generated on their own site, do not need a CD.

To obtain a CD, a facility must submit their application to the local government. The local government then refers the application to the program for a technical review, which ensures that the facility can operate safely and in a manner that protects human health and the environment. If the program recommends approving the application, the local government evaluates whether the proposed facility conforms to local land use plans and zoning restrictions. The local government may choose to approve or disapprove the application. However, if the program recommends disapproval, then the local government must disapprove the application.

The program specifically reviews the EDOP portion of the CD application. Certain facilities that do not require a CD must still have the program approve their EDOP. Therefore, the program's "permitted universe" includes all solid waste facilities with EDOPs. This large universe of sites with EDOPs is not static. New facilities are built and existing facilities are adding new solid waste management units, waste streams, and treatment capabilities – all of which need the program to review and approve EDOPs or EDOP modifications. Figure 3 presents the large number of documents that program staff review for this universe of facilities on an annual basis, from 2012 to 2022.

Figure 3



The graph in Figure 3 does not illustrate the relative complexity of these documents. The program now differentiates documents regulated entities submit for review and approval into three categories: projects of high, medium, and low complexity. While the CD application category is, by definition, a complex major project, EDOP modifications, for example, can vary in complexity. Additionally, groundwater monitoring reports can be relatively simple, but new engineering designs for treatment technologies and landfill cells with sophisticated liners and caps can be very complex.

Figure 4

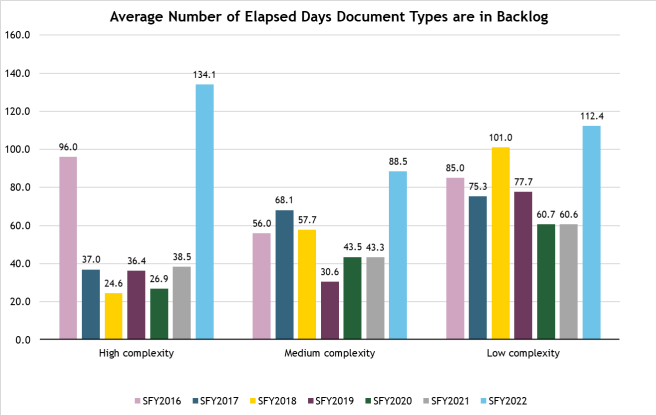
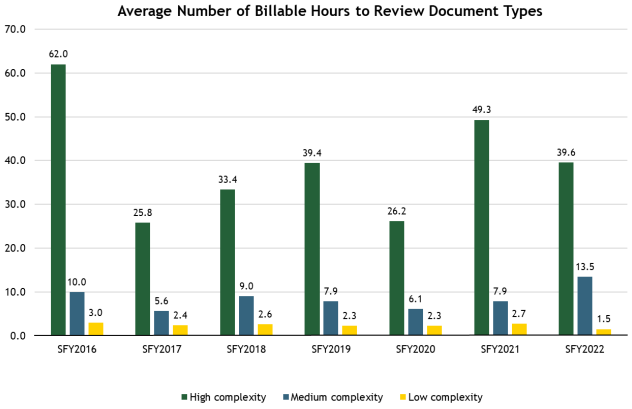


Figure 5



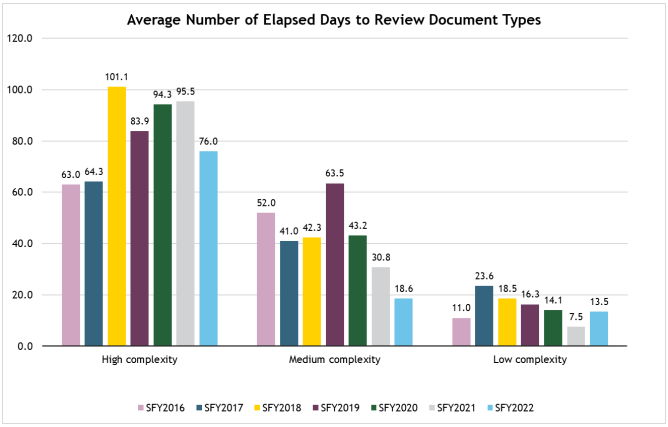


Figure 6 shows that the number of elapsed days during review has remained constant for high complexity projects. In the medium complexity category, this metric increased by about twenty percent, and in the low complexity category it nearly doubled as compared to the previous year. This reflects the program prioritizing more complex permit modifications when the program is understaffed, the routine - or low complexity - projects are given less attention.

Figures 4, 5, and 6 illustrate the program's efforts on documents of different complexities. These graphs compare FY 2017 through FY 2022 for three measures:

- Number of days to begin the review (days in backlog),
- Number of days to finish the review,
- Number of billable hours charged to the customer for the review

Figure 4 shows that the backlog for all document types increased in FY 2022. This is a function of staff turnover and the program's difficulty in hiring new staff over the last year. Efforts to hire new permitting staff are ongoing.

Figure 5 shows the average number of hours billed for document types, based on the complexity of the document reviewed. The average number of hours billed per document increased in FY 2022 above the average of past years for medium complexity projects. For the other two document types, the average number of billed hours per document decreased. Newer staff, who comprise a larger percentage of the permitting unit than in years past, tend to bill fewer hours, because they spend more time in training.

Materials management and recycling

Within the program, there are several materials management and recycling programs:

1. Waste tire program,
2. Beneficial use program,
3. Paint stewardship program, and
4. Recycling and waste diversion analysis for Colorado.

Waste tire program

Retailers of waste tires are required to charge a fee on the sale of each new tire, known as the waste tire fee. The legislature authorized the Solid and Hazardous Waste Commission to set the waste tire fee for both the waste tire administration fund and the waste tire end user fund. The waste tire administration fund is restricted to a maximum of $0.50 per tire sold, while the waste tire end user fee is restricted to a maximum of $1.25 per tire. Purchasers of new tires currently pay a total of $1.25 per tire with $0.50 dedicated to the waste tire administration fund and $0.75 dedicated to the waste tire end user fund.

The program implements the waste tire enforcement, illegal cleanup, and waste tire market development programs using the waste tire administration funds. Program staff use the waste tire end user fund to reimburse end users of products made from waste tires.

Waste tire End User Fund

With the passage of SB 19-198, the Colorado General Assembly reauthorized the waste tire end user program. The previous waste tire end user program sunset in 2018. The program issues waste tire end user rebates according to a tiered structure. The materials types for each tier are defined in statute, but the Solid and Hazardous Waste Commission promulgated the rebate amounts for each tier. The current and future rebate amounts are:

In CY 2021, the program issued:

$1,422,036 **Rebates** for the end use of tire derived products

36,903 **Tons** of tire derived products

	Material end used	Rebate amounts Calendar Years 2020 and 2021	Rebate amount per Calendar Year 2022
Tier 1	crumb rubber, tire derived fuel	$50 per ton	$80 per ton
Tier 2	molded products, rubber mulch	$25 per ton	$40 per ton
Tier 3	tire bales, alternative Daily cover, tire derived aggregate	$12.50 per ton	$20 per ton
Rural hauling rebate	N/A	$12.50 per ton	$20 per ton

Waste tire program compliance and enforcement

During FY 2022, waste tire staff conducted 131 waste tire inspections and compliance assistance visits. Of these 131 visits, the program evaluated 91 waste tire generator facilities selling new tires, for compliance with the requirements for submitting the waste tire fee, which is assessed on the retail sale of each new tire. Additionally, the waste tire program issued 23 compliance advisories (informal enforcement actions) for non-compliance with waste tire laws and regulations.

Illegal waste tire cleanup program

The Illegal Waste Tire Cleanup Grant program provides funding for the cleanup of illegal or abandoned waste tire sites. The program removed approximately 198,932 passenger tire equivalents in calendar year (CY) 2021 (2022 data is not tabulated), reducing environmental risks from tire fires and eliminating prime mosquito breeding grounds, at a cost of $458,457.

Waste tire disposal and recycling metrics

Some of the more-significant metrics tracked for the waste tire program are illustrated in Figures 7, 8, and 9 (below).

- Figure 7 shows that in 2021, 99% of waste tires generated in, or imported into, Colorado were either recycled or re-used.
- Figure 8 illustrates the top 10 uses of waste tires with tire-derived fuel, salvaged tires reuse, and alternative daily cover being the top three uses.
- Figure 9 shows that in 2021 and up until 2018, Colorado recycled or salvaged close to, or more than, 100% of the waste tires generated in Colorado. It is important to note that the End User Fund was also in existence during these years, until it ended in 2018 and returned again in 2020.

For a complete explanation of the waste tire program, please see the 2021 status report at: www.colorado.gov/pacific/cdphe/swreports

Figure 7

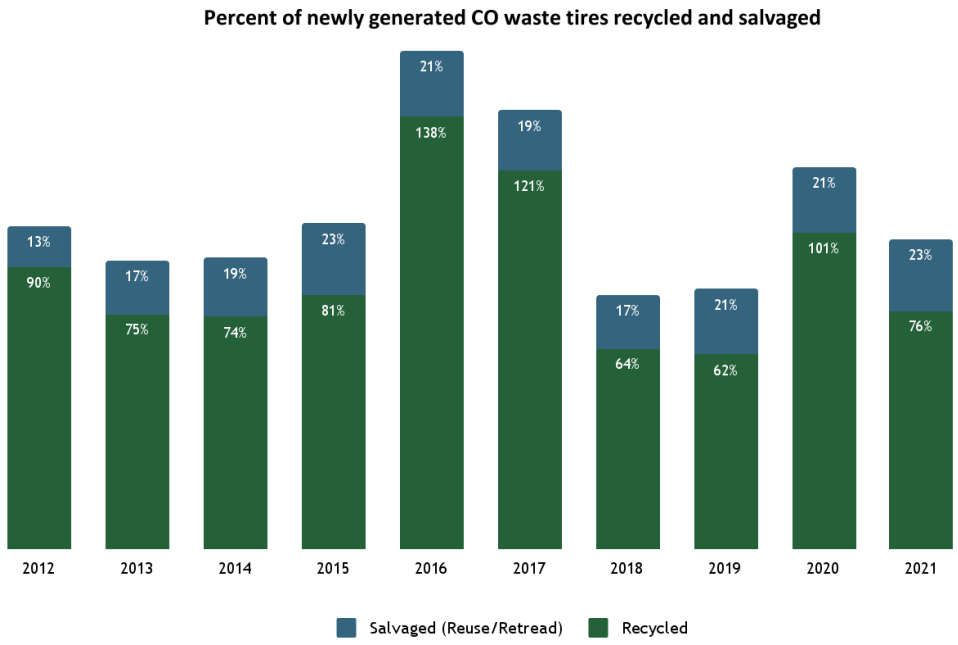


Figure 8

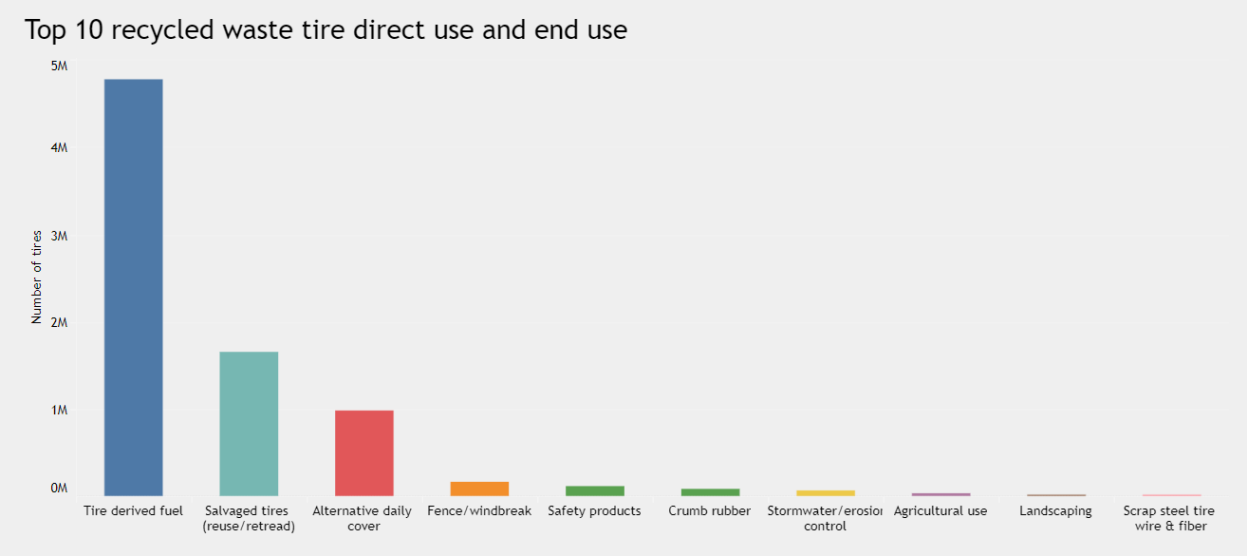
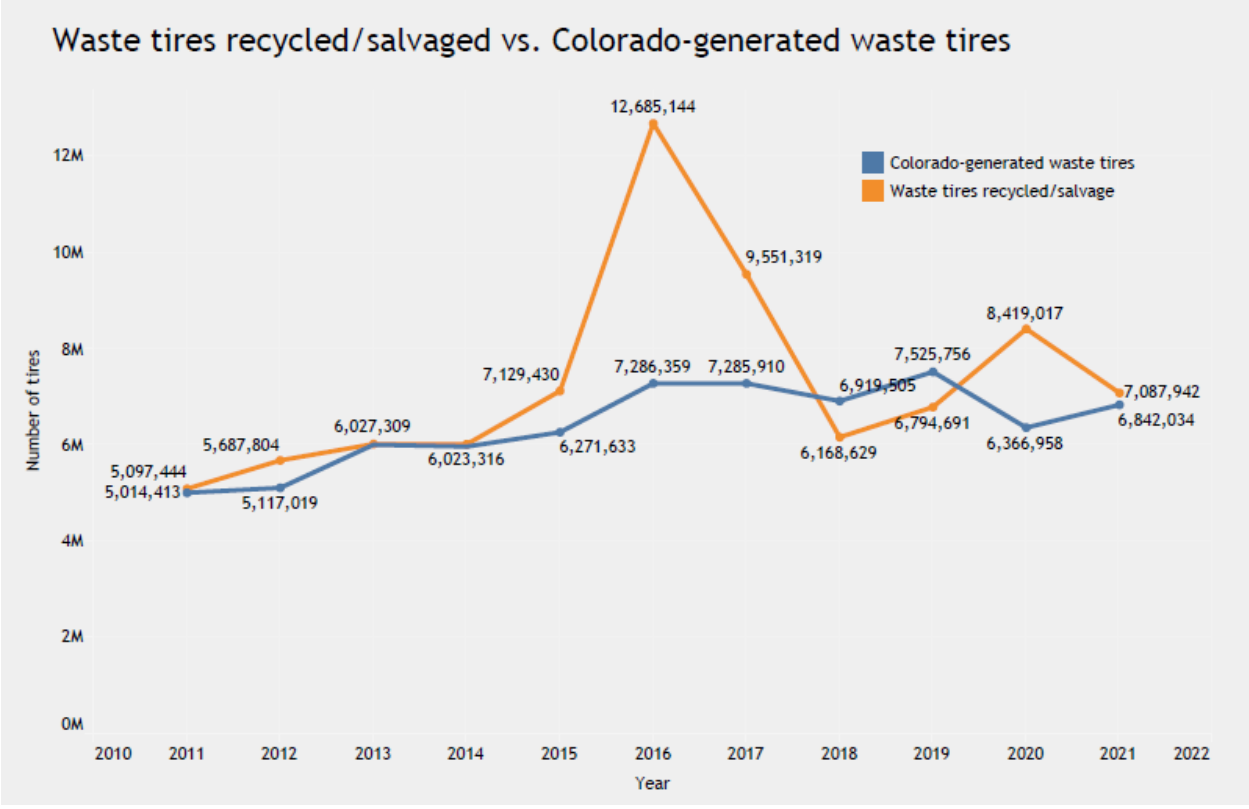


Figure 9



For more information about the waste tire program, visit:
https://cdphe.colorado.gov/wastetires

Beneficial use applications

Beneficial use of solid waste is using wastes as a substitute for products or feedstock material. Examples include using industrial wastewater for irrigation or dust suppression, land application of organic materials with beneficial crop nutrients, and using coal ash for cement production. The program's materials management unit reviewed 15 applications and approved eight beneficial use applications in FY 2022. Approved beneficial use projects diverted 442,644 tons of solid waste from disposal and utilized 230,228 tons of coal ash.

Paint stewardship

Managing unwanted paint occurs under the Architectural Paint Stewardship Act (Section 25-17-4, C.R.S). Paint manufacturers created PaintCare Inc., a non-profit stewardship organization, which drafted the plan for convenient paint drop-off locations in highly populated areas and methods for collecting paint in less densely populated areas. PaintCare contracts with various waste haulers, local household hazardous waste facilities, and paint recyclers to arrange the processing of unwanted paint. While PaintCare does not actually process any paint, they contract collection and recycling services, and they are responsible for ensuring that paint recycling and disposal is convenient and free for residents.

PaintCare is responsible for reporting to the department by March 31 each year on their performance for the previous calendar year. The program also drafts a report to the legislature annually that summarizes PaintCare's performance.

The 2021 PaintCare report provides the following highlights

In 2021, PaintCare processed 793,228 gallons of unwanted or unusable paint; 84% of the paint collected was latex paint and 16% was oil-based paint. Most of the latex paint collected was either beneficially used or recycled into new latex paint in Colorado.

The PaintCare Plan, the 2021 PaintCare annual report, and the program's 2021 report to legislature can be found at: **https://cdphe.colorado.gov/paint-stewardship-recycling**

Recycling and materials diversion tracking

The program tracks many aspects of recycling and waste diversion. Like most industries, the waste and recycling industry is experiencing significant changes and challenges since 2020. Waste generation patterns shifted, such that offices and businesses generated less waste and households generated more waste. These patterns are just starting to adjust back. Waste generation, which includes both waste disposal and waste diversion, remained relatively flat for total generation, but industrial waste management practices shifted towards more disposal and less recycling. Statewide, recycling and composting diversion of municipal solid waste (MSW) increased from 15.3% in 2020 to 16% in 2021.

Overall, recycling and composting quantities have remained at a relatively consistent rate for the last few years. Although MSW diversion improved in 2021, Colorado is still far from the

diversion goals that the Solid and Hazardous Waste Commission adopted in 2016, including the first benchmark of 28% in 2021, with the goal of reaching 45% by 2036.

2021 MSW diversion data

The recycling and composting totals for municipal solid waste are presented in Figure 10. It is important to note the distinction between the MSW diversion rate and the total diversion rate. MSW includes waste generated by households, businesses, and institutions. Generally speaking, this waste stream tends to be steady and predictable and is typically used to measure program effectiveness for commonly-generated recyclable materials.

The total diversion rate includes all other solid wastes. These wastes consist of things like construction and demolition debris, aggregates, and coal combustion residuals, all of which tend to fluctuate from year to year. While total diversion data is still measured, it is not used in goal setting or measurement because of this volatility. While recyclables such as paper, plastic, glass, and metal are often viewed as the primary component of the diversion rate, organic materials such as yard trimmings and food waste have a high percentage of material diversion by weight.

Regional diversion

Along with the statewide diversion goals, there are specific regional goals as well. The state is broken into two regions; the Front Range and Greater Colorado. The Front Range region includes the following counties: Adams, Arapahoe, Broomfield, Boulder, Denver, Douglas, El Paso, Jefferson, Larimer, Pueblo, and Weld. The Greater Colorado region includes all other counties.

The goals for these regions consider the economic and logistical challenges of recycling in areas of low population density, the existing access to waste diversion infrastructure along the state's urban corridor, as well as the number of residents in the Front Range which amounts to over 80% of the population.

Figure 10 shows that the Greater Colorado region is achieving the 2021 benchmark for diversion of 10%, but the Front Range is well behind the targeted rate of 32%. Accordingly, Colorado is short of the statewide goal of 28% waste diversion.

Figure 10 - Regional diversion rates, including goals

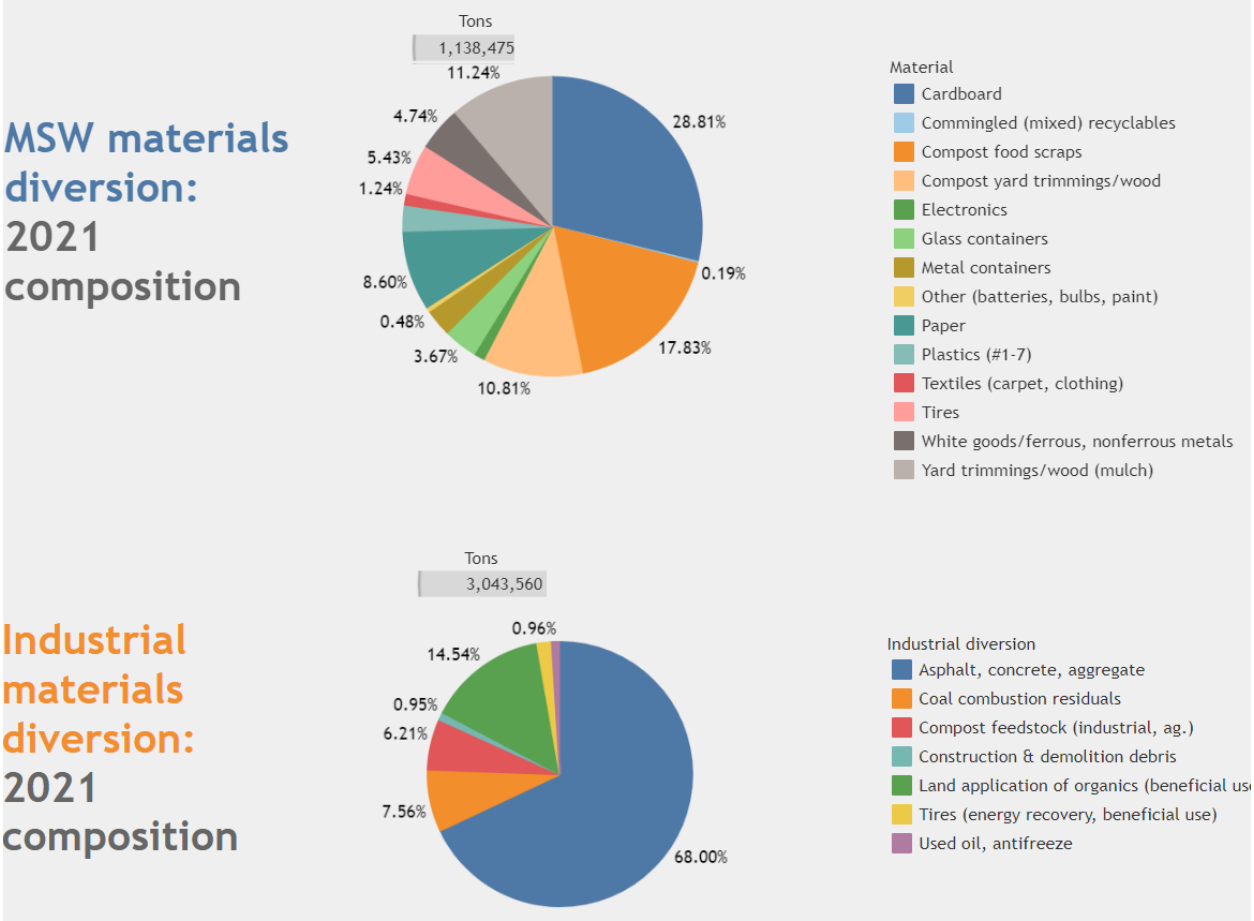
Region	2021 rate	2021 goals	MSW disposal	MSW diversion	Recycling in tons	Composting in tons
Front Range Region	15.8%	32.0%	5,166,221	972,460	686,223	286,237
Greater Colorado Region	10.0%	10.0%	802,881	108,118	68,260	39,859
Statewide	16.0%	28.0%	5,970,251	1133,361	807,265	326,096

Waste diversion composition and trends

The compositions of both the MSW and industrial waste diverted from disposal are dominated by a few larger and heavier waste streams. As illustrated in Figure 11, cardboard is the single biggest component, at almost 29% of the MSW diverted. Compost feedstocks, including food scraps and yard waste, make up another 29% of the MSW diverted from landfills.

In the industrial sector, asphalt, concrete, and aggregates make up 68% of the industrial waste diverted from landfills. It is important to note that diversion is calculated using weight and not volume, and therefore some of the more-dense material streams tend to make up more significant percentages.

Figure 11 - Waste diversion composition in MSW and industrial waste.



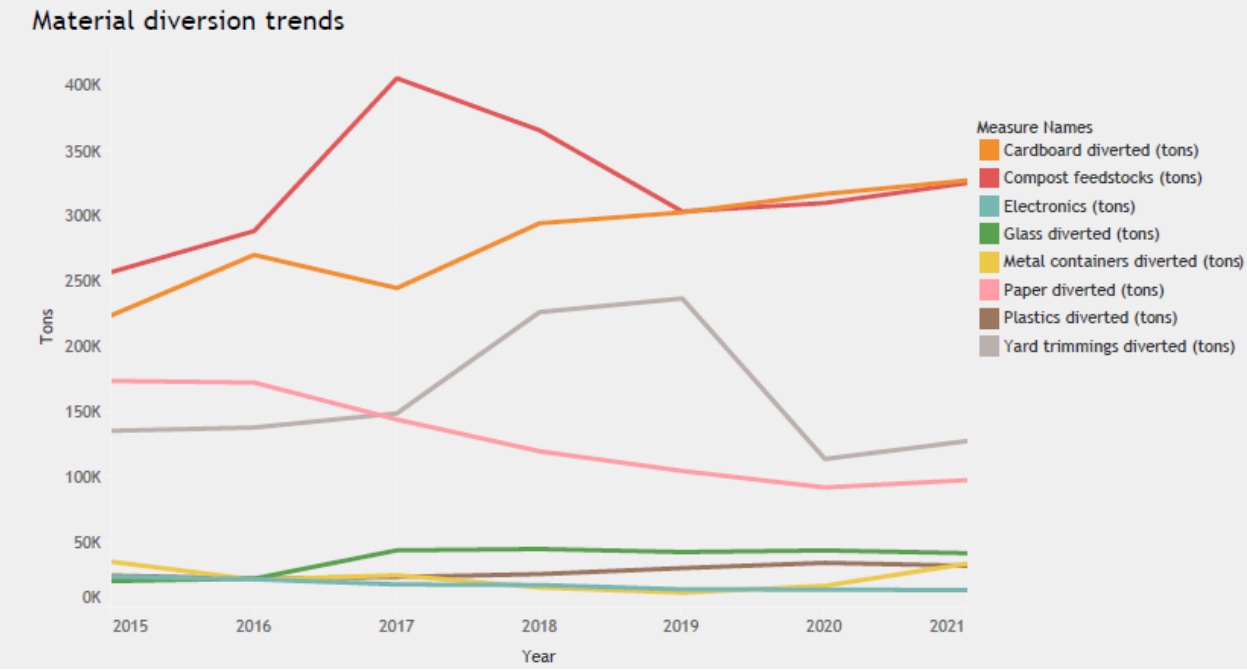
Waste diversion trends for the last several years are illustrated in Figure 12. The amount of cardboard recycled has risen in the last five years, while the amount of paper recycled has seen a dramatic decrease. This aligns with national trends, as more consumers have items shipped directly to their households, while the production of print media declines. A shift back to the office in 2021 also may have impacted the slightly increased generation and recycling tonnage of office paper waste. Recycling of metal containers is steadily growing, and glass diversion has leveled off, following the rapid increase in 2017, when an intermediate processing facility began taking and sorting glass that was previously too contaminated for recycling.

One key area to note is the large decrease in yard waste used to create mulch. This is a category that had steadily increased over the last few years, but there was a very large drop

in 2020. Not only did this loss of material have an impact on the trend for yard trimmings, but it also impacted the overall MSW diversion rate for 2020.

Figure 12 - Annual trends in MSW diversion

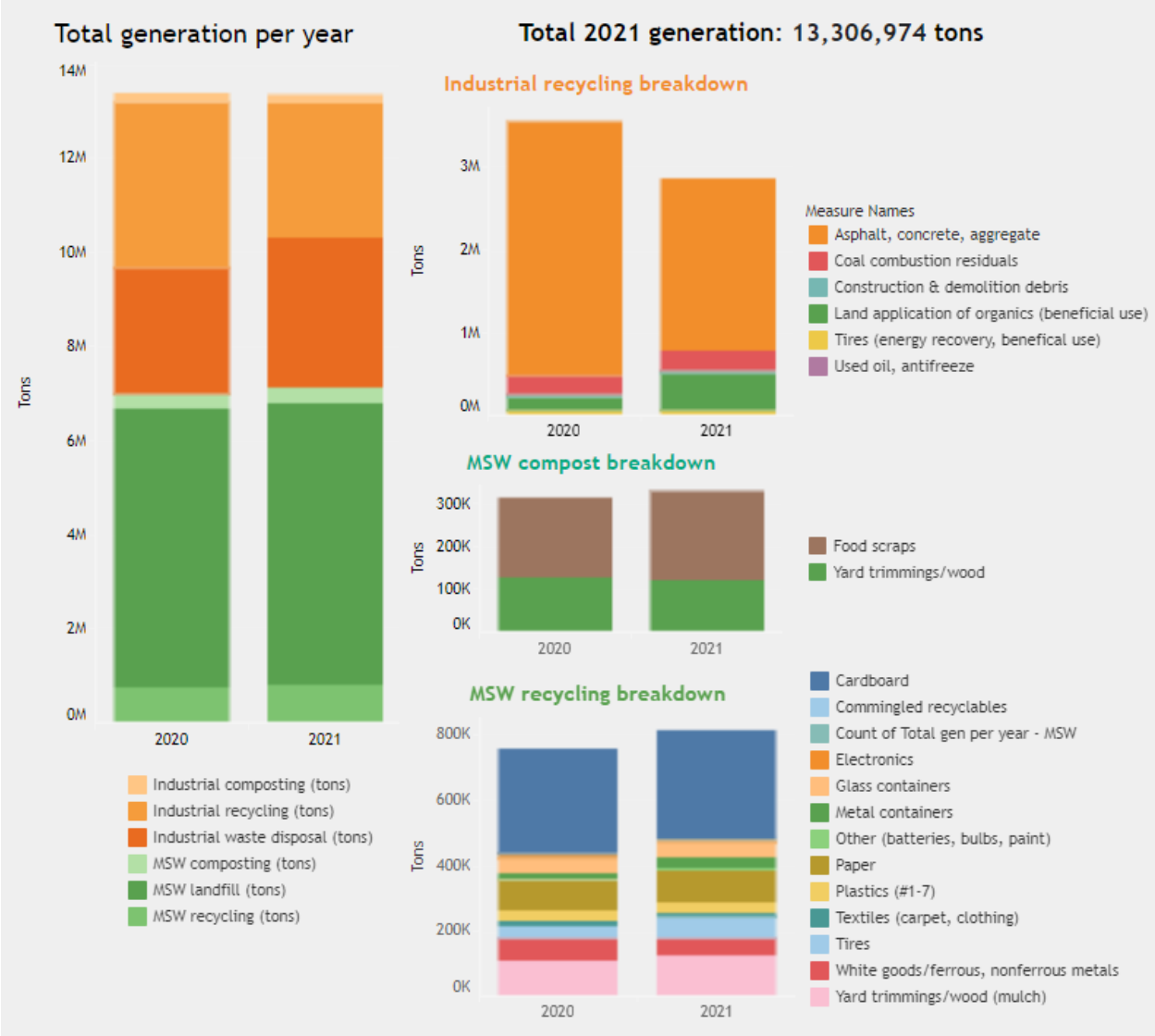
	Year						
	2015	2016	2017	2018	2019	2020	2021
Cardboard diverted (tons)	224,431	270,831	245,345	295,112	303,461	317,595	328,019
Compost feedstocks (tons)	257,678	289,195	406,472	366,525	304,202	310,686	326,096
Electronics (tons)	23,819	21,727	17,783	17,322	13,995	13,818	13,376
Glass diverted (tons)	20,332	22,241	43,964	44,965	42,646	43,880	41,764
Metal containers diverted (tons)	35,213	21,455	24,874	15,414	11,389	16,745	33,776
Paper diverted (tons)	174,079	172,765	144,416	120,006	104,910	92,200	97,911
Plastics diverted (tons)	24,547	22,296	23,498	25,721	30,312	34,337	32,124
Yard trimmings diverted (tons)	135,741	138,269	149,159	226,893	237,358	114,115	127,929



Total waste generation

Annual changes in waste generation, including diversion and disposal, are illustrated in Figure 13. Total waste generation slightly dropped in 2021, with a notable decrease in industrial recycling. Industrial recycling, which is primarily asphalt and concrete, decreased 680,000 tons, while industrial disposal increased 520,000 tons annually. Unlike industrial waste, MSW generation slightly increased, although the increase was not as significant as the large decrease in industrial diversion. MSW disposal increased by 60,000 tons, and MSW diversion also increased by 71,000 tons. Although MSW generation and disposal slightly increased in 2021, composting and recycling also increased, with notable improvements from diverting metal containers, cardboard, and food waste.

Figure 13 - Annual waste generation by category, including disposal and diversion



Benefits of waste diversion

There are many benefits of diverting materials from landfills. Not only is valuable landfill space saved, recycling also reduces greenhouse gas generation and energy consumption, and typically creates a stronger economic impact than disposal. Using the EPA's Waste Reduction Model (WARM), the projected savings from waste diversion can be evaluated in a different light. In 2021, the WARM model estimated that Colorado prevented 2,020,103 metric tons of carbon dioxide from being generated by preventing material going into landfills in Colorado. This equates to the emissions from 428,897 passenger cars. The energy savings from diversion were equivalent to the energy used in 155,523 homes in a year.

Statewide organics management plan

Based on available waste diversion and landfill composition data, a high percentage of material sent to landfills in Colorado are organic materials, such as food waste and landscape

trimmings. As a result, the program worked with a team of consultants to develop a Statewide Organics Management Plan throughout 2022. The recently-completed plan includes new recommendations to best address waste diversion of organic waste and incentivize the use of organic materials through localized end markets. The program is reviewing the organics plan and developing a timeline on how to best implement the recommendations from the plan. For more information about recycling and waste diversion, visit: https://cdphe.colorado.gov/colorado-recycling-totals

Program funding

Funding for the Colorado Solid Waste Management program comes entirely from fees. The program receives no Colorado General Fund money. The program's funding has five components:

1. Solid Waste User Fee (SWUF), which is a fee based on the weight or volume of waste disposed of at a landfill, also known as a "tipping fee,"
2. Hourly Activity Fee assessed for prescribed services rendered to facilities,
3. Annual Facility Fee, which is an annual fee remitted by facilities that are not required to pay the SWUF,
4. Waste tire fee assessed on the sale of new tires, and
5. PaintCare program fee, which is a flat fee PaintCare pays.

In FY 2022, the SWUF and hourly review fees provided about 71% of the program's funding needs. The waste tire fee covered 27% of the program's expenses. The PaintCare program covered the remaining 2% of the program's expenses.

Figure 14

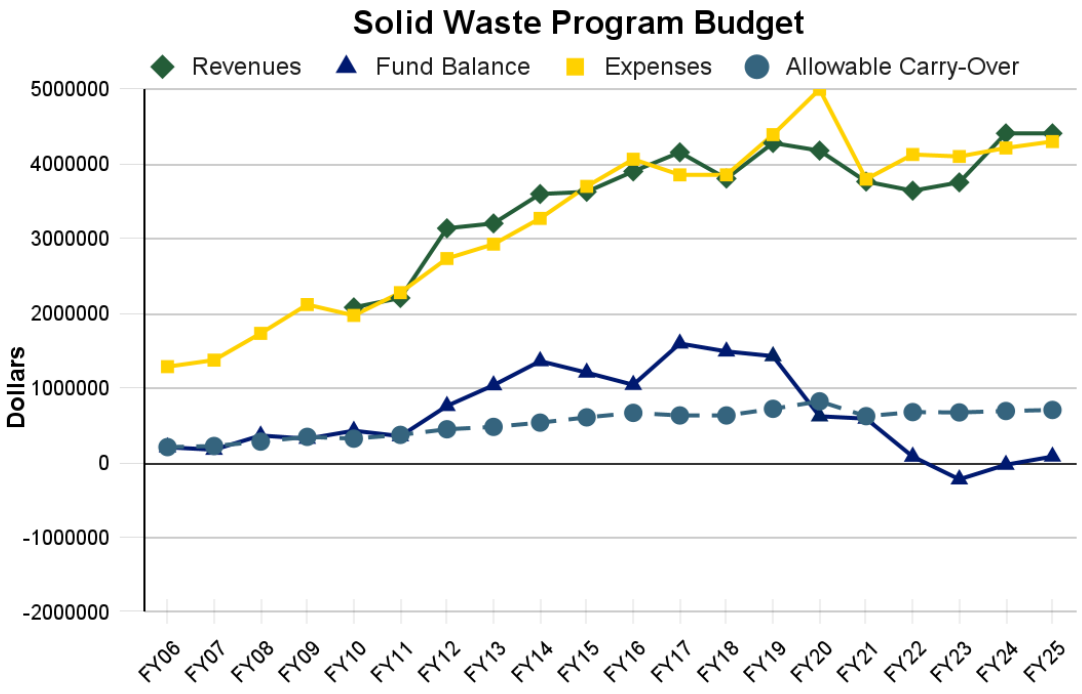


Figure 14 illustrates the revenue, expenditures, and fund balance for the portion of the program covered by the solid waste user fee assessed at solid waste disposal sites. This graph shows that, if projections are correct, the program will have adequate revenue streams to

fund the program at least through FY 2023 at the current fee levels, but may not have enough revenue after FY 2023 to continue operating at current staffing levels. The department will conduct a fee review in FY 2023, due to the shrinking balance in the solid waste user fund.

In FY 2022, the program collected $3,620,409 in the SWUF, document review fees, and annual facility fees, while spending $4,128,112 to fund program activities.

Landfill volumes are slowly recovering to pre-pandemic levels. The program will continue to closely monitor the volume of solid waste sent to landfills to ensure adequate funding for program implementation.

It is important to note that staff salaries are the biggest single expense item for the program. Therefore, managing staffing levels is an important part of managing the program's budget. Over the past 12 years, the program has grown significantly, both in terms of the programs administered and the staff needed to implement those programs. However, recent retirements have left some positions open while solid waste volumes are monitored. This may result in increased review time for permitting documents.

Conclusion

As discussed in this report, the Hazardous Materials and Waste Management Division has implemented an effective and efficient Solid Waste Management program satisfying the expectations set out in HB07-1288 (Section 30-20-101.5, C.R.S).

Key accomplishments include:

- Ensuring compliance with laws and regulations concerning the management of solid waste;
- Increasing the total number of inspections in FY22;
- Maintaining a program that is credible and accountable to the public;
- Maintaining a program that is cost effective and fiscally sound; and
- Energy savings from waste diversion that is equivalent to the energy used in 155,523 homes in a year.

The program has significantly improved both the efficiency and effectiveness of the program, and will continue efforts to improve annually.

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