



Colorado Department
of Public Health
and Environment

Colorado Solid Waste and Materials Management Program 2011 Annual Report to the Colorado General Assembly



A Message from Charles Johnson

Program Manager, Solid Waste and Materials Management

Solid waste management is still an expanding universe. In the past, managing solid waste focused primarily on disposal and the efficient operation of landfills. In the 21st Century, our focus is on managing materials, finding innovative ways to balance disposal and recycling and the reuse of everything from household trash to surplus electronics.

Along with materials management the program's activities include facility permitting, customer technical assistance, outreach, training and information availability sessions, inspections, and initiating enforcement actions as necessary. Inspection and enforcement activities serve multiple purposes including deterring improper solid waste management, protecting Colorado's environment and public health, and ensuring a level playing field for industry's good actors.

The program's multiple activities integrate with numerous other departments, divisions and programs throughout the state. These include working with the Department of Natural Resources Division of Reclamation and Mining Safety and the Colorado Oil and Gas Conservation Commission, the Department of Agriculture on mass livestock die-offs, the Water Quality Control Division on spill remediation and regulatory issues associated with waste impoundments, and the Air Pollution Control Division (APCD) regarding Title V, and the Green House Gas and Tailoring rules at solid waste disposal sites and facilities. In addition the program works extensively with the APCD regarding the management of asbestos-contaminated soils.

'Our focus is on managing materials, finding innovative ways to balance disposal and recycling and reuse of everything from household trash to surplus electronics.'

The program has begun developing processes to build better and more workable integrated solutions at sites involved with multijurisdictional issues. Toward this end we have been inviting representatives from other divisions and programs to permitting and site strategy/management meetings. This approach affords the owners and operators the opportunity to ask all of the regulators involved with the project questions that will help the formulation and development of more integrated and internally consistent solutions and business strategies. We hope this process results in a smoother, more efficient and less costly permitting process; while allowing the businesses to begin operations more quickly. We are working to more fully develop and institutionalize these processes to improve customer efficiency while optimizing staff time.

Charles G. Johnson, Manager,
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Impacts and Success Stories

Permitting

Every year millions of gallons of exploration and production water (E&P or “produced” water) are generated as a waste during oil and gas drilling and production in Colorado. Produced water contains chlorides, boron and selenium, plus free and dissolved hydrocarbons such as benzene. These contaminants must be managed appropriately to protect public health and the environment. Most Colorado solid waste facilities that manage E&P water do so in evaporative impoundments. Until recently, commercial operations designed to recycle and reuse produced water by other treatment methods have not been attempted, primarily due to supply and demand.

During 2011, the Department and Garfield County issued the necessary permits to GreenBack Produced Water Recovery, LLC, to construct and operate a solid waste facility to treat, recycle and reuse produced water. The Shaeffer Ranch Facility, five miles southeast of Rifle on Hunter Mesa in Garfield County, is an 11-acre facility designed to treat approximately 76 million gallons of E&P water annually. The facility will create about 10 new jobs when in operation.

The treatment process includes filtration to remove bacteria, hydrocarbons and solids from produced water, and to reduce the dissolved solids content to levels acceptable for reuse in drilling and well stimulation. Ideally, nearly all the

treated water would be returned to oil and gas operations for reuse. Treated water not returned for reuse will be allowed to evaporate in one of three 1.4-million gallon double-lined ponds or treated to water quality standards and discharged under an NPDES permit. In the future, GreenBack operators anticipate submitting five more applications to construct and operate produced water facilities similar to Shaeffer Ranch in western Colorado.

The number of solid waste permits and plan modifications continued to increase through 2010 (Page 4, Figure 3). This growth is partly due to businesses seizing the opportunity for innovative waste operations.

Materials Management

During 2010, the materials management group observed continued growth in the number of facilities managing solid waste using alternative methods such as composting, recycling and beneficial use. This growth includes the registration of 14 new recycling facilities and one new composting operation. The most notable change in the recycling industry is the opening of multiple recycling end user facilities that utilize recyclables in the manufacturing process to fabricate new products out of former waste materials. The advancement of Colorado manufacturers utilizing recyclable materials closes the final loop in the recycling process and puts Colorado



The Mesa County Landfill Composting Facility provides alternatives to traditional yard waste disposal.

into a position to expand the recycling industry. There are now end markets in Colorado for glass, plastic, paper, metal and many other secondary materials that can be recycled locally, helping to develop Colorado's recycling and manufacturing industry while creating

new jobs.

With the growth of the recycling end-user industry and shifts in the solid waste industry to sustainable materials management, demand for data on how much recycling

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By the Numbers: Overview of Colorado's Solid

Regulatory Authority and Program Elements

The Solid Waste and Materials Management Program, located within the Hazardous Materials and Waste Management Division of the Colorado Department of Public Health and Environment, is responsible for ensuring compliance with laws pertaining to solid waste management. Primary program elements include compliance assistance; compliance monitoring and enforcement; remediation, permitting and information management.

The program receives no monies from Colorado's General Fund, and is 100 percent fee supported. The Act and the Regulations (6-CCR 1007-2) provide three means of collecting fees to support the program.

These include the Solid Waste User Fee (SWUF) or "tipping fee," the Hourly Activity Fee and the Annual Facility Fee. During 2010 the Solid and Hazardous Waste Commission received authority for and passed regulations setting the SWUF. The SWUF supports approximately 78 percent of program funding (Figure 1) and the program is expected to have adequate revenue for at least five years.

During 2011, the program continued to improve efficiency and effectiveness following the passage of HB 07-1288. Examples of these activities include:

- Improved facility assistance delivered on inspections;
- Streamlined inspection and

reporting process;

- Increased team training to remain current with industry practices;
- Development of new a database (ongoing);
- Continued improvement of data collection;
- Planning to launch an improved customer and facility outreach;
- Continued cross-media integrations with internal and external customers;
- Continued integrated meetings with owners and air, water and waste regulators to expedite issue resolution; and
- Continued refinement of workplans.

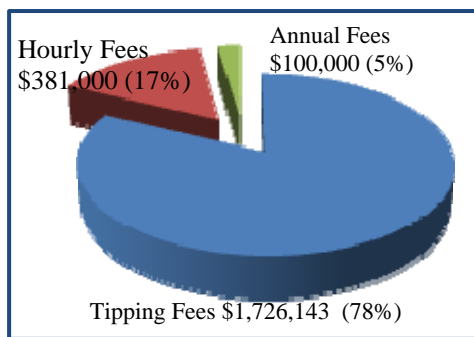


Figure 1: 2011 Solid Waste Revenues

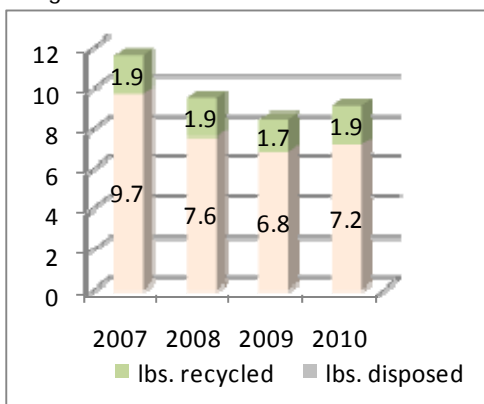


Figure 2: Per Person Daily Waste Generation

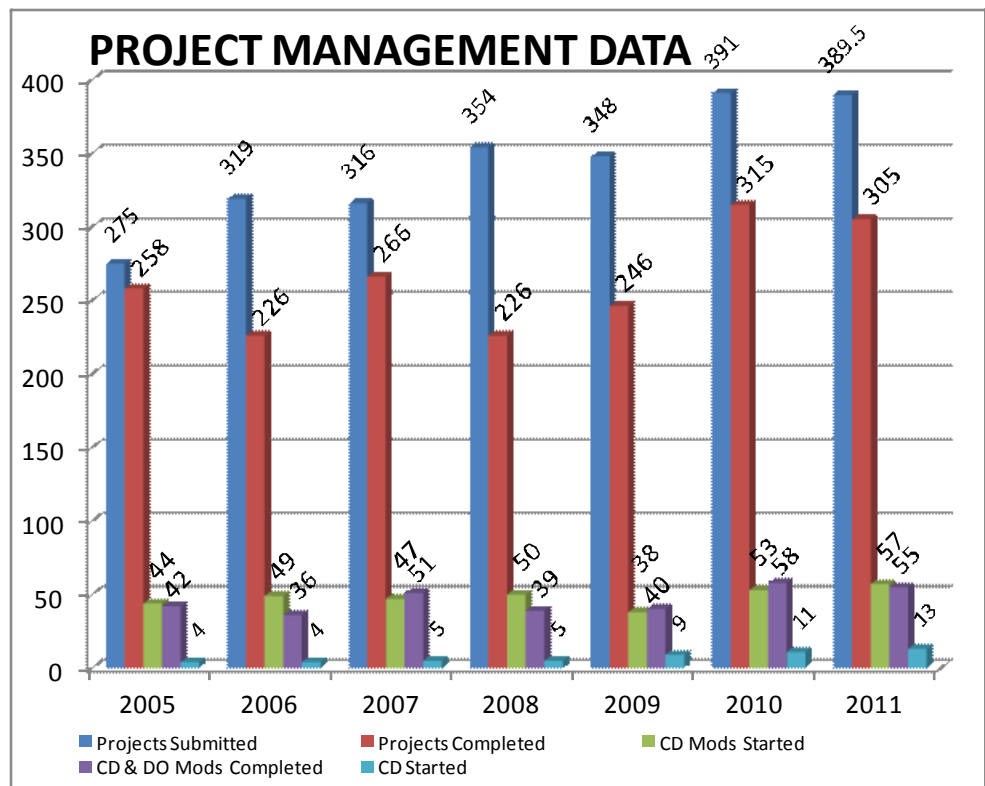


Figure 3: Project Management Data 2005—2011

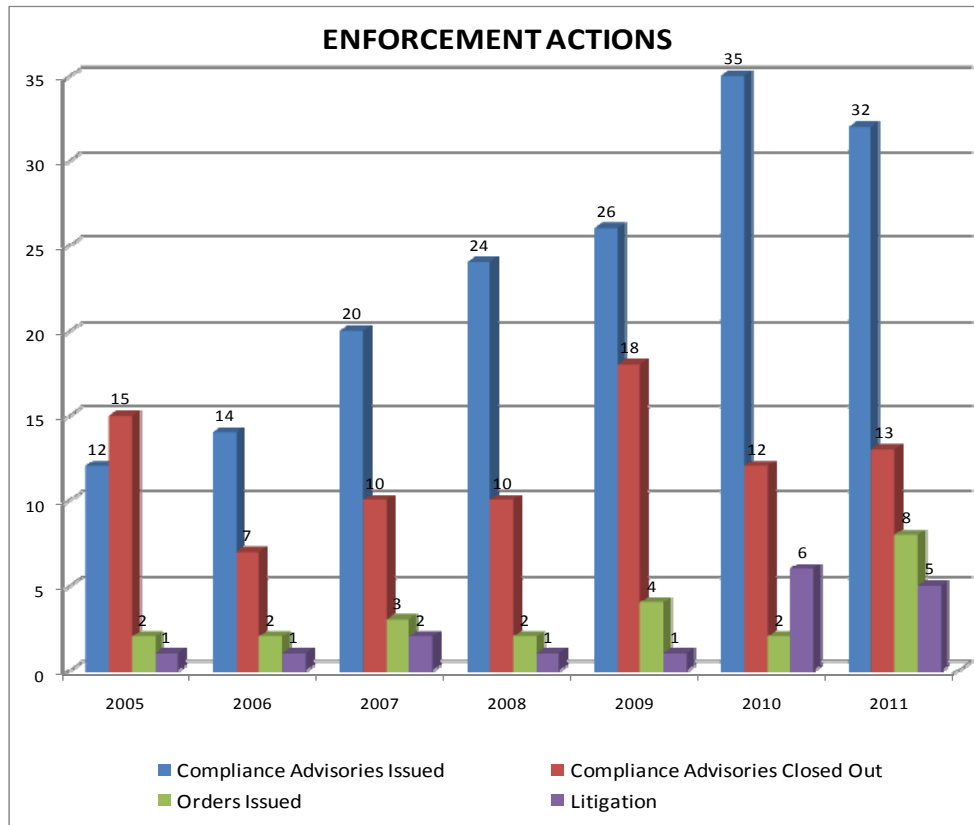


Figure 4: Enforcement Action 2005 through 2011

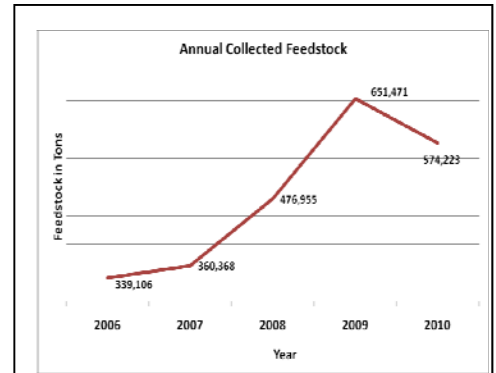


Figure 6: Annual Collected Compost Materials

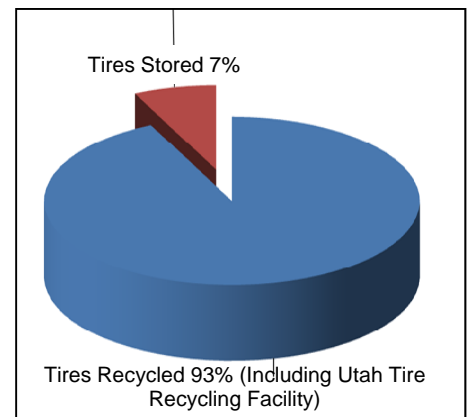


Figure 7: Waste Tires Generated and Recycled in 2010

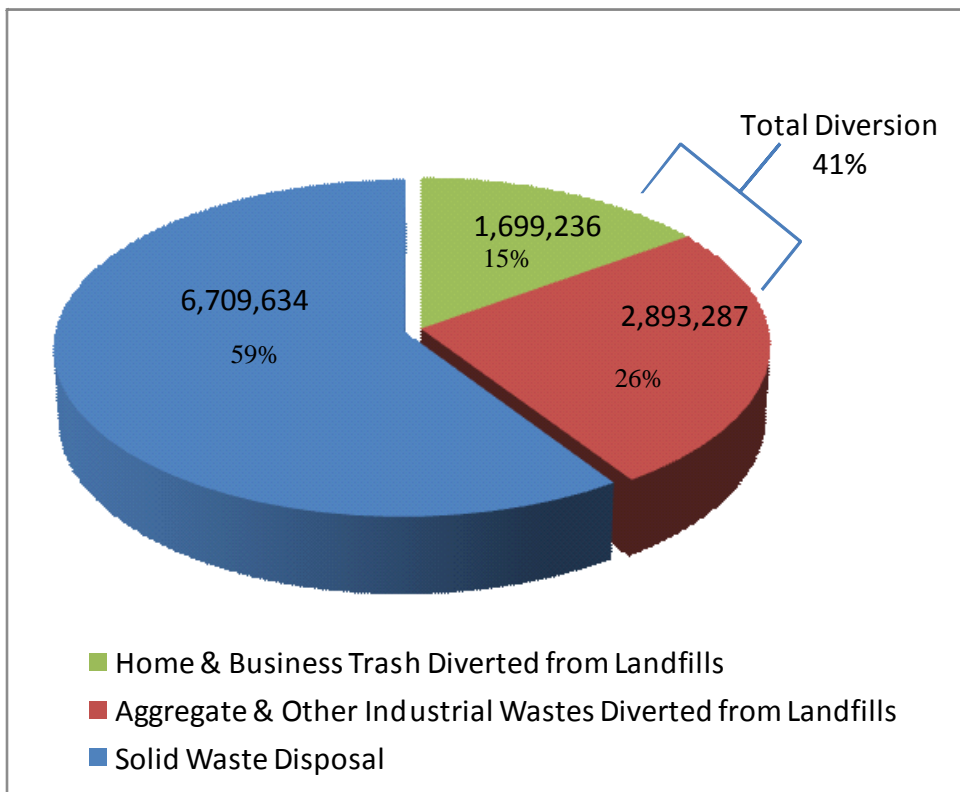


Figure 5: 2010 Materials Management

Additional Information

This report and additional data not reproduced here are available on the Colorado Department of Public Health and Environment website. Please visit us at:

www.cdphe.state.co.us/hm/solidwaste.htm
 and
www.recycle4colorado.info

Impacts and Success Stories

Materials Management

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and what types of materials are being generated is greater than ever. The materials management program has been working with the U.S. EPA Region 8, other state agencies within Region 8, and recycling associations to improve the measurement and tracking of waste and diversion of waste materials. The data collection will provide a first time opportunity to understand regional material generation rates, material flow, landfill diversion and

other data to support and inform the manufacturing sector of economic opportunities in Colorado and the Mountain West. The materials measurement methodology is being utilized by all Region 8 states, was presented on a national webinar and has played a role in the national discussion of the methodology and classification of waste diversion.

The materials management group ensures that recycling activities meet criteria established by the Solid and Hazardous Waste Commission. These criteria include: Environmental benefit of virgin resources being

replaced by the recycled material.

The beneficial use determination (BUD) process assesses the material and its proposed end use. The BUD process includes environmental testing and verification from end users that the waste materials meet appropriate specifications. For example, over the past year, the BUD process was used to improve the reuse of abandoned mine rock, domestic water treatment residuals, oil and gas produced water, coal ash, and petroleum contaminated soil.

Inspections

The solid waste inspectors are responsible for inspecting solid waste facilities, following up on complaints, reviewing groundwater and methane gas reports, and reviewing and inspecting asbestos-contaminated soil projects. The number of inspections in 2011 was virtually the same as in 2010: 127 vs. 125 respectively. The number of compliance advisories decreased slightly from 35 to 32, while compliance orders quadrupled from two to eight. Ongoing litigations decreased slightly from six to five (See Page 5, Figure 4).

The primary reason for the drop in the number of inspections from previous years was the continued large number of complaints received, which increased again from 125 to 150 between 2010 and 2011. In addition, staff time was consumed drafting and finalizing enforcement orders and pursuing ongoing litigations.

The Solid Waste Compliance Assurance Unit has implemented several measures to expedite enforcement actions. The unit increased the number

'A typical ESA is drafted and finalized in much less time than an administrative order.'

of enforcement actions settled via administrative orders instead of litigation. This approach reduced the number of litigations in the enforcement pipeline, which will free up time for additional inspections.

The unit also revised the Solid Waste Enforcement Response Policy. The revised policy includes an early settlement agreement (ESA) approach to

settling enforcement actions. The ESA is a formal enforcement action and may be used in cases where the facility can return to compliance within six months of finalizing the agreement and the penalty is less than \$50,000.

A typical ESA is drafted and finalized in much less time than an administrative order. The time savings affords an opportunity to increase the number of inspections and follow-up enforcement activities. The ESA also results in cost and time savings for the non-compliant facility.

Efforts continue regarding the development and deployment of a solid waste self-certification system modeled on the system already in use by the Hazardous Waste Compliance Assurance Unit. The information gained through self certification will help the unit develop more focused facility training while optimizing inspections.

Trends to Watch

In 1989 Gov. Roy Romer created the Integrated Solid Waste Management Task Force, whose purpose was to study the then-current status of solid waste management in Colorado. The task force produced an interim report in January 1990 with findings and short-term recommendations. In August 1992 the task force finalized the report, *Solid Waste Management in Colorado: Goals, Objectives, and Strategies*. The goals identified in the report included: 1) reducing disposal volumes, 2) reducing waste stream toxicity, 3) encouraging responsible facility siting, 4) educating the public about integrated waste management, 5) promoting public participation in waste solutions, and 6) ensuring funding needed to accomplish the identified goals.

Much has happened in Colorado's solid waste universe in the nearly 20 years since the publication of the report. Colorado's population increased from 3.3 million in 1990 to an estimated five million in 2011. Coloradans disposed of approximately 4.6 millions tons of solid waste in 1995, compared to 8.2 million tons in 2010. The total amount of material recycled is increasing year by year. In addition, more communities and business are involved in Colorado's material management and reuse efforts.

Now, more than ever, materials management is a

'Coloradans disposed of approximately 4.6 millions tons of solid waste in 1995, compared to 8.2 million tons in 2010.'

concept that needs further attention. Materials management incorporates the collection, sorting, transportation and reuse or recycling of materials. The program will embark on a new information collection and outreach effort during the next year. This effort will include hosting town-hall style meetings around the state to collect and evaluate information about solid waste disposal, recycling, materials management, community preferences and the costs, funding and liabilities associated with these activities. The goal will be to revisit the almost 20-year-old integrated materials management plan for Colorado. We hope to identify opportunities to integrate and optimize materials management, collection, transportation, reuse and disposal activities. Hopefully we will achieve a new and revamped scheme for managing materials in Colorado that benefits citizens, communities and industry. We expect this effort to take more than a year, and look forward to reporting our findings as we proceed.

Regulations and Workgroups

The program develops regulations to implement new legislation and to update outdated and restrictive regulations through a robust stakeholder process. Owners, operators, interested citizens, consultants and other stakeholders are invited to provide our technical staff with input regarding the draft regulations. The process includes multiple partnering meetings to review and refine the draft regulations. All parts of the state are engaged, using teleconferencing and interactive, web-based communications. Program staff strive to develop regulations meeting legislative mandates and innovative industry practices, while balancing protection of human health and the environment with industry needs.

Regulations passed during 2011 include new waste tire management regulations, medical waste regulations and waste grease regulations. The new waste tire regulations created a cradle-to-grave/reuse management construct for waste tires in Colorado. The waste tire regulations include manifests, gen-

erator and hauler registration and decals, and funding for waste tire reuse and abandoned tire cleanup.

The waste grease regulations were more problematic, because the waste grease generators and most of the final disposal facilities were exempt from the legislation. Therefore, the program was not able to create a similar cradle-to-grave/reuse construct for waste grease. The waste grease haulers bear the brunt of the burden for tracking waste grease.

The medical waste regulations codified and updated the infectious waste regulations to develop a more efficient and easily implemented medical waste management construct.

In addition, the program hosted the geotechnical workgroup that tackled the basic design for alternative final landfill covers (AFC). AFCs have the potential to save public and private facilities a significant amount of money during closure and post-closure care activities, while providing a more sustainable and protective final landfill cover.

2010 Recycling and Waste Diversion Facts

Municipal Solid Waste (MSW) Annual Totals

Total MSW Generated
8,269,754 tons

MSW Recycling Rate
20.5 percent (9.4 percent with scrap metal excluded)

Total Diversion Rate for All Tracked Waste, Including MSW
40.6 percent

Per Capita Generation
MSW Disposed: 7.2 lbs.
MSW Recycled: 1.9 lbs.
MSW Generated: 9.1 lbs.

1,699,236 tons of MSW was recycled.

2.8 million tons of asphalt, concrete, scrap metal, C&D and organic material was diverted from landfills for recycling.



For additional data on recycling and waste diversion see www.recycle4colorado.info/

1,057,721 tons of recyclable material was used in manufacturing glass and metal products.

214,000 tons of single-stream recycling was collected.

106,027 tons of municipally generated material including food waste was composted.

19.6 million pounds of electronic waste was collected for recycling.

Benefits of MSW Recycling

Energy Savings
3.2 million barrels of oil²

Energy savings were equivalent to energy used by 121,000 homes in a year.²

Natural Resources Conserved
18,848 acres of forest²

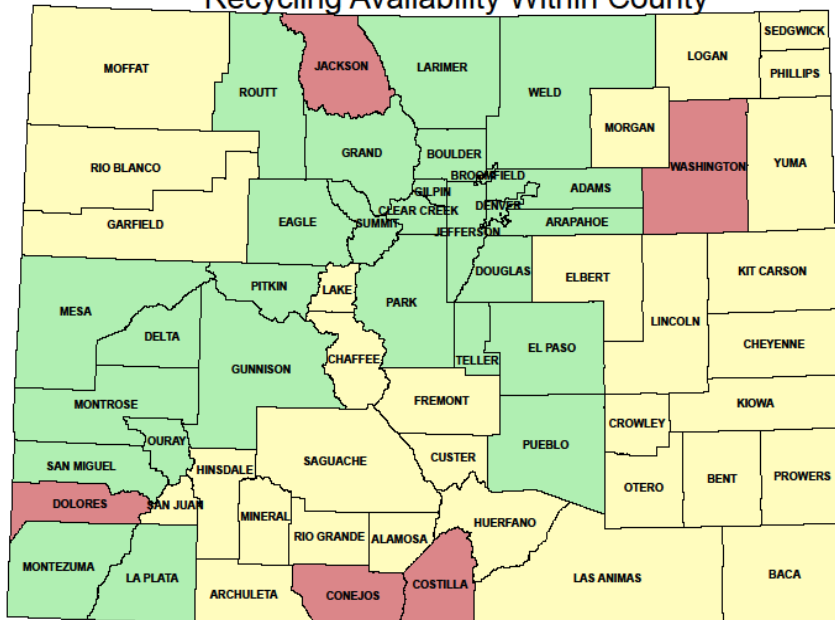
7,300 railcars worth of coal¹

Greenhouse Gas Emissions Avoided
1.4 million metric tons of carbon-dioxide emissions prevented, which equates to emissions from 256,000 cars²

¹US EPA "WARM" Waste Reduction Model Version 11

²USEPA "Greenhouse Gas Equivalency Calculator" updated May 2011

Recycling Availability Within County



Updated September, 2011

