



Department of
Toxic Substances
Control



CalEPA
California Environmental
Protection Agency

Draft Hazardous Waste Management Report

Implementation of California Health and Safety Code Section 25135

Section 3

3. Destinations of Hazardous Waste

For this Report, the term *destination facility* refers to all destinations of hazardous waste.¹ This may include, but not be limited to, recyclers, treatment facilities, disposal facilities, and many out-of-state non-hazardous waste landfills.² Hazardous wastes are sent to these facilities for recycling, treatment, and/or disposal.

Central to the management of hazardous waste is land disposal. If a hazardous waste cannot be recovered, treated, or recycled, it must be disposed of in an adequately designed land disposal unit (i.e., land treatment unit, landfill, surface impoundment, or waste pile). Prior to RCRA, disposal of hazardous waste in the land (e.g., buried in a landfill) was completed in a way that led to damage to human health and the environment, such as contamination of groundwater. The RCRA program established extensive technical requirements to ensure that land-based units prevent hazardous leachate from leaking into the environment.³ Like RCRA, California's program for hazardous waste management includes specific design requirements for land disposal units.

In 1984, the United States Congress added the Hazardous and Solid Waste Amendments (HSWA) to the RCRA program. HSWA established the authority for the Land Disposal Restriction (LDR) program, which complements RCRA's technical design requirements and adds three prohibitions – disposal, dilution, and storage.⁴ The disposal prohibition is one of the primary elements of the LDR program, requiring that hazardous wastes be treated before they are disposed of to a hazardous waste landfill. Properly treated hazardous wastes pose less of a risk to groundwater, surface water, and air, because treatment reduces characteristics like toxicity by destroying or removing the harmful constituents. Treatment also reduces the mobility of harmful constituents.

While land disposal is central to safe hazardous waste management, it may not be the preferred management method. In developing the Hazardous Waste Management Plan, DTSC will review and analyze waste management in California to identify additional opportunities to better support and apply the waste management hierarchy.⁵

The information in this section relates to the destinations of both manifested and unmanifested hazardous wastes.

¹ HSC § 25135(b)(2)(B)

² Many States do not recognize non-RCRA hazardous wastes coming from other States to be hazardous in their State. Therefore, many non-RCRA wastes are typically not required to be disposed in a hazardous waste landfill.

³ U.S. EPA RCRA Orientation Manual 2014

⁴ [U.S. EPA website regarding Land Disposal Restrictions for Hazardous Waste.](#)

⁵ [https://www.epa.gov/sites/default/files/2016-](https://www.epa.gov/sites/default/files/2016-01/documents/review_of_several_state_planning_approaches.pdf)

[01/documents/review_of_several_state_planning_approaches.pdf](https://www.epa.gov/sites/default/files/2016-01/documents/review_of_several_state_planning_approaches.pdf)

3.1 Manifested Waste

In accordance with HSC § 25135(b)(1), this section includes available information and discussion about hazardous waste streams currently being managed either in California or in other states. In addition, this section presents information for the following elements:

- The destination to which each hazardous waste stream is shipped
- The amount of hazardous waste disposed to land in California and other states
- The amount of hazardous waste treated in California and other states
- The amount of hazardous waste regulated under RCRA
- The amount of hazardous waste regulated only in California

The numerous sources used to compile the required information are discussed in the relevant subsections below. The primary source of information for manifested hazardous waste in this Report is DTSC's Hazardous Waste Tracking System (HWTS), which uses data from hazardous waste manifests. This Report incorporates adjusted HWTS data from 2010 through May 2022.

Since 1983, the number of hazardous waste facilities in California with an operating hazardous waste management permit has decreased. Figure 3.1-1 shows the decrease from more than 400 facilities to fewer than 100 still in operation.

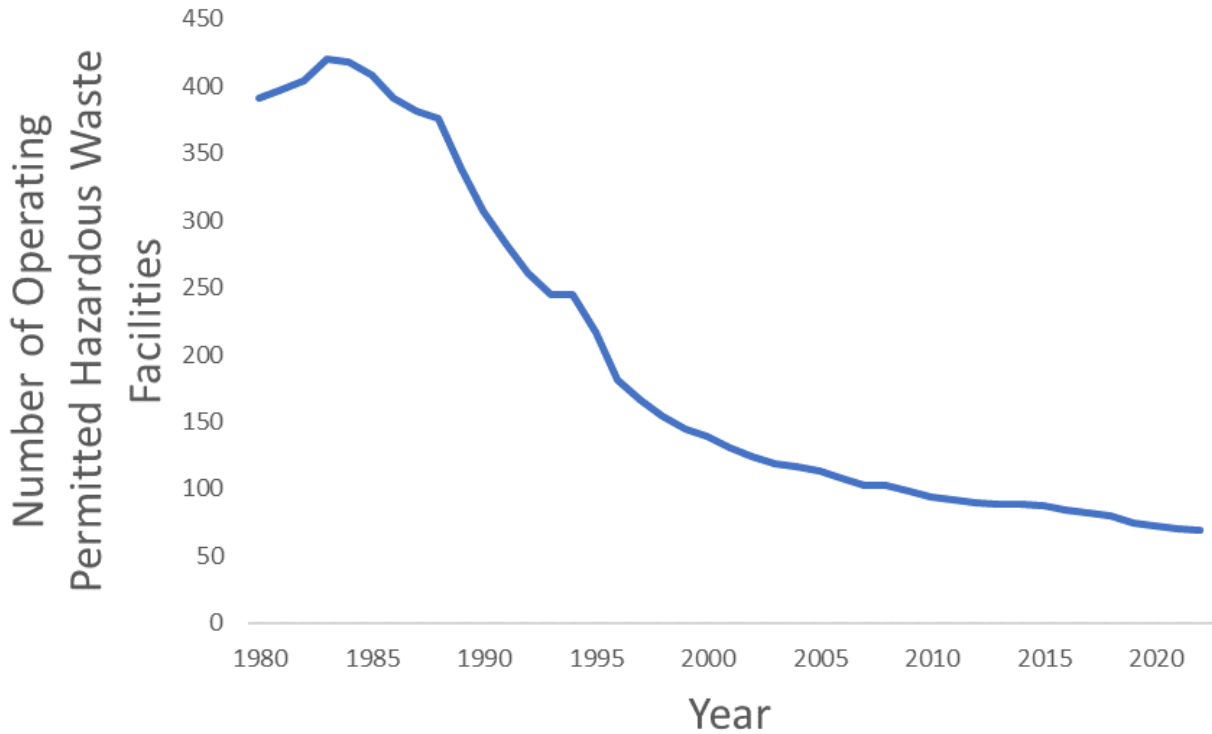


Figure 3.1-1: Number of California Hazardous Waste Facilities in Operation

Similarly, the number of destination facilities that receive California's manifested hazardous waste has also decreased, as shown in Figure 3.1-2. This trend includes both in-state and out-of-state destination facilities. There are two likely causes behind this trend. One is the additional hazardous waste facility siting and permitting requirements California has enacted. Another likely cause is a national consolidation and restructuring within the hazardous waste management industry, which has been observed by U.S. EPA.

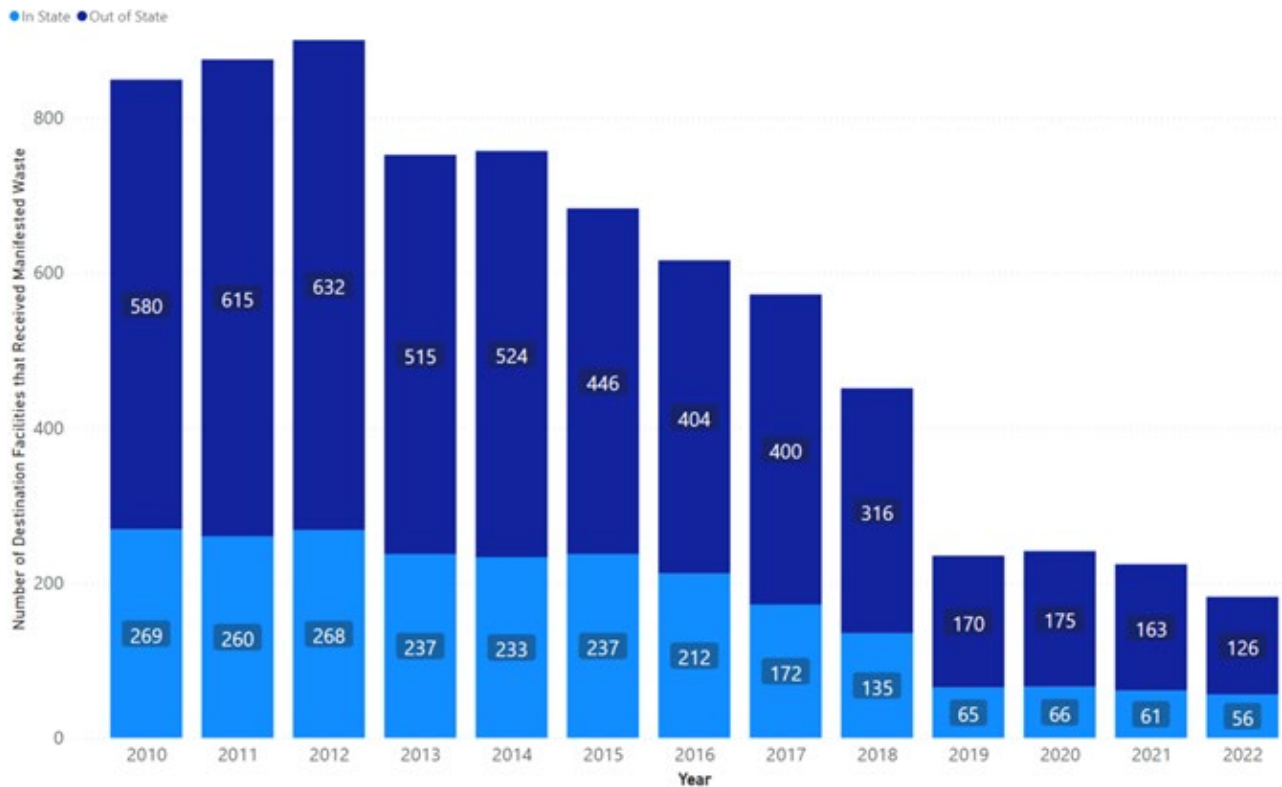


Figure 3.1-2: Number of Distinct EPA ID Numbers Managing Manifested Hazardous Waste (January 2010 to May 2022)

Since 2010, California generated 21.05 million tons of manifested hazardous waste. Once hazardous waste is generated, it needs to be properly managed. Table 3.1-1 provides an annual breakdown of the quantity of manifested hazardous waste in California, the quantity managed in California, and the quantity managed out of state.

Table 3.1-1: Annual Breakdown of California’s Manifested Waste: Manifested in California, Managed in California, and Managed Out of State from 2010-2022

Year	Quantity Manifested in California	Quantity Managed in California (Tons)	Quantity Managed in California (Percent)	Quantity Managed Out of State (Tons)	Quantity Managed Out of State (Percent)
2010	1,749,712	1,091,641	62%	658,071	38%
2011	1,790,019	934,786	52%	855,233	48%
2012	1,626,602	903,121	56%	723,481	44%
2013	1,532,005	804,325	53%	727,680	47%
2014	1,663,601	839,639	50%	823,962	50%
2015	1,746,462	921,003	53%	825,459	47%
2016	1,784,320	1,032,100	58%	752,220	42%
2017	1,968,877	950,161	48%	1,018,716	52%
2018	1,982,133	1,037,403	52%	944,730	48%
2019	1,805,200	902,662	50%	902,538	50%
2020	1,565,685	826,963	53%	738,722	47%
2021	1,413,212	731,908	52%	681,305	48%
2022	423,275	229,667	54%	193,608	46%

To understand how manifested hazardous waste is being managed, hazardous waste manifests and HWTS use Management Method Codes to describe the type of management system used to treat, recover, or dispose of the waste.

Land disposal⁶ has been one of the most common waste management methods in the United States, and it is the most common method for managing hazardous waste generated in California. Since 2010, 59.2 percent of the manifested hazardous waste generated in California (12.5 million tons) has been disposed of in a land disposal unit (Management Method Code: H132).

The second most common hazardous waste management method is “other recovery or reclamation for reuse” (Management Method Code: H039), which comprises 24.2 percent of the total (5.09 million tons). Incineration (Management Method Code: H040) is the third most common method; however, it has only been used for 2.31 percent of the hazardous waste managed since 2010 (620,000 tons). Figure 3.1-3 shows how California’s hazardous waste is being managed at destination facilities.

⁶ Cal. Code Regs., tit. 22, § 66260.10

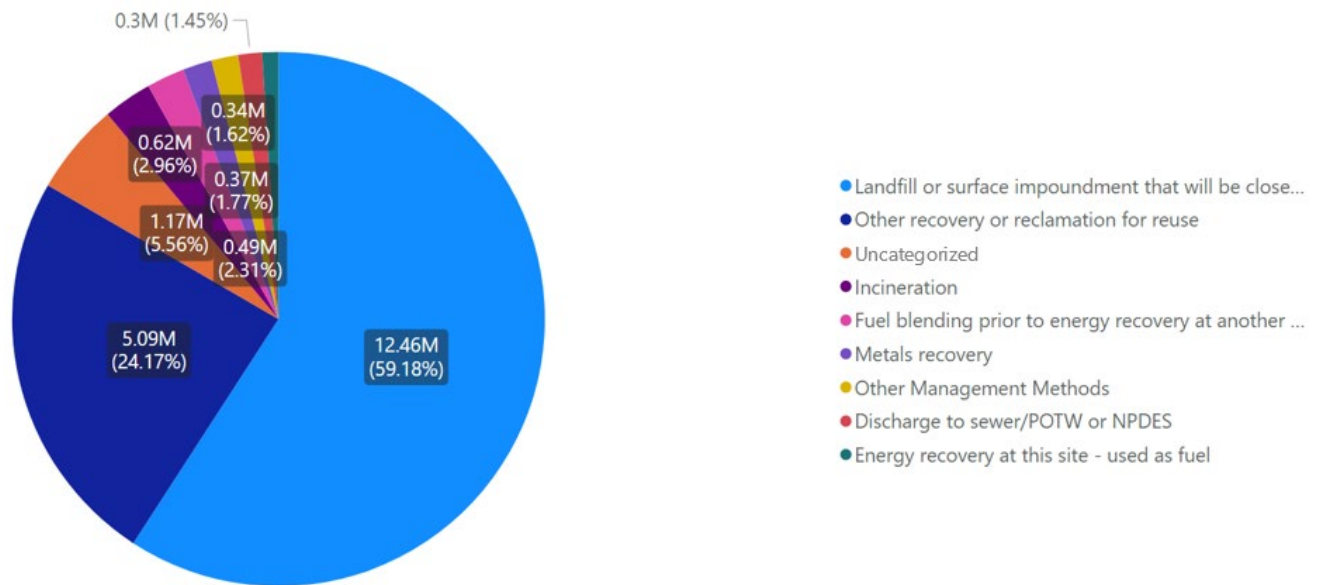


Figure 3.1-3: Quantity of Hazardous Waste per Management Method (January 2010 to May 2022)

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

3.1.1 Management of California’s Manifested Hazardous Waste In State

Since 2010, California generators have shipped 21.05 million tons of manifested hazardous waste. Due to several factors, not all hazardous waste generated in California is managed⁷ within California. Since 2010, 53.2 percent of manifested hazardous waste has been managed within the state (11.21 million tons). The remaining 46.8 percent (9.85 million tons) was managed outside the state. Figure 3.1-4 shows the amount of manifested hazardous waste managed within California each year since 2010.

⁷ Treated, recycled, or disposed at a destination facility.

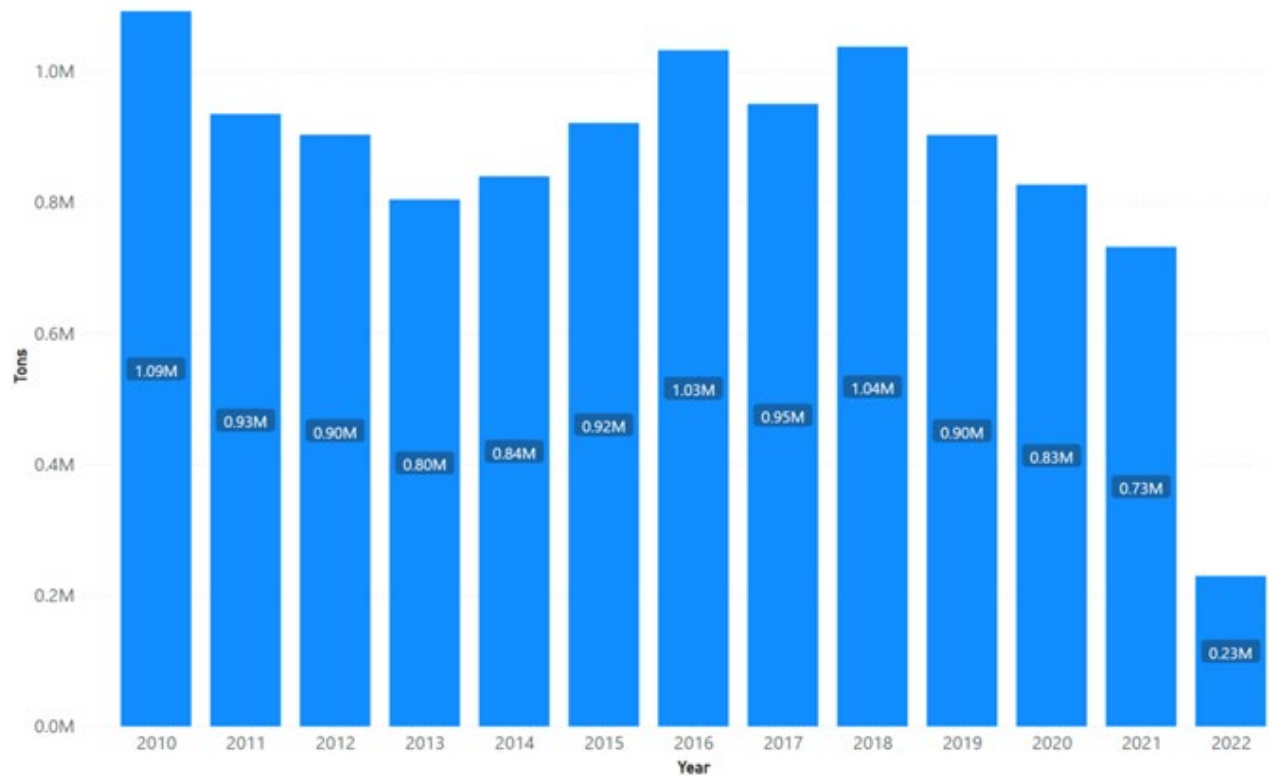


Figure 3.1-4: Amount of Manifested Hazardous Waste Managed within California (January 2010 to May 2022)

Since 2010, 86.1 percent of the manifested hazardous waste managed within California has been non-RCRA hazardous waste (9.65 million tons), and 12.9 percent (1.45 million tons) has been RCRA hazardous waste, as shown in Figure 3.1-5.

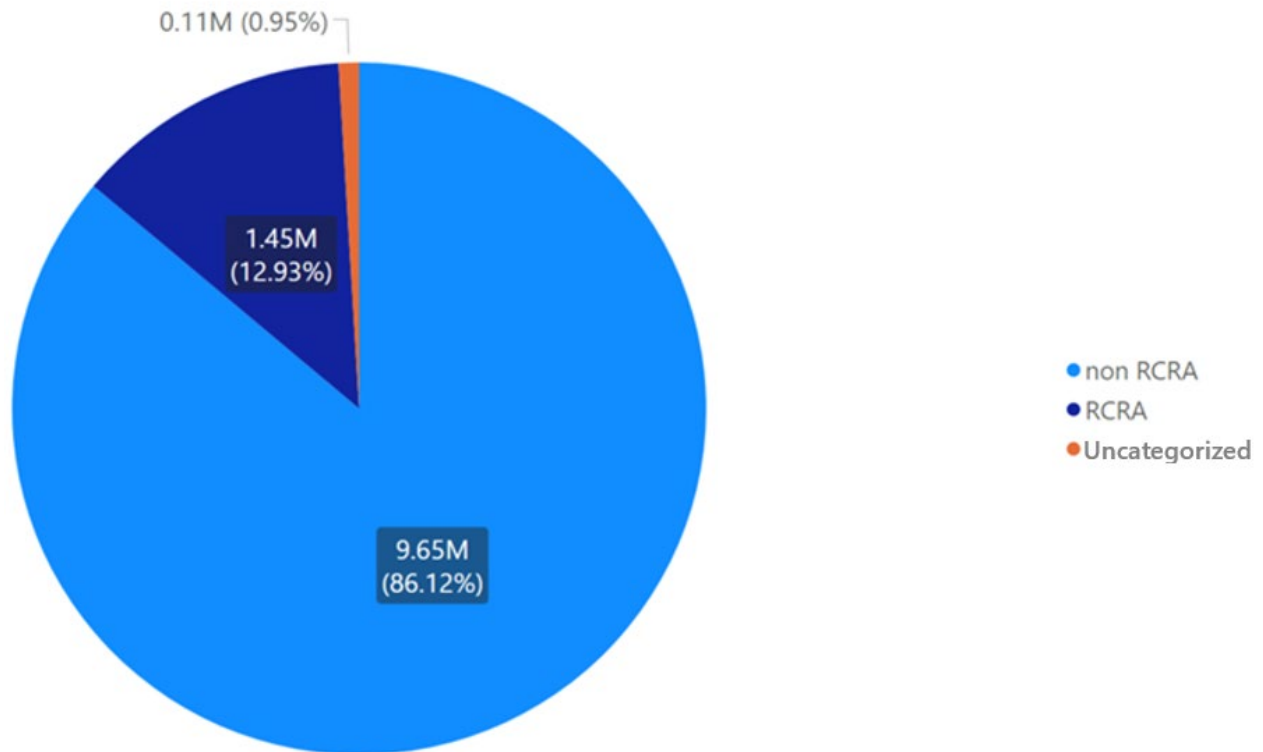


Figure 3.1-5: RCRA and Non-RCRA Manifested Hazardous Waste Managed within California, tons (January 2010 to May 2022)

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

As mentioned in Section 2.1.6, California’s Largest Hazardous Waste Streams, three waste streams have consistently been the largest by weight since 2010. The largest waste stream generated in California each year is Contaminated Soil from Site Cleanups (State Waste Code 611). The second largest is Waste Oil and Mixed Oil (State Waste Code 221). The third largest is Other Inorganic Solids (State Waste Code 181). Since 2010, these three waste streams have accounted for 64.8 percent of the total waste generated, or 13,651,300 tons.

3.1.1.1 Contaminated Soil from Site Cleanups

California has generated more Contaminated Soil from Site Cleanups (contaminated soil) than any other waste stream since 2010 – on average, more than 567,000 tons each year (Figure 3.1-6). Just under half of California’s contaminated soil has been managed in California. Since 2010, 3.13 million tons (43.9%) of contaminated soil have been managed in California, while 4.00 million tons (56.1%) has been managed out of state. The annual quantity of contaminated soil managed within California can be seen in Figure 3.1-6.

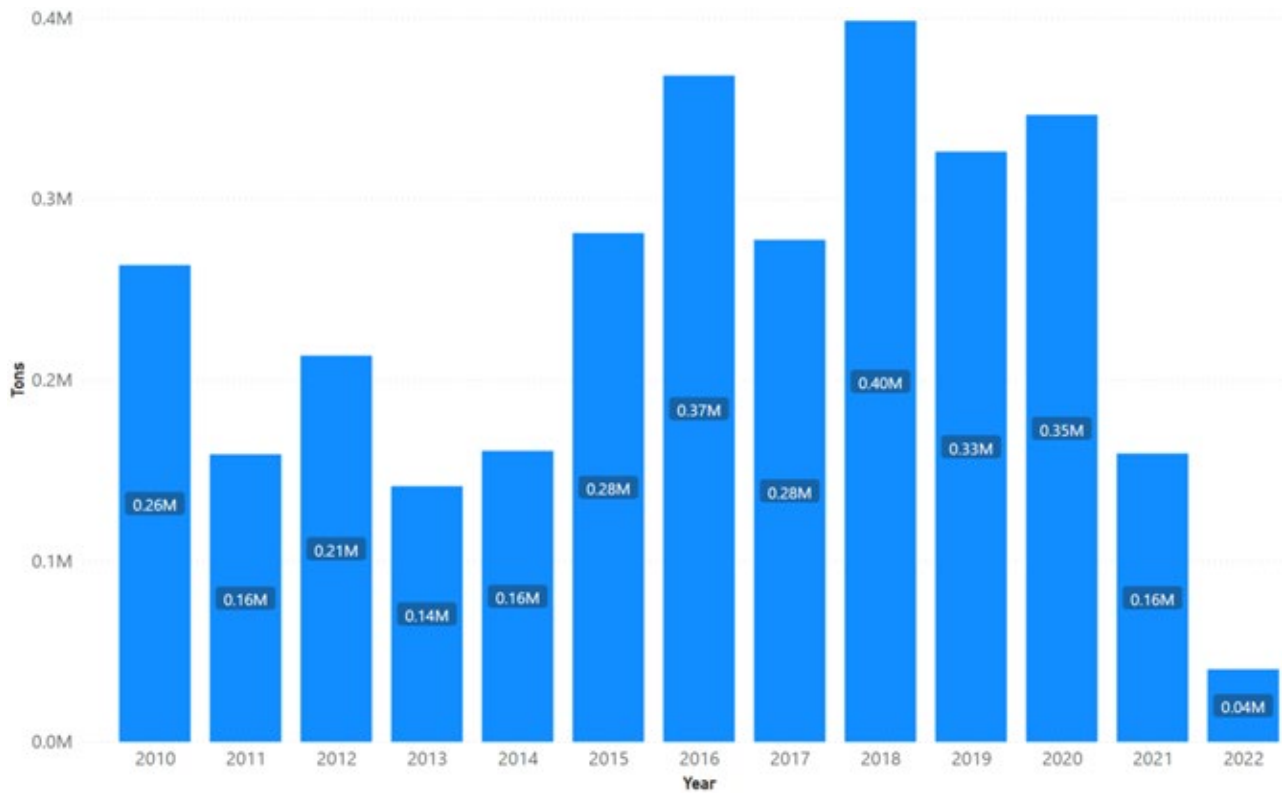


Figure 3.1-6: Amount of Contaminated Soil Managed in California (January 2010 to May 2022)

Approximately 93 percent of the contaminated soil generated in California since 2010 has been non-RCRA hazardous waste (Figure 3.1-7).

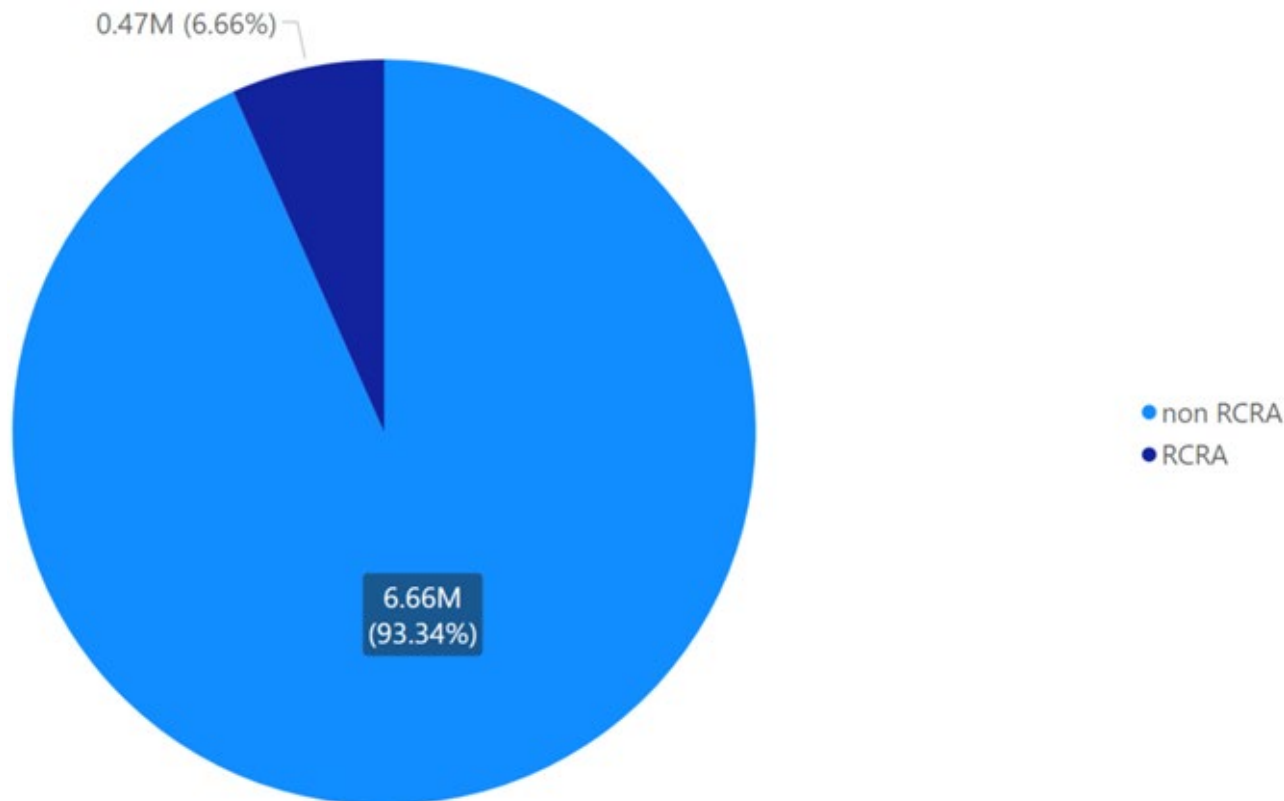


Figure 3.1-7: Amount of RCRA and Non-RCRA Contaminated Soil Generated in California (January 2010 to May 2022)

Since 2010, 99.9 percent of the contaminated soil disposed of within California has been disposed of within three locations:

- 2.10 million tons (66.9%) was disposed of at Clean Harbors Buttonwillow LLC.
- 0.978 million tons (31.2%) was disposed of at Chemical Waste Management Inc Kettleman.
- 58,400 tons (1.9%) was disposed of at Mecca Resources Facility.⁸

3.1.1.2 Waste Oil and Mixed Oil

Since 2010, California's second largest type of hazardous waste generated has been Waste Oil and Mixed Oil (waste oil). On average, California manifests more than 323,000 tons of waste oil each year.

The vast majority of California's waste oil is managed in California. Since 2010, 3.12 million tons (92.0%) has been managed in California compared to 0.269 million tons (7.95%) managed out of state. The annual quantity of waste oil managed within California can be seen in Figure 3.1-8.

⁸ Western Environmental Incorporated, Mecca, California Community Notice, May 2014 ([Weblink](#))

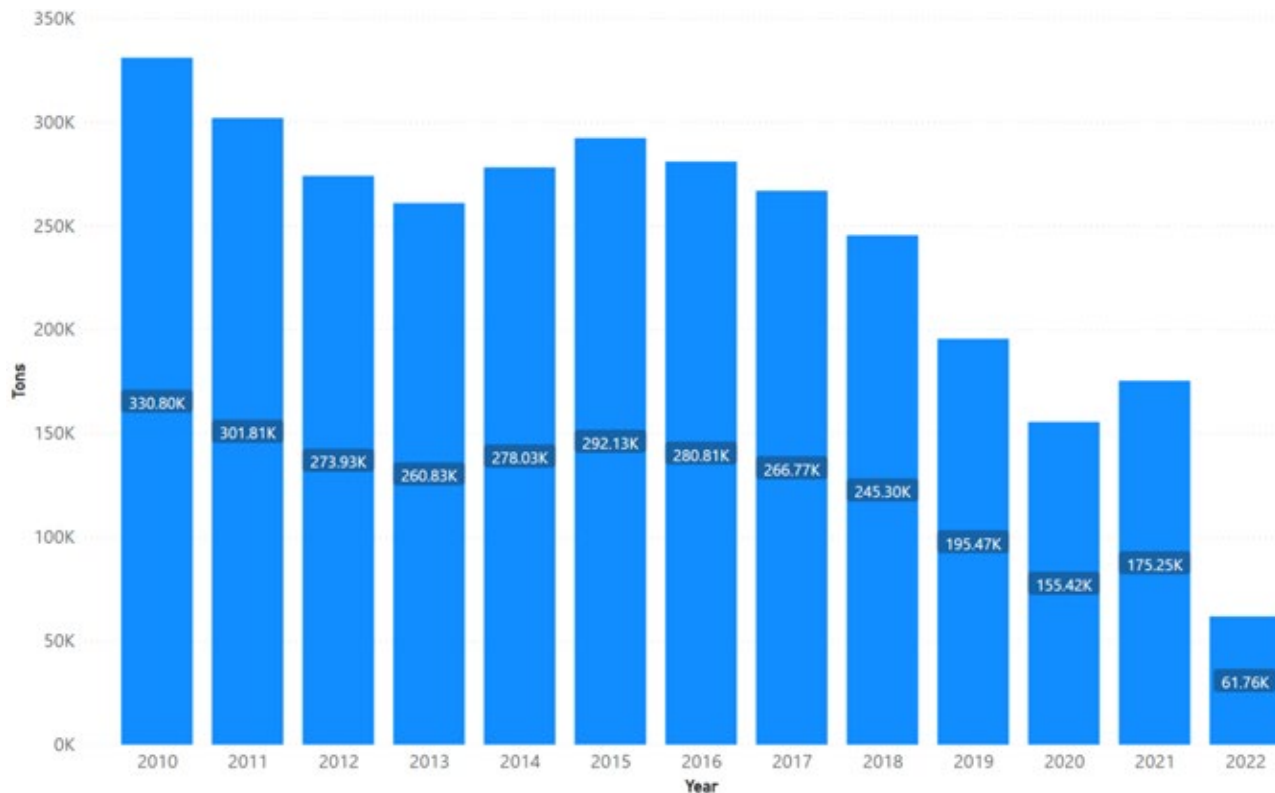


Figure 3.1-8: Quantity of Waste Oil Managed in California (January 2010 to May 2022)

Since 2010, more than 95.4 percent of the waste oil managed within California has been managed at four locations:

- 2.20 million tons (70.7%) was managed at Demenno-Kerdoon.
- 374,100 tons (12.0%) was managed at Safety-Kleen of California Inc.
- 200,700 tons (6.4%) was managed at Industrial Service Oil Co Inc.
- 194,200 tons (6.2%) was managed at Agritec INT DBA Cleantech Environmental Inc.

3.1.1.3 Other Inorganic Solid Waste

Since 2010, California's third largest type of hazardous waste generated has been Other Inorganic Solid Waste (inorganic solid waste). On average, California manifests more than 264,000 tons of inorganic solid waste each year, with just under half of it managed in California. Since 2010, 1.43 million tons (45.7%) of inorganic solid waste was managed in California while 1.70 million tons (54.3%) was managed out of state. The annual quantity of inorganic solid waste managed within California can be seen in Figure 3.1-9.

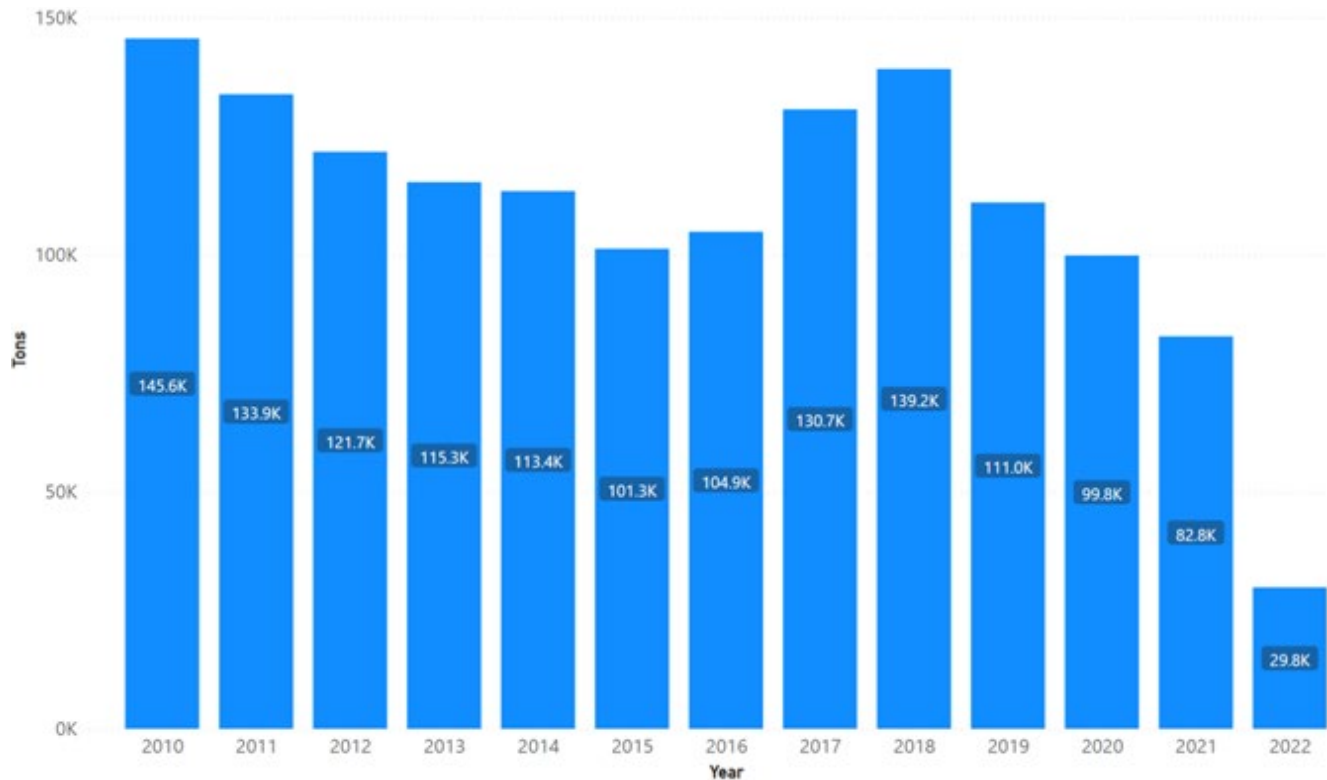


Figure 3.1-9: Quantity of Inorganic Solid Waste Managed in California (January 2010 to May 2022)

Since 2010, 98.5 percent of the inorganic solid waste managed within California was shipped to five locations:

- 822,600 tons (57.6%) was managed at Clean Harbors Buttonwillow LLC.
- 417,000 tons (29.2%) was managed at Chemical Waste Management Inc. Kettleman.
- 88,800 tons (6.2%) was managed at KW Plastics of California.
- 40,400 tons (2.8%) was managed at Quemetco Inc.
- 39,900 tons (2.8%) was managed at Exide Technologies Inc.

3.1.2 Management of California's Manifested Hazardous Waste in Other States

Since 2010, California has generated 21.05 million tons of manifested hazardous waste. Of that waste, 46.8 percent was managed outside California (9.85 million tons). The top three states that received the most manifested hazardous waste from California were:

- Utah – 3,158,000 tons (15.2%)
- Arizona – 2,839,400 tons (13.4%)
- Nevada – 2,169,400 tons (10.4%)

As discussed in Section 2.3.3, California’s hazardous waste criteria are more stringent and broader in scope, which results in California identifying more wastes as hazardous than does RCRA. As such, California’s manifested hazardous waste is organized into two categories: “RCRA hazardous waste” and “non-RCRA hazardous waste.”

Non-RCRA hazardous waste generated in California is typically required to be managed as hazardous waste within California.⁹ Many states do not consider non-RCRA hazardous waste to be hazardous waste. Two exceptions to this are Oregon and Nevada which require wastes that are considered hazardous waste in their state of origin to be managed as hazardous waste.¹⁰

3.1.2.1 Management in Utah

Utah has received the most manifested hazardous waste from California since 2010. Utah has received 3,158,000 tons (15.2%), ranging from 160,300 tons to 478,100 tons per year (Figure 3.1-10).

⁹ There are some non-RCRA wastes, like some treated wood, which are allowed to be disposed in a non-hazardous waste landfill in (HSC § 25230.3).

¹⁰ Oregon Department of Environmental Quality 340-093-0040(2)(a) ([Weblink](#)) and Nevada Administrative Code 444.843 ([Weblink](#))

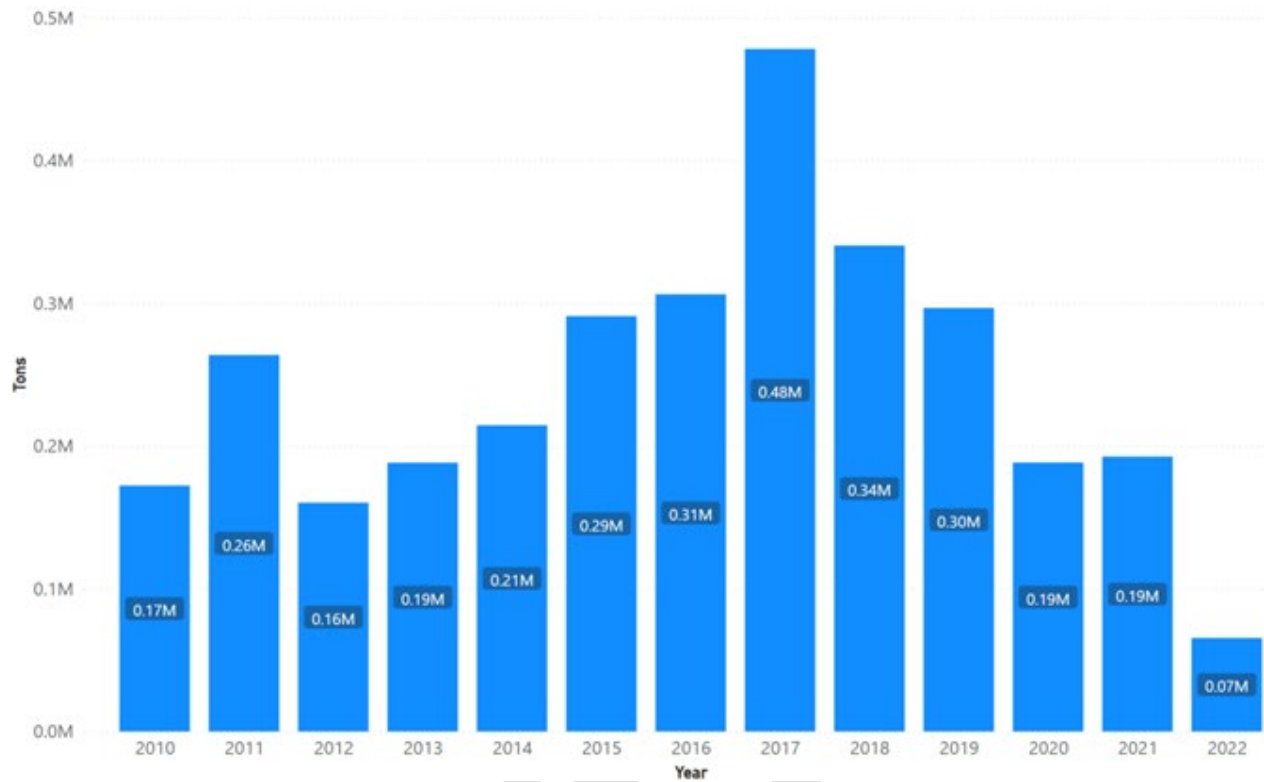


Figure 3.1-10: Quantity of Manifested Hazardous Waste Managed within Utah (January 2010 to May 2022)

About 88.8 percent of all manifested hazardous waste shipped to Utah was non-RCRA hazardous waste, while 10.8 percent was RCRA hazardous waste (Figure 3.1-11).

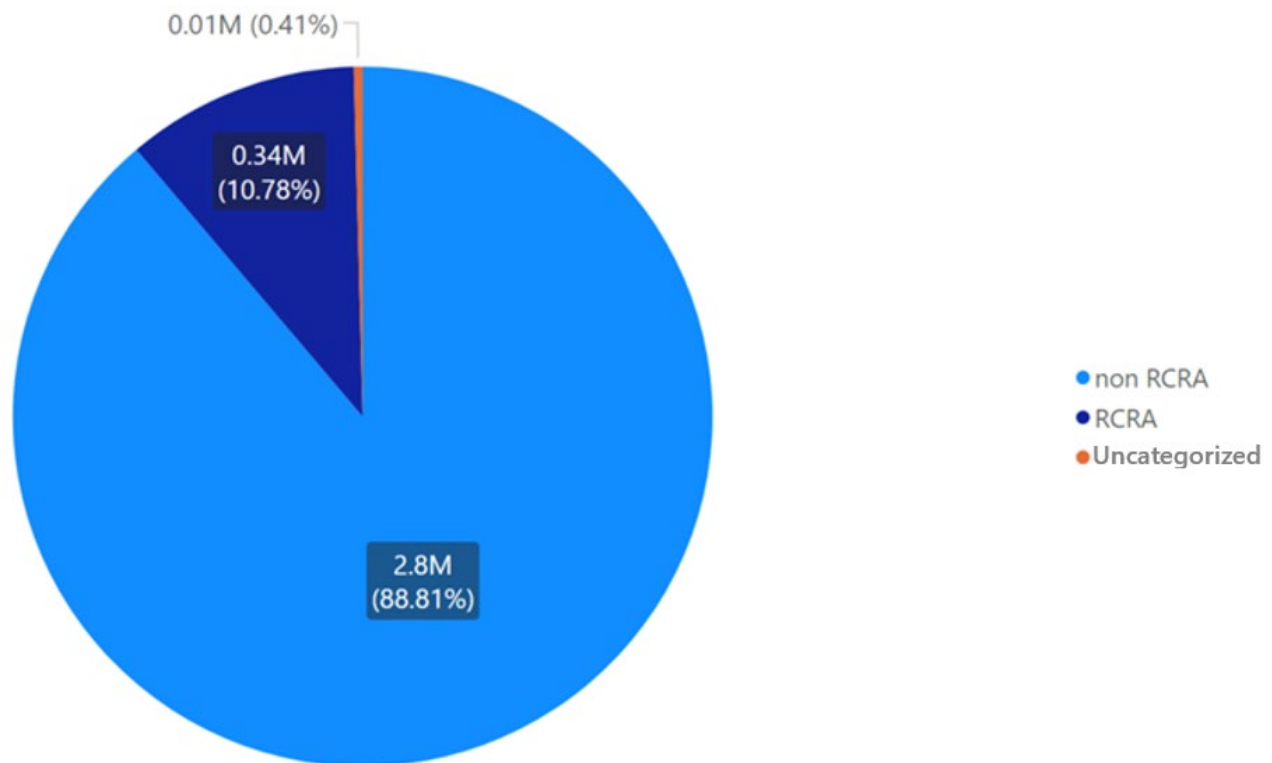


Figure 3.1-11: Amount of RCRA vs Non RCRA Waste Shipped to Utah, tons (January 2010 to May 2022)

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

The primary management method for California's manifested hazardous waste in Utah was landfilling, at 2,762,100 tons (87.5%). The next largest management method, incineration (Management Code H040), accounted for 10.2 percent of the manifested hazardous waste shipped to Utah from California (322,700 tons).

Since 2010, a total of 13 Utah facilities have managed California's hazardous waste. The top two facilities have managed 93.5 percent of the manifested hazardous waste shipped to Utah from California (2,620,900 tons).

One waste stream dominated the manifested hazardous waste shipped to Utah – contaminated soil. Since 2010, about 2,360,000 tons of contaminated soil has been shipped to Utah. This equates to 74.7 percent of all hazardous waste shipped to Utah from California. The primary method of managing California's contaminated soil within Utah is landfilling at 2,344,000 tons (99.3%).

Of the 2,360,000 tons of contaminated soil sent to Utah, 98.9 percent was managed at one facility: ECDC Environmental, a non-hazardous Subtitle D landfill. The company is identified by two EPA ID Numbers within HWTS: UTC093012201 and UTR000000687.

Clean Harbors Aragonite LLC, a commercial hazardous waste incinerator, received 321,900 tons (99.8%) of waste sent to Utah from California for incineration. The company is identified by EPA ID Number UTD981552177 in HWTS.

3.1.2.2 Management in Arizona

Arizona has received the second most manifested hazardous waste from California since 2010. Arizona has received 2,839,400 tons (13.6%) of California's manifested hazardous waste, ranging from 153,100 tons to 321,900 tons per year (Figure 3.1-12).

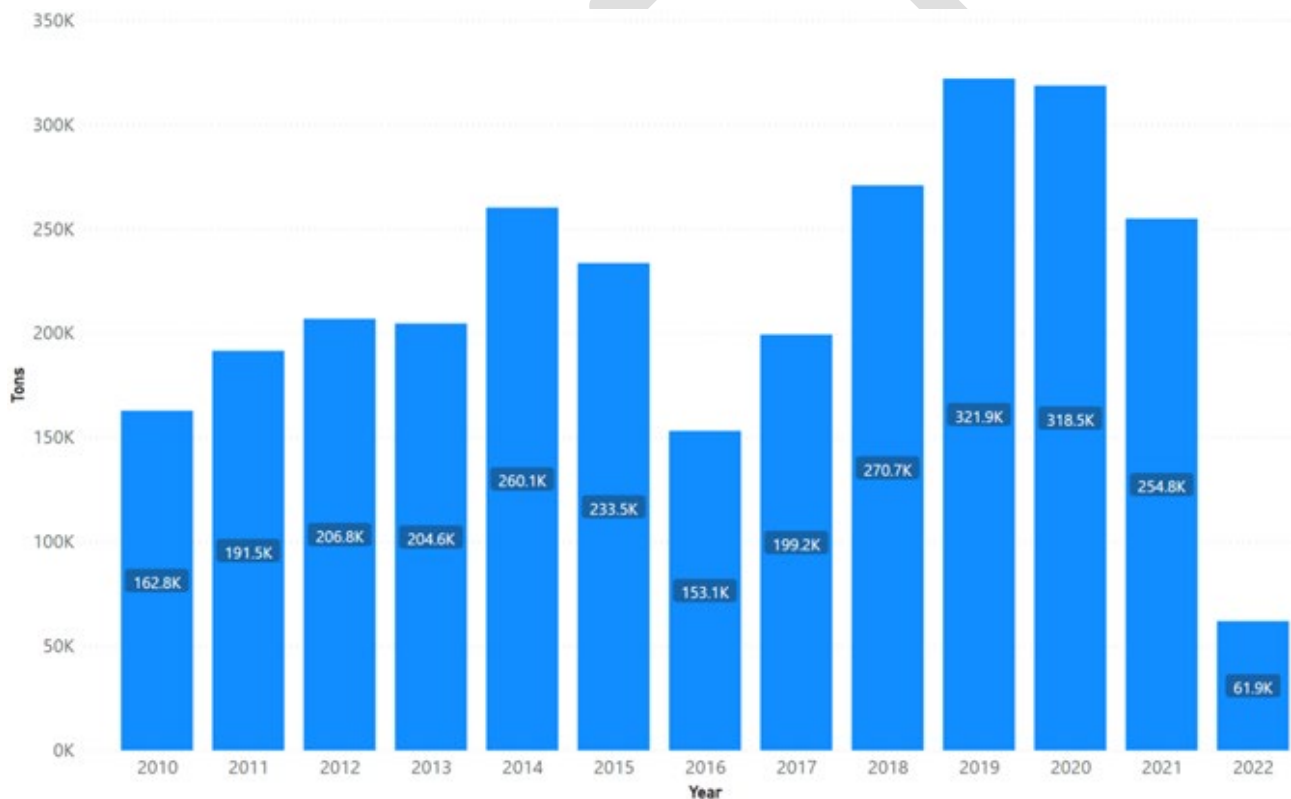


Figure 3.1-12: Amount of Manifested Hazardous Waste Managed within Arizona (January 2010 to May 2022)

About 94.6 percent of all manifested hazardous waste sent to Arizona was non-RCRA hazardous waste, and 3.3 percent was RCRA hazardous waste (Figure 3.1-13).

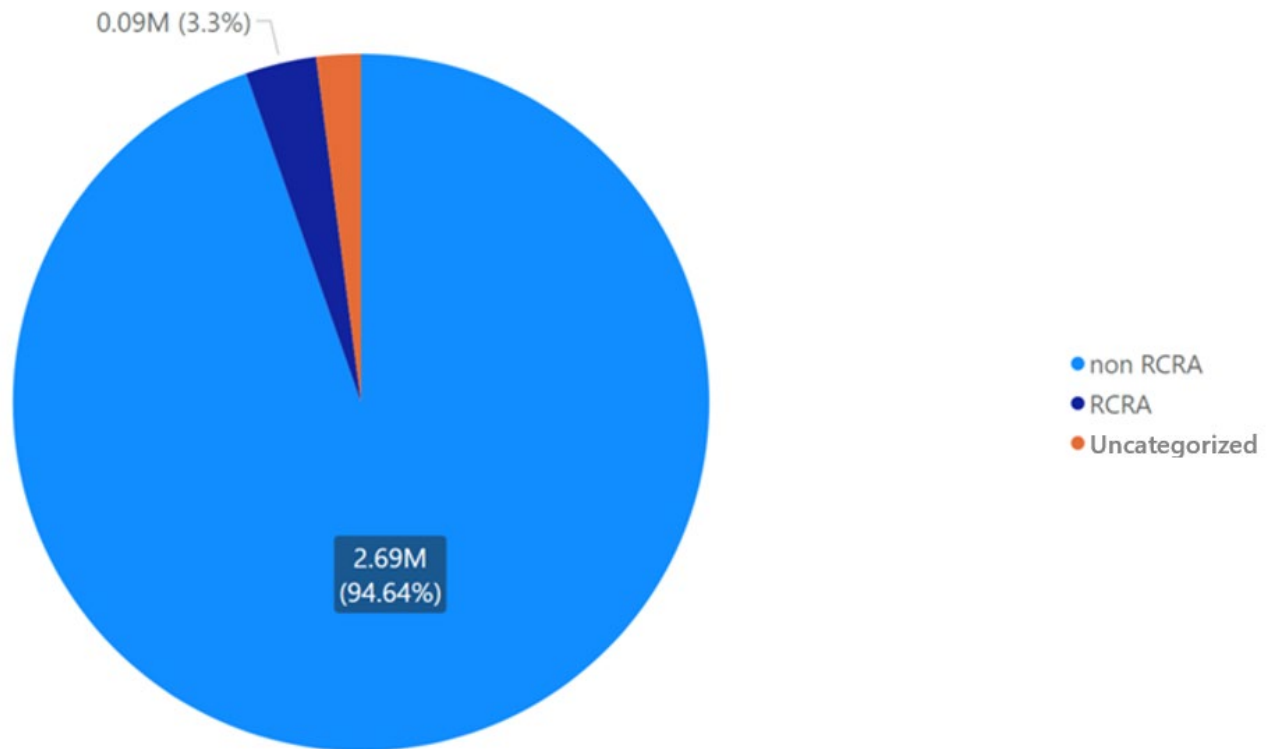


Figure 3.1-13: Amount of RCRA vs Non RCRA Waste Shipped to Arizona, tons (January 2010 to May 2022)

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

The types of manifested hazardous waste shipped to Arizona for management are more varied than those shipped to Utah. Still, the largest waste stream was contaminated soil. Since 2010, about 980,200 tons of contaminated soil has been manifested and shipped to Arizona from California. This equates to 34.5 percent of all manifested hazardous waste sent to Arizona from California. The next largest waste stream was inorganic solid waste, with 619,400 tons shipped since 2010. The third largest waste stream shipped to Arizona was asbestos-containing waste, with 298,900 tons shipped since 2010.

The top three waste streams shipped to Arizona from California are managed at three facilities:

- Copper Mountain Landfill (EPA ID Number: AZR000002428)
- La Paz County Landfill (EPA ID Number: AZR000520882 and AZC950823111)
- South Yuma County Landfill (EPA ID Number: AZR000506980)

Of the 980,200 tons of manifested contaminated soil shipped to Arizona, 94.0 percent was managed at:

- South Yuma County Landfill – 491,200 tons (50.1%)
- La Paz County Landfill – 266,000 tons (27.1%)
- Copper Mountain Landfill – 164,900 tons (16.8%)

The next largest waste stream shipped to Arizona from California was inorganic solid waste. Of the 619,400 tons sent to Arizona, 87.3 percent was managed at:

- Copper Mountain Landfill – 228,200 tons (36.8%)
- La Paz County Landfill – 219,300 tons (35.4%)
- South Yuma County Landfill – 93,500 tons (15.1%)

The third largest waste stream shipped to Arizona from California was asbestos-containing waste. Of the 298,900 tons sent to Arizona, 99.9 percent was managed at:

- La Paz County Landfill – 249,900 tons (83.6%)
- South Yuma County Landfill – 45,000 tons (15.1%)
- Copper Mountain Landfill – 3,600 tons (1.2%)

3.1.2.3 Management In Nevada

Nevada has received the third most manifested hazardous waste from California generators since 2010. Nevada has received 2,169,400 tons (10.4%) of California's manifested hazardous waste, ranging from 139,300 tons to 234,400 tons per year (Figure 3.1-14).

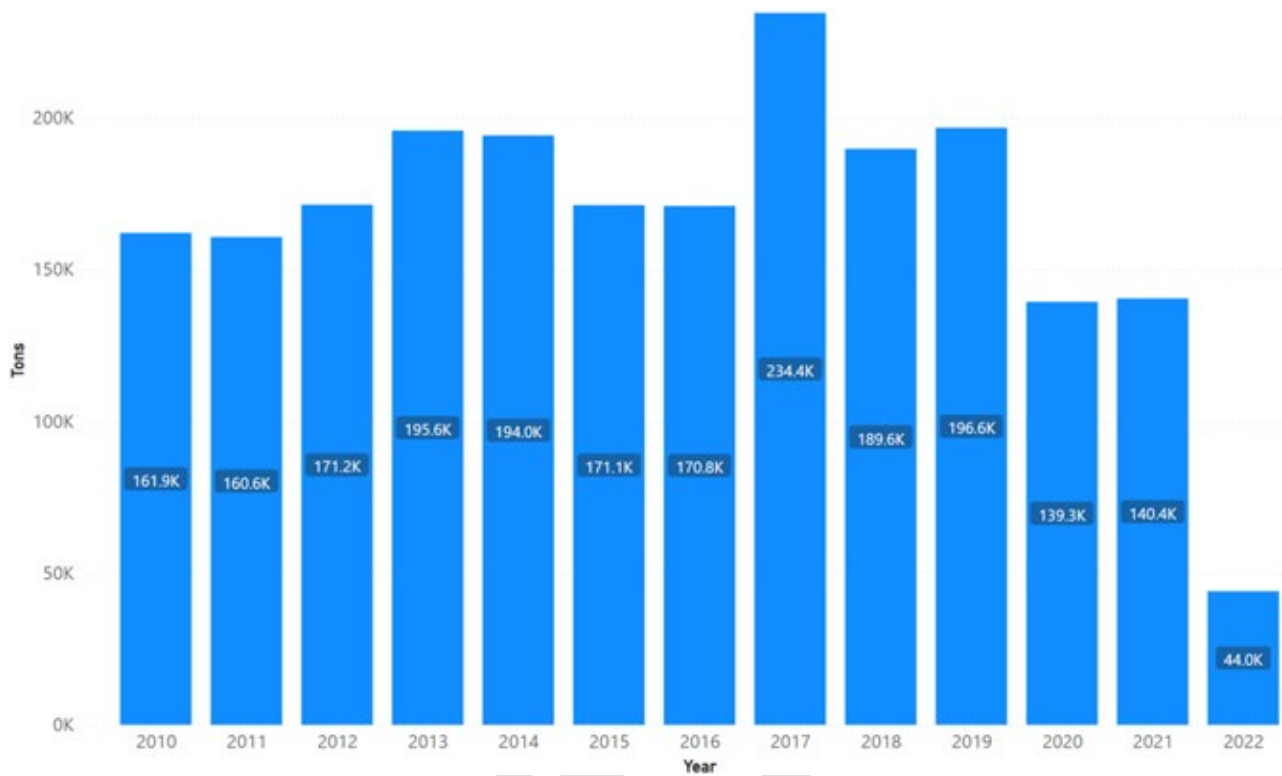


Figure 3.1-14: Quantity of Manifested Hazardous Waste Managed within Nevada (January 2010 to May 2022)

About 1,236,600 tons (57.0%) of all manifested hazardous waste shipped to Nevada from California was non-RCRA hazardous waste, and 910,400 tons (42.0%) was RCRA hazardous waste (Figure 3.1-15).

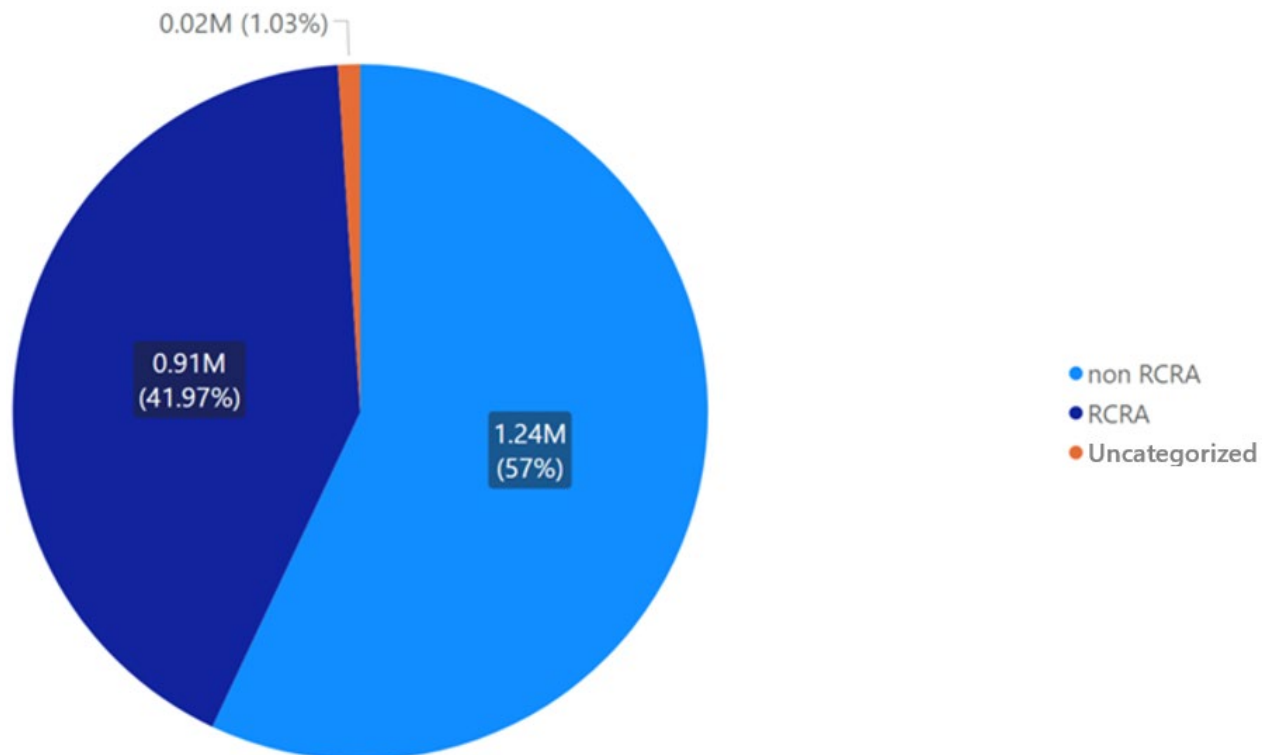


Figure 3.1-15: Quantity of RCRA vs Non RCRA Waste Shipped to Nevada, tons (January 2010 to May 2022)

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

Unlike in Utah or Arizona, the largest waste stream shipped to Nevada since 2010 has been inorganic solid waste. California has shipped about 739,900 tons of inorganic solid waste, which equates to 34.1 percent of all manifested hazardous waste shipped to Nevada.

Of the 739,900 tons of manifested inorganic solid waste shipped to Nevada from California, 730,600 (98.8%) was managed at US Ecology Nevada, a hazardous waste landfill. This facility is identified in HWTS as EPA ID number NVT330010000.

The next largest waste stream shipped to Nevada was lead waste (RCRA Waste Code D008). Of the 594,000 tons sent to Nevada, 95.1 percent was managed at US Ecology Nevada.

The third largest waste stream shipped to Nevada was contaminated soil. Of the 375,700 tons sent to Nevada, 98.5 percent was also managed at US Ecology Nevada.

3.1.3 Amount of Manifested Hazardous Waste Disposed to Land

In accordance with HSC § 25135(b)(1)(C), the following information quantifies the amount of manifested hazardous waste disposed to land, both within California and in other states.

To track how manifested hazardous waste is being managed, hazardous waste manifests use Management Method Codes to describe the type of management system used to treat, recover, or dispose of the waste.

To complete this analysis, two management codes were analyzed:

- H131 Land treatment or application (to include on-site treatment and/or stabilization)
- H132 Landfill or surface impoundment that will be closed as landfill (to include prior treatment and/or stabilization)

Since 2010, 59.2 percent of California’s manifested hazardous waste (12,465,300 tons) has been disposed to land. This includes both RCRA and non-RCRA waste. Annual quantities of hazardous waste disposed to land averaged 1,016,000 tons and ranged from 773,700 tons to 1,283,600 tons. Figure 3.1-16 shows the annual quantity of hazardous waste disposed to land since the start of 2010.

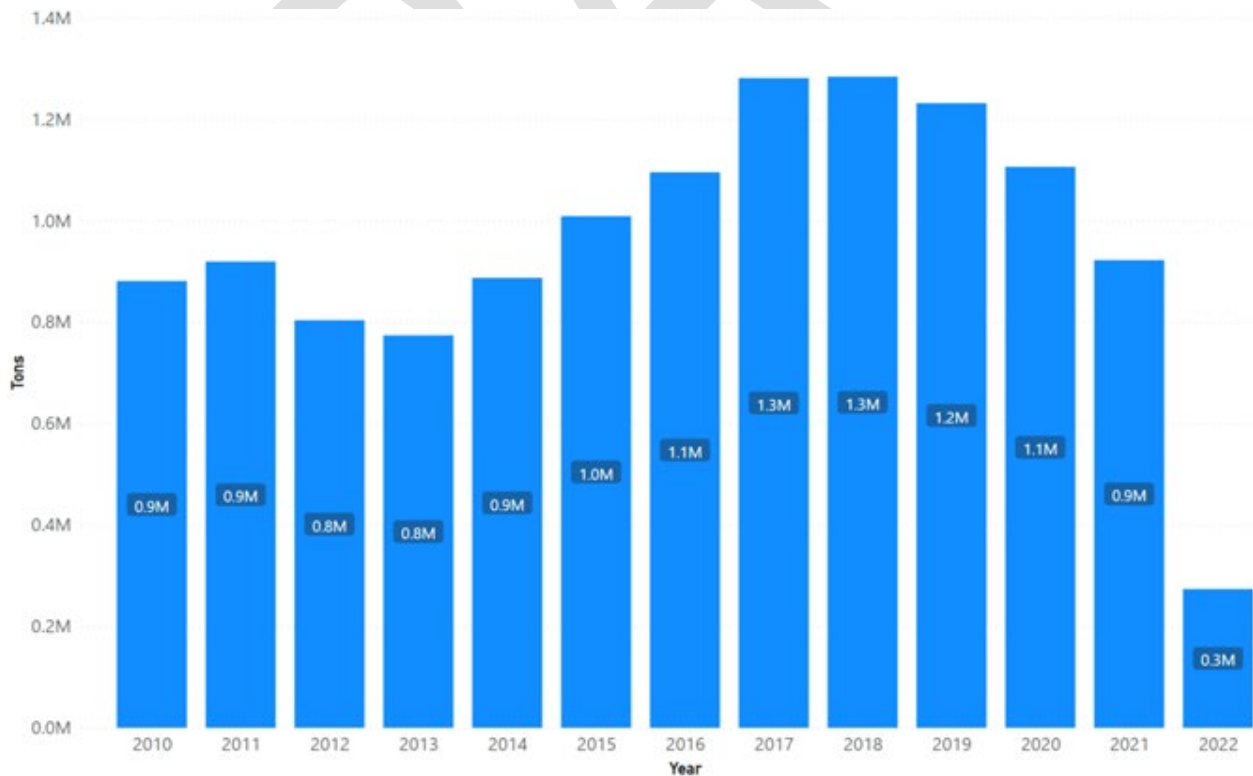


Figure 3.1-16: Annual Quantity of Hazardous Waste Disposed to Land

About 88 percent of all land-disposed manifested hazardous waste was non-RCRA hazardous waste (10,966,200 tons). Just under 11 percent was RCRA hazardous waste (Figure 3.1-17).

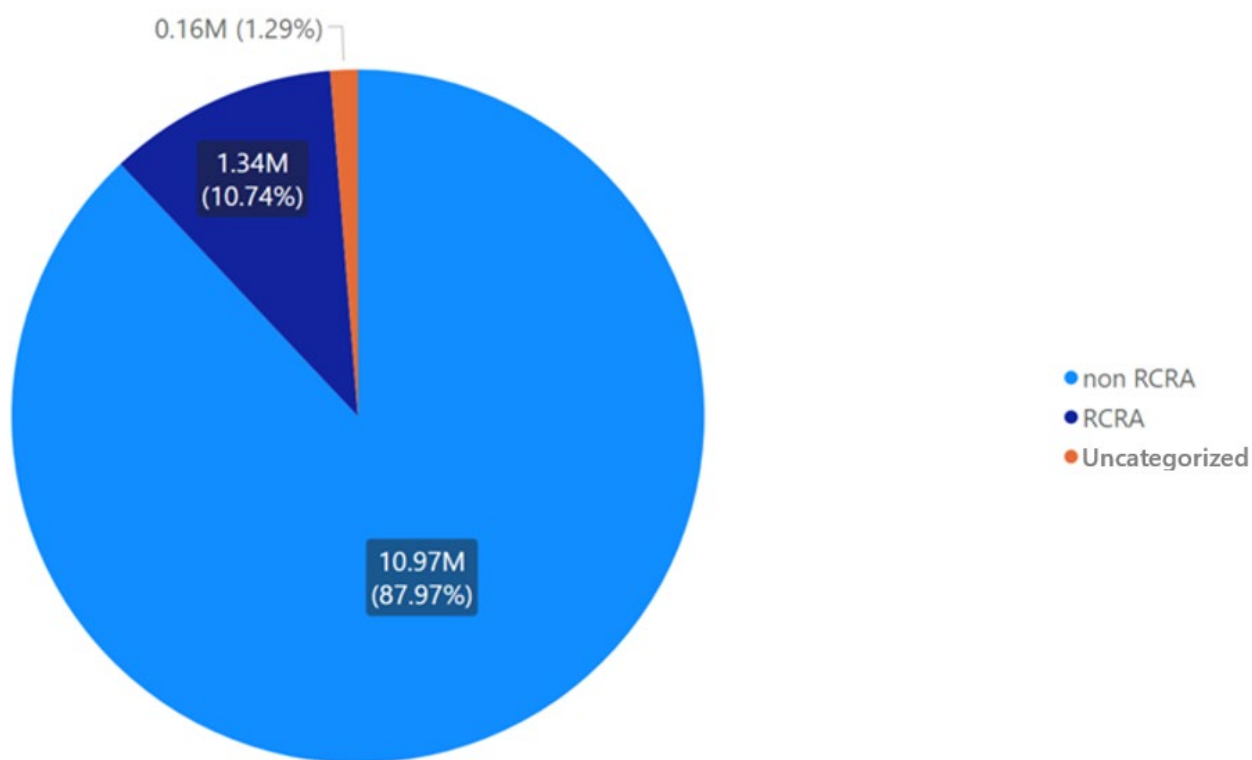


Figure 3.1-17: Breakdown of RCRA vs non-RCRA Waste being Land Disposed, tons (January 2010 to May 2022)

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

Just over half of California's land-disposed hazardous waste has been disposed of outside of California. Since 2010, approximately 6,509,300 tons (52.2%) was disposed of outside California, with the remaining 5,956,000 tons (47.8%) disposed of within California (Figure 3.1-18).

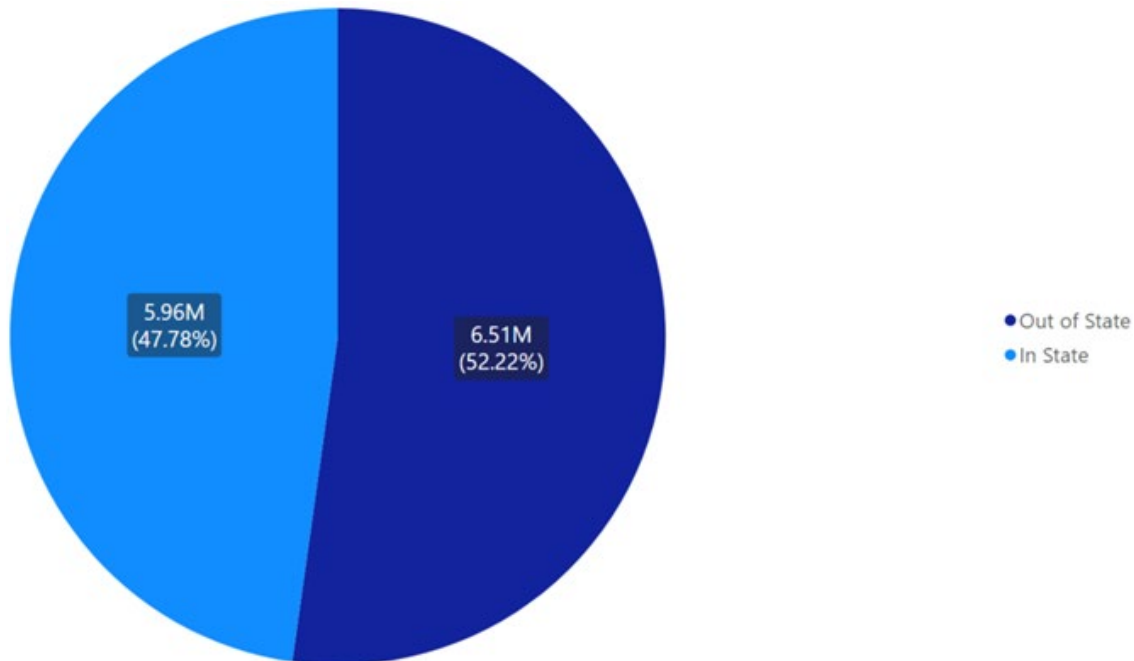


Figure 3.1-18: Management Location of California’s Manifested RCRA Hazardous Waste, tons (January 2010 to May 2022)

California’s land-disposed manifested hazardous waste has been disposed of in 26 other states since 2010 (Figure 3.1-19). Nearly half has gone to three states:

- Utah – 2,762,300 tons (22.3%)
- Arizona – 1,970,600 tons (15.9%)
- Nevada – 1,433,400 tons (11.6%)

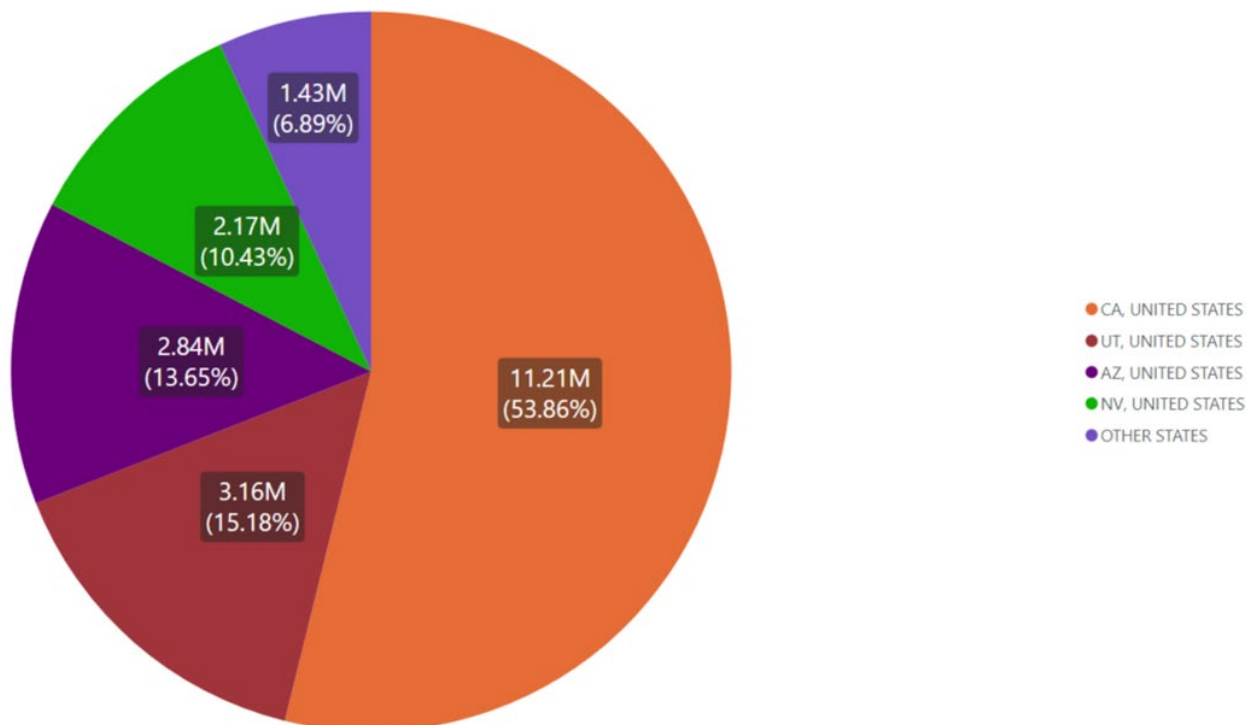


Figure 3.1-19: States that Accept California’s Hazardous Waste for Land Disposal, tons (January 2010 to May 2022)

As shown in Section 2, 81 percent of the manifested hazardous waste generated in California since 2010 is non-RCRA. In most cases, this waste is not required to be managed as hazardous waste in other states, meaning they are not required to dispose of California’s non-RCRA waste in permitted hazardous waste land disposal facilities. Figure 3.1-20 compares the amount of manifested hazardous waste disposed of at hazardous waste landfills (Class 1 Landfill) with the amount disposed of in other landfills (Class 2 and Class 3).¹¹ Since 2010, approximately 7,091,800 tons (56.9%) of California’s manifested land-disposed hazardous waste was managed at permitted Class 1 landfills, and the remaining 5,373,400 tons (43.1%) was disposed of at other Class 2 or Class 3 landfills.

¹¹ Hazardous waste landfills (Class 1) are regulated under RCRA Subtitle C and non-hazardous Subtitle D landfills (Class 2 and Class 3) are regulated under RCRA Subtitle D

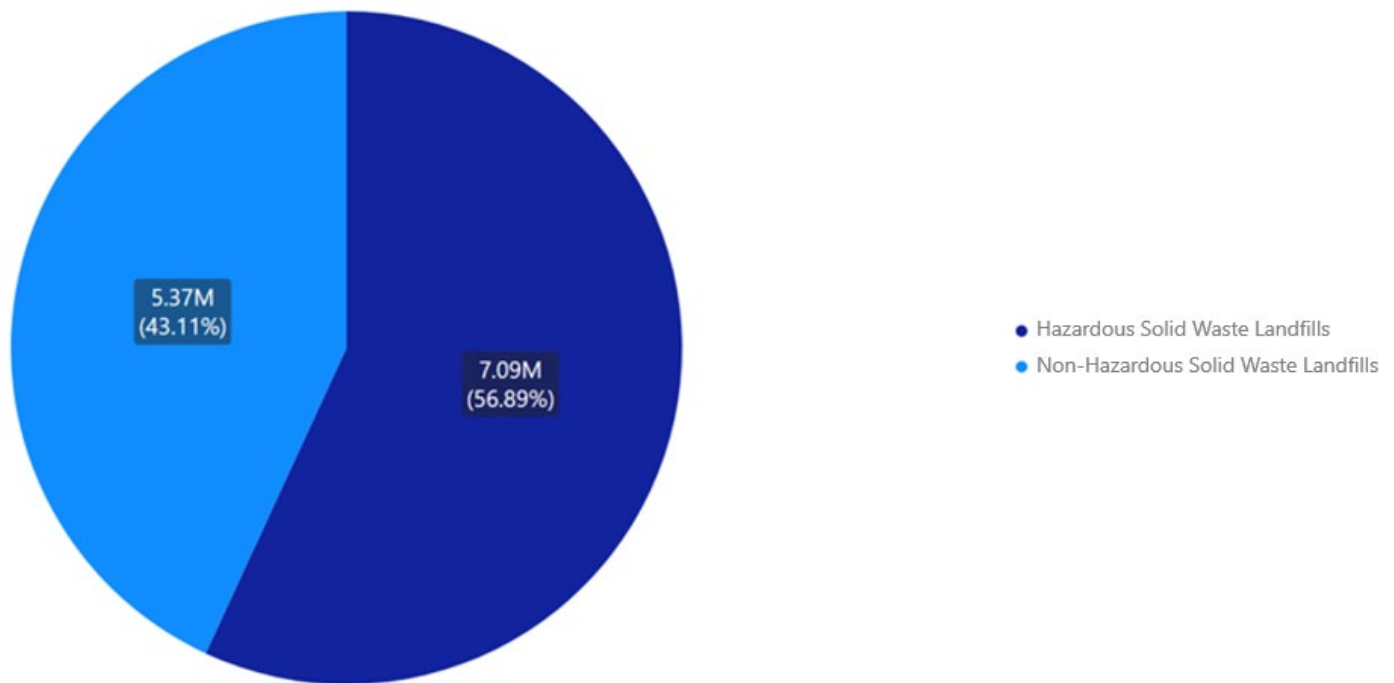


Figure 3.1-20: Land Disposal of California's Hazardous Waste, tons (January 2010 to May 2022)

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

3.1.3.1 Hazardous Waste Landfill Disposal

Permitted hazardous waste landfills are engineered sites where non-liquid hazardous waste is disposed of and which must be properly closed and covered once they are at capacity. These locations are designed and operated to minimize any release of hazardous waste into the environment.

Disposal of hazardous waste by means other than a permitted facility constitutes illegal disposal. Illegal disposal occurs either intentionally or out of ignorance. Examples of intentional illegal disposal include wastes that are abandoned along roadways, released into ditches or waterways, or released onto soils. These activities are often done to avoid the expense of proper waste management activities or to evade documentation as part of other illegal activities. Accidental illegal disposal usually occurs because an individual or facility operator does not realize the waste is considered hazardous under federal or state regulations and disposes of the waste, for instance, in a municipal landfill. It is very difficult, if not impossible, to obtain quantitative data on wastes that are disposed of illegally. However, if waste is found to be illegally disposed of is then

managed appropriately, the quantity would be included in HWTS because it would be manifested when removed.

Due to the complexity and stringent oversight of these facilities, not all states have permitted hazardous waste landfills. There are 24 permitted hazardous waste landfills in the United States. Figure 3.1-21 shows a map of all permitted hazardous waste landfills still in operation.

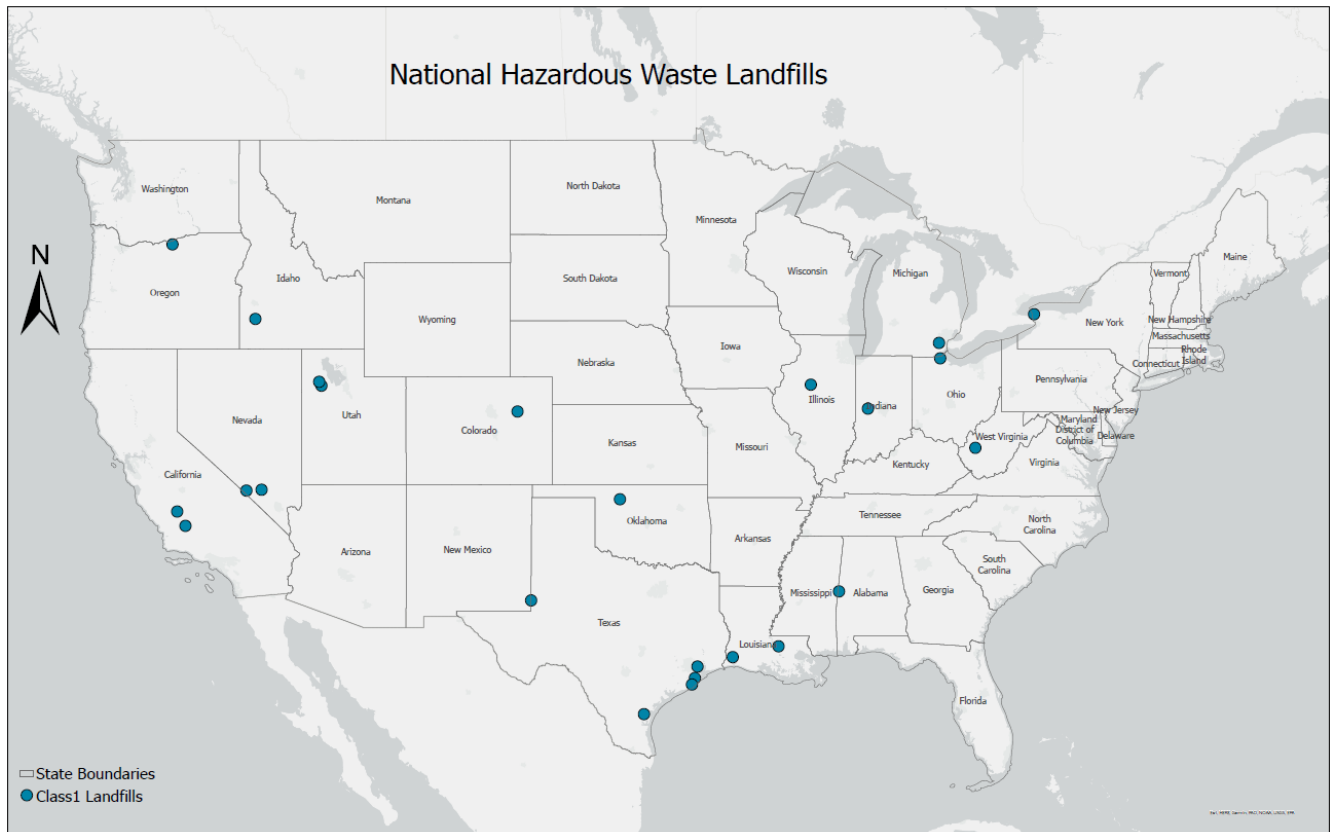


Figure 3.1-21: Map of Permitted Hazardous Waste Landfills in operation (as of 2022)

Since 2010, about 7,091,800 tons of California’s manifested hazardous waste has been land disposed at permitted hazardous waste landfills. Annual quantities have ranged from 431,600 tons to 734,200 tons. Figure 3.1-22 shows California’s manifested hazardous waste land disposed at permitted hazardous waste landfills annually since the start of 2010.

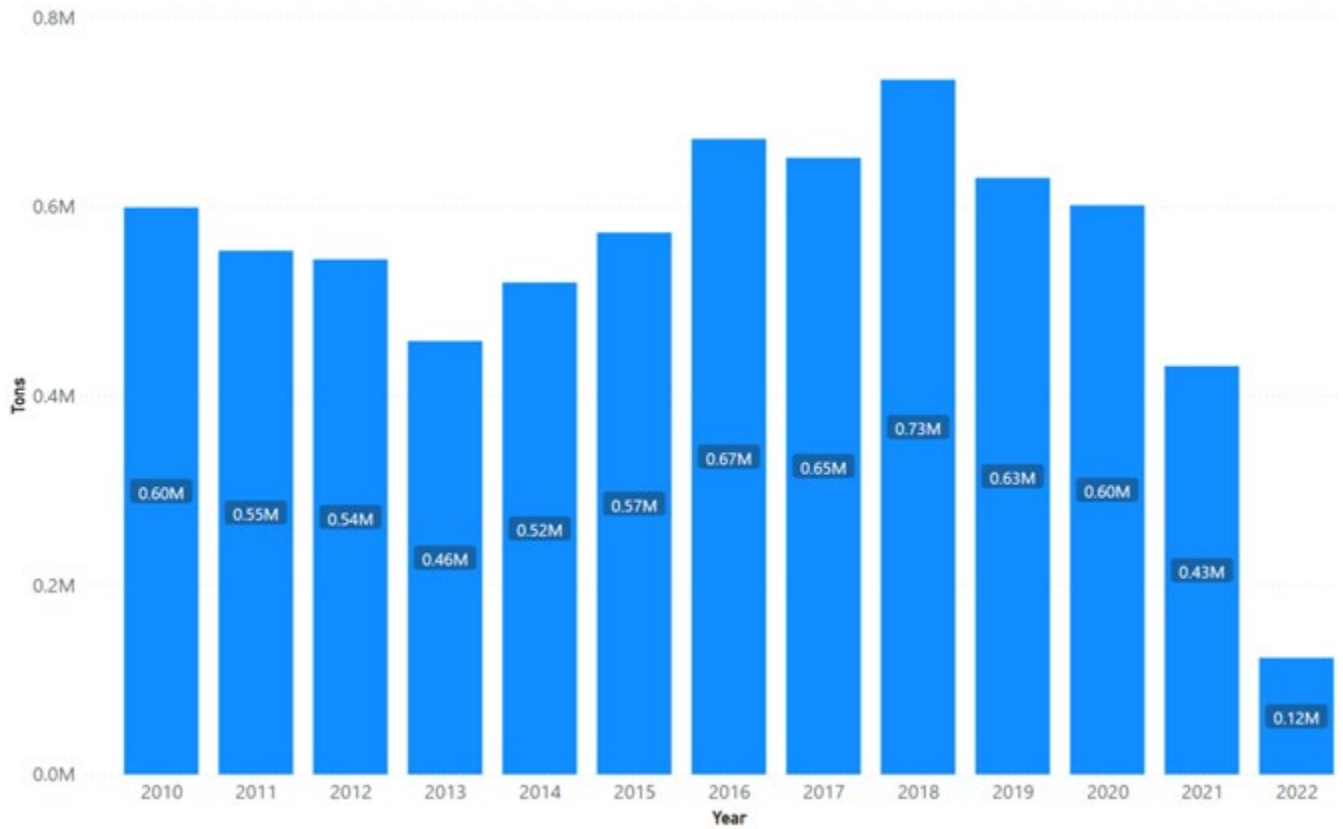


Figure 3.1--22: Annual Quantity of Hazardous Waste for Land Disposal at Permitted Hazardous Waste Landfills

About 81 percent of manifested hazardous waste land disposed at permitted hazardous waste landfills since 2010 was non-RCRA hazardous waste, and about 18 percent was RCRA hazardous waste (Figure 3.1-23).

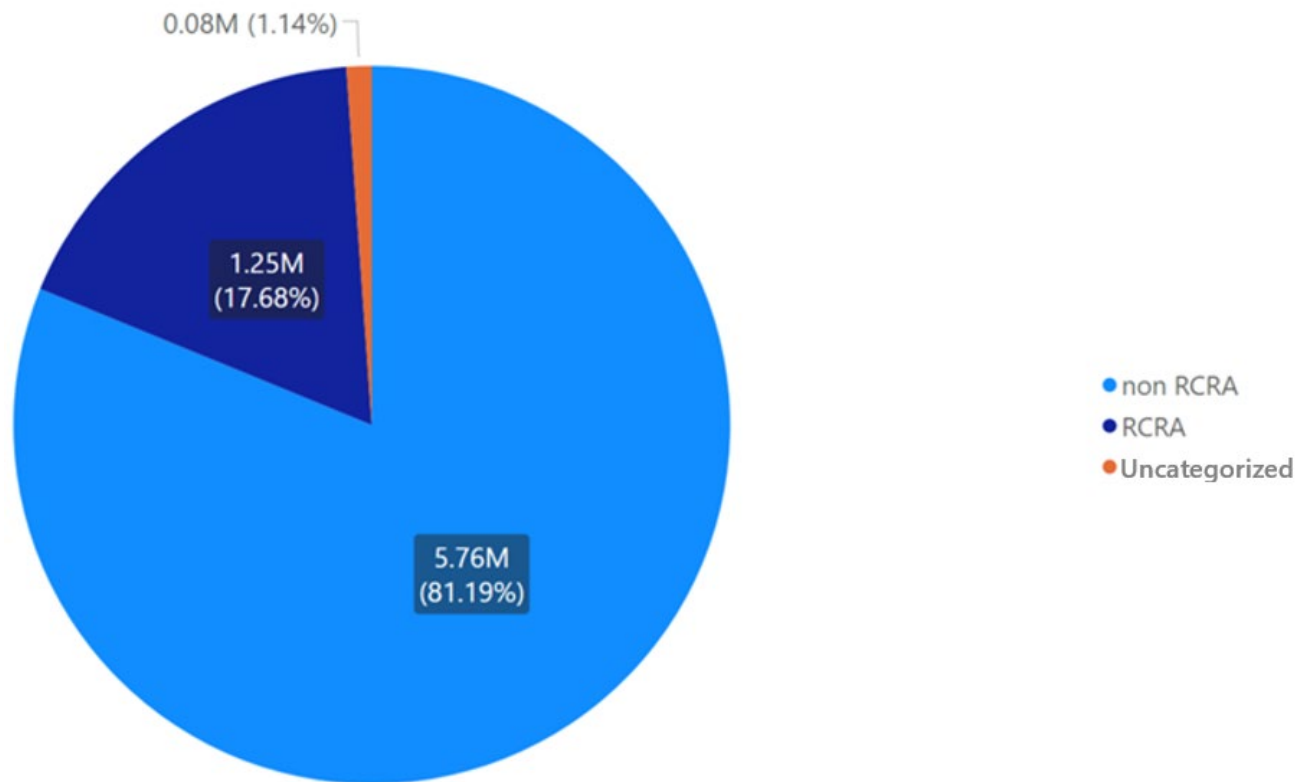


Figure 3.1-23: RCRA vs Non RCRA Waste being Land Disposed at Permitted Hazardous Waste Landfills, tons (January 2010 to May 2022)

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

3.1.3.1.1 Hazardous Waste Landfill Capacity

Hazardous waste landfill capacity is an important consideration for the proper management of California’s hazardous waste. U.S. EPA’s 2019 National Capacity Assessment Report reiterates important details about the complexities of regulating hazardous waste landfills.¹³ First, hazardous waste landfill capacity is finite and landfills are essential to managing the nation’s hazardous waste. Second, hazardous waste landfills can be costly to operate and difficult to permit.

California has two hazardous waste landfills currently in operation – Clean Harbors Buttonwillow and Chemical Waste Management Inc. Kettleman. According to the 2019 Capacity Report, the combined remaining capacity at Clean Harbors Buttonwillow (5,943,100 tons) and Chemical Waste Management (3,798,000 tons) is 9,741,100 tons.

¹³ U.S. EPA. National Capacity Assessment Report. December 2019.

At the current rate of disposal, with about 47.8 percent of California's land-disposed hazardous waste being disposed of in the state each year, these two landfills have a combined 20.1 years of permitted capacity remaining. If 100 percent of the state's 1,016,000 tons per year were disposed of in California, these two landfills would have a combined 9.6 years of permitted capacity remaining.

Any change to the available hazardous waste landfill capacity can alter where California's waste is managed. This was seen in the 2000's when the Chemical Waste Management Kettleman Hills Facility (KHF) began winding down operations and accepting less waste as it awaited approval of its landfill expansion. During that time period, the proportion of hazardous waste shipped out of state increased from about 25 percent of all hazardous waste generated to nearly 50 percent.

3.1.3.2 Non-Hazardous Waste Landfill Disposal

Manifested hazardous waste disposed of in California must be disposed of in a permitted Class 1 hazardous waste landfill. This includes RCRA and non-RCRA hazardous wastes. Some exceptions include non-RCRA Asbestos-containing Waste (State Waste Code 151) and Treated Wood Waste (State Waste Code 614). Within California, these wastes can be managed at authorized Class 2 or Class 3 solid waste landfills.¹⁴ However, in almost all other states, non-RCRA hazardous waste can be managed at non-hazardous Class 2 or Class 3 solid waste landfills.

Since 2010, about 5,373,400 tons of manifested hazardous waste has been land disposed at non-hazardous solid waste landfills. Annual quantities have ranged from 259,200 tons to 1,280,900 tons. Figure 3.1-24 shows the annual quantity of California's hazardous waste that has been land disposed at non-hazardous Subtitle D landfills since 2010.

¹⁴ Disposal Facilities Authorized to Accept Treated Wood Waste ([Weblink](#))

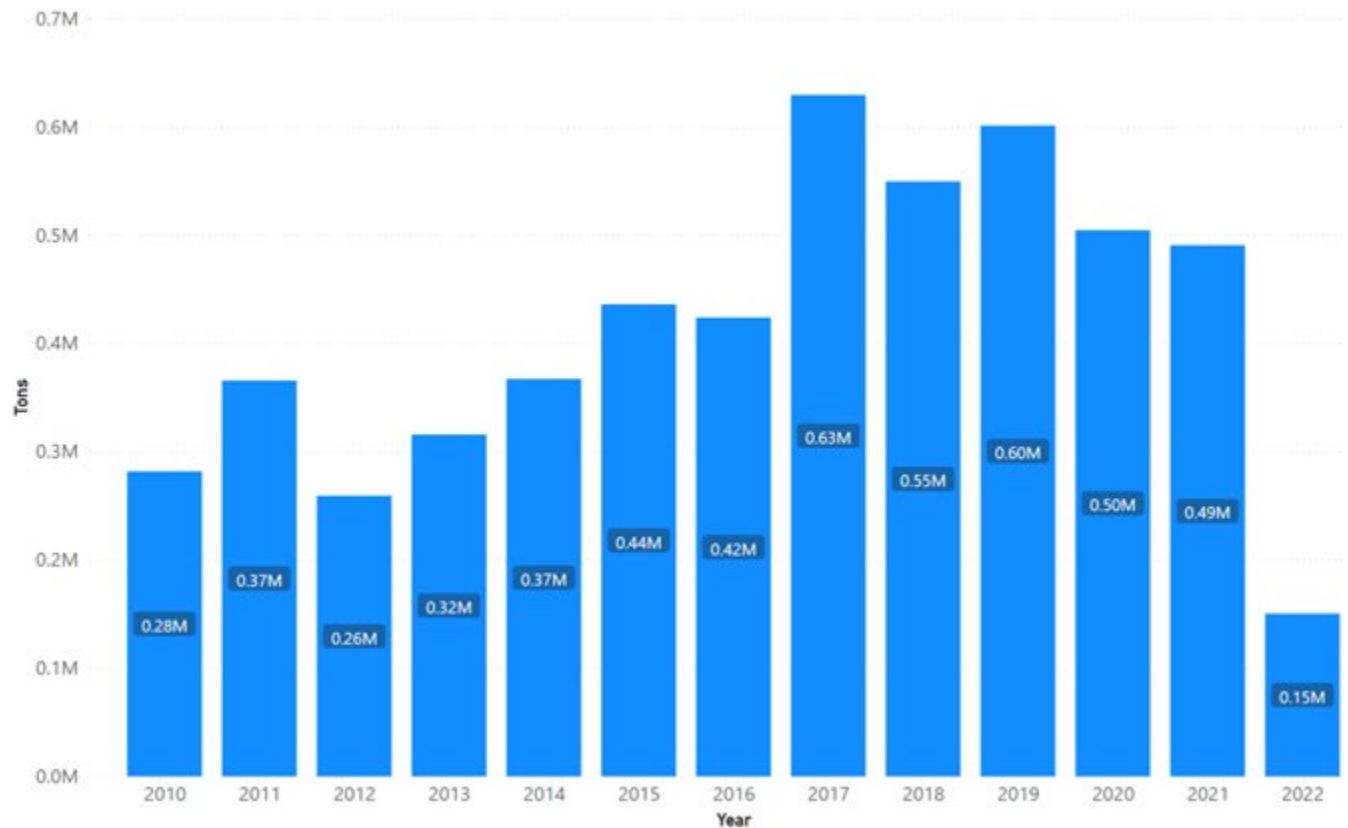


Figure 3.1-24: Annual Quantity of Hazardous Waste Land Disposed at Non-Hazardous Subtitle D Landfills

About 97 percent of manifested hazardous waste land disposed at non-hazardous Subtitle D landfills was non-RCRA hazardous waste, and about 2 percent was RCRA hazardous waste (Figure 3.1-25).

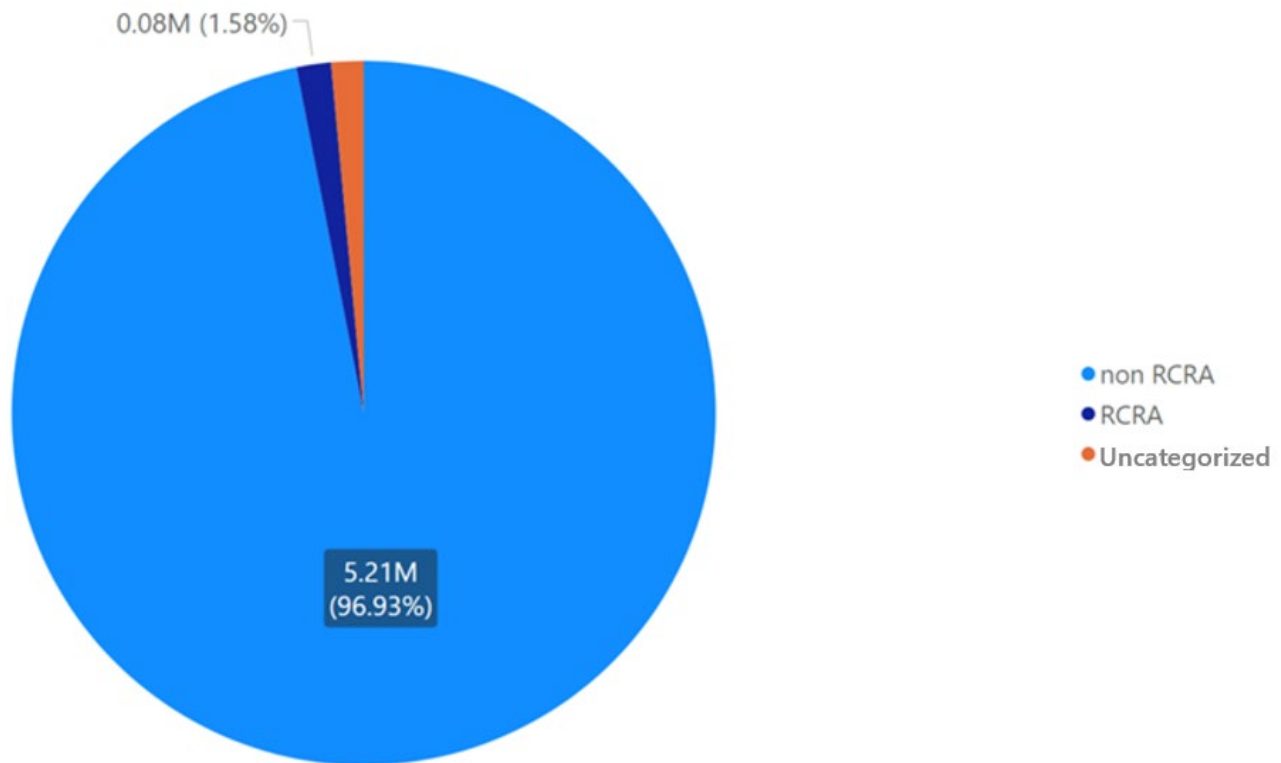


Figure 3.1-25: Breakdown of RCRA vs Non RCRA Hazardous Waste Land Disposed at non-Hazardous Landfills since 2010, tons

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

3.1.4 Amount of Manifested Hazardous Waste Treated

In accordance with Health and Safety Code § 25135(b)(1)(D), this Report has quantified the amount of manifested hazardous waste that has been treated, both within California and in other states.

Not all hazardous waste presents equivalent risks to human health and the environment. Some manifested hazardous waste is prohibited from land disposal if it has not been adequately treated. The criteria hazardous waste must meet before being disposed of are called treatment standards. These are either based on specific concentrations of hazardous constituents or specific treatment technologies that are required. Approved technologies have been identified that best minimize the mobility and/or toxicity of hazardous constituents. These are known as Best Demonstrated Available Technologies (BDAT) and may vary depending on the waste stream. Treatment standards are found in Cal. Code Regs., tit. 22, article 4.

To determine the quantity of manifested waste that has been treated, this Report utilized the waste management codes found on a manifest. The associated waste management codes are:

- H040 Incineration
- H071 Chemical reduction with or without precipitation
- H073 Cyanide destruction with or without precipitation
- H075 Chemical oxidation
- H076 Wet air oxidation
- H077 Chemical precipitation with or without pre-treatment
- H084 Biological treatment
- H082 Adsorption
- H083 Air or steam stripping
- H101 Sludge treatment and/or dewatering
- H103 Absorption
- H111 Stabilization and/or chemical fixation prior to disposal
- H112 Macro-encapsulation prior to disposal at another site
- H121 Neutralization
- H122 Evaporation
- H123 Settling or clarification
- H124 Phase separation
- H129 Other treatment methods

A review of this information within HWTS reveals that, since 2010, about 778,600 tons (3.7%) of California's manifested hazardous waste has been treated – between 46,000 tons and 126,000 tons annually. Figure 3.1-26 shows the quantity of California's manifested hazardous waste treated annually since the start of 2010.

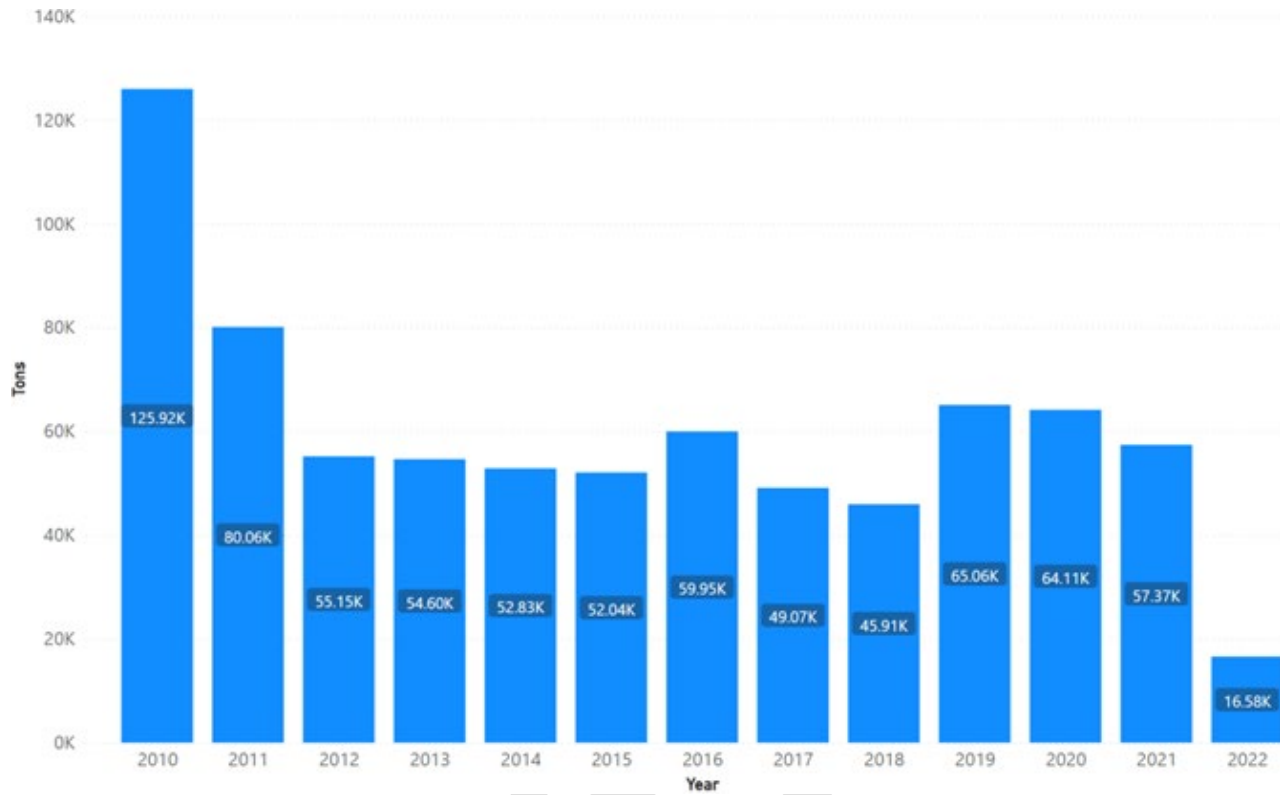


Figure 3.1-26: Annual Quantity of Hazardous Waste Treated

About 66.9 percent of all treated manifested hazardous waste was RCRA hazardous waste, and 32.0 percent was non-RCRA hazardous waste (Figure 3.1-27).

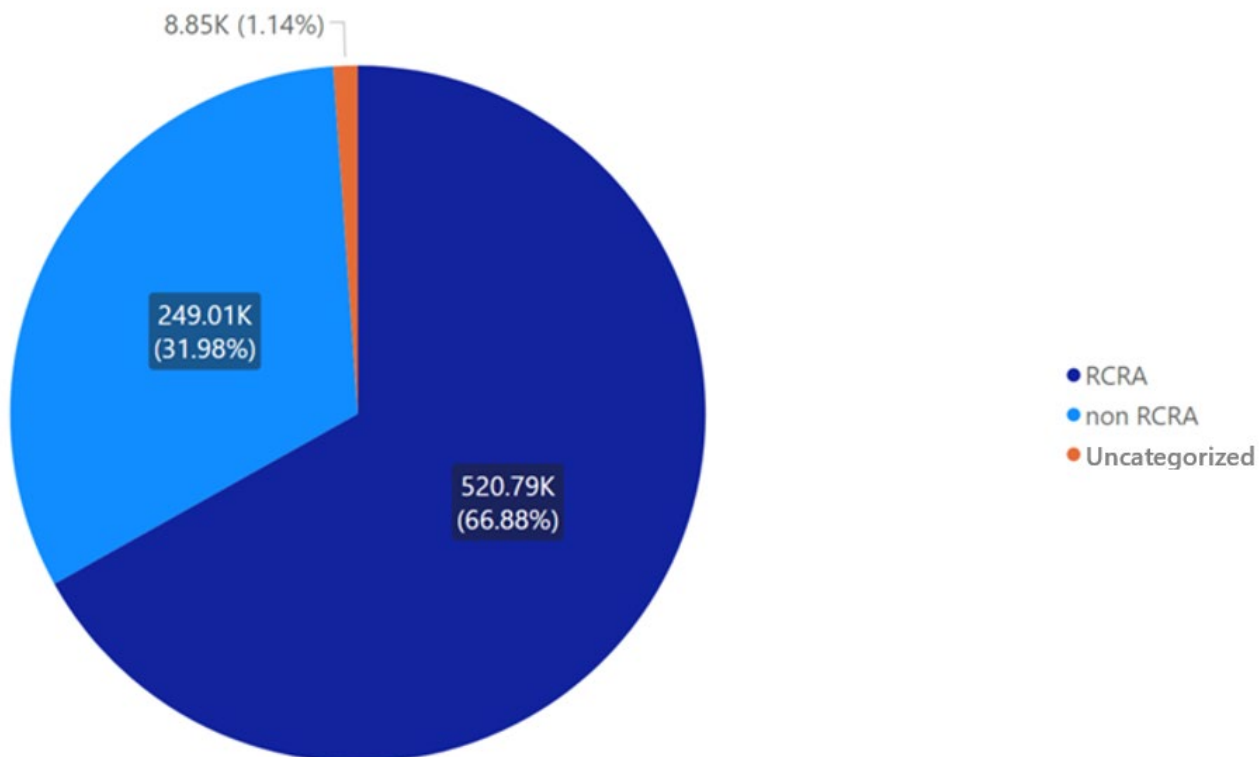


Figure 3.1-27: RCRA vs Non RCRA Hazardous Waste Treated since 2010, tons

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

As discussed earlier in this section, there are many methods of treating hazardous waste. Incineration is the most common method. Since 2010, about 80 percent of the manifested hazardous waste generated in California (623,800 tons) has been treated through incineration out of state (Figure 3.1-28).

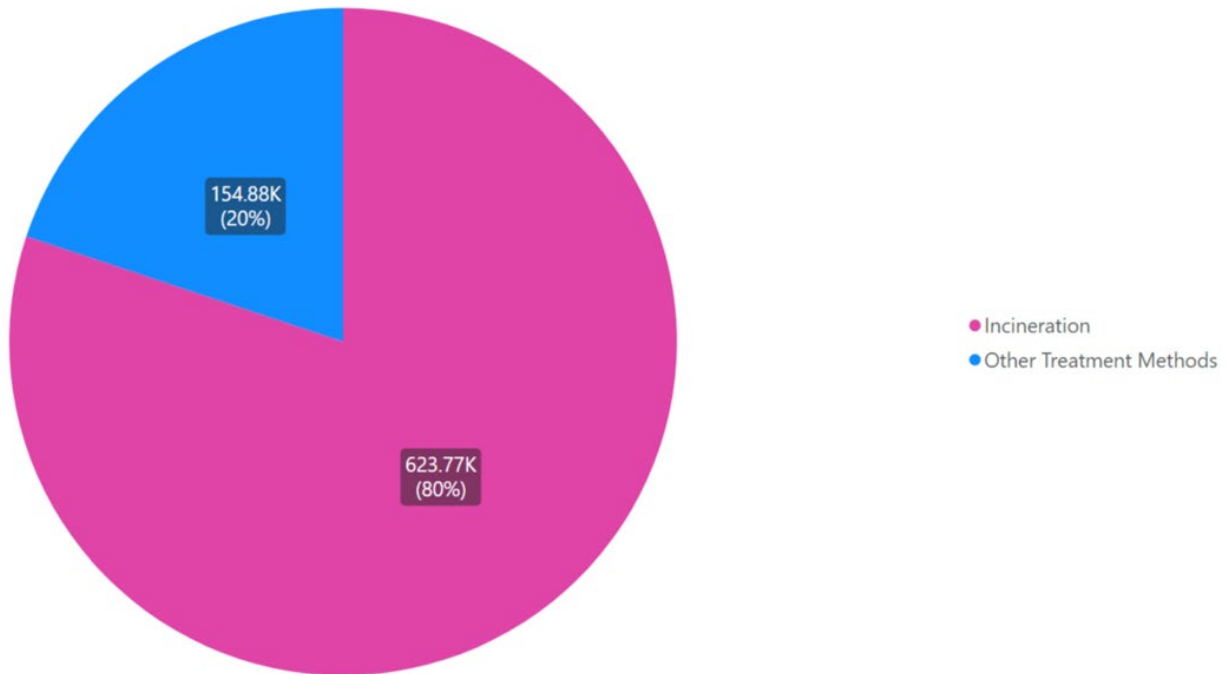


Figure 3.1-28: Quantity of Hazardous Waste Treatment per Management Method, tons

The remaining 154.900 tons (20%) of California’s manifested hazardous waste has been treated through stabilization, chemical precipitation, neutralization, or other treatment methods. (Figure 3.1-XXX).

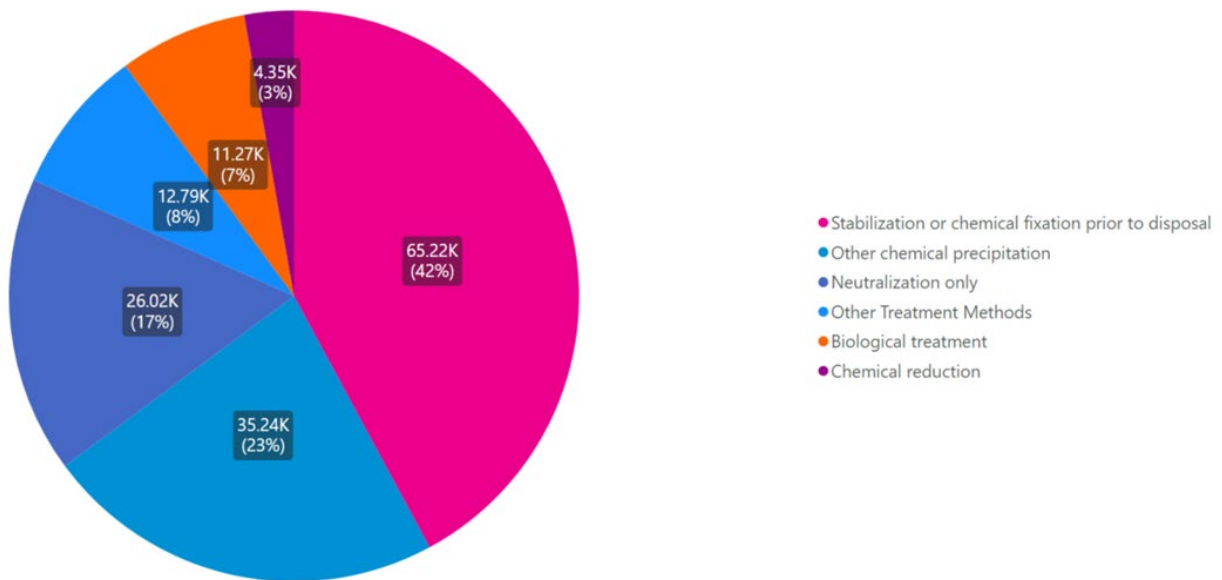


Figure 3.129: Quantity of Hazardous Waste Treatment per Management Method excluding Incineration, tons

Since 2010, 16.5 percent of California’s hazardous waste has been treated within the state’s borders (128,700 tons), while 83.5 percent (650,000 tons) has been treated out of state (Figure 3.1-29).

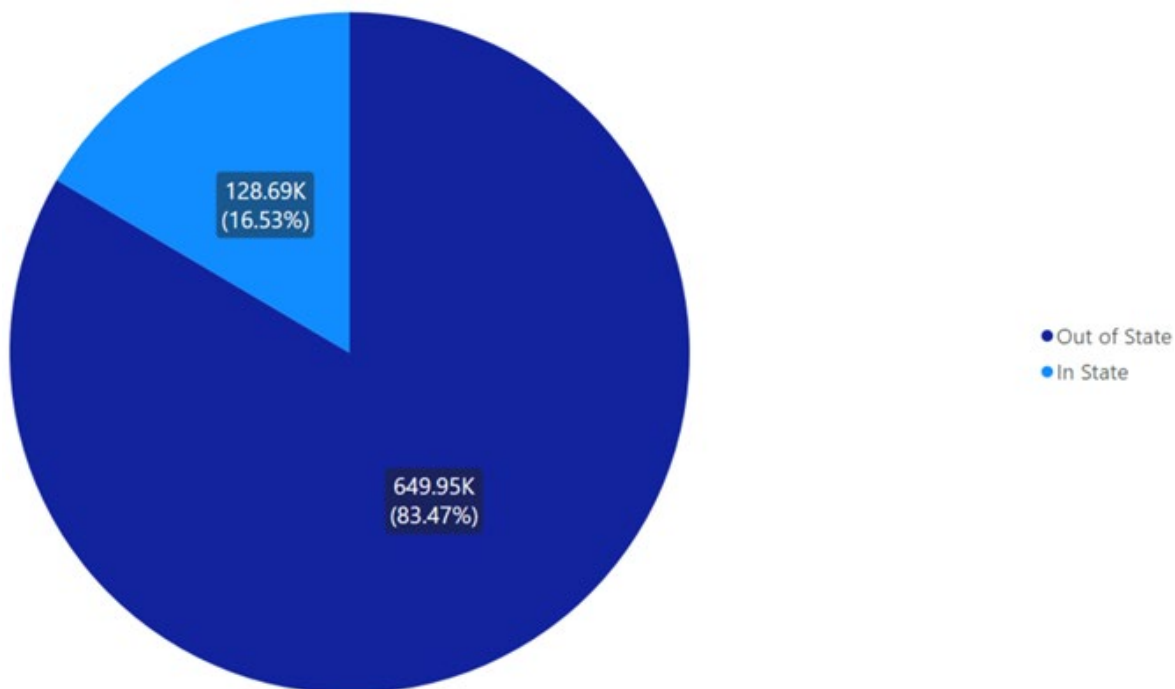


Figure 3.1-30: Breakdown of Hazardous Waste Treatment in California vs Out of State, tons

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

One of the largest factors contributing to this disparity is the fact that 80 percent of all treated waste is shipped to be incinerated as required by RCRA, and there are no commercial incinerators in California. The closest commercial incinerator is in Utah. Figure 3.1-30 provides a map of all the nation’s commercial incinerators.

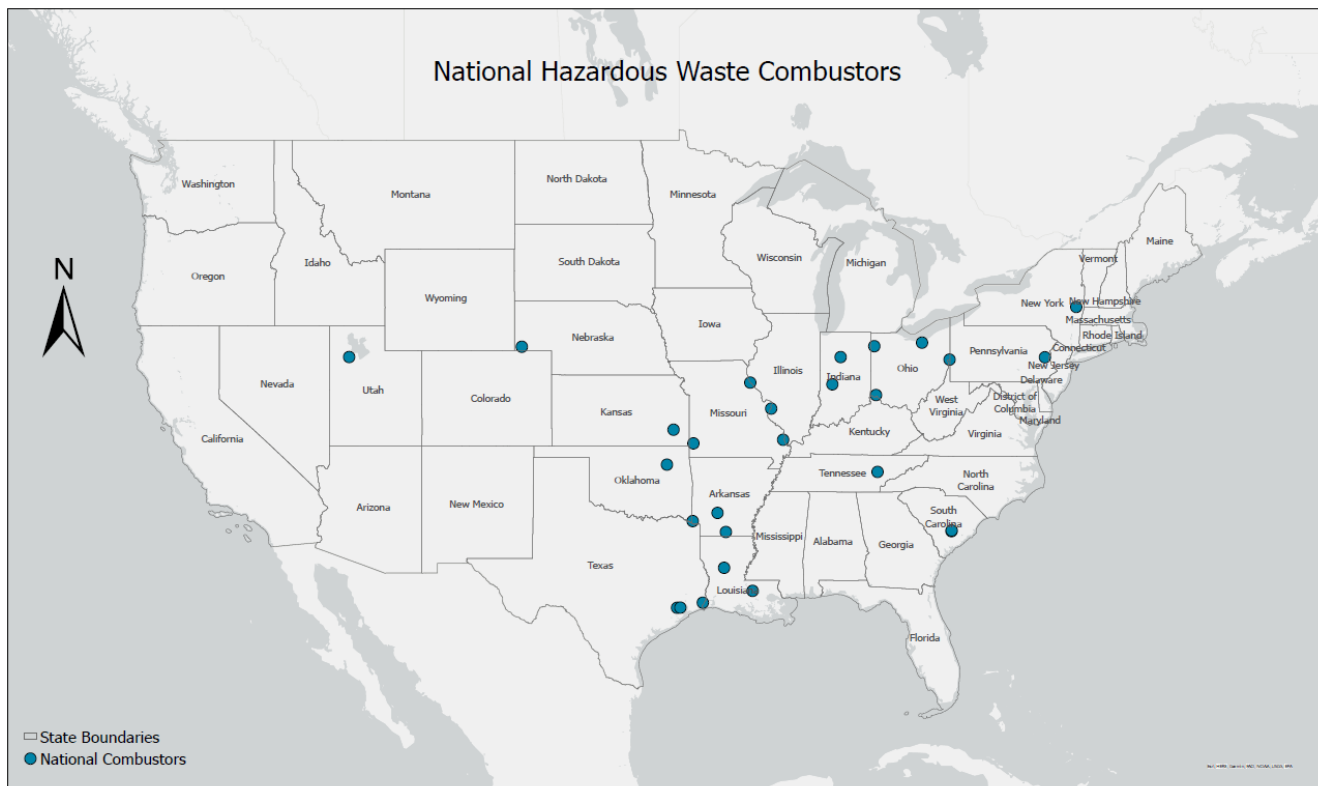


Figure 3.1-31: Map of National Commercial Incinerators

In June 2021, U.S. EPA became aware that some commercial hazardous waste incinerators would no longer accept containerized hazardous waste due to backlogs at their facilities. This limitation presented significant issues for hazardous waste generators because of regulatory limitations on storage times. Because many commercial incinerators stopped accepting hazardous waste that is required to be incinerated to meet land disposal restriction treatment standards, some generators could not locate any permitted TSDF to send their waste within the regulatory timeframes.

In August 2021, U.S. EPA issued a memorandum that provided regulatory options for containerized waste needing incineration. The August 2021 memorandum indicated that the backlog may not be fully resolved until the first quarter of 2022.

3.1.5 Amount of Hazardous Waste Regulated under RCRA

In accordance with Health and Safety Code 25135(b)(1)(E), this Report has quantified the amount of manifested hazardous waste that is regulated under RCRA.

Since 2010, California has generated 21.05 million tons of manifested hazardous waste, with approximately 18 percent of that being RCRA hazardous waste (3.79 million tons). Generation of manifested RCRA hazardous waste has averaged 310,000 tons per year, ranging from 224,700 tons to 398,700 tons per year (Figure 3.1-31).

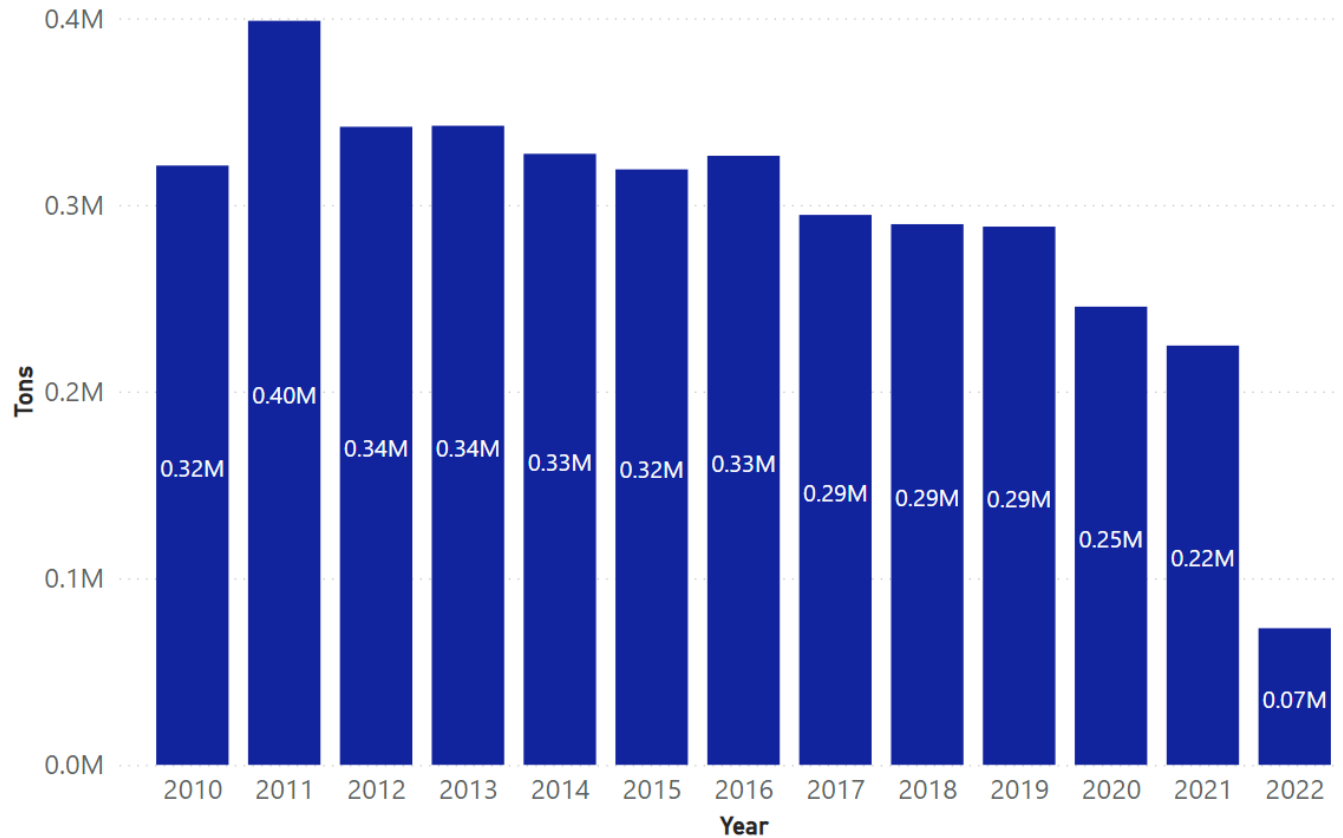


Figure 3.1-32: Annual Amount of RCRA Manifested Hazardous Waste (January 2010 to May 2022)

Most of California’s RCRA hazardous waste is managed outside the state. Since 2010, approximately 62 percent of California’s manifested RCRA hazardous waste (2.3 million tons) was managed outside the state, and the remaining 38 percent (1.45 million tons) was managed within California (Figure 3.1-32).

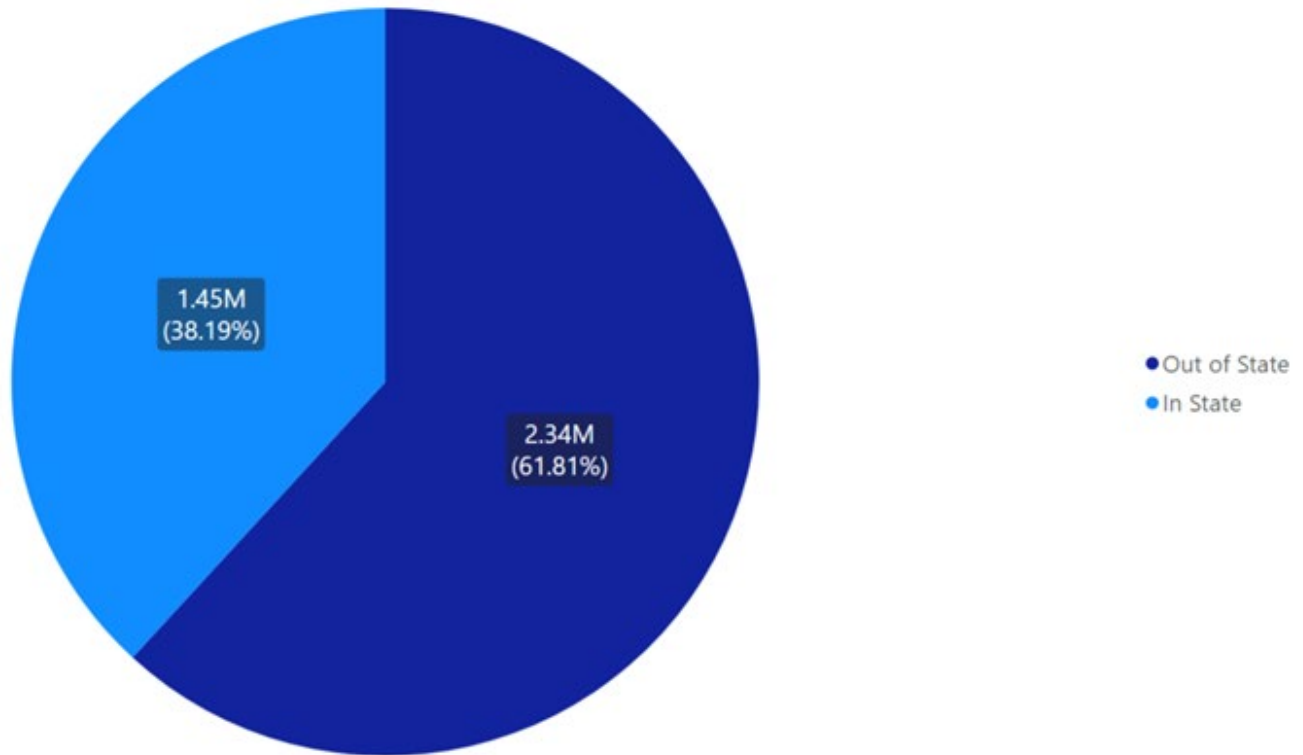


Figure 3.1-33: Management Location of California's Manifested RCRA Hazardous Waste, tons

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

Since 2010, California's manifested RCRA hazardous waste has been managed in 40 other states (Figure 3.1-33). The three states that have received the most manifested RCRA hazardous waste from California are:

- Nevada: 0.91 million tons (24.5%),
- Utah: 0.34 million tons (9.2%), and
- Kansas: 0.15 million tons (4.0%).

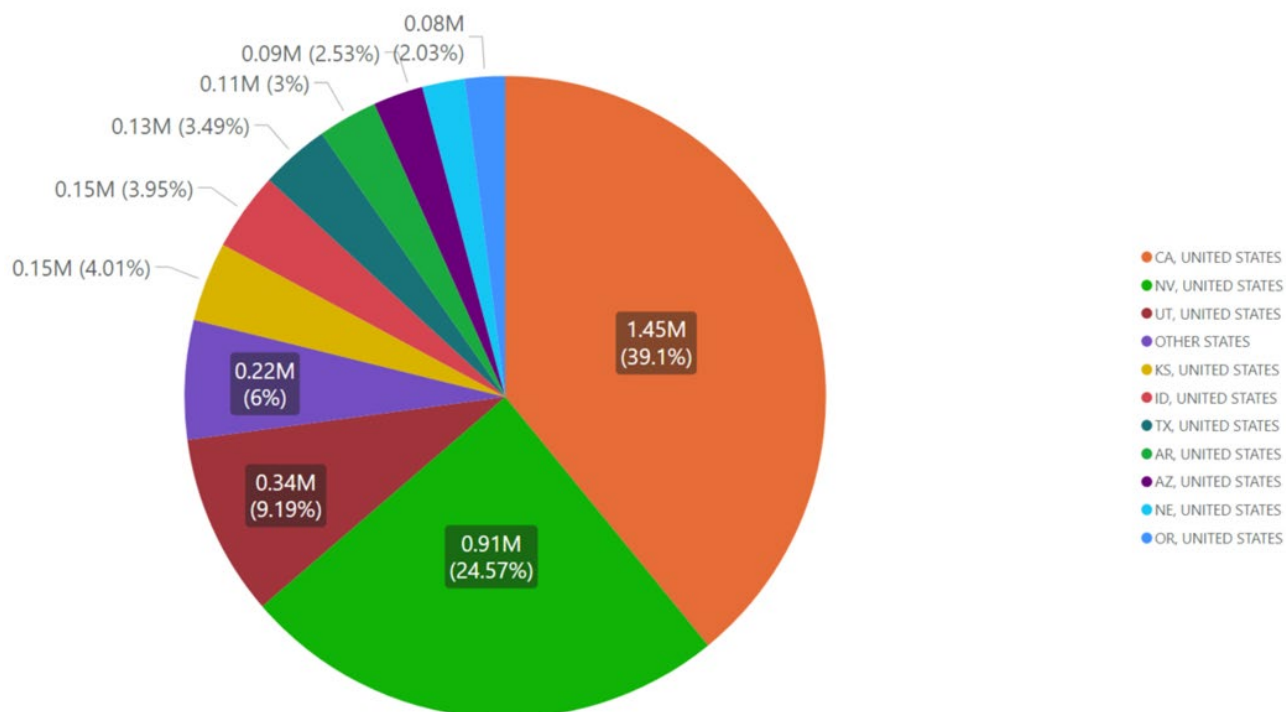


Figure 3.1-34: California's RCRA Manifested Hazardous Waste Managed in Each State, tons

The types of waste shipped to each state for management vary because different types are managed differently, and available management methods vary from state to state. For example, there are no hazardous waste incinerators in California, Utah is the nearest state that has a commercial incinerator, and most of the RCRA hazardous waste types shipped to Utah are those that are required to be incinerated.

3.1.6 Amount of Hazardous Waste Regulated only in California (non-RCRA)

In accordance with Health and Safety Code § 25135(b)(1)(F), the following information quantifies the amount of non-RCRA manifested hazardous waste – that is, waste that is identified as hazardous only in California.

Since 2010, California has generated 21.05 million tons of manifested hazardous waste. Approximately 81 percent of that (17.02 million tons) has been non-RCRA hazardous waste. Generation of manifested non-RCRA hazardous waste averaged 1,389,800 tons per year and ranged between 1,091,200 tons and 1,680,300 tons per year (Figure 3.1-34).

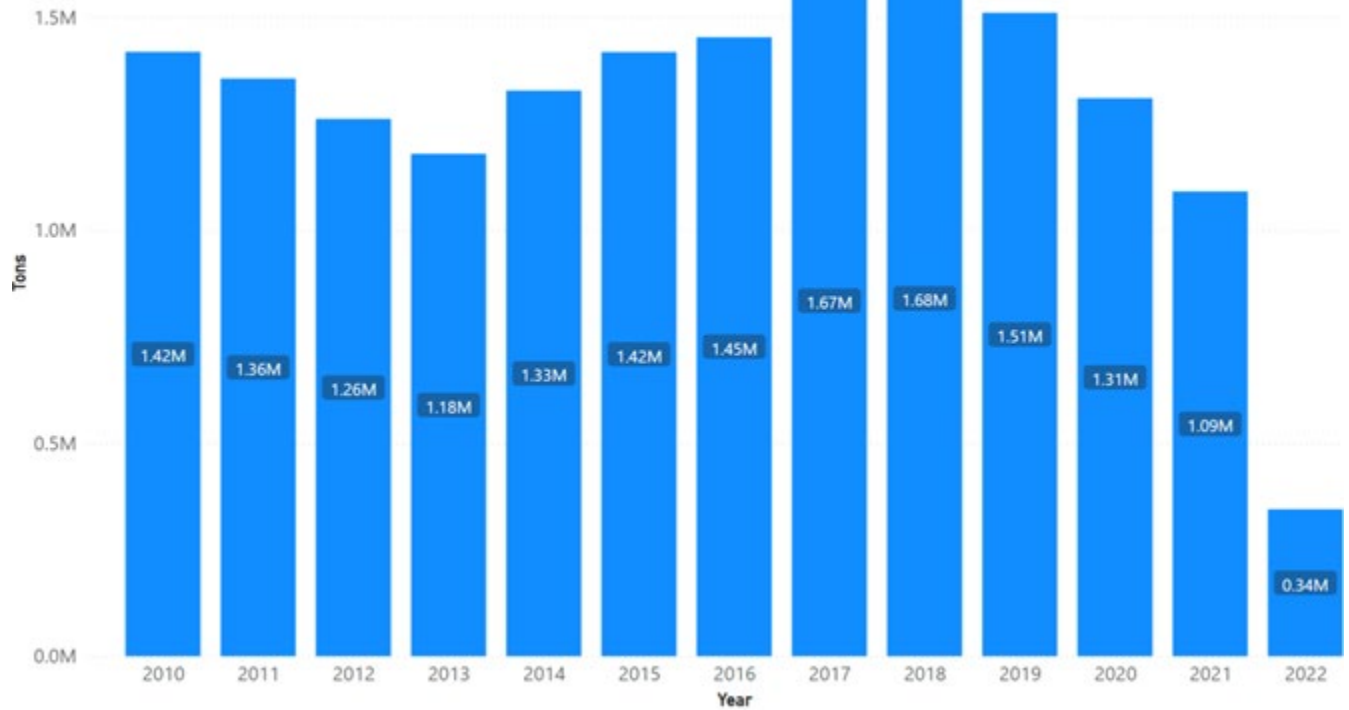


Figure 3.1–35: Annual Generation of Non-RCRA Hazardous Waste

Just over half of California’s non-RCRA hazardous waste has been managed in California. Since 2010, 9.65 million tons (56.7%) of non-RCRA hazardous waste has been managed in California, and 7.37 million tons (43.3%) has been managed out of state. This can be seen in figure 3.1-35.

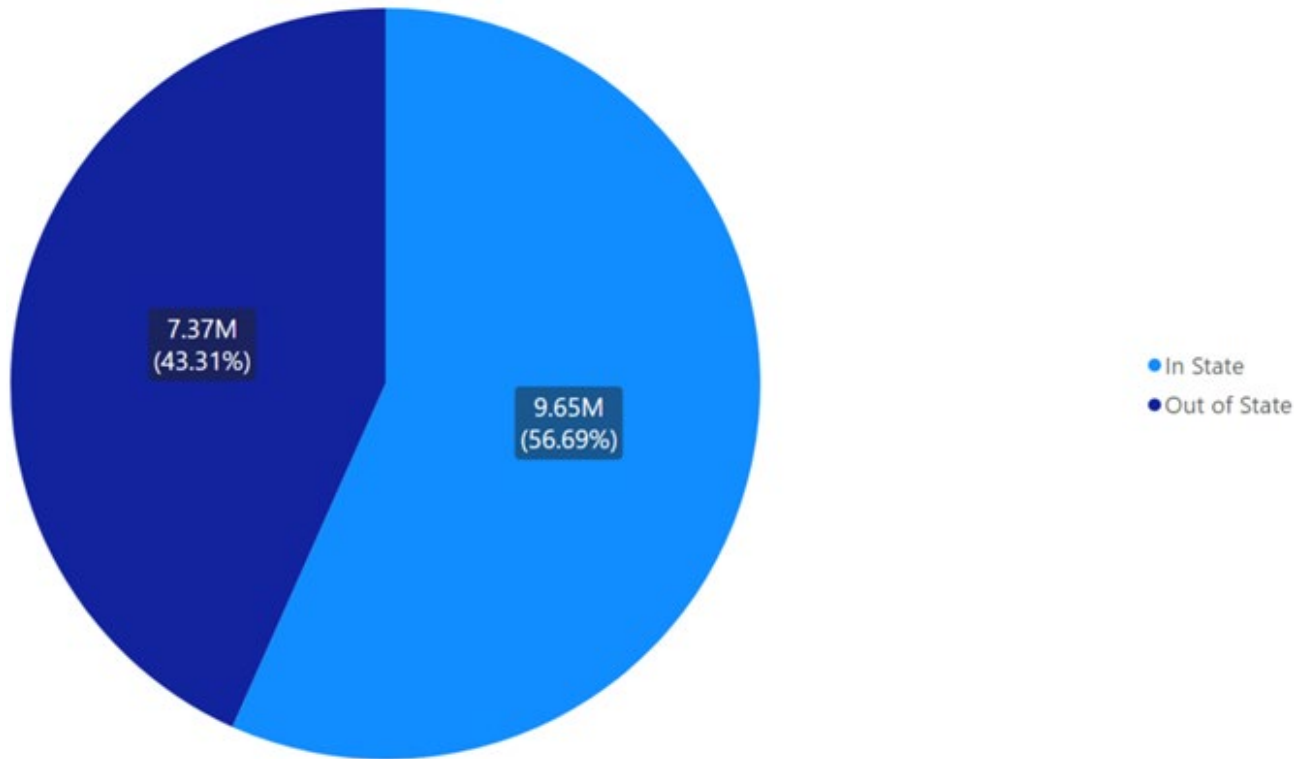


Figure 3.1-36: Breakdown of non-RCRA Hazardous Waste Management in California vs Out of State, tons

Note: Data sourced from Hazardous Waste Tracking System after data validation methods. Data range January 1, 2010, through May 5, 2022.

Forty-two other states have managed California's manifested non-RCRA hazardous waste (Figure 3.1-36). The three states that have received the most manifested non-RCRA hazardous waste from California are:

- Utah: 2,804,600 tons (16.6%),
- Arizona: 2,687,100 tons (15.9%), and
- Nevada: 1,236,600 million tons (7.3%).

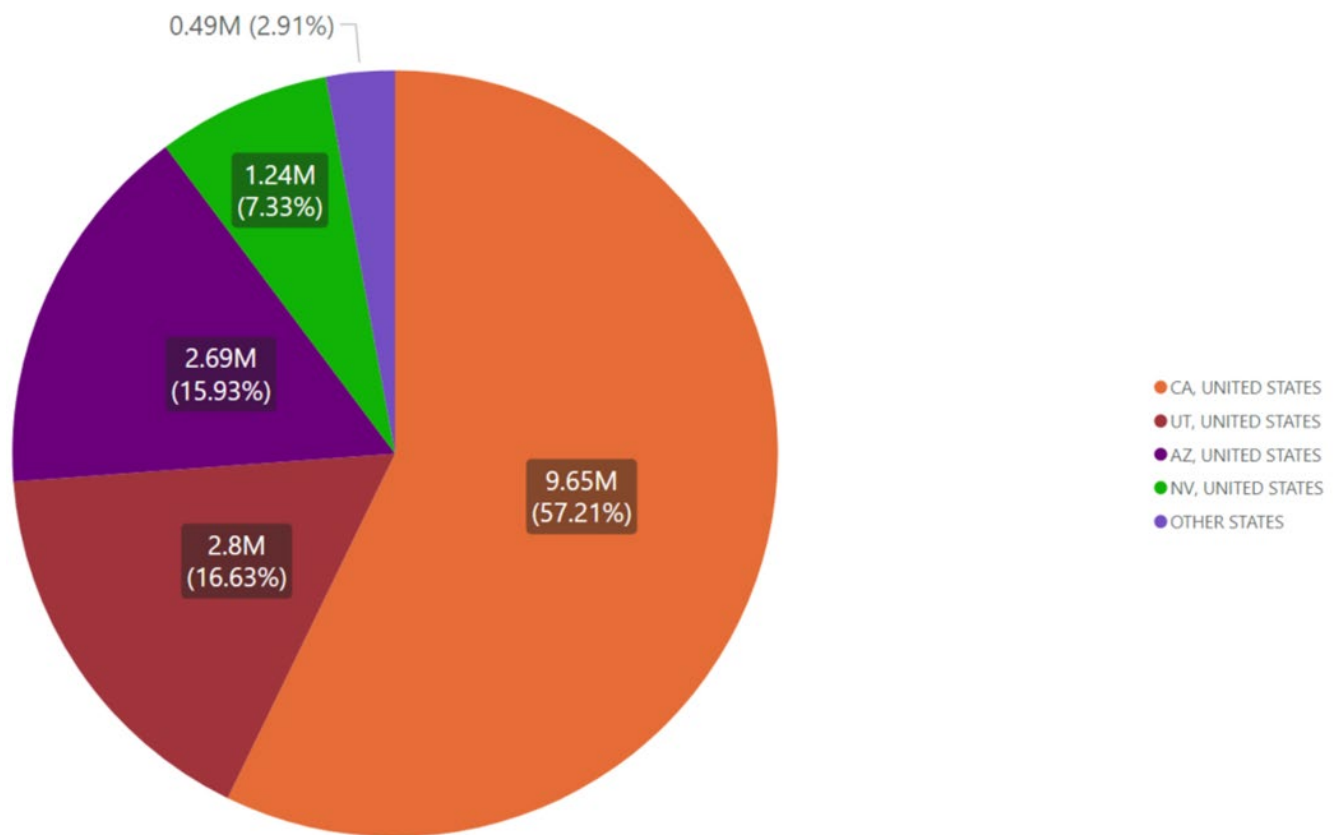


Figure 3.1-37: Breakdown of California's non-RCRA Manifested Hazardous Waste Being Managed in Each State, tons

The types of non-RCRA waste shipped to each state for management did not vary as much as with RCRA hazardous waste. For example, 91.3 percent of non-RCRA hazardous waste shipped to Utah was either Contaminated Soil from Site Cleanups (State Waste Code 611), Other Inorganic Solid Waste (State Waste Code 181), or Unspecified Oil-Containing Waste (State Waste Code 223). California shipped a similar distribution of non-RCRA hazardous waste to Arizona and to Nevada.

Utah has received 2,804,600 tons of non-RCRA hazardous waste since 2010. Contaminated soil made up 84 percent (2,350,000 tons). The primary method of managing California's non-RCRA hazardous waste in Utah is landfilling at 2,696,600 tons (95%).

One facility in Utah (E CDC Environmental) managed 93 percent of the non-RCRA hazardous waste shipped to that state from California. E CDC Environmental is a non-hazardous Subtitle D landfill that appears in HWTS under two EPA ID Numbers: UTC093012201 and UTR000000687. California's non-RCRA hazardous waste is typically not required to be managed as hazardous waste in other states.

The types of non-RCRA wastes shipped to Arizona have a similar makeup as those shipped to Utah. Since 2010, about 69.2 percent of non-RCRA hazardous waste shipped to Arizona have been either Contaminated Soil, Other Inorganic Solid Waste, or Asbestos-Containing waste (State Waste Code 151). The primary method of managing California's non-RCRA hazardous waste in Arizona is landfilling at 1,898,011 tons (71%).

Of the 2,687,100 tons of non-RCRA hazardous waste shipped to Arizona, 828,700 tons (30.8%) were managed at one non-hazardous Subtitle D landfill, South Yuma County Landfill (EPA ID Number: AZR000506980). The next largest receiver of California's non-RCRA hazardous waste in Arizona was La Paz, a non-hazardous Subtitle D landfill that appears in HWTS under two EPA ID Numbers: AZC950823111 and AZR000520882.

The types of non-RCRA wastes managed in Nevada have a similar makeup as those in Utah and Arizona. The top three non-RCRA waste categories shipped to Nevada since 2010 have been Other Inorganic Solid Waste (State Waste Code 181), Other Organic Solids (State Waste Code 352), and Contaminated Soil from Site Cleanups (State Waste Code 611). The primary method of managing California's non-RCRA hazardous waste in Nevada is landfilling at 738,100 tons (59.7%).

Of the 1,236,600 tons of non-RCRA hazardous waste shipped to Nevada, 91 percent (1,125,800 tons) have been managed at –US Ecology Nevada (EPA ID Number: NVT330010000), a Class 1 hazardous waste landfill.

3.2 Universal Waste

3.2.1 Regulated Entities

Destination facilities are fully regulated facilities that treat, dispose of, or recycle a specific kind of universal waste. Examples of destination facilities include hazardous waste treatment and/or recycling facilities and hazardous waste landfills.

A destination facility is required to operate under a hazardous waste facilities permit, unless otherwise noted in California Code of Regulations, Title 22, § 66273.60.

Destination facilities must also follow certain rules for shipping universal wastes off site and for rejecting shipments that contain universal waste.¹⁵ In addition, they are required to keep records of all shipments received for three years.¹⁶

A universal waste handler is a facility that accepts, accumulates, and ships universal waste and is not considered a destination facility.¹⁷

3.2.2 Electronic Devices

Quantifying the amount of electronic device waste handled and treated in California is difficult. One challenge is associated with the fact that handlers can choose whether to record devices they handle either by weight or by count. Because the sizes of electronic devices vary greatly – a mobile phone vs a television, for example – there is no reliable way to convert a number of devices reported to weight in tons or vice versa.

3.2.2.1 Treated Electronic Devices

Universal waste handlers that handle electronic devices are authorized to conduct certain activities, including, but not limited to, removal, disassembly, and draining activities. They are allowed to remove user-replaceable components such as batteries and ink cartridges,¹⁸ and they may also dismantle or manually segregate components from an electronic device.¹⁹

Other treatment activities universal waste handlers are allowed to conduct on electronic devices²⁰ include those that only change the physical properties of the device. This includes sawing, cutting, or shredding, as well as physically separating materials based on differences in physical properties like size, color, and density.

¹⁵ Cal. Code Regs., tit. 22, § 66273.61

¹⁶ Cal. Code Regs., tit. 22, § 66273.62

¹⁷ “DTSC Universal Waste Fact Sheet.” *Dtsc.ca.gov*, State of California, Jan. 2010, [Website Link](#).

¹⁸ Cal. Code Regs., tit. 22, § 66273.71(b)

¹⁹ Cal. Code Regs., tit. 22, § 66273.72(c)(1)(a)

²⁰ Cal. Code Regs., tit. 22, § 66273.73(d)

Treatment activities can make it difficult to accurately quantify electronic device waste, because handlers can record devices either by weight or by count (number of devices). For example, a handler may submit an annual report to DTSC listing a certain number of devices but then dismantle those devices into separate categories of waste, like plastic, metal, and battery packs. The handler may then ship those separate wastes to another handler or destination and list the materials by weight. In the end, the same materials can be listed in one report as a single electronic device and in another report as 4 pounds of plastic, 12 pounds of metal, and 3 pounds of battery pack (unspecified universal waste). Figure 3.2-1 illustrates how a single electronic device can be broken down into multiple components.

A further challenge to quantifying electronic device waste is presented when a waste is refurbished. A refurbished electronic device is no longer considered a waste, so it is not included in the handler’s annual report.

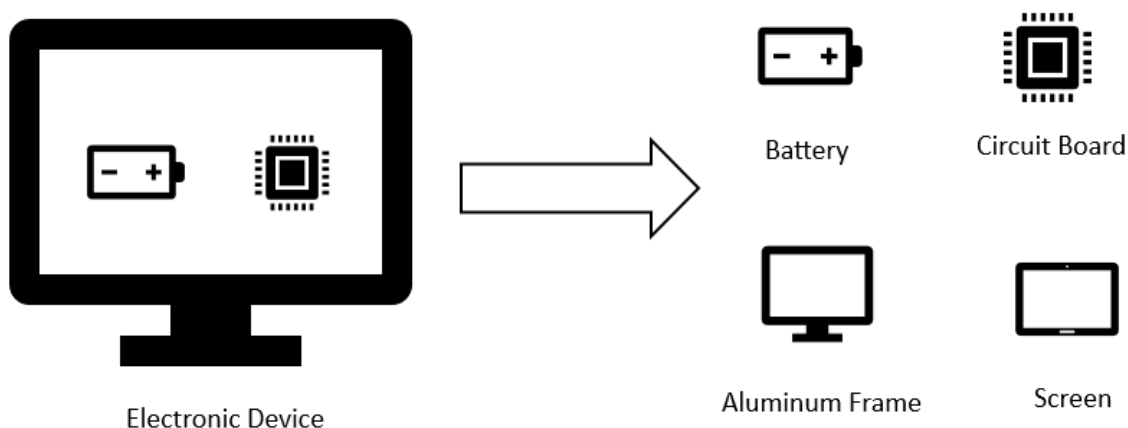


Figure 3.2-1: Electronic Device Broken into Components

Figure 3.2-2 shows treated electronic devices by weight (tons) in 2021 by county. About 59,410 tons of electronic devices were treated in California in 2021. Fresno County treated 15,170 tons (26%), San Bernardino County treated 11,270 tons (19%), and Orange County treated 9,880 tons (17%). Table 3.2-1 shows treated electronic devices by weight (tons) by county in 2021 in tons.

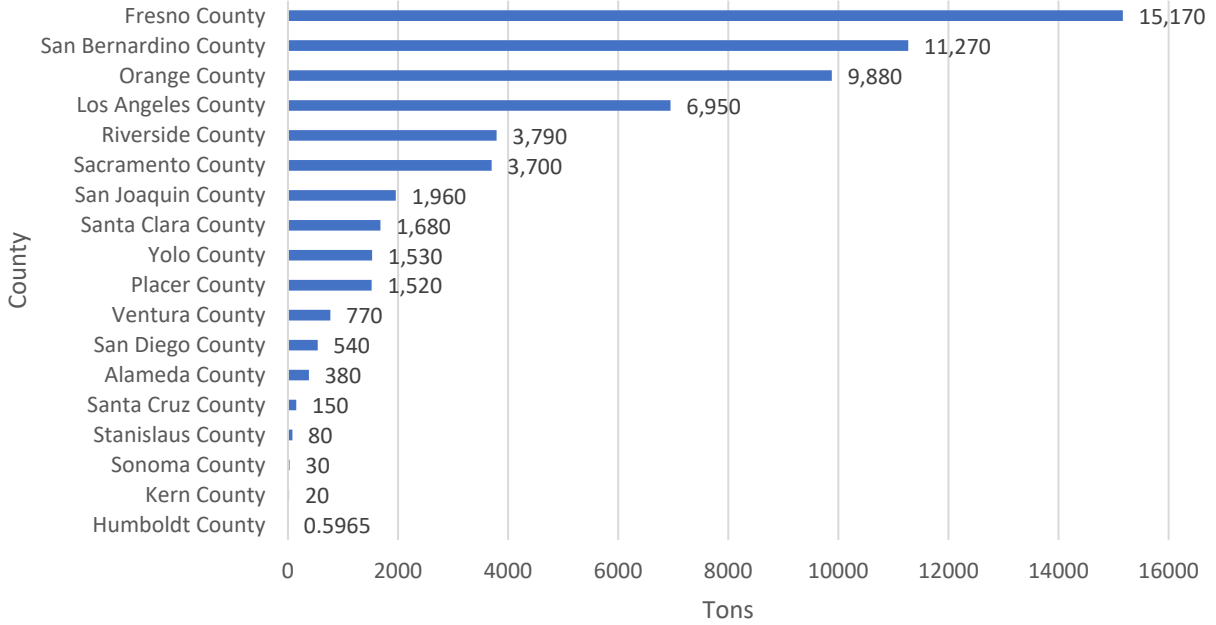


Figure 3.2-2: Treated Electronic Devices by County, Tons, 2021

Figure 3.2-3 shows treated electronic devices by count in 2021 by county. Only two counties recorded devices by count. Of the 32,720 electronic devices recorded in California in 2021, handlers in Alameda County treated 31,890 of them (97%) and handlers in San Diego County treated 830 (3%). There is no reliable conversion to determine the weight of electronic devices that are recorded by count because device sizes vary so greatly. Table 3.2-1 shows treated electronic devices by count in 2021 by county.

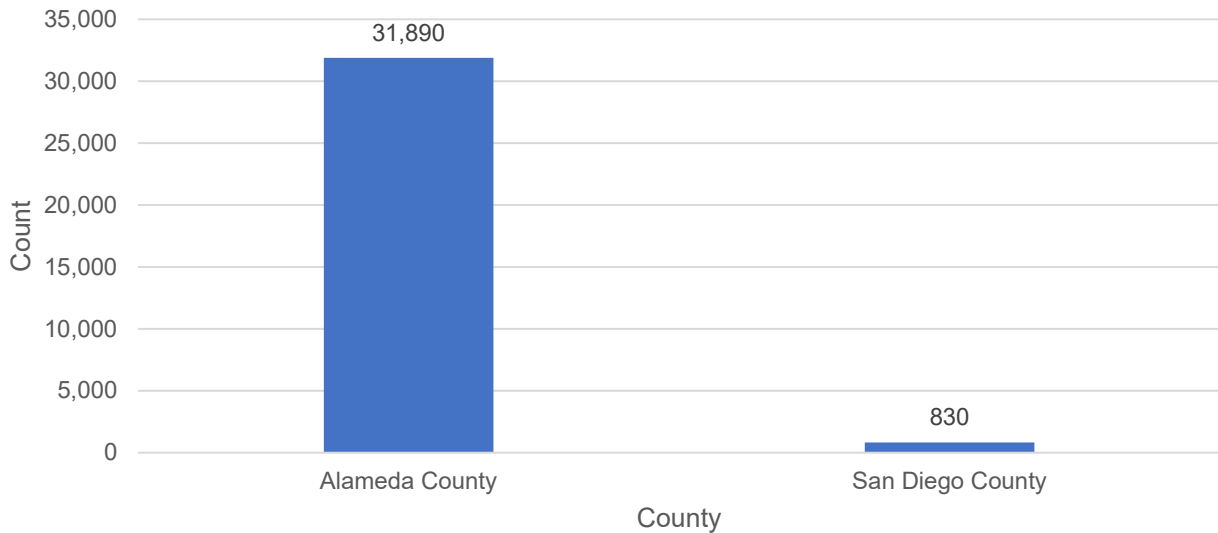


Figure 3.2-3: Count of Treated Electronic Devices by County, 2021

3.2.2.2 Destinations of Electronic Devices

Universal waste handlers can send waste either to another handler or to a destination facility²¹ and must record the amount shipped in an annual report.²² Handlers include the name, address, and phone number of the entity receiving the universal waste, but they are not required to report the types of activities conducted at those locations, so DTSC lacks that information.

Figure 3.2-4 shows the countries that received electronic devices from California in 2021. California handlers shipped about 41,600 tons of electronic devices to seven other countries in 2021. About 29,040 tons (70%) of electronic devices went to a location within the United States, about 5,670 tons (14%) were shipped to Indonesia, and about 2,670 tons (6%) went to Mexico. Table 3.22 shows destinations of electronic devices shipped from California in 2021.

²¹ Cal. Code Regs., tit. 22, § 66274.38(a)

²² In UWED, this is called a destination, not a destination facility.

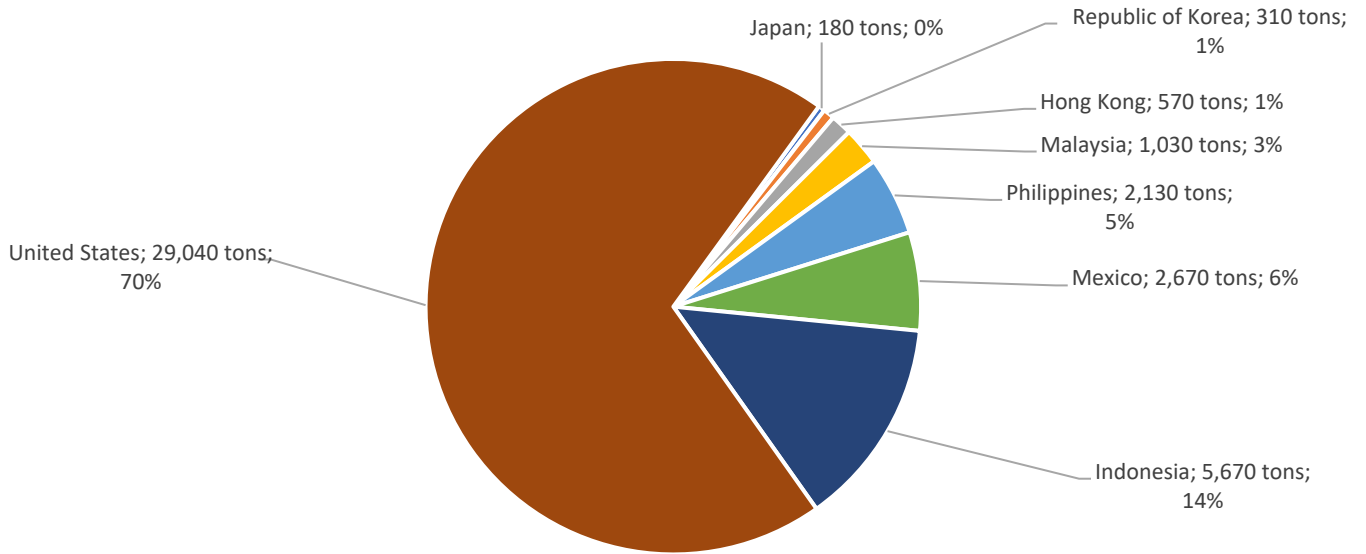


Figure 3.2-4: Destinations of Electronic Devices by Country, Tons, 2021

Figure 3.2-5 shows the states that received electronic devices from California in 2021. California handlers shipped about 29,040 tons of electronic devices to destinations in 25 states, including California. About 19,540 tons (67%) of electronic devices went to destinations within California, about 3,970 tons (14%) were shipped to Arizona, and about 1,190 tons (4%) went to Nevada. Table 3.2-3 shows the states that received electronic devices from California in 2021.

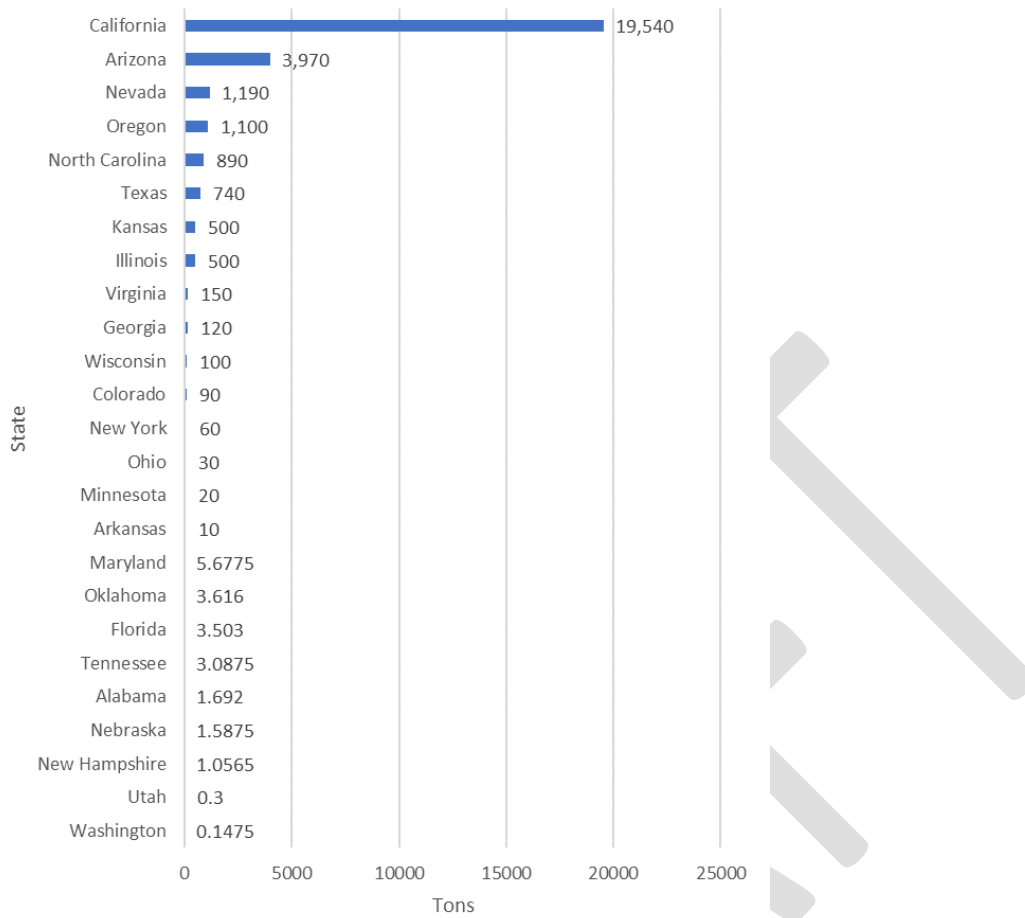


Figure 3.2--5: Destinations of Electronic Devices by State, Tons, 2021

Figure 3.2-6 shows the California counties that received electronic devices in 2021 by weight. California handlers shipped about 19,540 tons of electronic devices to destinations in 21 counties. Fresno County destinations received 8,010 tons (41%) of shipped electronic devices, Los Angeles County destinations received 2,760 tons (14%), and San Bernardino County destinations received 2,570 tons (13%). Table 3.2--4 shows destination counties of electronic devices.

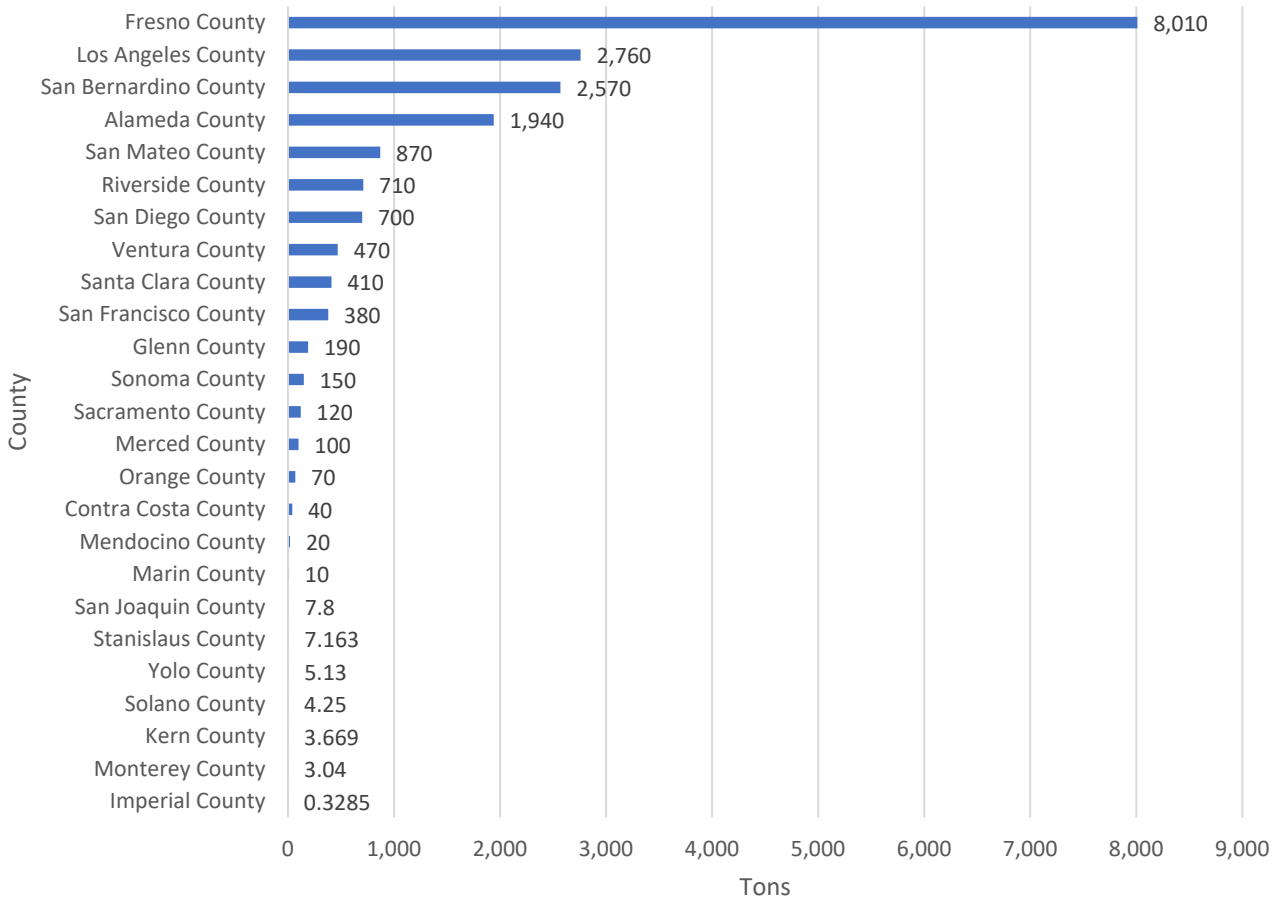


Figure 3.2-6: Destinations of Electronic Devices by County, Tons, 2021

Figure 3.2-7 shows the California counties that recorded electronic devices received by count in 2021. Of the 27,790 electronic devices recorded as being shipped to a destination in California, Monterey County destinations received 17,740 devices (64%), Fresno County destinations received 4,450 (16%), and Los Angeles County destinations received 2,200 devices (8%). Table 3.24 shows the destination counties of electronic devices.

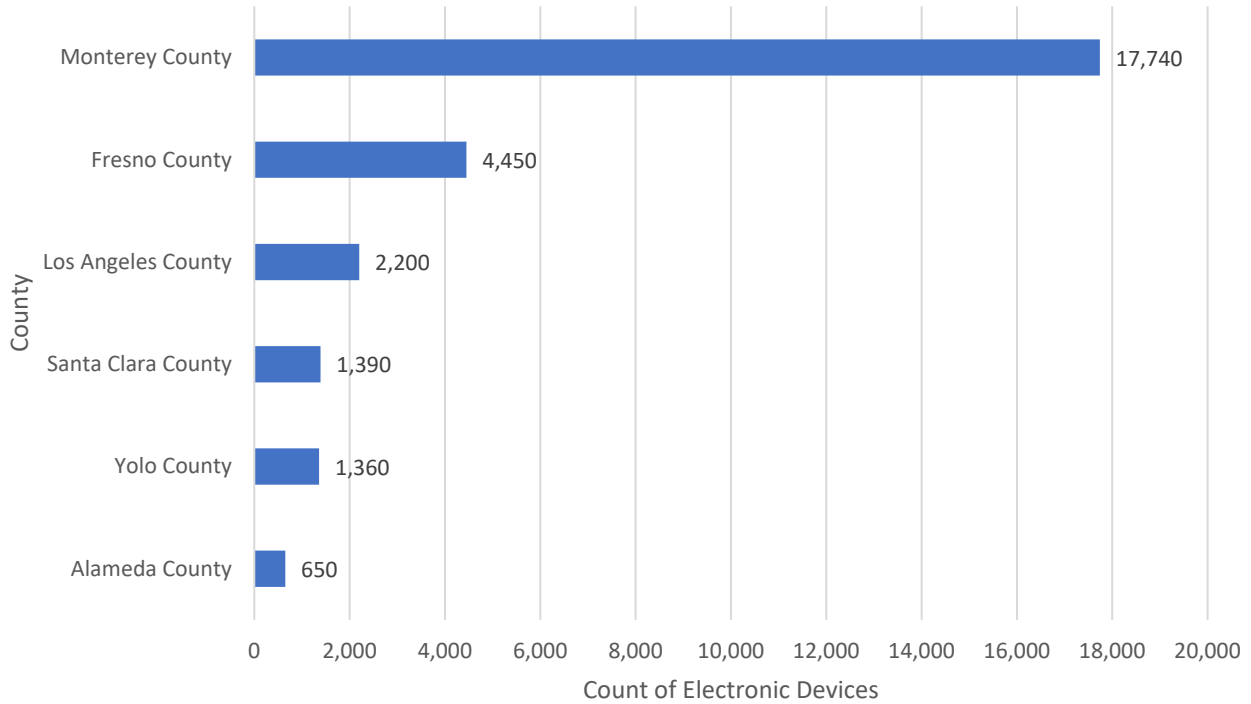


Figure 3.2-7: Destinations of Electronic Devices by County, by Count, 2021

3.2.3 Cathode Ray Tube (CRT) Devices

3.2.3.1 Treated CRT Devices

Universal waste handlers that handle Cathode Ray Tube (CRT) devices can either ship the devices to other facilities for treatment or treat them themselves. Handlers are authorized to remove CRTs from devices as long as it is done in a manner that prevents the CRT from breaking.²³

Figure 3.2-8 shows the California counties where CRT devices were treated in 2021. Of the 18,180 tons of CRT devices treated, recyclers in Los Angeles County treated 4,410 tons (24%), recyclers in San Bernardino County treated 3,010 tons (17%), and recyclers in Riverside County treated 2,410 tons (13%). While some counties recorded CRT devices by count in annual reports, the HWPlan unit was able to convert these numbers to weight because CRT devices are more uniform in size than other electronic devices. The team multiplied the number of devices by 50 to arrive at a weight in pounds for counties that reported CRT devices by count.²⁴ Table 3.2-1 shows treated CRT devices by county in 2021 in tons.

²³ Cal. Code Regs., tit. 22, § 66273.72(b)(1)

²⁴ 50 is used for the weight of a CRT device to convert count of devices to weight.

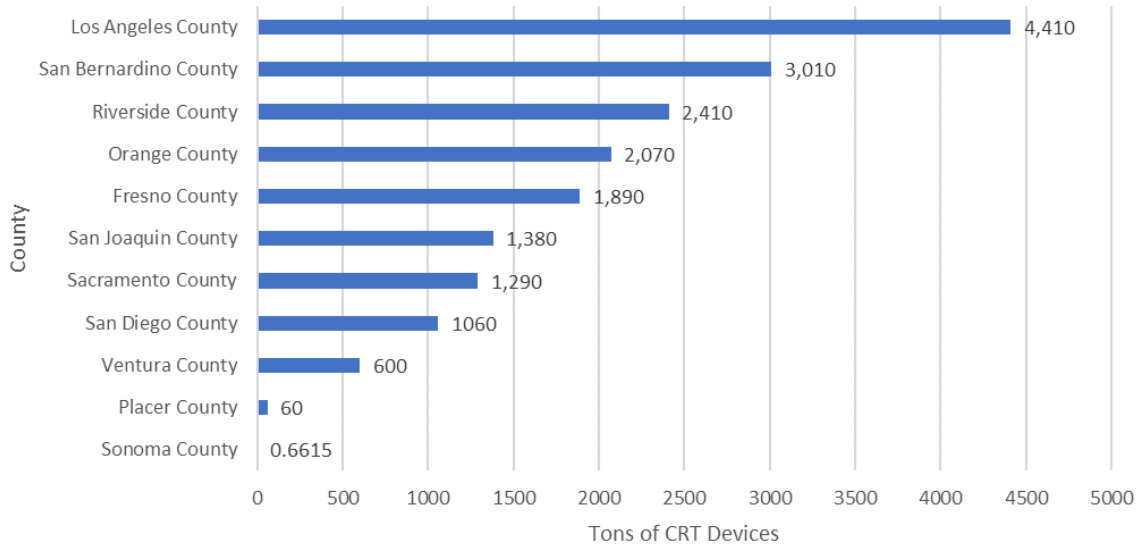


Figure 3.2-8: CRT Devices Treated by County, Tons, 2021

3.2.3.2 Destinations of CRT Devices

Figure 3.2-9 shows the countries that received CRT devices from California in 2021. California handlers shipped 2,810 tons of CRT devices to destinations in two countries in 2021. About 1,820 tons (65%) of California's CRT devices went to destinations within the United States, and about 990 tons (35%) went to destinations in Mexico. Table 3.2-2 shows destinations of CRT devices in tons by country in 2021.

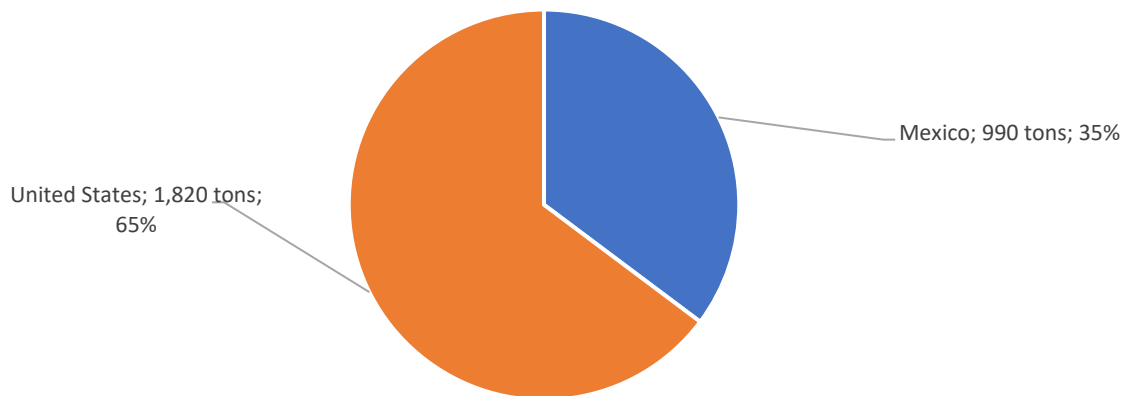


Figure 3.2-9: Destinations of CRT Devices by Country, Tons, in 2021

Figure 3.2-10 shows the states that received CRT devices from California in 2021. Of the 1,820 tons of CRT devices shipped to destinations within the United States in 2021, about 1,800 tons (99%) went to destinations within California. Oregon, Arizona, Texas,

Illinois, and Arkansas each received less than 10 tons of CRT devices from California. Table 3.2-3 shows destinations of CRT devices by state in tons in 2021.

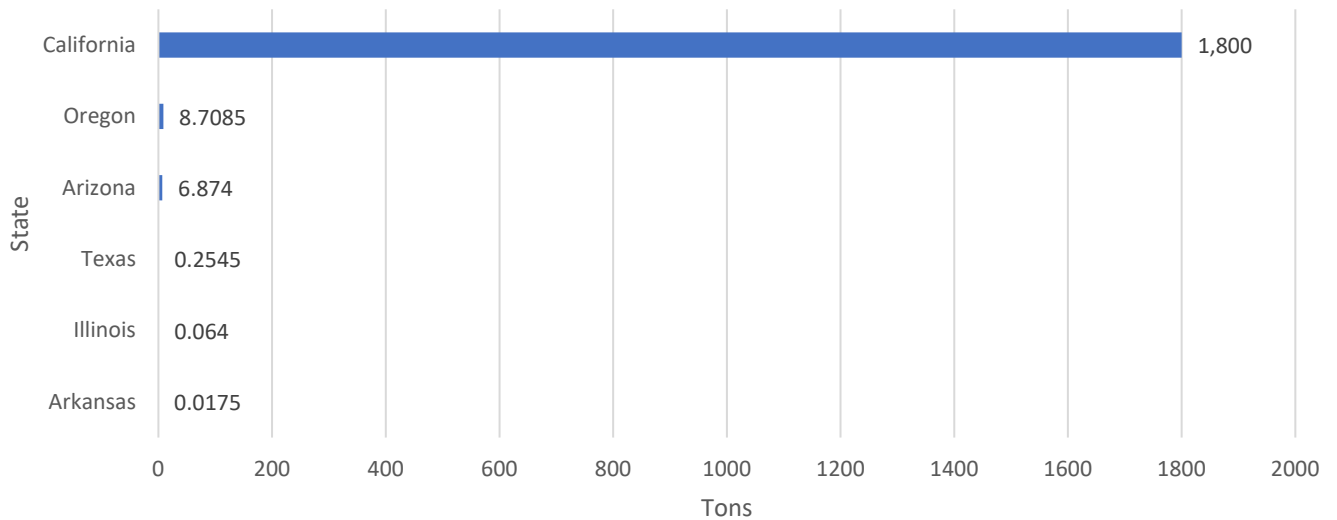


Figure 3.2-10: Destinations of CRT Devices by State, Tons, 2021

Figure 3.2-11 shows the California counties that handlers sent CRT devices to in 2021. Of the 1,800 tons of CRT devices shipped within California in 2021, about 860 tons (46%) went to destinations in Fresno County, about 400 tons (22%) went to destinations in Alameda County, and about 140 tons (8%) were shipped to destinations in Los Angeles County. Table 3.2-4 shows destinations of CRT devices in tons by county in 2021.

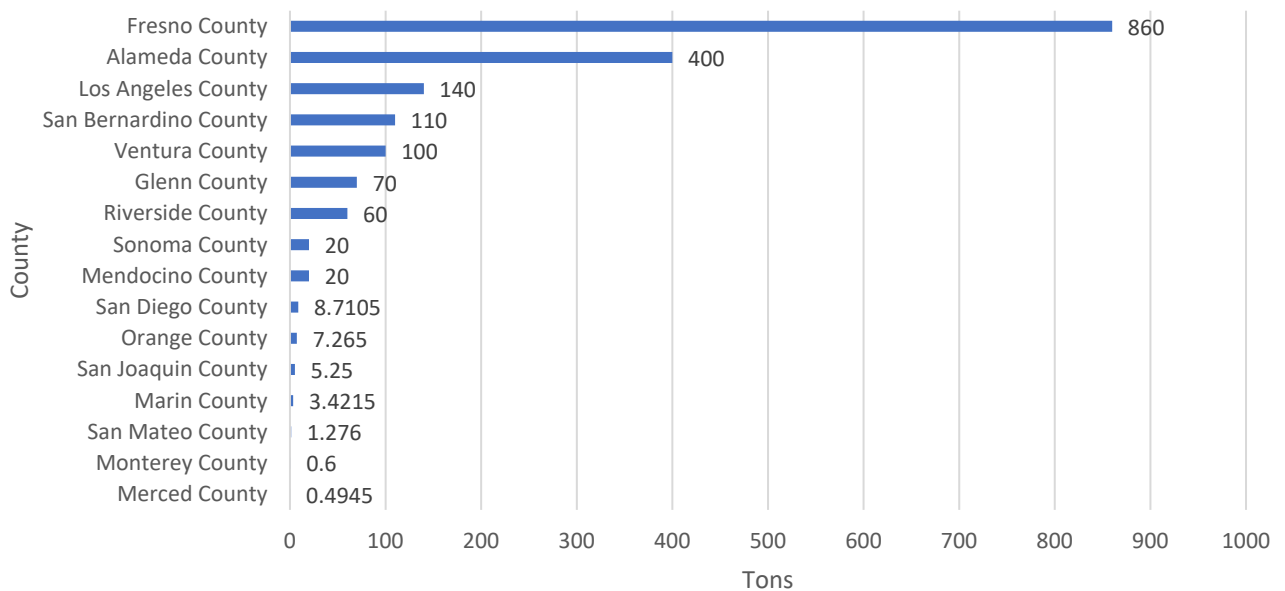


Figure 3.2-11: Destinations of CRT Devices by County, Tons, 2021

3.2.4 Cathode Ray Tubes (CRTs)

3.2.4.1 Treated CRTs

Universal waste handlers that handle CRTs and CRT glass are authorized to conduct certain treatment activities including:²⁵

- physical treatment that changes only the physical properties of the CRT²⁶
- physical separation based on differences in physical properties²⁷
- use of a pinpoint torch or hot wire to check CRTs for glass separation²⁸
- physical separation of CRT panel glass²⁹ from CRT funnel glass³⁰ for the disposal of CRT panel glass into a CRT glass approved landfill³¹
- physical separation of CRT panel glass from CRT funnel glass for the management of CRT panel glass pursuant to HSC § 25143.2.5³²

These treatments are not authorized if they use chemicals, including water, and/or external heat.³³

Figure 3.2-12 shows treated CRTs by county in California in 2021. Of the 1,860 tons of CRTs treated in California in 2021, about 800 tons (43%) were treated by San Bernardino County recyclers, about 740 tons (40%) were treated by Sacramento County recyclers, and about 320 tons (17%) were treated by Ventura County recyclers. Table 3.2-4 shows treated CRTs in tons by county in 2021.

²⁵ Cal. Code Regs., tit. 22, § 66273.73(b)(2)

²⁶ Cal. Code Regs., tit. 22, § 66273.73(d)(1)(A)

²⁷ Cal. Code Regs., tit. 22, § 66273.73(d)(1)(B)

²⁸ Cal. Code Regs., tit. 22, § 66273.73(d)(1)(C)

²⁹ The face plate of a CRT, which contains a viewing surface.

³⁰ Any glass of a CRT separated from panel glass.

³¹ Cal. Code Regs., tit. 22, § 66273.73(d)(1)(E)

³² Cal. Code Regs., tit. 22, § 66273.73(d)(1)(F)

³³ Cal. Code Regs., tit. 22, § 66273.73(d)(2)(A)

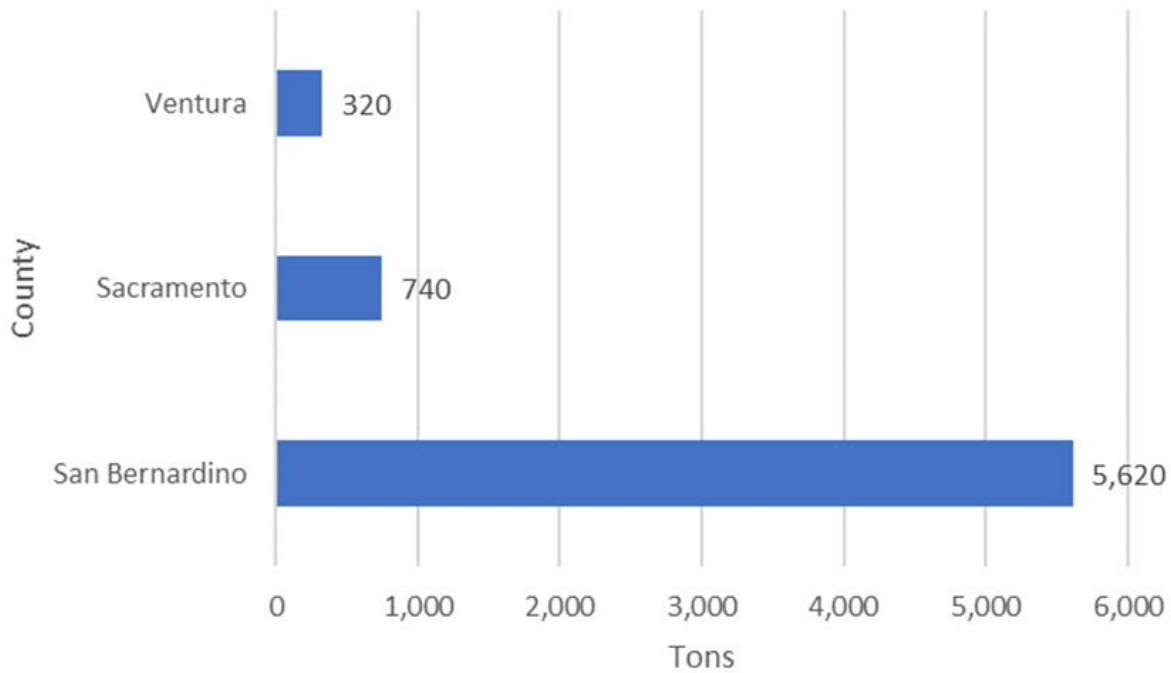


Figure 3.2-12: CRTs Treated by County, Tons, 2021

3.2.4.2 Destinations of CRTs

Universal waste handlers have five options for the disposition of waste CRTs and CRT glass:³⁴

1. Send CRTs and CRT glass for recycling through CRT glass manufacturing or primary/secondary lead smelting.
2. Send CRTs and CRT glass to an intermediate facility for further processing.
3. Dispose of tested CRT panel glass in a CRT panel glass approved landfill, if certain requirements are met.³⁵
4. Recycle CRT panel glass that only exceeds the Total Threshold Limit Concentration (TTL)³⁶ for barium; this recycled CRT panel glass is no longer considered a waste.
5. Manage CRTs and CRT glass as hazardous waste by disposing of them at a permitted hazardous waste facility.

Figure 3.2-13 shows countries that received CRTs from California in 2021. California handlers shipped about 12,530 tons of CRTs to two countries in 2021. About 8,940 tons (71%) went to Mexico, while about 3,590 tons (29%) went to destinations within the United States. Table 3.2-2 shows destinations of CRTs in tons by country in 2021.

³⁴ Department of Toxic Substances Control. *Final Disposition Options for Universal Waste: Cathode Ray Tubes and CRT Glass*

³⁵ Cal. Code Regs., tit. 22, § 66273.75(a)(9) and § 66273.75(f)(2)

³⁶ Total Threshold Limit Concentration

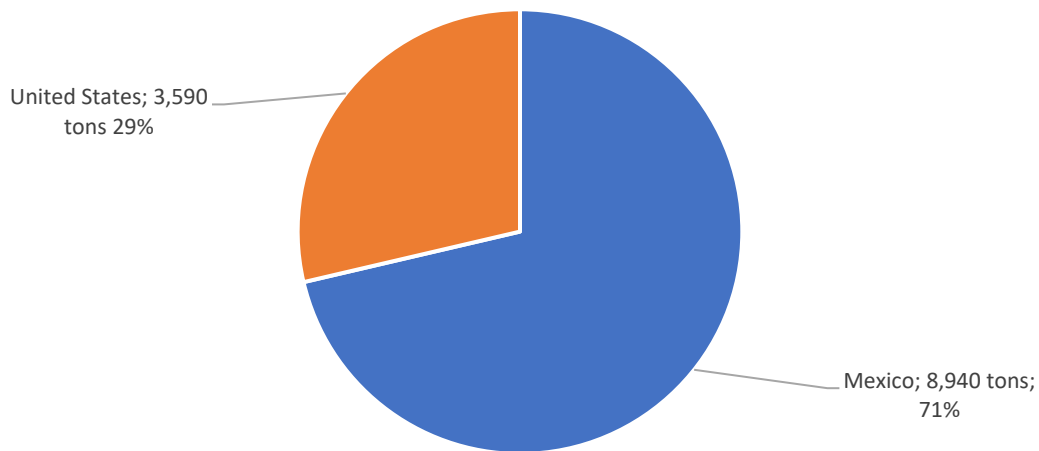


Figure 3.2-13: Destinations of CRTs by Country, Tons, 2021

Figure 3.2-14 shows the states California handlers shipped CRTs to in 2021. Of the 3,590 tons of CRTs shipped within the United States in 2021, about 2,800 tons (79%) went to destinations in Nevada, about 700 tons (20%) went to destinations in Missouri, and about 90 tons (3%) went to destinations within California. Table 3.2-3 shows destinations of CRTs in tons by state in 2021.

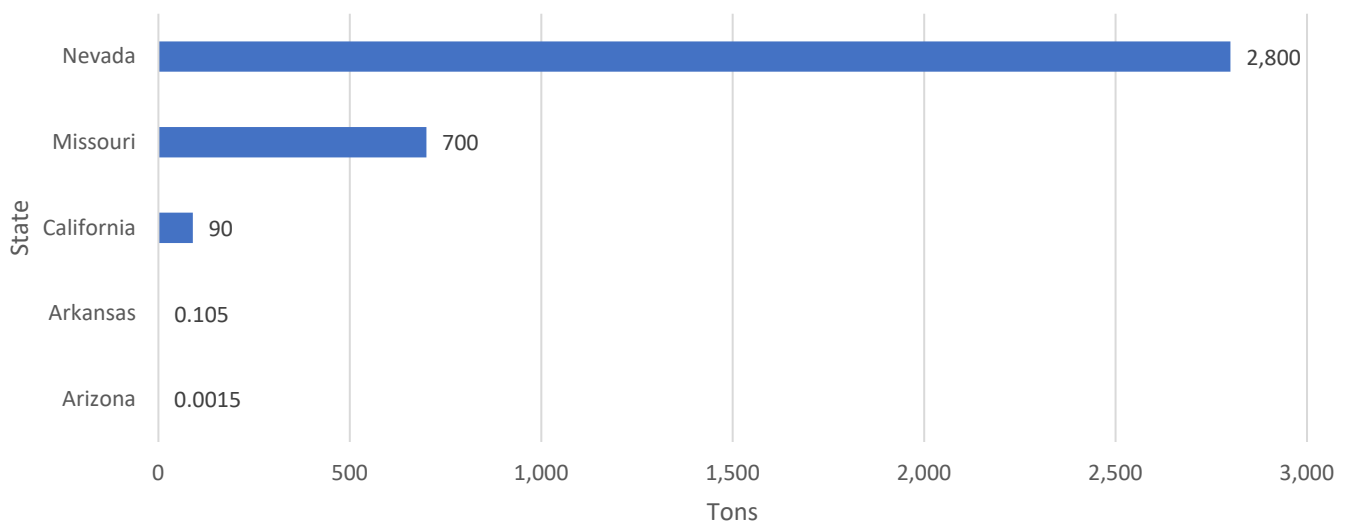


Figure 3.2-14: Destination of CRTs by State, Tons, 2021

Figure 3.2-15 shows the California counties that handlers shipped CRTs to in 2021. Of the 90 tons of CRTs that were shipped within California in 2021, about 60 tons (67%) went to destinations in Fresno County, and about 30 tons (33%) went to destinations in Alameda County. Table 3.2-4 shows destinations of CRTs in tons by county in 2021.

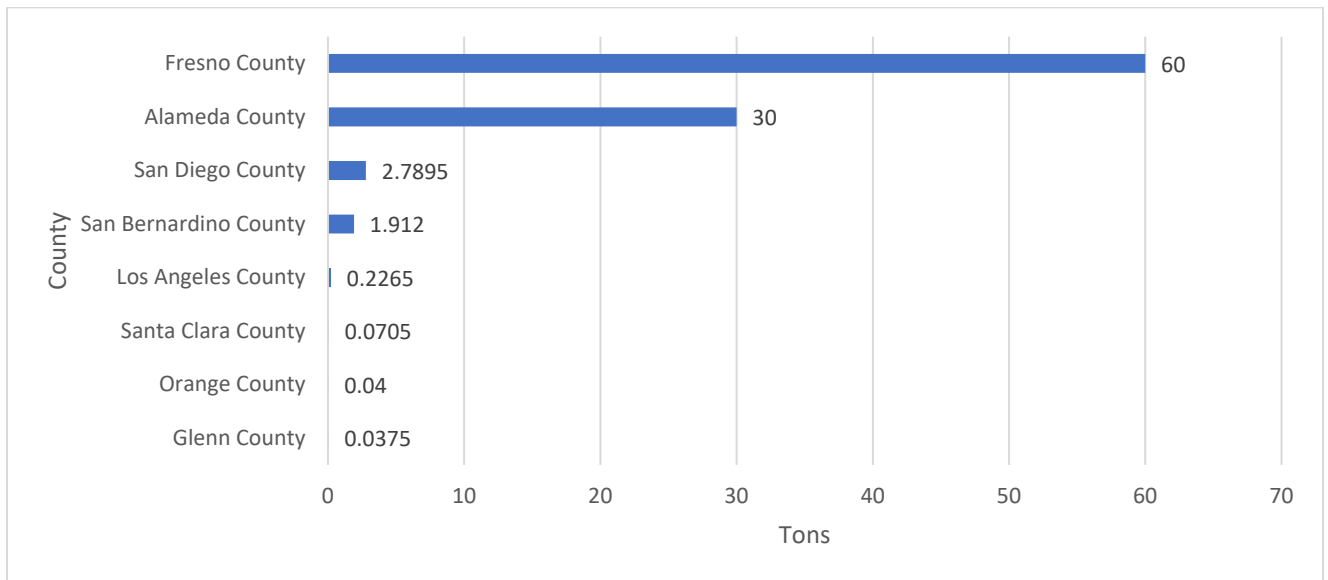


Figure 3.2-15: Destinations of CRTs by County, Tons, 2021

3.2.5 CRT Glass

CRT glass is handled separately from CRTs when it has been separated from CRTs either because of treatment or breakage.

3.2.5.1 Treated CRT Glass

No CRT glass was treated in California in 2021.

3.2.5.2 Destinations of CRT Glass

CRT glass may come from accidental breakage of a CRT or from treatment of a CRT. CRT glass shipped to a destination out of state in 2021 was greater than the amount handled in California. This may be because some CRT glass originated from handlers that treated CRTs.

Figure 3.2-16 shows the countries that received CRT glass from California in 2021. Of the 3,270 tons of CRT glass shipped in 2021 about 1,850 tons (56%) went to destinations within the United States, about 870 tons (27%) was shipped to South Korea,³⁷ and about 560 tons (17%) went to Mexico. Table 3.2-2 shows destinations of CRT glass in tons in 2021.

³⁷ May be recorded in UWED data as the Republic of Korea or Democratic People's Republic of Korea.

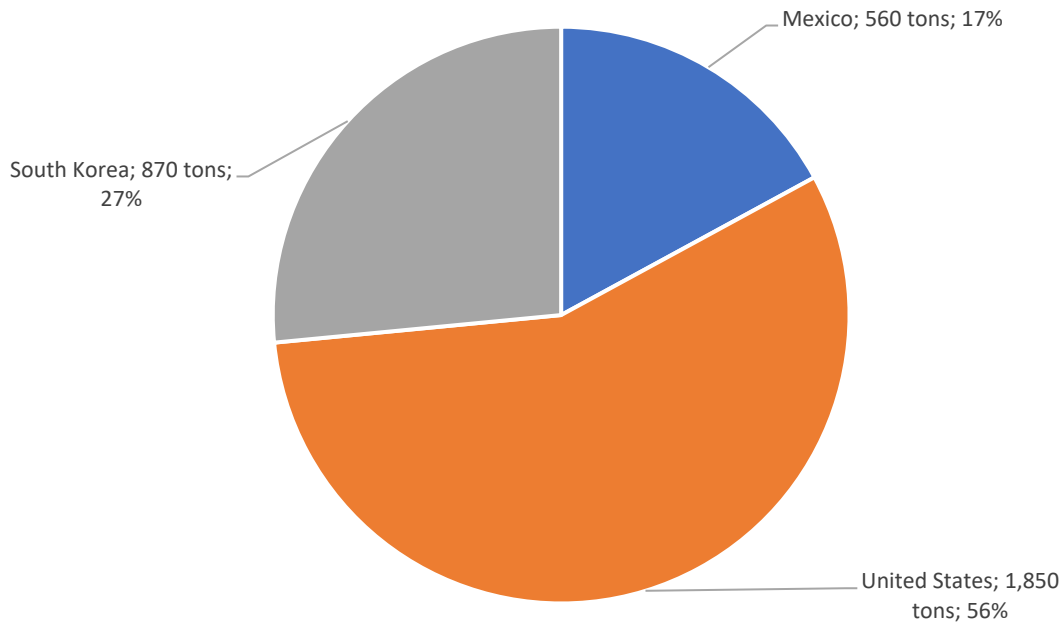


Figure 3.2-16: Destinations of CRT Glass by Country, Tons, 2021

Figure 3.2-17 shows the states that received CRT glass from California in 2021. Of the 1,850 tons of CRT glass shipped to destinations within the United States in 2021, 1,110 tons (60%) went to destinations in Nevada, 740 tons (40%) went to destinations in Missouri, and less than one ton went to destinations in Arizona. CRT glass was not shipped to destinations in California in 2021. Table 3.23 shows destinations of CRT glass in tons by state in 2021.

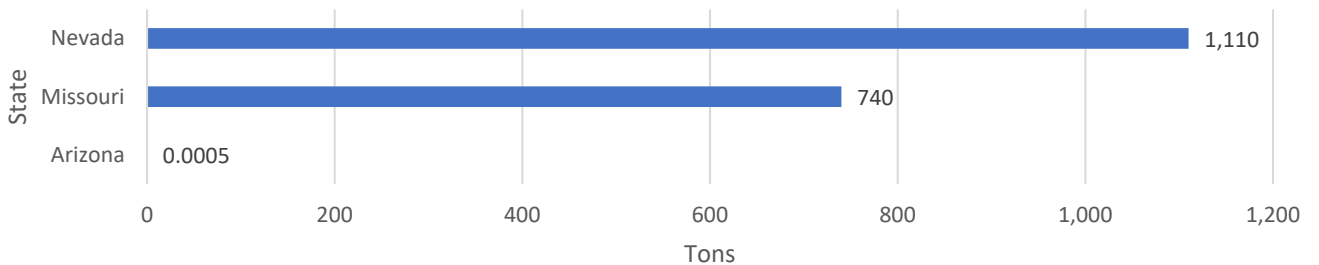


Figure 3.2-17: Destinations of CRT Glass by State, Tons, 2021

3.2.6 Unspecified Universal Waste

When an electronic device is treated, it may be broken down into components, or treatment residuals. These may include universal waste, such as batteries or electric lamps, that are recorded in annual reports as unspecified universal waste.

3.2.6.1 Destinations of Unspecified Universal Waste

Figure 3.2-18 shows the states that received unspecified universal waste from California in 2021. Of the 930 tons of unspecified universal waste shipped in 2021, about 460 tons (49%) went to destinations within California, 150 tons (16%) went to destinations in Nevada, and 90 tons (10%) went to destinations in Ohio. Table 3.2-5 shows destinations of unspecified universal waste in tons by state in 2021.

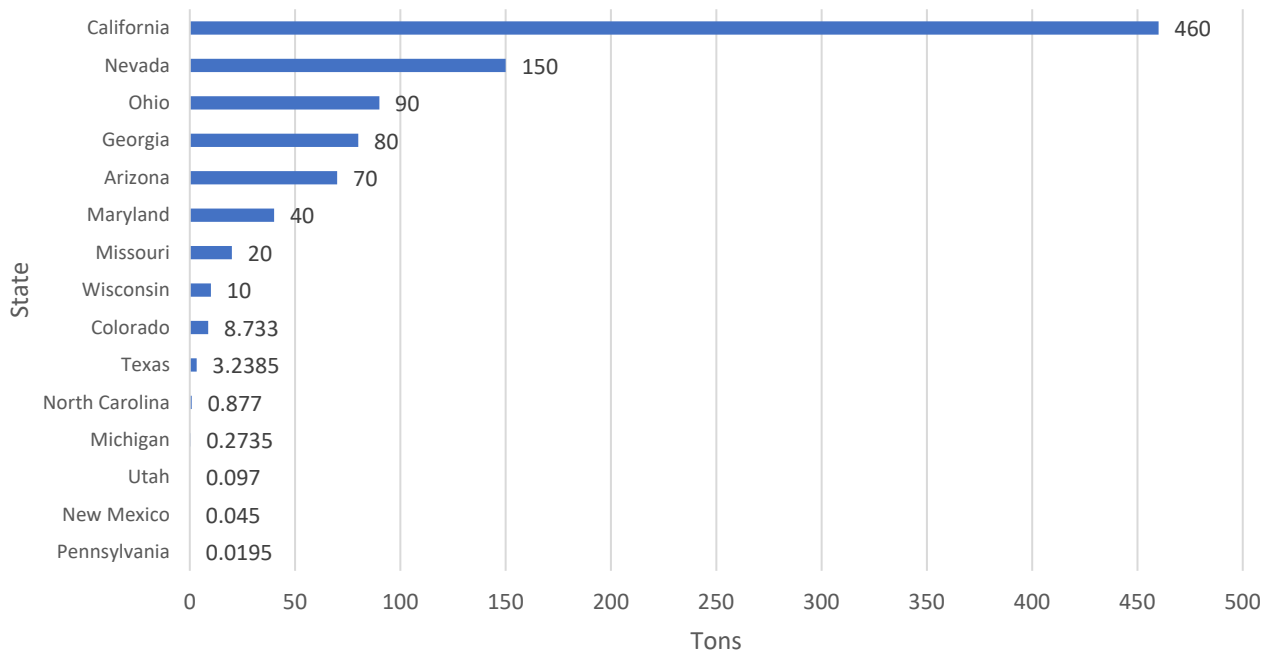


Figure 3.2-18: Destinations of Unspecified Universal Waste by State, Tons, 2021

Figure 3.2-19 shows the California counties that received unspecified universal waste in 2021. Of the 460 tons of unspecified universal waste shipped to destinations in California in 2021, San Bernardino County destinations received 280 tons (61%), Los Angeles County destinations received 130 tons (28%), and Orange County destinations received 50 tons (11%). Table 3.2-4 shows destinations of unspecified universal waste in tons by county in 2021.

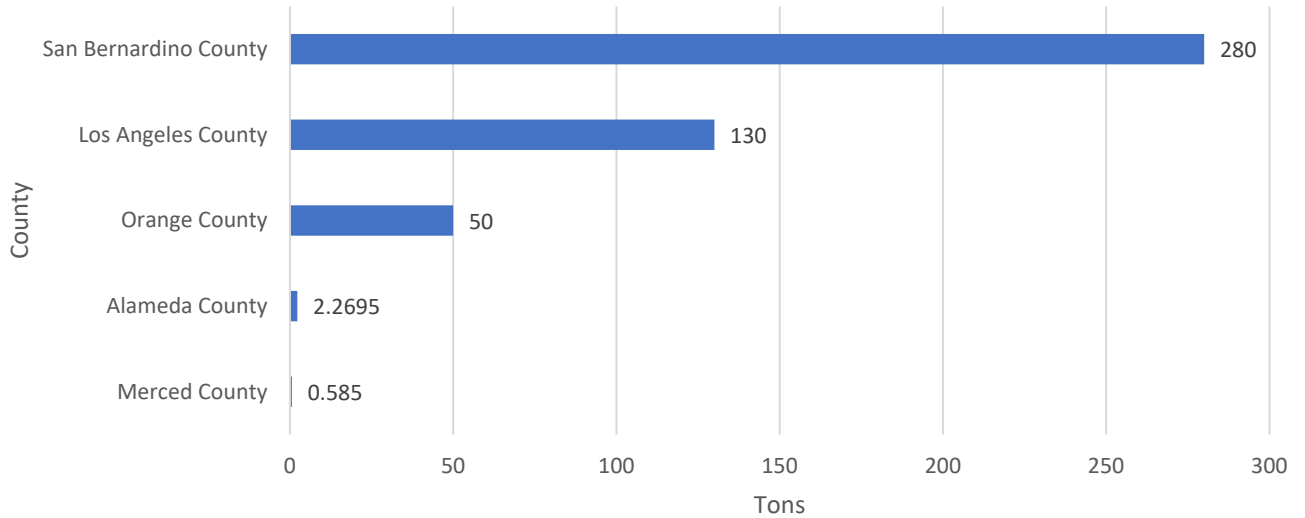


Figure 3.2-19: Destinations of Unspecified Universal Waste by County, Tons, 2021

3.2.7 Batteries

3.2.7.1 Treated Batteries

Universal waste handlers that handle batteries may conduct certain treatment activities as long as the casing of the battery cell is not breached and remains intact and closed.

Authorized treatment activities include:^{38 39}

- Sort by battery type
- Mix battery types in one container
- Discharge batteries to remove the electric charge
- Regenerate used batteries
- Disassemble batteries and battery packs into individual batteries or cells
- Remove batteries from consumer products
- Remove electrolyte from batteries

A universal waste handler that removes electrolyte from batteries must determine whether the removed electrolyte is a hazardous waste and, if so, must manage the electrolyte as a hazardous waste. Similarly, a universal waste handler that removes batteries from consumer products must determine whether the remaining waste exhibits a characteristic of hazardous waste and manage it accordingly. Regenerated batteries are not considered a waste.

³⁸ Cells may be opened to remove electrolyte, but the cell must be closed immediately after removal of the electrolyte.

³⁹ Cal. Code Regs., tit. 22, § 66273.33(a)(2)

DTSC conducts an annual rechargeable battery survey to estimate the amount of batteries returned to handling or recycling facilities, but the survey does not request information from these facilities on the treatment of batteries. DTSC staff interviewed an employee with a company that engages in the recovery of valuable metals from end-of-life batteries and catalytic converters. The employee stated that the company breaks down batteries and treats electrolyte from batteries on site.

3.2.7.2 Destinations of Batteries

The DTSC rechargeable battery survey does not request information on the destinations of batteries collected by handlers and/or recyclers. DTSC staff interviewed an employee with a company that engages in the recovery of valuable metals from end-of-life batteries and catalytic converters. The employee stated that collected batteries may be shipped to different locations depending on the nature of the battery or associated material. Specifically, the employee conveyed the following information regarding that company's practices: Lithium primary batteries, which are single use and not rechargeable and, therefore, not part of the DTSC rechargeable battery survey, are shipped primarily to a destination in British Columbia, Canada; rechargeable Li-ion and Ni-Cd batteries are shipped to a destination in Ohio; lead-acid batteries are either shipped to a destination in California or exported; scrap metal fractions from batteries go to ferrous and non-ferrous metal facilities.

3.2.8 Lamps

3.2.8.1 Treated Lamps

Universal waste handlers are authorized to remove lamps from products or structures.⁴⁰ Universal waste lamps must be managed in a manner that prevents breakage to avoid potential release of toxic components.

3.2.8.2 Destinations of Lamps

Information about the destinations of lamps managed as universal waste is not available for this Report.

3.2.9 Mercury-Containing Equipment

3.2.9.1 Treated Mercury-Containing Equipment

The treatment of mercury-containing equipment varies depending on the equipment being treated. Handlers are permitted to conduct the following activities:⁴¹

⁴⁰ Cal. Code Regs., tit. 22, § 66273.33(b)(3)

⁴¹ Cal. Code Regs., tit. 22, § 66273.33(c)

- Drain elemental mercury from pressure or vacuum gauges at the site where the gauges were generated.
- Remove mercury-containing batteries and switches from novelties.
- Remove mercury switches from motor vehicles and other products.
- Remove ampoules from thermostats.

Removed batteries, switches, ampoules, and drained mercury are universal wastes and must be managed appropriately. Novelties that were universal wastes due to the presence of mercury-containing switches or batteries are no longer hazardous waste once the battery or switch is removed, as long as the novelty doesn't otherwise exhibit a hazardous waste characteristic.

3.2.9.2 Destinations of Mercury-Containing Equipment

DTSC staff interviewed an employee from an industry-funded nonprofit corporation that transports and disposes of mercury switch thermostats. According to the employee, the mercury collected through the nonprofit corporation is retorted, or purified, at a destination in Wisconsin. The retorted mercury is sent to a precious metals supplier or prepared for long-term storage.

3.2.10 Non-Empty Aerosol Cans

3.2.10.1.1 Treated Non-Empty Aerosol Cans

Universal waste handlers can treat non-empty aerosol cans by processing the cans to remove and collect the contents.⁴² The empty can is no longer a universal waste or a hazardous waste.

3.2.10.2 Destinations of Non-Empty Aerosol Cans

Information about the destinations of non-empty aerosol cans managed as universal waste is not currently available for this Report.

3.2.11 Photovoltaic (PV) Modules

3.2.11.1 Treated Photovoltaic Modules

Authorized treatment of photovoltaic (PV) modules (i.e., solar panels) is like authorized treatment of electronic devices. Universal waste handlers are authorized to remove from PV systems⁴³ discrete assemblies such as batteries, inverters, cables, connectors, or

⁴² HSC § 25201.16(h)

⁴³ Cal. Code Regs., tit. 22, § 66273.71(c)

diode boxes, and are authorized to disassemble PV modules without the use of chemicals or external heat⁴⁴ and to physically treat and separate components.⁴⁵

Facilities can report handling and treatment of PV modules to DTSC by either weight or count. Some facilities report handling PV modules by weight but report shipping modules by count. There is not a conversion from count to weight, because PV modules are made from a variety of materials and in a variety of sizes.

Handlers are required to report how the location that will receive the PV modules intends to manage them. The term “recycling” in this context can include activities like continued use, repair, redeployment, or reclamation activities. Additional information on the specific activities occurring at each facility is not available.

Figure 3.2-20 shows the fates of PV modules in 2021 by count. Of the 1,330 PV modules managed by a destination in 2021, about 1,090 modules (81%) were recycled, and about 250 modules (19%) were refurbished.⁴⁶ Table 3.2-6 shows fates of PV modules by count in 2021.

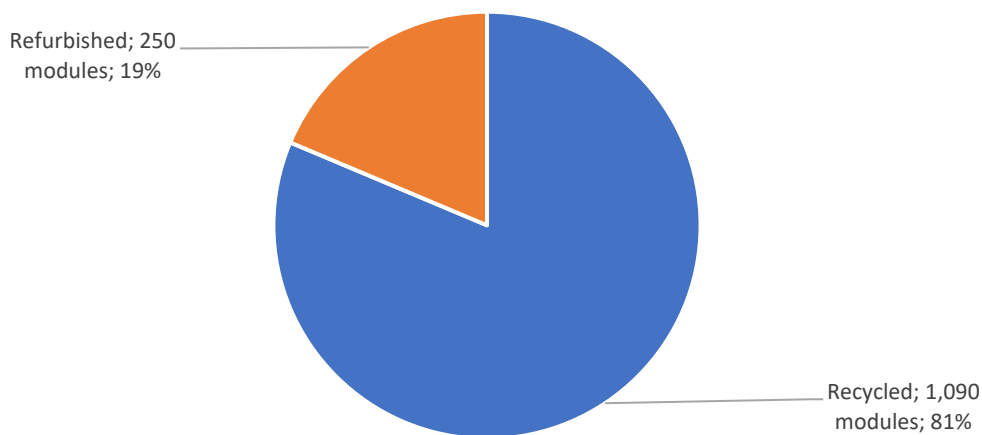


Figure 3.2-20: PV Modules Fates by Count, 2021

Figure 3.2-21 shows the fates of PV modules in 2021 by weight. Of the 660 tons of PV modules managed by a facility in 2021, about 540 tons (83%) were reported to be

⁴⁴ Cal. Code Regs., tit. 22, § 66273.72(f)

⁴⁵ Cal. Code Regs., tit. 22, § 66273.73(d)

⁴⁶ “Recycled” is the term used by facilities that manage photovoltaic modules in annual reports for PV modules. The annual report does not require specific information and therefore specific management activities at these facilities was not available.

managed under the reuse/recover/recycle hierarchy.⁴⁷ The quantity of modules managed under each category in this hierarchy is not available. About 80 tons (12%) of PV modules were reported to be recycled⁴⁸ outside of the reuse/recover/recycle hierarchy, and about 30 tons (5%) were handled by a handler in California but not shipped to a destination. For quantities not shipped to a destination, there is no description of how they were managed. For quantities that were shipped to a destination, annual reports include a description of how the destination intended to manage the shipped modules. Table 3.2-5 shows fates of PV modules in tons in 2021.

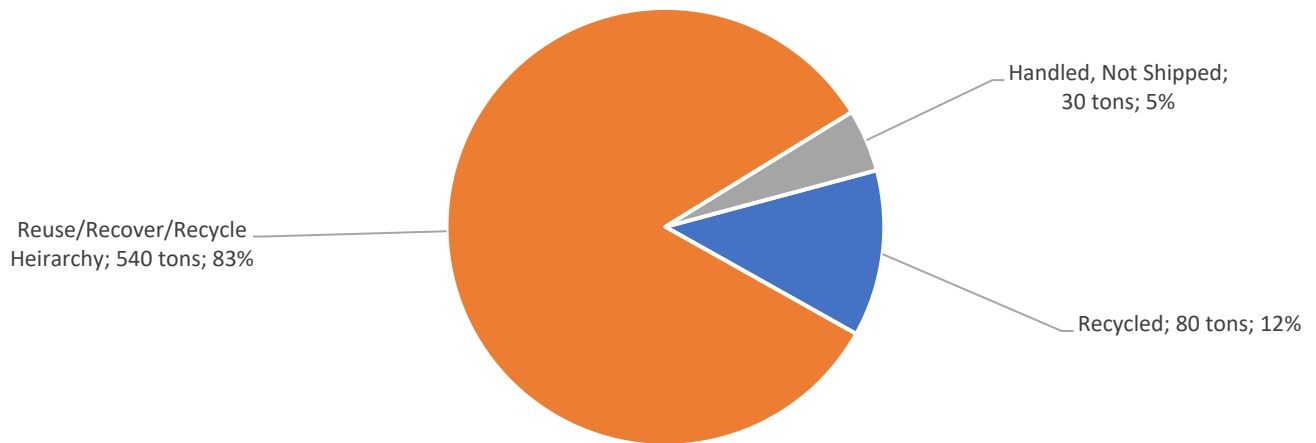


Figure 3.2-21: Fates of PV Modules in Tons, 2021

3.2.11.2 Destinations of Photovoltaic Modules

Figure 3.2-22 shows the states that received PV modules from California in 2021 by count. California handlers shipped about 1,330 PV modules to destinations in two states in 2021. About 1,000 modules (75%) went to destinations in Arizona, and about 340 (25%) were shipped to destinations in California. Table 3.2-3 shows count of destinations of PV modules by state in 2021.

⁴⁷ The terminology “reuse/recover/recycle hierarchy” is used here because the annual reports for PV modules use this terminology.

⁴⁸ “Recycled” is the term used by facilities that manage photovoltaic modules in annual reports for PV modules. The annual report does not require specific information and therefore specific management activities at these facilities was not available.

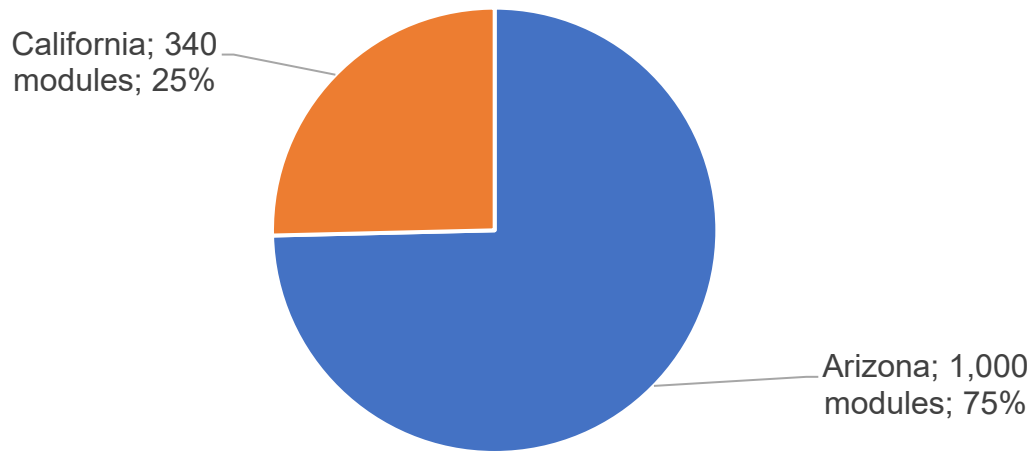


Figure 3.2-22: Count of PV Modules by Destination State, 2021

Figure 3.2-23 shows the states that received PV modules in 2021 by weight. Of the 630 tons of California PV modules shipped in the United States in 2021, about 600 tons (97%) were shipped to destinations in Texas, about 10 tons (2%) were shipped to Nevada, and about 10 tons (2%) went to Ohio. About 30 tons were handled by a handler in California but not shipped to a destination. Table 3.23 shows destinations of PV modules in tons by state in 2021.

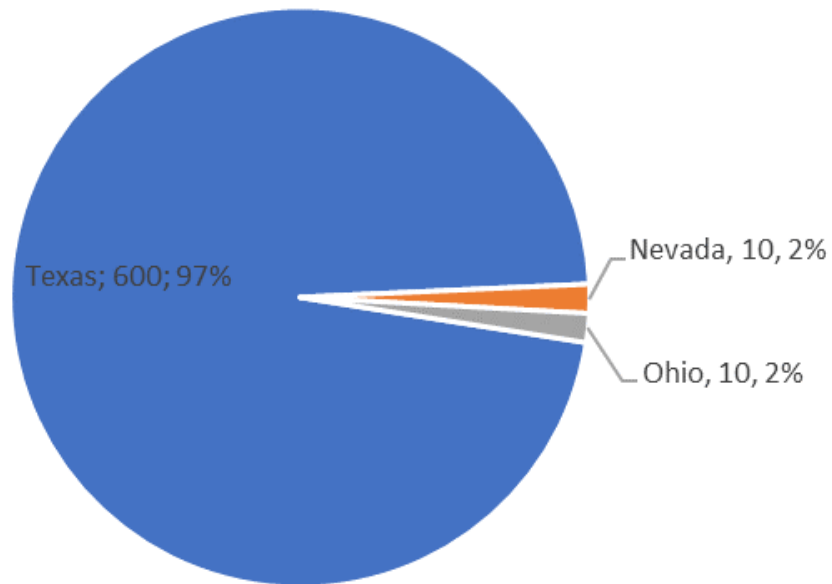


Figure 3.2-23: Destinations of PV Modules by State, Tons, 2021

Figure 3.2-24 shows the California counties that handlers shipped PV modules to in 2021 by count. California handlers shipped about 340 modules to destinations in two counties in 2021. About 250 modules (76%) went to San Bernardino County destinations, and about 80 tons (24%) were shipped to Sacramento County destinations. Table 3.2-4 shows the destination county of PV modules by count in 2021.

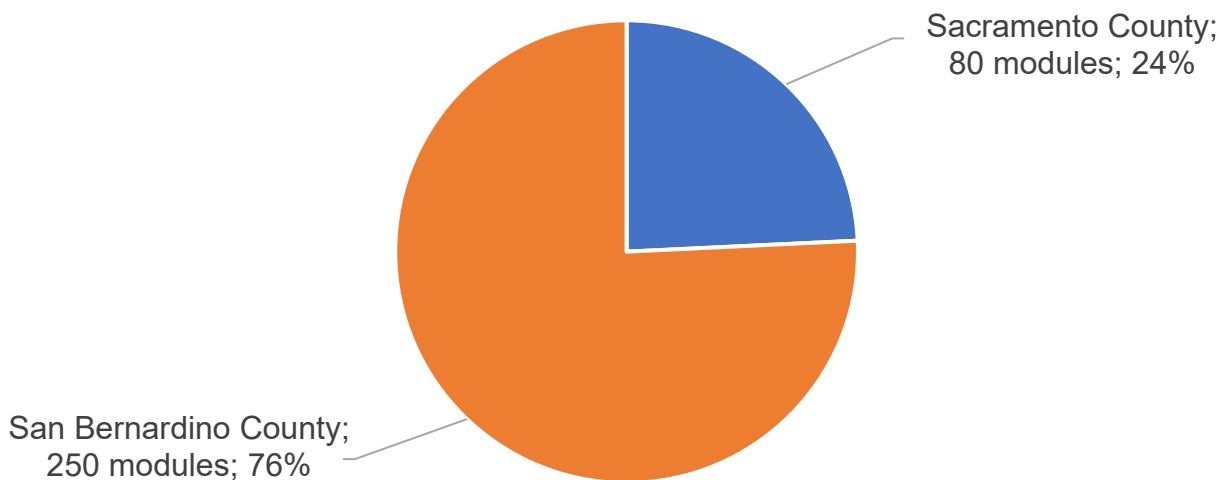


Figure 3.2-24: County Destinations of PV Modules by Count, 2021

Figure 3.2-25 shows the California counties where PV modules were handled in 2021 by weight. California handlers managed about 32 tons of PV modules in 2021. About 30 tons (94%) were handled by Fresno County handlers but not shipped to a destination, and nearly 2 tons of PV modules were handled by Stanislaus County handlers but not shipped to a destination. Table 3.24 shows destination counties of PV modules by tons in 2021.

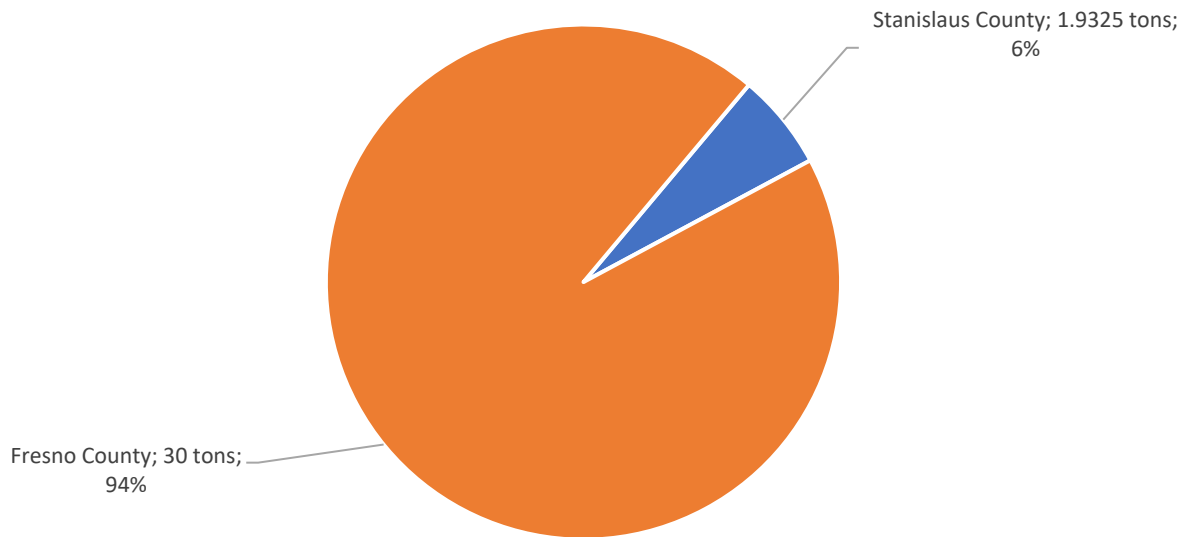


Figure 3.2-25: Destinations of PV Modules by Count, Tons, 2021

3.3 Household Hazardous Waste

3.3.1 Disposition of Household Hazardous Waste (HHW)

Certain hazardous wastes require specific methods of treatment and/or disposal. Treatment is any method, technique, or process that changes the physical, chemical, or biological character or composition of hazardous waste.⁴⁹ Disposal is discharge, deposit, injection or dumping into land or water.⁵⁰

Figure 3.3-1 shows the disposition of California’s household hazardous waste (HHW) in 2020-2021. About 63,800 tons of HHW was treated, recycled, or disposed of in the 2020-2021 reporting period. About 36,630 tons (57%) of HHW was recycled, about 12,370 tons (19%) was managed by PaintCare stewardship programs, about 6,680 tons

⁴⁹ Cal. Code Regs., tit. 22, §66260.10

⁵⁰ Cal. Code Regs., tit. 22, §66260.10

(11%) was destructively incinerated, and about 3,850 tons (6%) was incinerated for fuel use. Less than one ton of HHW was mercury that was managed through TRC stewardship programs (operated by Thermostat Recycling Corporation). Table 3.3-1 shows disposition of HHW in tons in 2020-2021.

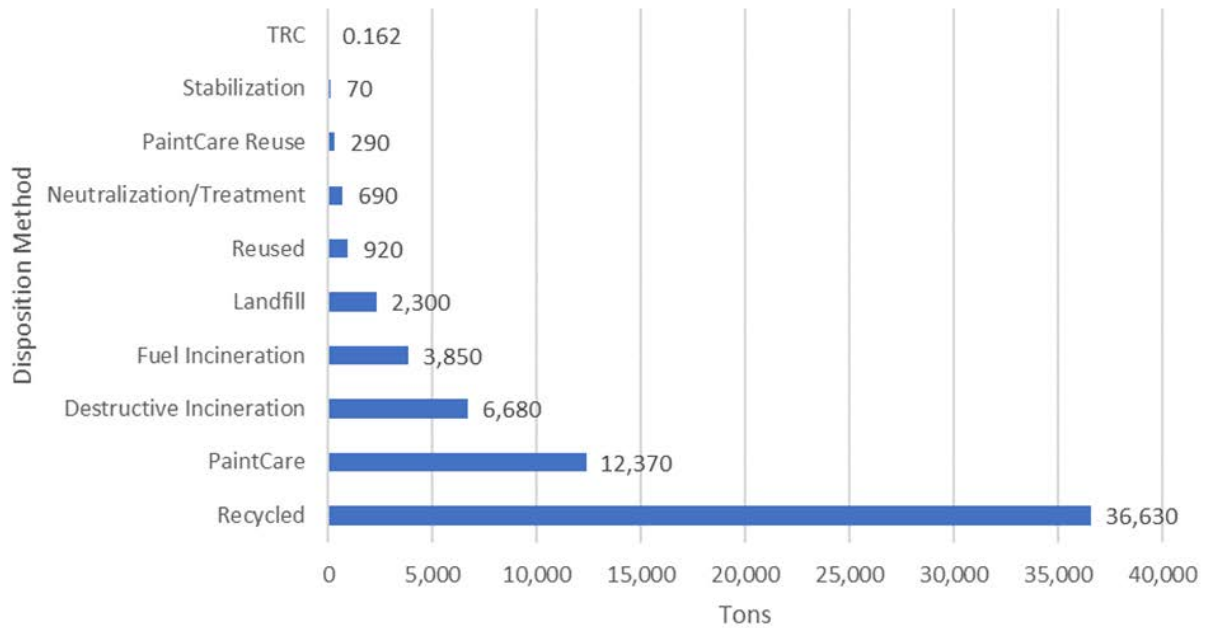


Figure 3.3-1: Disposition of HHW in 2020-2021, Tons

Figure 3.3-2 shows the counties where HHW was disposed of in the 2020-2021 reporting period. Of the 63,800 tons of HHW disposed of in the 2020-2021 reporting period, about 14,840 tons (23%) was disposed of in Los Angeles County, about 5,820 tons (9%) in Orange County, and about 3,230 tons (5%) in Alameda County. Table 3.3-2 shows disposition of HHW in tons by county in 2020-2021.

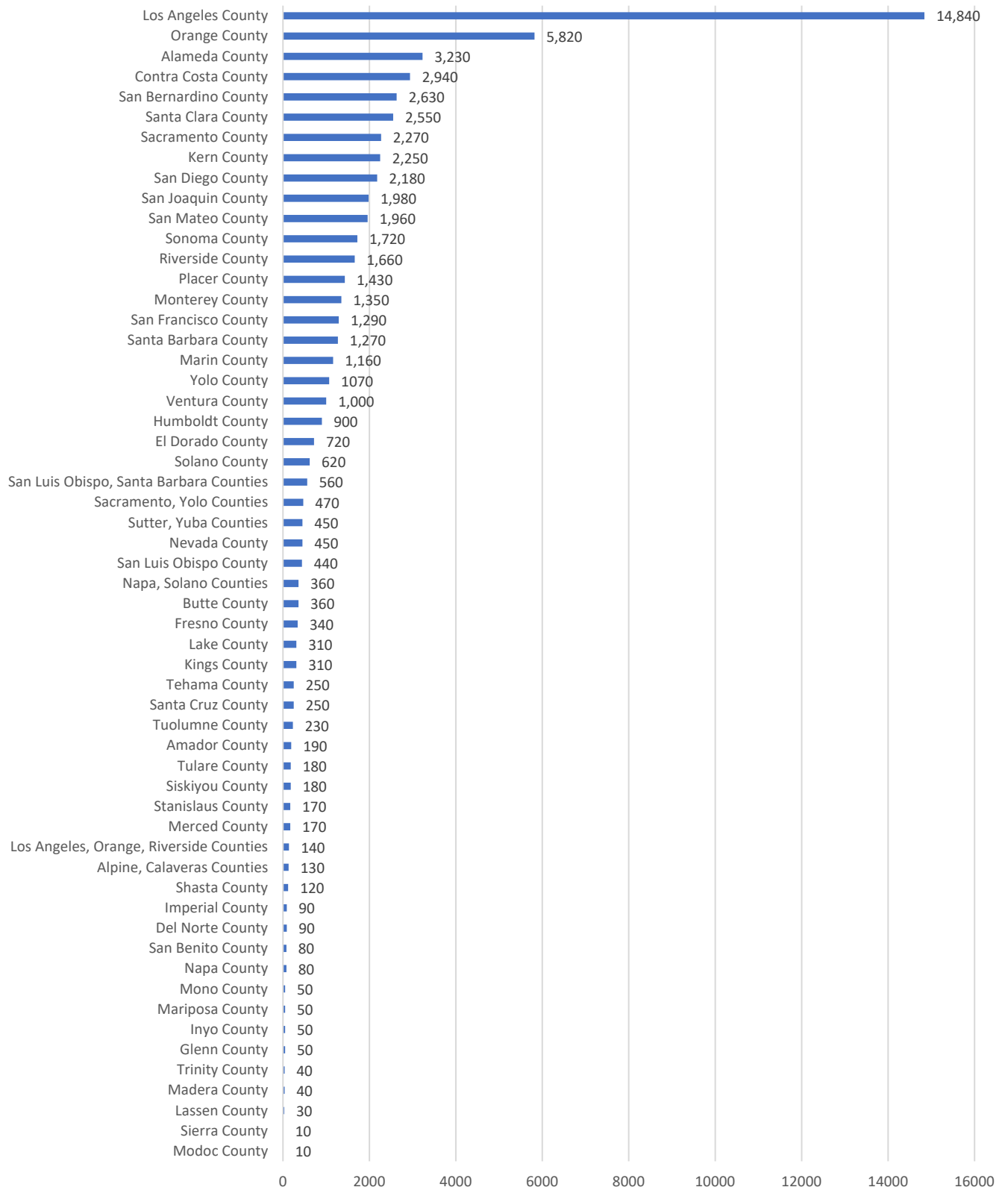


Figure 3.3-2: Disposition of HHW by County, Tons, 2020-2021

3.4 Treated Wood Waste

Non-RCRA hazardous treated wood waste is subject to alternative management standards. These include lessened storage requirements extended accumulation periods, shipments are allowed without a hazardous waste manifest or hazardous waste transporter and allow disposal at specific non-hazardous waste landfills. These standards promote the safe and economical disposal of treated wood waste.

This principle was illustrated in 2021, after these alternative management standards were briefly abolished due to the veto of Senate Bill 68. This lapse in standards created issues for generators, homeowners, landfills, and DTSC. Generators of treated wood waste needed to either arrange for Class I disposal or find alternatives, likely increasing costs for generators. In addition, DTSC granted variances during the lapse to allow generators of treated wood waste to dispose of it in certain landfills. Generators needed to apply for and pay for these variances, and issuance of these variances took weeks of processing time. DTSC also received calls from generators and homeowners asking where to take treated wood waste. The lapse in alternative management standards created concerns because landfills no longer accepted treated wood waste, and there were reports of illegal disposal of treated wood waste. Assembly Bill 332 restored the alternative management standards on August 31, 2021, allowing the disposal of treated wood waste to non-hazardous landfills. In the bill, the legislature stated its intent to “continue to evaluate the alternative management standards for treated wood waste, including the potential for longer term solutions that may replace the continuation of the alternative management standards and disposal of treated wood waste in solid waste landfills.”

Treated wood waste facilities and landfills that accept treated wood waste submit semiannual reports to DTSC using the Treated Wood Waste Tracking System. DTSC’s website includes lists of State Water Resources Control Board-approved treated wood waste landfills, transfer facilities that accept treated wood waste, and transporters that deliver treated wood waste to disposal facilities.⁵¹

Detailed information regarding the destination of all treated wood waste is not available for this Report. However, destination information for treated wood waste that is tracked with a manifest is found in HWTS using State Waste Code 614.

⁵¹ “DTSC Requirements for Generators of Treated Wood Waste (TWW) Fact Sheet.” *Dtsc.ca.gov*, State of California, Sept. 2021, [Website Link](#).

3.5 Used Oil Filters

3.5.1 Discussion

Used oil filter regulations allow generators to pierce and crush drained used oil filters. This treatment does not require a hazardous waste treatment permit.⁵²

An estimate of the quantity of used oil filters treated, recycled, or disposed of annually is not available. However, some of this information is captured through CalRecycle's Form 303 data under the "Reclaimables" category. Disposition data for recycled materials recorded through Form 303 data is in section 3.3.1, Disposition of Household Hazardous Waste.

3.6 Discussion

Approximately 21 million tons of manifested hazardous waste was generated in California from January 2010 to May 2022. Just over 17 million tons (81%) of that was non-RCRA hazardous waste, while about 3.8 million tons (19%) was RCRA hazardous waste. Just over half of the manifested hazardous waste generated since 2010, 11 million tons (53%), was managed within California, with the remainder shipped outside California for management.

Land disposal has been the most common method of managing hazardous waste generated in California since 2010, with approximately 12.5 million tons (59.2%) disposed of in a land disposal unit. The second most common method is "other recovery or reclamation for reuse," accounting for 5.09 million tons (24.2%) of waste. Incineration is the third most common method, with approximately 620,000 tons (2.31%) of hazardous waste managed since 2010. Access to incinerator capacity is a significant challenge for the current hazardous waste management system.

3.6.1 Access to Capacity

Access to appropriate disposal facilities that are carefully constructed and managed in a way that protects human health and the environment is one of the most crucial components of the hazardous waste management system. The lack of capacity can lead to improper or illegal disposal. Access to all types of hazardous waste management facilities is important, including the least-preferred management method, land disposal.

To be accessible, facilities must have enough capacity. Measuring the capacity of California's hazardous waste management facilities requires an estimate of the remaining volume of landfills and an estimate of the amount of waste that can safely pass through treatment or recycling facilities (throughput).

⁵² Cal. Code Regs., tit. 22, § 66266.130(d)

3.6.1.1 Land Disposal Capacity

As of 2019, the two hazardous waste landfills currently in operation in California had a combined remaining capacity of 9,741,100 tons.⁵³ At the current rate of disposal – with 48 percent of land-disposed hazardous waste being disposed of in state – these two landfills had about 20 years of permitted capacity remaining. If 100 percent of California’s land-disposed hazardous were disposed of in state, they would have 9.5 years of permitted capacity remaining.

This Report found that almost 88 percent (11 million tons) of California’s land-disposed hazardous waste manifested since 2010 has been non-RCRA waste. About 42 percent of this non-RCRA waste (4,640,000 tons) has been land disposed at non-hazardous Subtitle D landfills outside of California. This represents a significant quantity of hazardous waste that could potentially be disposed of in state if California had more capacity and/or if existing capacity were more accessible.

California’s limited landfill capacity can be affected by a number of factors, including, but not limited to:

- Physical considerations: Facilities may be non-operational for a period of time while undergoing maintenance, may not be equipped to adequately treat difficult waste types, or may not be designed to maximize the amount of waste they are allowed to manage annually.
- Choice: Facility operators are under no obligation to accept every waste presented to them.
- Economic considerations: At the same time that California has a limited supply and a high demand for hazardous waste landfill capacity, a much greater and accessible supply exists in other states that allow non-RCRA waste to be managed in non-hazardous waste landfills. This also lowers the cost of disposal out of state because non-hazardous waste landfills are less expensive to build and operate. Generators send that non-RCRA waste out of state realize a cost savings in disposal.

The HWPlan unit will conduct additional research to better understand access to hazardous waste management capacity in California. Research will be informed by waste generation information and consideration of specific waste streams.

⁵³ U.S. EPA. National Capacity Assessment Report. December 2019.

3.6.1.2 Throughput Capacity

Another way to assess the capacity of hazardous waste management facilities is to measure throughput capacity – the amount of waste that can flow through a system over a certain time period. In this case, this measure applies to systems that conduct management activities like recycling and treatment of hazardous waste. Throughput is vital to appropriately managing current and future waste streams because it can be a significant limitation as exemplified by recent incinerator issues.

Throughput capacity has become especially important for recycling some growing waste streams in California like photovoltaics (PVs) and lithium-ion batteries. This is vital because these hazardous items can only be recycled if there is available technology to recycle these wastes as well as capacity. An adequate throughput capacity is essential to safe hazardous waste management and the ability for the state to support a more circular economy.

The HWPlan unit will conduct additional research in this area to better understand access to hazardous waste throughput capacity in California. Research will be informed by waste generation information and consideration of growing waste streams.