



CalRecycle

Department of Resources Recycling and Recovery

State of Disposal and Recycling in California

Calendar Year 2020



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Letter from the Director

California is a global leader in environmental policy. As the fifth largest economy in the world, we innovate groundbreaking policies and programs that show the nation and the rest of the world how to make the future better and safer for the public while driving strong economic growth.

With the climate in crisis and a relentless stream of single-use trash overtaking our oceans and polluting our communities, California must do better to again lead the world as we chart the path for ending trash pollution and waste.

We must build on the solid progress we have made over the past three decades, including extended producer responsibility programs for problem materials like paint, carpet, mattresses and sharps/pharmaceuticals. We must move to material and products that are designed for reuse, recycling and remanufacturing – not disposal.

In 2020, California produced 77.4 million tons of trash. Of that the state landfilled 40 million tons of material and recycled just 42 percent, or 32.5 million tons. California has a recycling goal of 75 percent of all materials. Exports of recyclable materials declined 1.2 million tons in 2020, yet overseas markets remain the top destination for California's recycling. California's Bottle Bill, while innovative when first enacted, is no longer meeting the needs of the people of California and has not achieved the program's 80 percent beverage container recycling goal. In 2020, our state's beverage container recycling rate was 68 percent.

We are falling far short of our 75 percent recycling goal and face clear evidence that an economy driven by resource extraction and single-use disposable products continues to endanger our people and imperil our planet.

A circular economy is California's roadmap to a zero-waste future

Consumers placing items in the right bin alone will not solve systemic problems like unrecyclable product designs and a lack of end markets for complex materials. To achieve our waste and climate goals, California's strategy for waste reduction and increased recycling must continue to build on the first major laws enacted in the 1980's through supporting innovation. The state must work with local and private partners to ensure the products California produces and uses can be efficiently collected and remanufactured into new products here in our state.

Getting to zero waste requires all of these strategies, as well as new innovations to improve existing recycling programs and create new pathways for waste reduction, reuse, and recycling.

California's latest budget includes \$270 million in new investments to modernize recycling infrastructure and move our state towards a more circular economy through informed consumer choice and greater industry accountability.

With a circular economy California can support source reducing, reusing, and intentionally designing products to get efficiently collected and remanufactured in state.

- Approaches like the Beverage Container Recycling Program create a financial incentive for consumers to recycle.
- Policies like California's single-use plastic bag ban and CalRecycle's new Reuse Grant Program motivate consumers and businesses to reduce and reuse.
- The Plastic Market Development Payment program developed California's markets for empty plastic beverage containers by subsidizing reclaimers and remanufacturers.
- Requiring beverage manufacturers to use recycled plastic (AB 793 -Ting, Irwin) can increase demand for recycled feedstock.
- Regulations for SB 1335 define recyclable, reusable, and compostable for the first time in California to inform future policy on what we can sustainably manage.
- Requiring statewide food and yard waste recycling will turn organic waste, which makes up more than half of what we throw in landfills each year, into green products while cutting a top source of climate emissions.

The circular economy is California's chance to make sure products get recycled

California will build the new circular economy on truth and transparency. Not every material sold in California is recyclable in California. Laws like SB 343 (Allen) can help clear up consumer confusion by banning the use of the "chasing arrows" recycling symbol on products unless 60% of the state's communities collect them to recycle.

Similarly, exporting our recyclables is not recycling. The transparency standards set in AB 881 (Gonzalez) will help consumers regain confidence in recycling and open the door to more remanufacturing of recycled materials right here in our state.

California is an environmental leader and an industry innovator

In the coming year CalRecycle looks forward to partnering with state, local, and private entities to consciously build the foundation for an intentional circular economy that reduces waste, increases recycling, and ensures recycled materials replace virgin materials in newly manufactured products.

The circular economy will be built. Thank you for your partnership to help us build it right here in California.



Executive Summary

This report for Calendar Year 2020 presents data and information on California's waste management activities, including the seaborne export of recyclable materials. Additionally, it provides a snapshot of the state's waste management and recycling goals and progress, as well as CalRecycle's efforts and new initiatives in 2020.

CalRecycle estimates that California's overall waste generation in 2020 was about 77.4 million tons. Of that total waste generation, 44.9 million tons went to disposal and disposal-related activities, including about 40 million tons sent to landfill. This equates to a statewide per capita disposal rate of 6.2 pounds per person per day. Alternative daily cover was the most common disposal-related activity at about 2.8 million tons.

An estimated 32.6 million tons of waste were recycled or diverted in California in 2020, resulting in a statewide recycling rate of 42 percent, up from 37 percent in 2019 but lower than the peak of 50 percent in 2014. Seaborne export of recyclable materials accounted for about 13.2 million tons in 2020, a decrease of approximately 1.2 million tons from 2019. Despite the decrease, seaborne exports of recyclable materials were the largest destination for statewide recycling.

In 2020, CalRecycle continued to support source reduction, recycling, and composting through many of its programs, including:

- The Beverage Container Recycling Program redeemed 18 billion beverage containers.
- CalRecycle, in partnership with the Governor's Office of Emergency Services, removed debris from properties destroyed in the Camp Fire in addition to other structural debris and hazard trees cleanup activities. In this role, the department oversaw the removal of almost 90 thousand tons of debris, with almost 40 thousand tons of that material recycled.
- CalRecycle also awarded over \$90 million across 1,099 entities through its grant and loan programs, including the Greenhouse Gas Reduction Fund Grant programs and the Recycling Market Development Zone loans.

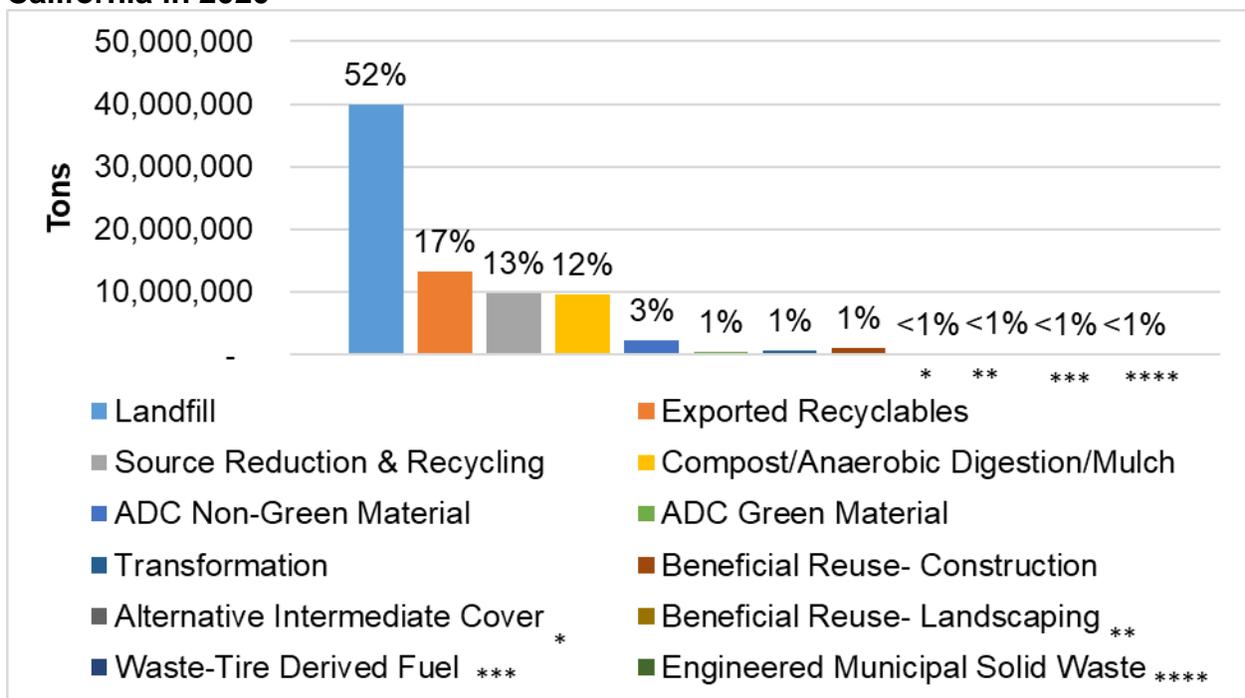
Appendix 1 provides data tables associated with every figure in the body of this report, to ensure Americans with Disability Act (ADA) accessibility for non-sighted readers. Appendix 2 provides detailed graphics and tables on total exports and recyclable materials exports from California ports not included in the body of this report. Appendix 3 provides the country codes for each importing country.

Waste Generation

California’s 39.6 million residents and 1.6 million businesses generated an estimated 77.4 million tons of material in 2020*.

Of the total materials generated, 52 percent were sent to landfill, 17 percent were exported as recyclables, 12 percent were composted, anaerobically digested or mulched, and another 13 percent were recycled, or source reduced (see Figure 1). The remainder of the material, less than 10 percent, went to alternative daily cover (ADC), beneficial reuse, transformation, alternative intermediate cover (AIC), waste-tire derived fuel, and engineered municipal solid waste (EMSW).

Figure 1. Estimated Management of 77.4 Million Tons of Materials Generated in California in 2020



CalRecycle derived quantities of landfilled waste, transformation, ADC, AIC, EMSW, and other beneficial reuse from the Recycling and Disposal Reporting System (RDRS). CalRecycle calculated waste tire-derived fuel based on data reported to CalRecycle⁽¹⁾. CalRecycle collected exported recyclables data from WISERTrade.⁽²⁾ CalRecycle collected estimates for materials composted, anaerobically digested, and mulched based on published reports^(3; 4)

* CalRecycle determined total generation from the 1990-2010 per person baseline and the 2020 population in California.

Disposal and Disposal-Related Activities

To calculate overall disposal, CalRecycle adds tons of landfill disposal [as used in the Assembly Bill (AB) 939 jurisdiction calculations] to tons from six disposal-related activities: ADC, AIC, other beneficial reuse at landfills (such as construction activities, landscaping, and erosion control), transformation, EMSW, and waste-tire derived fuel. The calculated overall disposal is subsequently used to determine the statewide recycling rate.

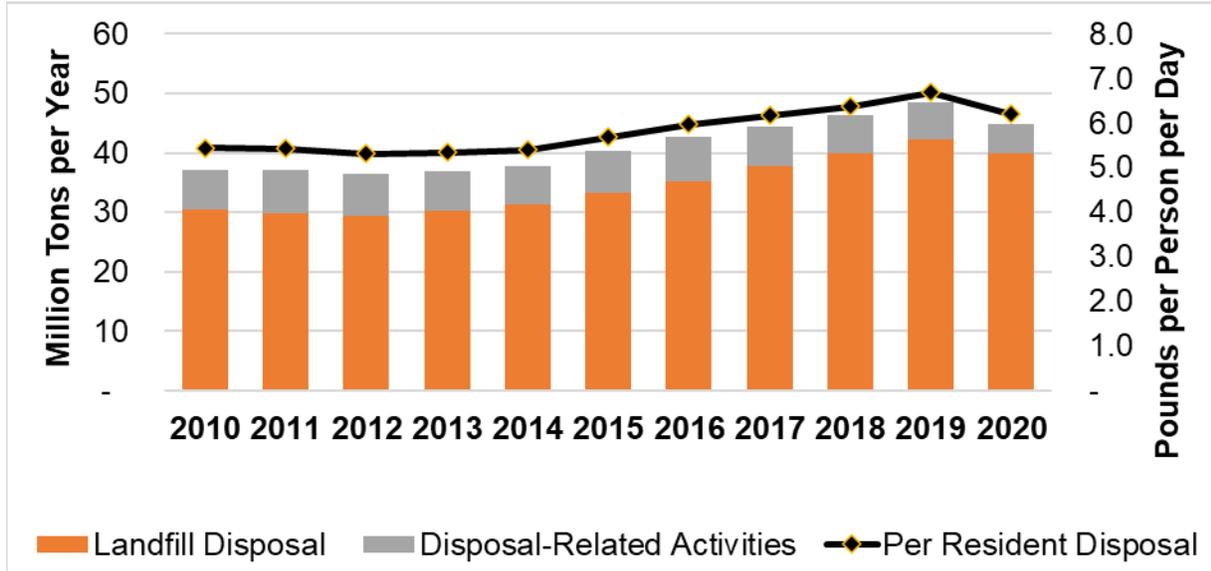
Based on data reported to CalRecycle, overall disposal in 2020 equaled 44.9 million tons, including disposal and disposal-related activities.

In 2020, 40 million tons of waste were landfilled in California or in out-of-state landfills, including disaster debris and designated waste[†]. An additional 4.9 million tons of materials went to disposal-related activities. California had a per capita overall disposal rate of 6.2 pounds per resident per day (see Figure 2), including both disposal and disposal-related activities. This corresponds to approximately 2,263 pounds of disposal per resident in 2020.

[†]“Designated waste” is defined in CA Water Code § 13173 (2017) and means either of the following:

- (a) Hazardous waste that has been granted a variance from hazardous waste management requirements pursuant to Section 25143 of the Health and Safety Code.
- (b) Nonhazardous waste that consists of, or contains, pollutants that, under ambient environmental conditions at a waste management unit, could be released in concentrations exceeding applicable water quality objectives or that could reasonably be expected to affect beneficial uses of the waters of the state as contained in the appropriate state water quality control plan.

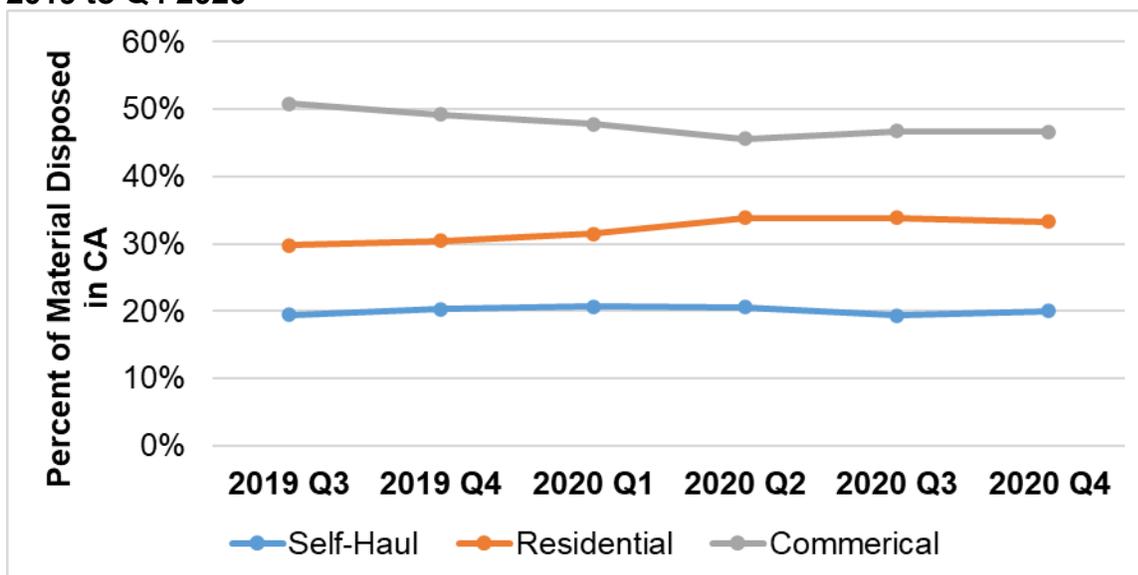
Figure 2. California’s Statewide Per Resident and Total Disposal from 2010 to 2020



The left y-axis represents tons of disposal per year as shown by the bar graphs. The right y-axis represents the number of pounds of disposal per resident per day as shown by the black line. Data is from RDRS with population from the California Department of Finance (5). Accessed May and August 2021.

Starting in the third quarter of 2020, CalRecycle began collecting disposal tonnages by source sector through RDRS. Consistently each quarter since Q3 2019, the commercial sector was the source of the most material disposed, followed by the residential and then self-haul sectors (see Figure 3). In 2020, about 47 percent of disposed material originated from the commercial sector. Compared to data available for 2019, disposal decreased in the commercial sector, while disposal originating from the residential sector increased.

Figure 3. Source Sector Breakdown of Material Disposed in California from Q3 2019 to Q4 2020



Data on disposal by source sector is from the RDRS, which started being collected Quarter 3 (Q3) of 2019. Accessed October 2021.

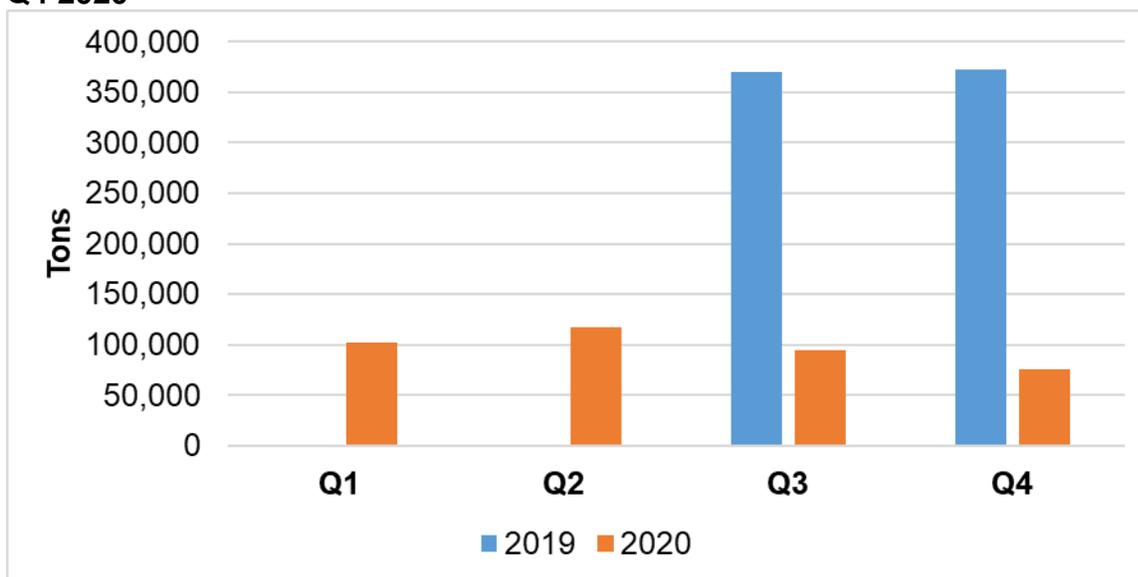
Disposal-Related Activities

Disposal-related activities are included in total disposal for the purpose of estimating the recycling rate. The six types of disposal-related activities in the state contributed to 6 percent of total disposal. ADC was the most prevalent with 2.7 million tons used in 2020.

As per AB 1594 (Williams, Chapter 719, Statutes of 2014), beginning January 1, 2020, the use of green material ADC no longer counts as diversion and is considered disposal. In 2020, CalRecycle collected the first full year of data from RDRS on the use of Green Material ADC at landfills. For 2019, only data for quarters three and four (Q3 & Q4) were collected through RDRS. We compared the tons of green material ADC between Q3 & Q4 of 2019 and 2020 (see Figure 4) to illustrate the decreased use of green material ADC in 2020 compared to 2019. In 2020, California landfills used 170 thousand tons of ADC, which is 570 thousand tons less than the 743 thousand tons used in 2019.

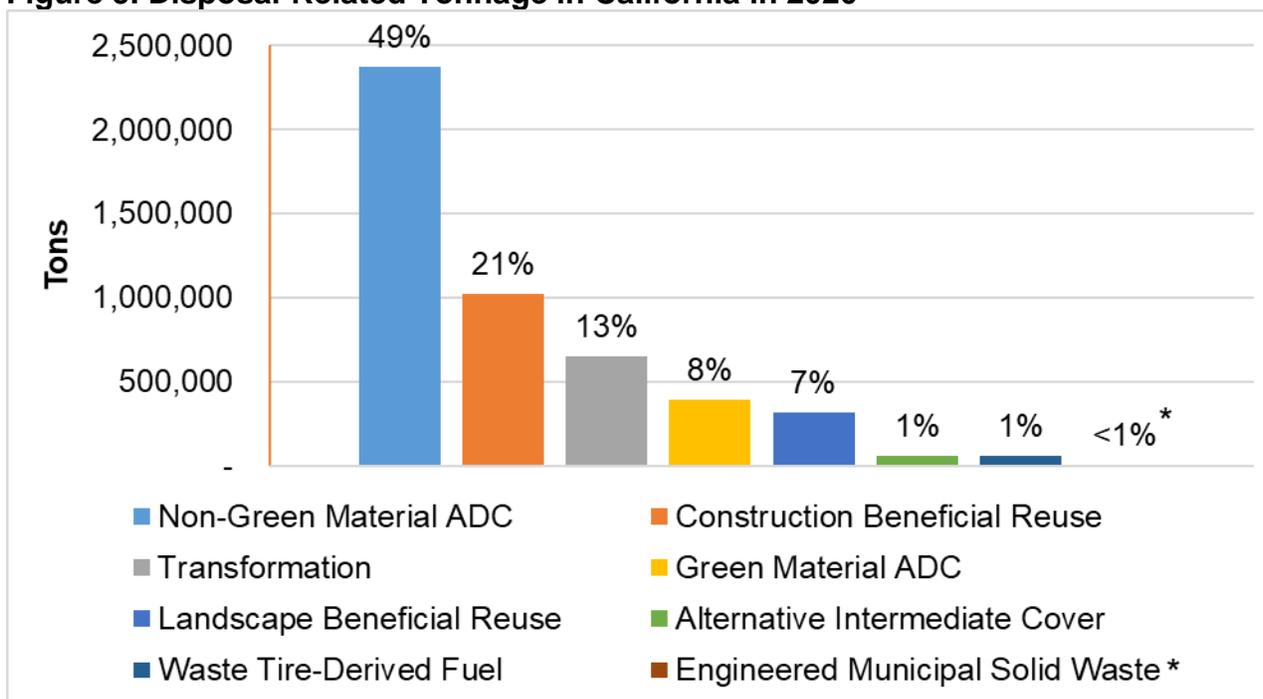
At landfills, operators used 1.3 million tons of material for other beneficial reuse; comprising of 320 thousand tons for Landscaping and Erosion, around one million tons for Construction, and about 59 thousand tons for AIC. In 2020, operators processed about 653 thousand tons of material at transformation facilities, about three thousand reportable tons at EMSW facilities, and about 57 thousand tons at waste tire-derived fuel facilities (see Figure 5).

Figure 4. Green Material Alternative Daily Cover (ADC) Utilization from Q3 2019 to Q4 2020



Data on green material ADC from the RDRS, which started being collected Quarter 3 (Q3) of 2019. Accessed August 2021.

Figure 5. Disposal-Related Tonnage in California in 2020

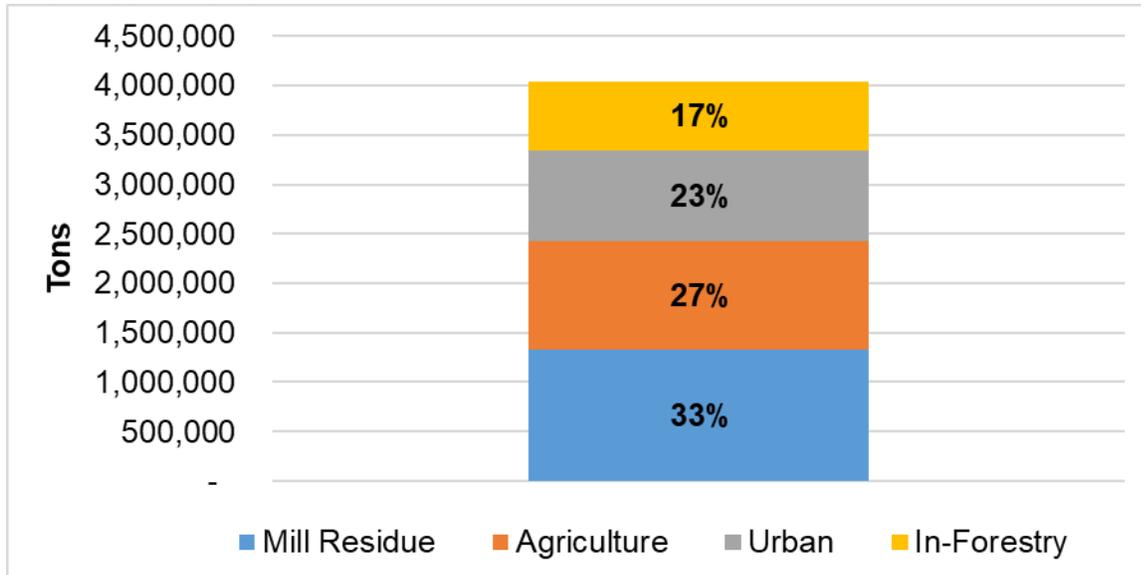


Data is from RDRS, and waste tire-derived fuel reports submitted to CalRecycle⁽¹⁾.

Biomass

For the 2020 reporting year, all 25 operating biomass conversion facilities submitted reports to CalRecycle. Collectively, these facilities accepted over 4 million tons of woody biomass, and rejected 134 tons of the material, primarily due to contamination and incompatibility. As shown in Figure 6, roughly one-third of the wood waste originated from mill residue (about 1.3 million tons), a little over a quarter originated from agricultural sources, and slightly under a quarter originated from urban sources.

Figure 6. Source Sector for Woody Biomass Sent to Biomass Conversion Facilities in 2020



The y-axis represents the number of tons of biomass from contributing source sectors. Biomass conversion facilities reported data directly to CalRecycle pursuant to Public Resources Code Section 44107.

Disaster Debris

CalRecycle, in partnership with the Governor's Office of Emergency Services, frequently supports local governments with debris removal and remediation from disasters. In 2020, CalRecycle oversaw major structural debris and hazard trees clean-up projects, including the Camp Fire of 2018, totaling more than 129 thousand tons of debris that were removed, segregated, and disposed or recovered (see Table 1).

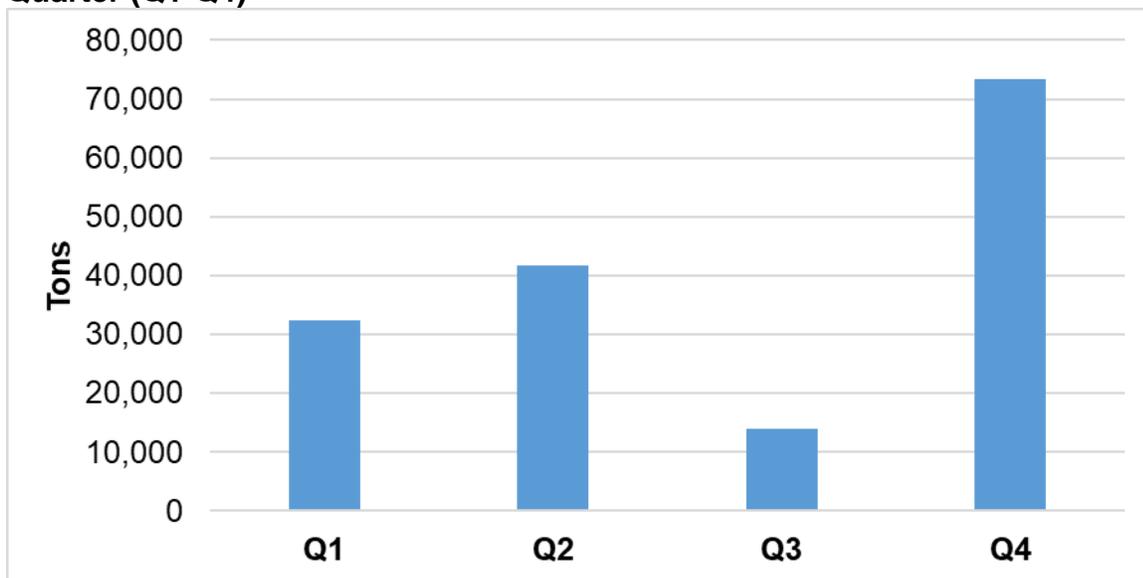
Table 1. 2020 CalRecycle Structural Debris and Hazard Trees Clean-up Operations

Branch	Tons Recycled	Tons Disposed
North Branch	2,800	8,700
South Branch	30,786.4	63,122.75
Inland Branch	4,384.06	13,448.89
Bay Branch	826.13	1,901.81
Camp Fire Clean Up*	375.57	2,721.05
Total	39,172.16	89,894.60

*Data provided above for the Camp Fire Clean Up is only for 2020, though the clean up spanned multiple years.

Based on data collected through the Recycling and Disposal Reporting System (RDRS), the total amount of disaster debris, including structural debris and hazard trees, disposed of in California totaled to over 161 thousand tons in 2020 (see Figure 7).

Figure 7. Trends in Disaster Debris Disposal in California Landfills in 2020, by Quarter (Q1-Q4)



Data is from the RDRS. Accessed August 2021.

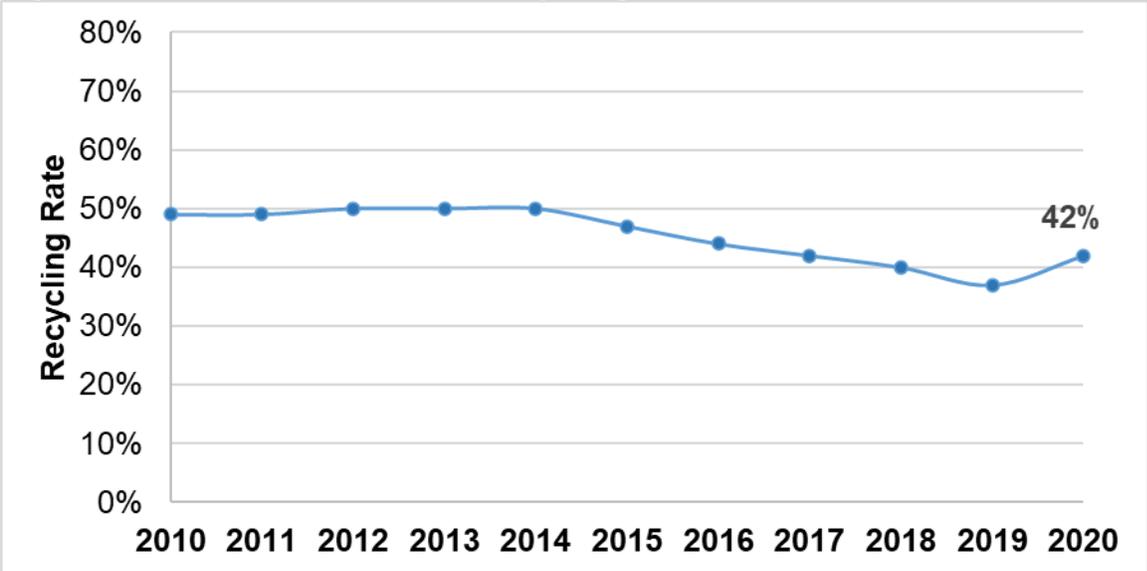
Recycling

Statewide Recycling Rate

To calculate the statewide recycling rate to track progress towards the 75 percent recycling rate goal as defined by AB 341 (Chesbro), CalRecycle subtracts the amount of material disposed in landfills and six disposal-related activities from estimated total generation.

According to CalRecycle calculations and comparison with reported disposal, the department estimates that 32.5 million tons of material were recycled (through source reduction, recycling, and composting) in 2020. California’s statewide recycling rate was 42 percent (see Figure 8).

Figure 8. California’s Statewide Recycling Rate Since 2010



Beverage Container Recycling

Californians recycled more than 18 billion beverage containers in 2020 as part of the Beverage Container Recycling Program. The overall recycling rate for beverage containers was 68 percent in 2020. About 97 percent of recycled beverage containers were collected at 1,220 recycling centers and through 601 curbside programs.

The passage of AB 3056 (Committee on Natural Resources, Chapter 907, Statutes of 2006) created the Plastic Market Development Payment Program to develop California markets for recycled empty plastic beverage containers. The passage of SB 854 (Committee on Budget and Fiscal Review, Chapter 51, Statutes of 2018) extended the Plastic Markets Development Fund through 2022 and allocated payments of up to \$15

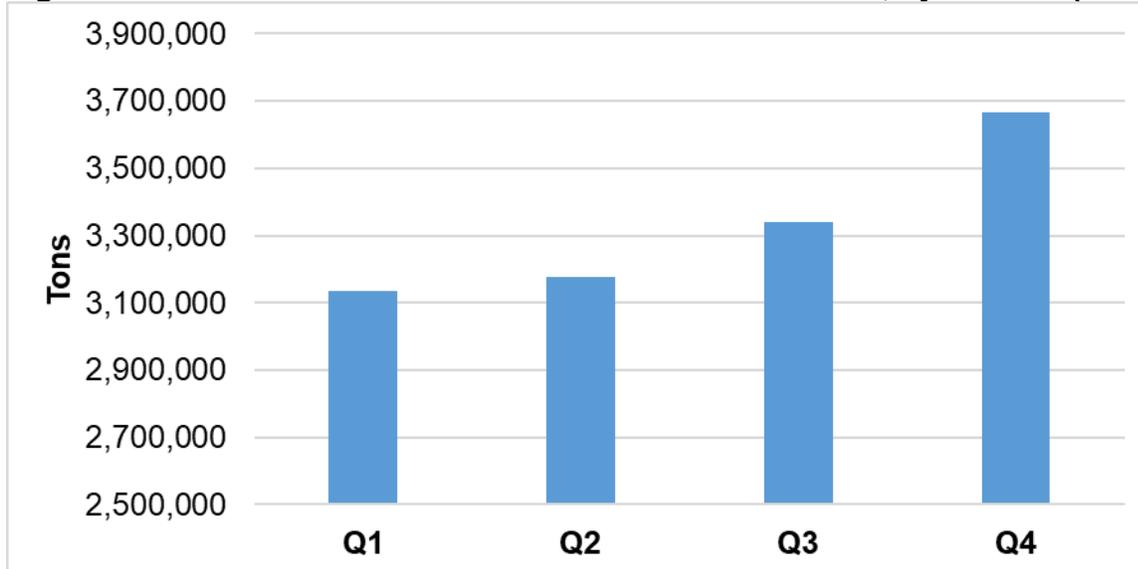
million dollars for fiscal year (FY) 2018-2019, and \$10 million for the following years until 2022.

SB 458 (Wiener, Chapter 649, Statutes of 2017) established the Beverage Container Recycling Pilot Program and the subsequent AB 54 (Ting, Chapter 793, Statutes of 2019) was signed into law to allow for greater flexibility and funding to support pilot projects. The law granted CalRecycle authority to approve up to five pilot projects throughout the state in areas where there are not sufficient California Refund Value (CRV) beverage container redemption opportunities. Pilot programs allow local jurisdictions and recycling center operators to collaborate on innovative methods to provide convenient recycling options to consumers. During 2020, the department awarded the final pilot projects and four of the five are already operating and serving their communities. The Beverage Container Recycling Pilot Project Program is slated to run through December 2025.

End Use

In 2020, over 13 million tons of recovered material was sent to end use from California. End use, a subset of materials estimated to be recycled, means that material was sent to a user that is a material consumer (compost and wood chips) or utilizes the recovered material for manufacturing and packaging, construction, fuel, or other use including land application or inert debris fill. See Figure 9 for trends in end use outflows.

Figure 9. Trends in End Use Outflows in California in 2020, by Quarter (Q1-Q4)



Data is from the RDRS. Accessed in August 2021.

Recyclable Materials Exports

The following section details recyclable materials exports. After providing details on methods and data limitations, this section presents data on the number of recyclable materials exported via seaborne container vessels from California ports in 2020. The following sections provide more detail by country of import and specific material types (e.g., unsorted mixed paper). Additionally, appendices one and two contain more detailed information and data tables.

Methods & Data Limitations

The data on recyclable materials exports presented in this report come primarily from the World Institute for Strategic Economic Research (WISERTrade) Database unless otherwise noted ⁽²⁾. The most common mode of international export of recyclable materials from California is via seaborne container vessels. These vessels backhaul recyclable materials to countries in Asia and other parts of the world after delivering goods to American markets. WISERTrade also includes some information regarding materials exported by air, but this is not a typical means for exporting recyclable materials from California. This section includes data available for seaborne recyclable materials exports.

WISERTrade includes data on all material exports from California ports. The Harmonized System (HS) code is an international standard that assigns numeric codes to traded commodities and is used to identify recyclable commodities from the database. To provide the estimates in this report, specific recyclable commodities were combined into custom groups to represent common recyclable categories by type or purpose (e.g., nonferrous metal). All weights shown are in short tons, equivalent to 2,000 pounds, or million tons. WISERTrade also reports vessel value in U.S. dollars (USD) ‡. The data presented are for calendar year 2020 and were accessed in March 2021.

One of the main data limitations of this report is that material is reported by port of export (by state) rather than by origin of material exported. Ports in other states may export materials that were generated in California, and materials generated out of state can also be exported via California ports. Materials may also be transported out of the state by truck and rail. The data presented in this section do not account for these factors.

‡The “vessel value”, or the free alongside ship value, is the value of exports at the U.S. seaport, airport, or border port of export, based on the transaction price, including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier at the U.S. port of exportation. The value, as defined, excludes the cost of loading the merchandise aboard the exporting any charges or transportation costs beyond the port of exportation.

Table 2. Examples of Material Types Found in Each Recyclable Material Category

Recyclable Material Category	Material Types in Category
Batteries	waste and scrap of batteries and electric storage batteries
Chemical Pulp	other paper made mainly of bleached chemical pulp
Copper Wire	copper wire waste and scrap
Ferrous Metal	ferrous metal waste and scrap including steel and iron
Glass	cullet and other waste scrap glass
High-grade Paper	office paper scrap, deinked waste paper, and paperboard
Mechanical Pulp	other paper made mainly of mechanically separated pulp
Mixed Plastics 3-7	resin types: polymers of vinyl (PV), polystyrene (PS), other plastic not PET
Nonferrous Metal	aluminum cans, brass, copper (excluding copper wire), zinc, tin, tungsten, and other metals, waste, and scrap
OCC and Kraft Paper	old corrugated cardboard (OCC), brown paperboard, kraft paper
Other Miscellaneous Mixed Paper	mechanical pulp paper, chemical pulp paper, newsprint
Plastics 1-2	resin types: polyethylene, polyethylene terephthalate (PET), PET scrap
Tire and Rubber Scrap	waste parings and scraps of rubber, and retreads of tires
Unsorted Mixed Paper	unsorted mixed paper
Used Oil and Grease	waste oils made of polychlorinated biphenyls (PCBs), and other grease and light oils
Worn Clothing	worn clothing and other worn items, and rags

Total Seaborne Recyclable Materials Exports

Based on the 2020 WISERTrade data, 13.2 million tons of recyclable materials were exported from California ports to international markets. Compared to 2019, the tonnage decreased in 2020 by over one million tons (see Figure 10). Recyclable materials exported from California ports had a vessel value of about \$4.5 billion USD (see Figure 11). Consistent with the reduction in tonnage exported, the total vessel value decreased by about \$352 million USD compared to 2019. Recyclable materials accounted for 23 percent of the 58 million tons of all material exported from California.

Figure 10. Seaborne Recyclable Materials Exports from California from 2010 to 2020, by Weight

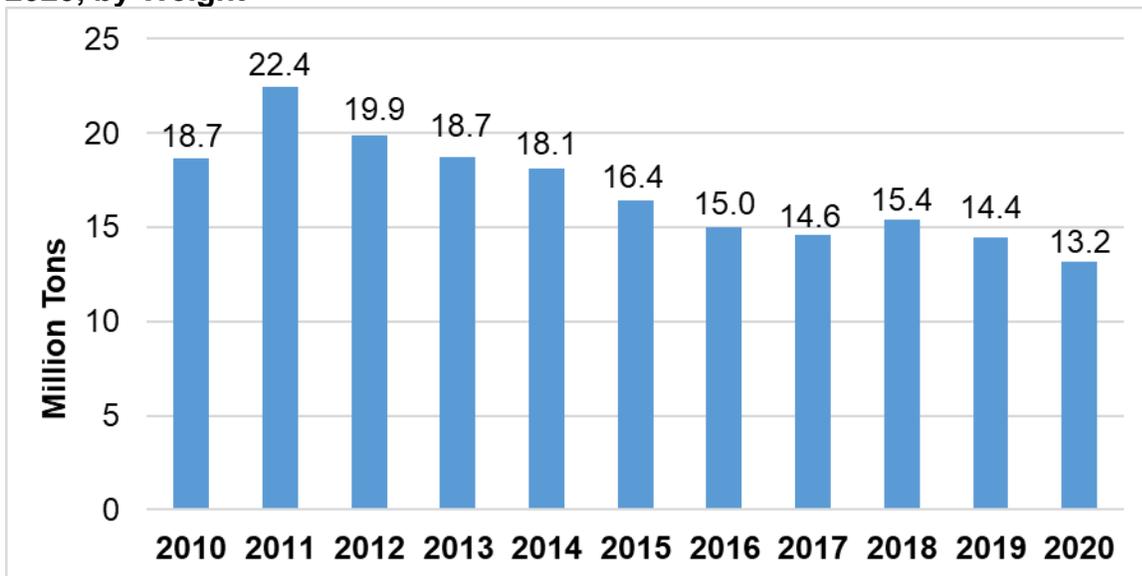
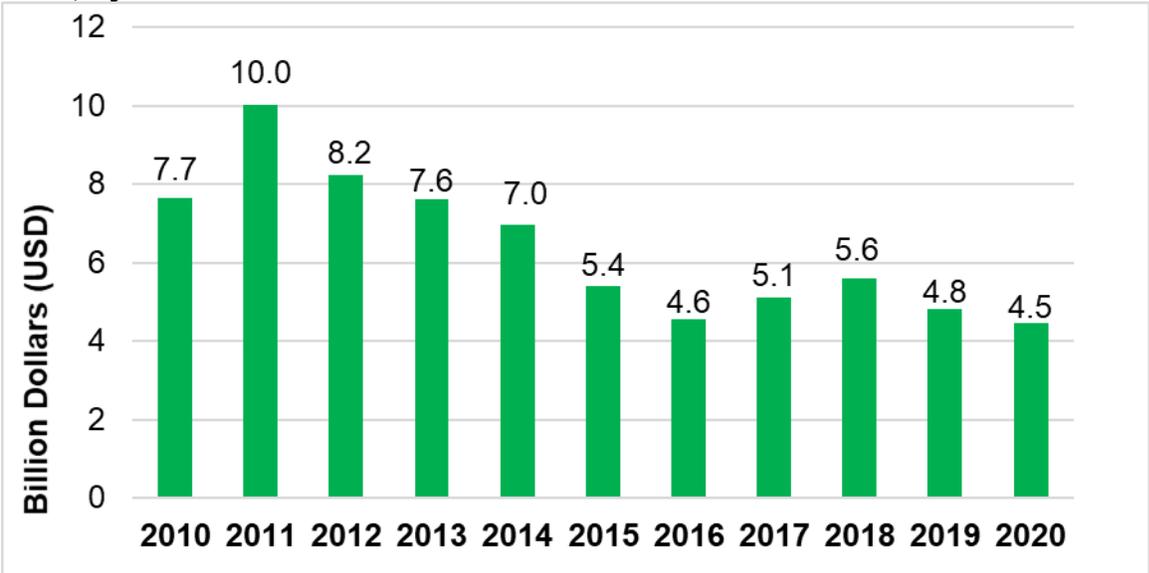


Figure 11. Seaborne Recyclable Materials Exports from California from 2010 to 2020, by Vessel Value



Tables 3 and 4 provide a summary of the recyclable materials exported from California ports in 2020. Table 3 provides the weight (tons) of recyclable materials exported by material category in 2019 and 2020, including the percent change in weight from 2019 to 2020. Table 4 provides the vessel value (USD) of recyclable materials exported by material category in 2019 and 2020, including the percent change in vessel value from 2019 to 2020.

Table 3. Seaborne Recyclable Materials Exports from California for 2019 and 2020, by Weight

Material Category	2019 Tons	2020 Tons	Tonnage Change (Tons)	Percent Change
Ferrous Metal	5,373,202	5,209,189	-164,013	-3%
OCC and Kraft Paper	5,255,943	4,976,543	-279,400	-5%
Other Misc. Paper	1,670,844	1,463,159	-207,685	-12%
Mechanical Pulp Paper*	1,230,575	1,130,005	-100,570	-8%
Chemical Pulp Paper*	91,404	57,992	-33,412	-37%
Non-Ferrous Metal	980,539	922,774	-57,765	-6%
Aluminum Cans*	8,033	46,754	38,721	482%
Copper Wire*	33,982	32,673	-1,309	-4%
Unsorted Mixed Paper	610,628	368,445	-24,2183	-40%
Plastics 1 and 2	107,531	111,996	4,464	4%
Worn Clothing	133,496	103,703	-29,793	-22%
High Grade Paper	106,517	74,659	-31,858	-30%
Mixed Plastics 3-7	62,800	48,404	-14,396	-23%
Batteries	16,157	20,690	4,533	28%
Used Oil and Grease	27,400	14,963	-12,437	-45%
Tires/Rubber	50,288	14,439	-35,849	-71%
Glass	2,696	1,837	-859	-32%
Total All Recyclable Material	14,443,411	13,201,284	-1,242,127	-9%
Total All Exports (Recyclable and Not)	64,623,262	58,001,327	-6,621,935	-10%

**Mechanical Pulp Paper and Chemical Pulp Paper are sub-categories included within the material category of Other Miscellaneous Paper. Aluminum cans and Copper wire are a sub-category included within the material category of Non-Ferrous Metal.*

***The total of all seaborne recyclable materials exports includes material types not included in the selected material categories listed in the table.*



Table 4. Seaborne Recyclable Materials Exports from California for 2019 and 2020, by Vessel Value

Material Category	2019 Vessel Value (USD)	2020 Vessel Value (USD)	Vessel Value Change (USD)	Percent Change
Non-ferrous metal	1,678,436,388	1,620,751,071	-57,685,317	-3%
Aluminum Cans*	8,499,892	54,120,219	45,620,327	537%
Copper Wire*	169,017,814	166,781,664	-2,236,150	-1%
Ferrous Metal	1,603,286,259	1,392,188,039	-211,098,220	-13%
OCC and Kraft Paper	727,815,550	697,519,082	-30,296,468	-4%
Other Misc. Paper	292,902,029	258,491,800	-34,410,229	-12%
Mechanical Pulp Paper*	230,321,188	207,126,952	-23,194,236	-10%
Chemical Pulp Paper*	19,439,156	13,224,051	-6,215,105	-32%
Worn Clothing	105,797,007	84,986,965	-20,810,042	-20%
Unsorted Mixed Paper	73,902,714	48,936,296	-24,966,418	-34%
Plastics 1 and 2	40,162,801	32,541,585	-7,621,216	-19%
Batteries	22,668,528	29,014,364	6,345,836	28%
Glass	41,242,997	28,132,009	-13,110,988	-32%
High Grade Paper	24,223,263	18,312,637	-5,910,626	-24%
Tires/Rubber	11,090,612	14,549,431	3,458,819	31%
Mixed Plastics 3-7	18,338,696	11,012,669	-7,326,027	-40%
Used Oil and Grease	6,465,461	3,558,470	-2,906,991	-45%
Total All Recyclable Material**	4,819,248,316	4,467,521,954	-351,726,362	-7%
Total All Exports (Recyclable or Not)	94,394,915,424	85,579,834,256	-8,815,081,168	-9%

**Mechanical Pulp Paper and Chemical Pulp Paper are sub-categories included within the material category of Other Miscellaneous Paper. Aluminum cans and Copper Wire are a sub-category included within the material category of Non-Ferrous Metal.*

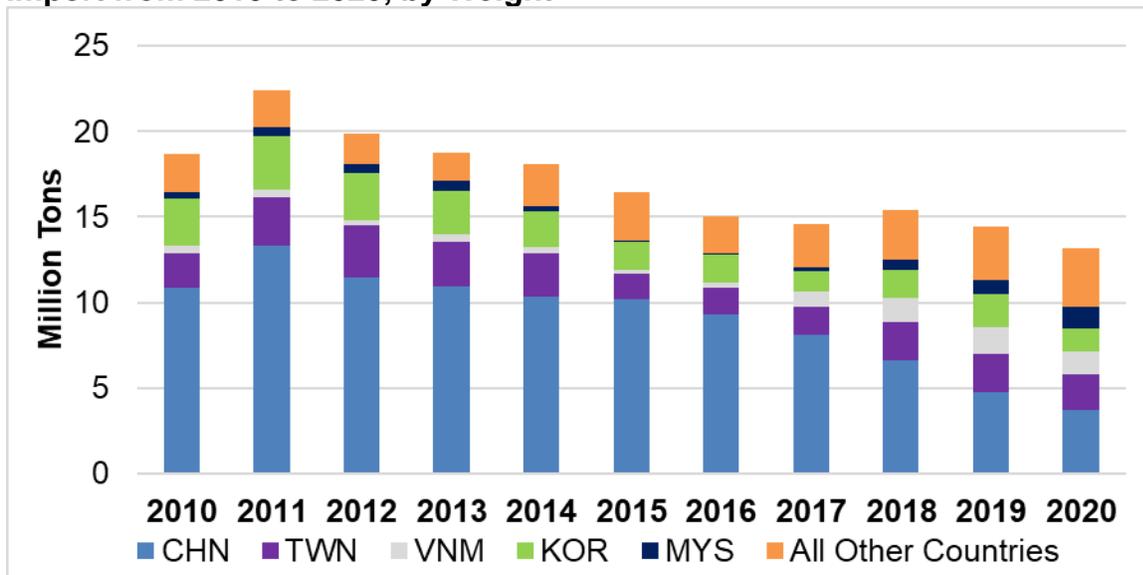
***The total of all seaborne recyclable materials exports includes material types not included in the selected material categories listed in the table.*

Country of Import

China has been the largest importer of California's recyclable materials since 2000. The amount of recyclable materials imported by China has steadily decreased since 2011. In 2020, China imported 28 percent of all seaborne recyclable materials by weight and 21 percent by vessel value.

The five countries importing the most recyclable materials from California in 2020 were, in order of greatest tonnage: China, Taiwan, Vietnam, Republic of Korea, and Malaysia (see Figure 12). Out of the top five countries, only Malaysia's total recyclable imports increased in 2020 compared to 2019, by weight.

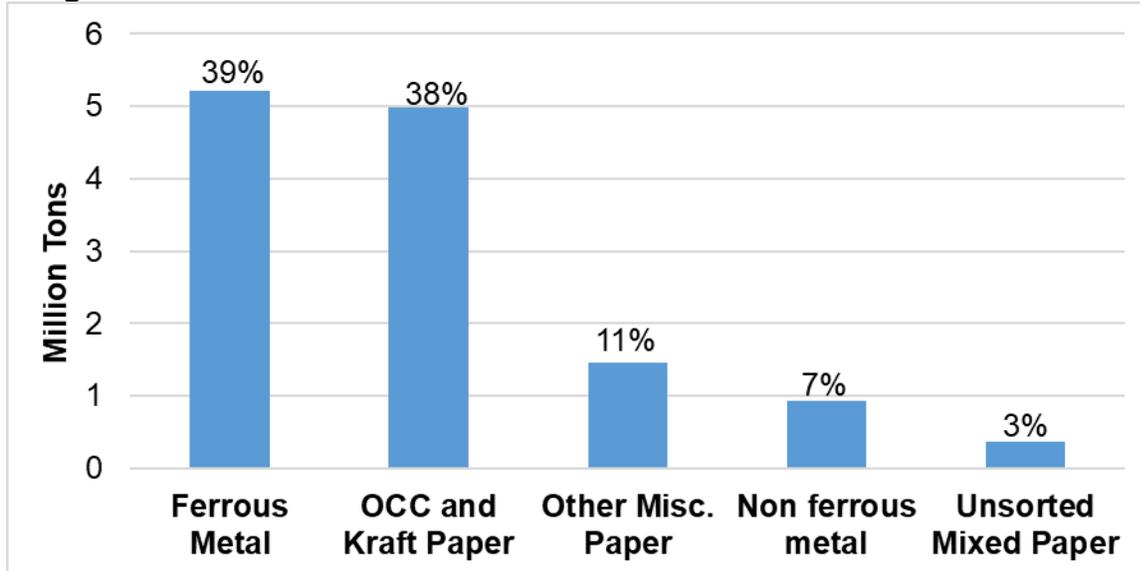
Figure 12. Seaborne Recyclable Materials Exports from California by Country of Import from 2010 to 2020, by Weight



Material Type

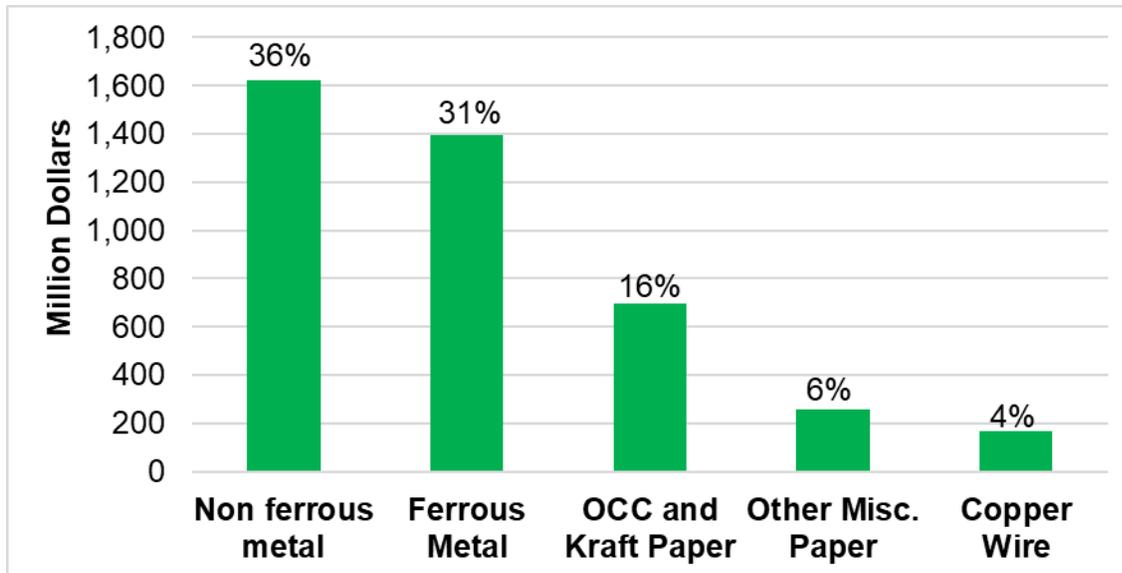
The five recyclable material categories with the most weight exported from California in 2020 were ferrous metal, OCC and kraft paper, other miscellaneous mixed paper, non-ferrous metal, and unsorted mixed paper (see Figure 13). By vessel value, the five greatest exported recyclable material types were: nonferrous metal, ferrous metal, OCC and kraft paper, other miscellaneous mixed paper, and copper wire (see Figure 14).

Figure 13. Top Five Exported Recyclable Materials from California in 2020, by Weight



Information presented in terms of million tons and percent of total seaborne recyclable materials exports (13.2 million tons in 2020). The figure only includes the top five exported recyclable materials, thus does not sum to 100 percent.

Figure 14. Top Five Exported Recyclable Materials from California in 2020, by Vessel Value



Information presented in terms of million USD and percent of total seaborne recyclable materials exports (\$4.5 billion USD in 2020). The figure only includes the top five exported recyclable materials, and thus does not sum to 100 percent.

Ferrous Metals

Recyclable materials exports of Ferrous Metals decreased from about 5.4 million tons in 2019 to about 5.2 million tons in 2020 (see Figure 15). The vessel value also decreased from \$1.6 billion to \$1.4 billion USD in 2020 (see Figure 16).

Figure 15. Seaborne Exports of Ferrous Metals from California by Country of Import from 2010 to 2020, by Weight

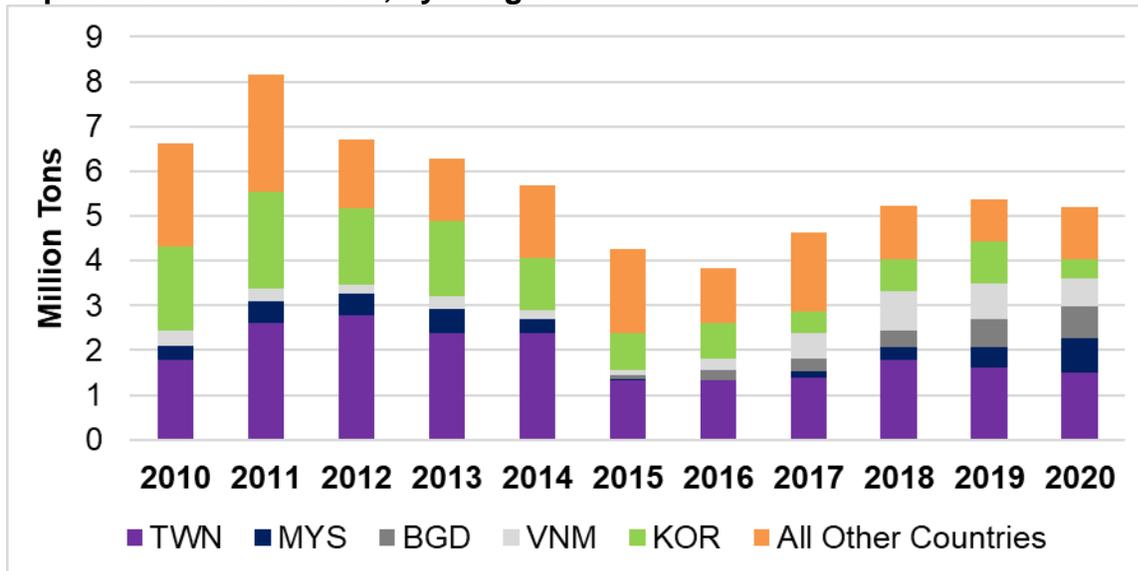
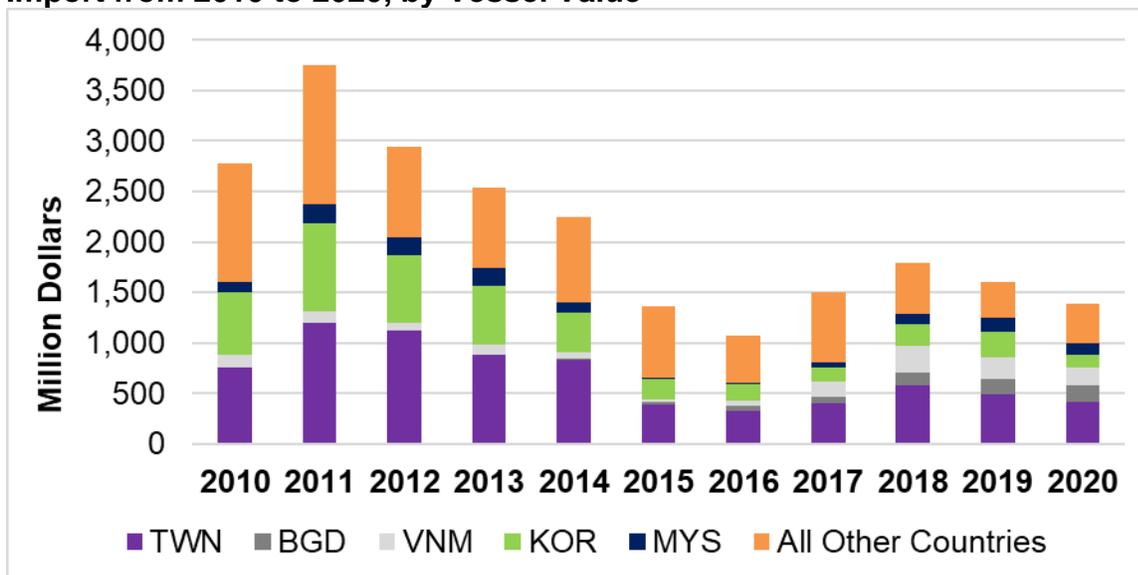


Figure 16. Seaborne Exports of Ferrous Metals from California by Country of Import from 2010 to 2020, by Vessel Value



Old Corrugated Cardboard (OCC) and Kraft Paper

Recyclable materials exports of OCC and Kraft paper decreased from about 5.3 million tons in 2019 to about 5.0 million tons in 2020 (see Figure 17). The vessel value also decreased from \$728 million to \$698 million USD in 2020 (see Figure 18).

Figure 17. Seaborne Exports of OCC and Kraft Paper from California by Country of Import from 2010 to 2020, by Weight

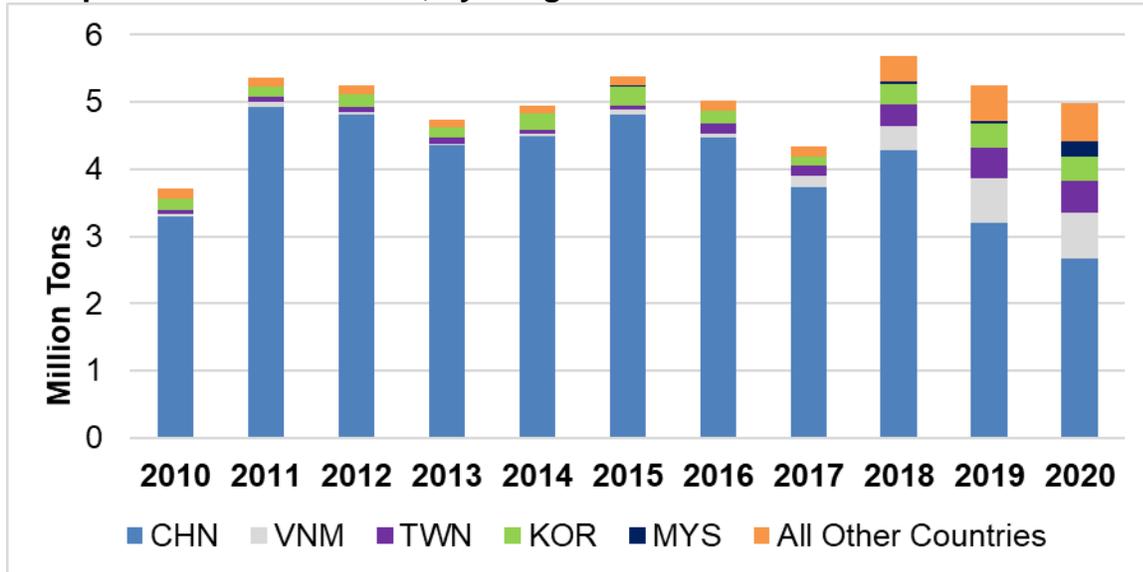
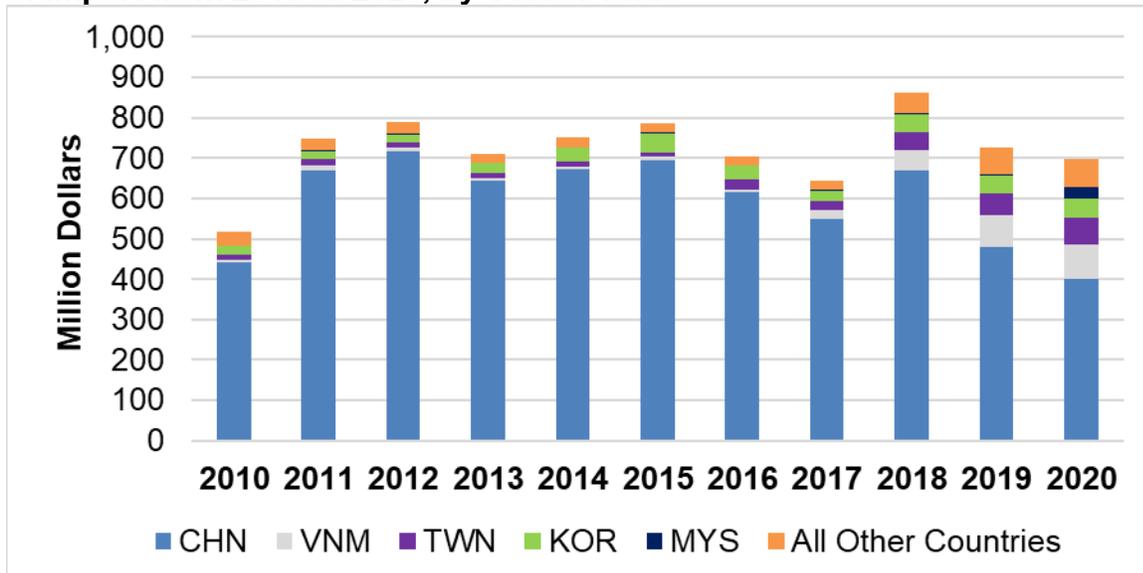


Figure 18. Seaborne Exports of OCC and Kraft Paper from California by Country of Import from 2010 to 2020, by Vessel Value



Plastics 1 and 2

Recyclable materials exports of Plastics 1 and 2 increased for the first time since 2015 from about 108 thousand tons in 2019 to about 112 thousand tons in 2020 (see Figure 19). Notably, China is no longer one of the top five importers of recyclable Plastics 1 and 2, starting in 2019. Despite the increase in total tons exported, the vessel value decreased from about \$40 million to about \$33 million USD in 2020 (see Figure 20).

For plastic scrap materials, the figures below include the top five countries that import the most recyclable plastics 1 and 2 in addition to China. Materials imported by countries other than China and the top 5 countries are included in “All Other Countries.”

Figure 19. Seaborne Exports of Plastics 1 and 2 from California by Country of Import from 2010 to 2020, by Weight

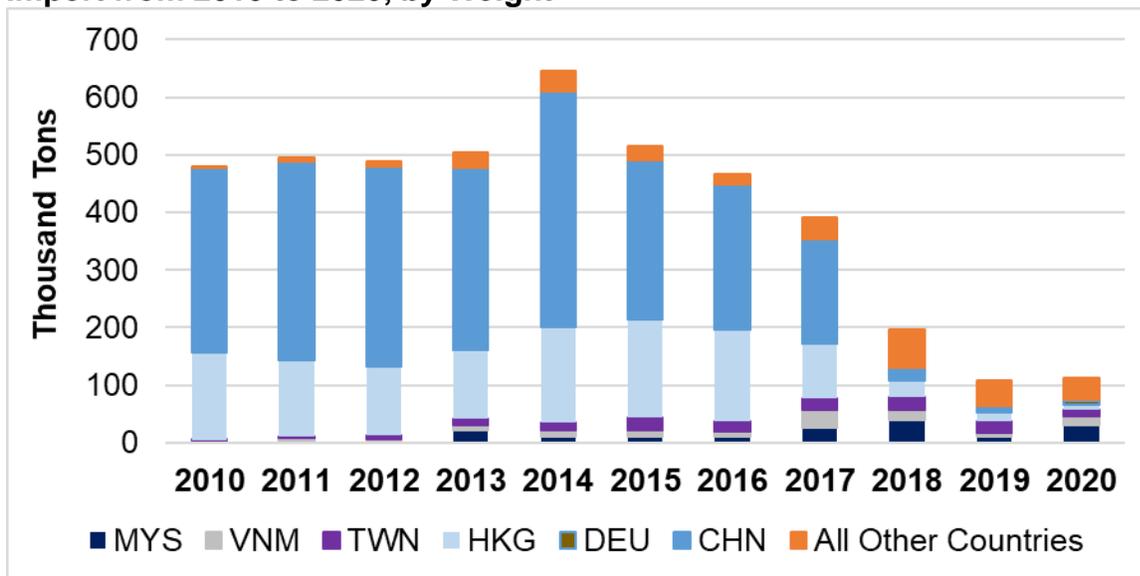
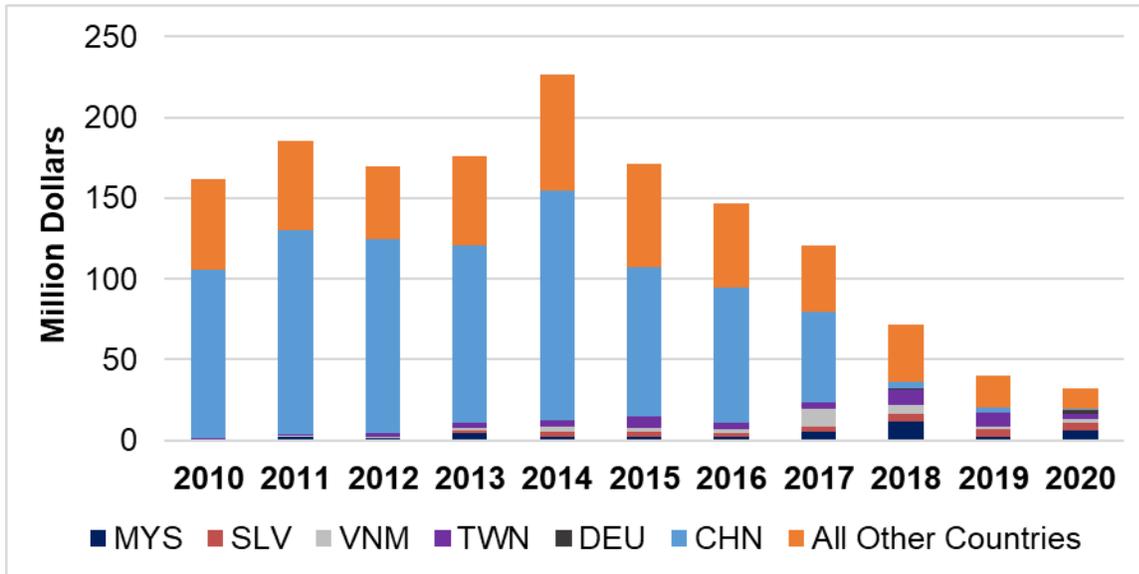


Figure 20. Seaborne Exports of Plastics 1 and 2 from California by Country of Import from 2010 to 2020, by Vessel Value



Mixed Plastics 3 through 7

Recyclable materials exports of Mixed Plastics 3 through 7 decreased from almost 63 thousand tons in 2019 to over 48 thousand tons in 2020 (see Figure 21). The vessel value also decreased from \$18 million in 2019 to over \$11 million USD in 2020 (see Figure 22).

For plastic scrap materials, the figures below include the top five countries that import the most recyclable plastics 3 through 7 in addition to China. Materials imported by countries other than China and the top 5 countries are included in “All Other Countries.”

Figure 21. Seaborne Exports of Mixed Plastics 3 through 7 from California by Country of Import from 2010 to 2020, by Weight

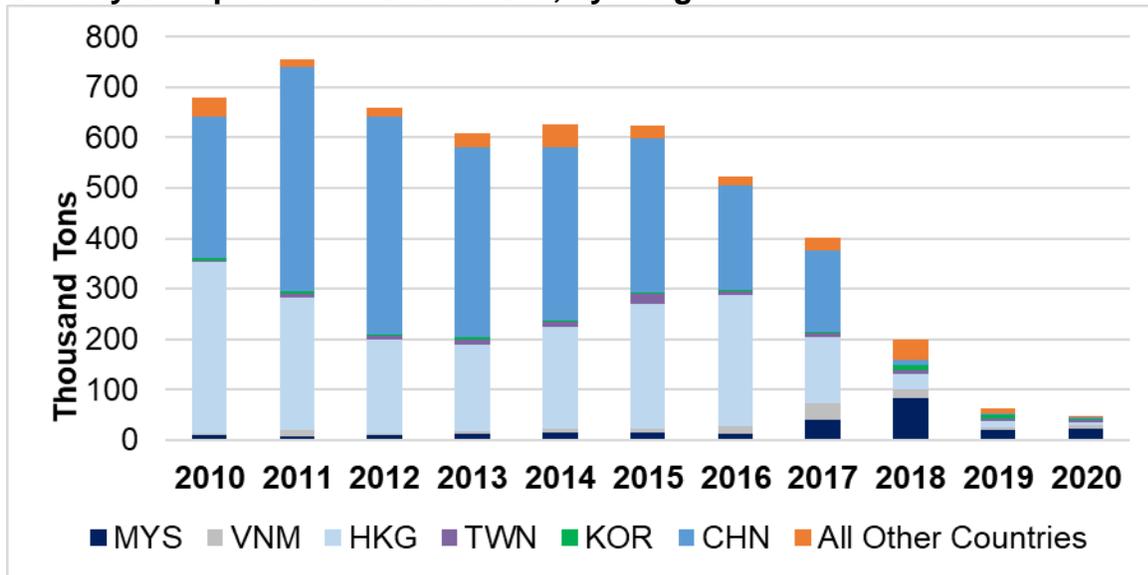
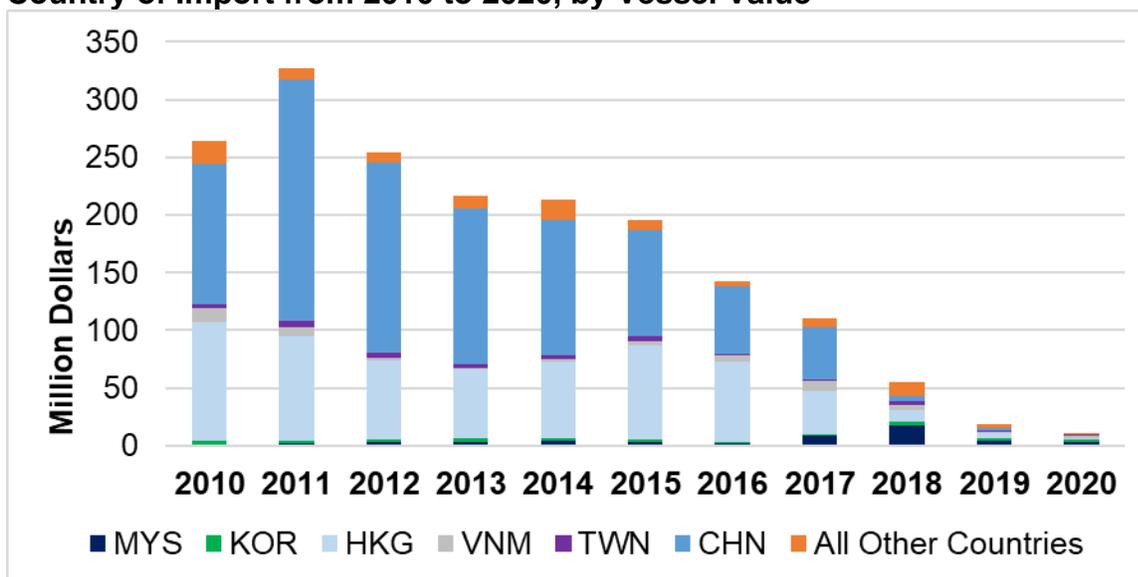


Figure 22. Seaborne Exports of Mixed Plastics 3 through 7 from California by Country of Import from 2010 to 2020, by Vessel Value



Non-Ferrous Metals

Recyclable materials exports of Non-Ferrous Metals decreased from about 981 thousand tons in 2019 to about 923 thousand tons in 2020 (see Figure 23). The vessel value also decreased from about \$1.7 billion to \$1.6 billion in 2020 (see Figure 24).

Figure 23. Seaborne Exports of Nonferrous Metals from California by Country of Import from 2010 to 2020, by Weight

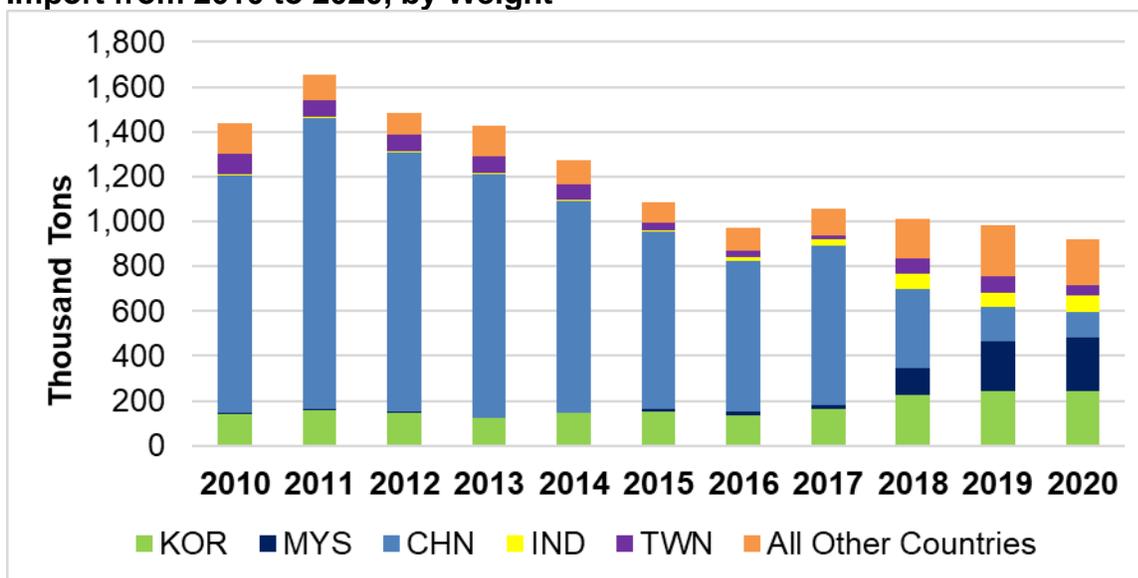
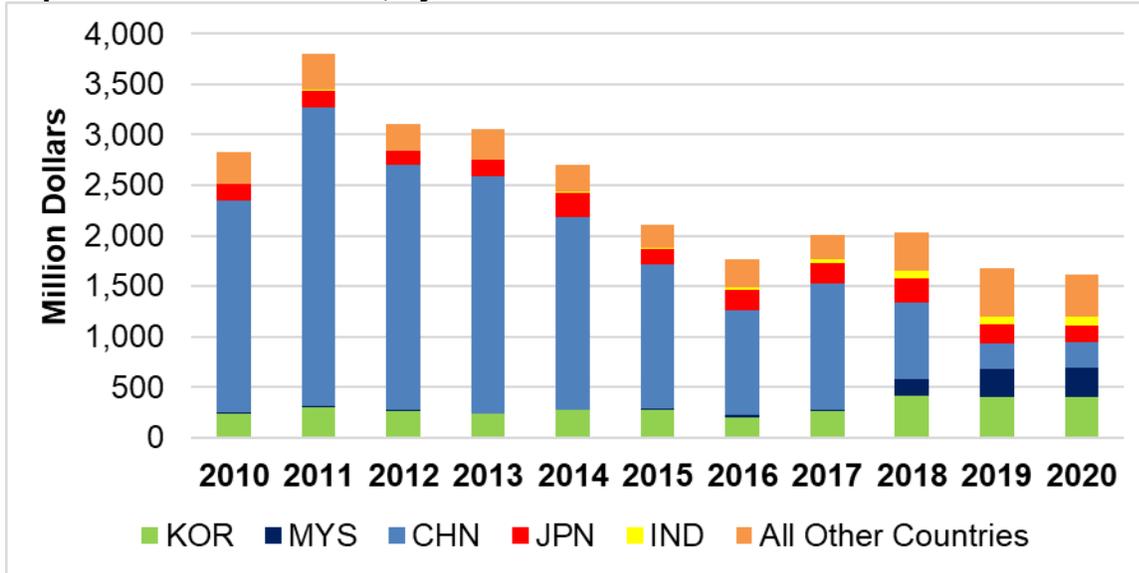


Figure 24. Seaborne Exports of Nonferrous Metals from California by Country of Import from 2010 to 2020, by Vessel Value



Import Restrictions & Policies

Multiple countries have implemented policies related to the international trade of recyclable materials. Table 5 provides a summary of several country-specific recyclable scrap import policies from 2013 to 2020.

Table 5. Recyclable Scrap Import Policies Through 2020

Country	Year	Policy
China	2013	<ul style="list-style-type: none"> Created the Green Fence Policy which restricted the importation of recyclable scrap and increased requirements for inspections.
China	2017	<ul style="list-style-type: none"> Introduced the National Sword Policy to stop the smuggling of illegal scrap imports and implemented the National Sword Policy which banned the import of twenty-four materials beginning December 31, 2017.
China	2018	<ul style="list-style-type: none"> Created the Blue Sky Policy which enacted tougher import contamination standards as well as stringent inspection standards and enforcement measures. Enacted a 100 percent inspection rate of recyclable scrap material at all ports and shut down U.S. pre-shipment approvals for one month. Announced additional material bans to go into effect at the end of 2018 and the beginning of 2019. Passed a resolution to ban scrap plastic imports within two years. Announced the goal of banning all recyclable material imports by 2020.
Indonesia	2018	<ul style="list-style-type: none"> Required inspection of all scrap paper and plastic imports.
Malaysia	2018	<ul style="list-style-type: none"> Imposed a new import tax on scrap plastics and tightened import permit requirements.
Vietnam	2018	<ul style="list-style-type: none"> Imposed a temporary ban on scrap plastic at multiple ports and enacted new requirements for recovered fiber imports. Stopped issuing new scrap plastic import licenses, banned plastic scrap until further notice, and released new inspection guidelines.
Taiwan	2018	<ul style="list-style-type: none"> Limited fiber and plastic scrap imports.
Thailand	2018	<ul style="list-style-type: none"> Implemented an indefinite ban on scrap plastic and electronic imports.
Vietnam	2019	<ul style="list-style-type: none"> Announced a new plan to ban all plastic scrap imports by 2025.
Malaysia	2019	<ul style="list-style-type: none"> Rerouted non-recyclable plastic scrap back to countries of origin.
China	2019	<ul style="list-style-type: none"> Announced intention to ban all recycled fiber imports by 2021. Announced restrictions on scrap steel and aluminum to begin on July 1, 2019.
India	2020	<ul style="list-style-type: none"> Enforced a 1% contamination limit on mixed paper imports.
China	2020	<ul style="list-style-type: none"> Imposed standards on where recycling iron and steel raw materials that meet the standards are not solid waste and can be imported freely.
Worldwide	2020	<ul style="list-style-type: none"> Continued discussions and implementation of the Basel Convention amendments on plastic waste with the United States being a non-signatory. Prepared for the Basel Convention plastic waste amendments to take effect on January 1, 2021.
Canada	2020	<ul style="list-style-type: none"> Signed a bilateral agreement with the United States to continue trade of plastic scrap and waste to comply with new Basel Convention plastic amendments.

Highlights from CalRecycle in 2020

Goals & Mandates

CalRecycle implements statutes and policies to achieve statewide mandates and other goals that protect California’s resources, public health and safety, and environment (see Table 6 for a partial list of new statutes from 2020).

Table 6. Snapshot of CalRecycle’s New Goals & Mandates from 2020

Relevant Policies & Legislation	Goals & Mandates
<p>Solid Waste Plastic Products Certification (AB 2287, Eggman, Chapter 281, Statutes of 2020)</p>	<ul style="list-style-type: none"> Updated the plastic labeling statute to conform with current standards for compostability and degradability. Provided authority to CalRecycle to issue guidelines and adopt standards for labeling of plastic products. Extended the due date of the recommendations from the Statewide Commission on Recycling Markets and Curbside Recycling from January to July 2021. Exempted parks, as defined, from providing recycling and organic waste bins to customers until January 1, 2022.
<p>Recycling: Plastic beverage containers: minimum recycled content (AB 793, Ting, Chapter 115, Statutes of 2020)</p>	<ul style="list-style-type: none"> Required beverage manufacturers to utilize minimum percentages of post-consumer recycled plastic (minimum recycled content) for all plastic beverage containers subject to the California Refund Value (CRV). The minimum recycled content requirement will increase from 15 percent on January 1, 2022, to 25 percent on January 1, 2025, to 50 percent on January 1, 2030.
<p>Energy: Biomethane Procurement (AB 3163, Salas, Chapter 358, Statutes of 2020)</p>	<ul style="list-style-type: none"> Expanded the definition of biomethane to include the gas derived from the non-combustion thermal conversion of certain feedstock for purposes of gas utility biomethane procurement targets.
<p>State government (AB 107, Chapter 264, Statutes of 2020)</p>	<ul style="list-style-type: none"> Among other statutory changes related to state administration, this changed the frequency of reporting to the legislature on the status of the Beverage Container Recycling Fund from every three months to every six months.

Grants, Loans, & Other Economic Support

CalRecycle has continued its successful history of administering grants, payments, and loans to help develop and maintain the recycling collection and processing infrastructure. In 2020, CalRecycle awarded over \$90 million across 1,099 entities through its grant and loan programs.

Grants

Greenhouse Gas Reduction Fund Grants

Grant programs funded by the Greenhouse Gas Reduction Fund (GGRF), part of California Climate Investments, target infrastructure development and program support for projects that reduce greenhouse gas emissions associated with waste and materials, including food waste prevention and rescue. Projects awarded in 2020 through GGRF grant programs will reduce an estimated 136,649 metric tons of CO₂ equivalent that would otherwise be generated in California. Information on specific GGRF grant programs awarded in 2020 can be found in Table 7.

Table 7. Greenhouse Gas Reduction Fund Grants Awarded in 2020

Grant Program	Number of Awardees	Money Awarded
Community Composting for Green Spaces Grant Program	1*	\$1,540,045

**The awardee, the California Alliance for Community Composting (CACC) proposes to develop 50 community composting sites across 6 regions of California (greater Los Angeles, Inland Empire, San Diego, Bay Area, Fresno & Rural Central CA, and Sacramento & Rural Northern CA). The sites will have a collective organics diversion capacity of almost eleven thousand tons during the grant period and will support a large array of community benefits for disadvantaged & low-income communities.*

Beverage Container Recycling Grants

In 2020, CalRecycle awarded over \$9.5 million across 396 entities to assist with convenient beverage container recycling and to encourage and expand development of uses for beverage container materials (see Table 8).

Table 8. Beverage Container Recycling Grants Awarded in 2020

Grant Program	Number of Awardees	Money Awarded
Beverage Container Recycling City/County Payment Program	396	\$9,569,185

Tire Recycling Management Fund Grants

In 2020, CalRecycle awarded over \$17 million across 96 entities from the Tire Recycling Management Fund to decrease the stockpiling of waste tires and to decrease the

number of tires going to landfill (see Table 9). Grants awarded in 2020 will help keep over 153 thousand tires out of the landfill. These awards target business assistance, market development, amnesty events, cleanups, and local jurisdiction enforcement activities related to waste tire storage and hauling.

Table 9. Tire Recycling Management Fund Grants Awarded in 2020

Grant Program	Number of Awardees	Money Awarded
Local Government Waste Tire Amnesty Grants	15	\$1,250,000
Rubberized Pavement (TRP) Grant Program	33	\$6,382,777
Tire-Derived Aggregate (TDA) Grants	2	\$488,906
Tire Incentive Program	14	\$3,000,000
Local Government Waste Tire Enforcement Grants	32	\$5,959,184

Other Grants

In 2020, fourteen certified Local Conservation Corps (LCC) grantees operated comprehensive youth development programs for 18 to 25-year-old adults. LCC programs include recycling and conservation activities, education, and career education programs. The LCC Grant Program is funded through a combination of four material funds:

- 1) Beverage Container Recycling Fund
- 2) Electronic Waste and Recovery and Recycling Account
- 3) California Tire Recycling Management Fund
- 4) California Used Oil Recycling fund

In Fiscal Year 2020–21 (July 2020–June 2021), the LCCs collected over two million pounds of beverage container material, more than 96,000 waste tires, and over two thousand pounds of e-waste. LCCs also conducted signage reviews at over 1,700 Certified Used Oil Collection Centers.

In 2020, CalRecycle addressed illegal solid waste dumping issues on farms, ranches and agriculturally zoned property in California through its Farm and Ranch Cleanup and Abatement Grant Program. The Department awarded over \$1.5 million dollars to twenty applicants. These awards addressed cleanup and recycling of household waste, appliances, tires, used oil, automobiles and scrap metal, construction debris, electronic waste and green waste, and abatement through methods such as fencing and signage that prevent future illegal dumping on these properties.

Table 10. Other Grants Awarded by CalRecycle in 2020

Grant Program	Number of Awardees	Money Awarded
Household Hazardous Waste Grant Program	17	\$1,500,000
Local Conservation Corps Grant Program	14	\$24,343,121
Local Enforcement Agency Grant Program	59	\$1,404,000
Farm and Ranch Solid Waste Cleanup and Abatement Grant Program	20	\$1,577,394

Loans

CalRecycle provides low-interest loans, technical assistance, and free product marketing to businesses, non-profit entities, and government entities. The Recycling Market Development Zone (RMDZ) loans are available to recycling manufacturers located in one of the 39 zones throughout California that use non-hazardous solid waste materials (organics, fiber, plastic, glass, construction and demolition, and tires) destined for a landfill to manufacture recycled-content products. In 2020, the RMDZ loans funded organizations that utilized post consumer or post industrial PET material to manufacture food grade plastic packaging and purchase equipment to utilize old asphalt concrete and recycled aggregate product to produce new hot asphalt mix.

The Greenhouse Gas (GHG) Reduction loans are available to recycling manufacturers located anywhere in California that divert non-hazardous solid waste materials from a landfill, reduce greenhouse gas emissions, and make recycled-content products (see Table 11). In 2020, the Greenhouse Gas Reduction Loan funded an organization that increased recycled fiber content and reduced plastic content in their packaging.

Table 11. CalRecycle Loan Program Awardees in 2020

Loan Program	Number of Awardees	Money Awarded
Recycling Market Development Zone Loan Program	3	\$5,000,000
Greenhouse Gas Reduction Loan Program	1	\$2,000,000

Enforcement

Local Government Compliance and Enforcement

Local jurisdictions, along with their industry partners, direct the flow of waste and influence the ultimate destinations of materials. CalRecycle staff enforces the fifty percent diversion mandate of AB 939 and the mandatory commercial recycling mandates [AB 341 (Chesbro, Chapter 476, Statutes of 2011), Recycling of Commercial Solid Waste (MCR) and AB 1826 (Chesbro, Chapter 727, Statutes of 2014), Recycling of Organic Waste (MORe)]. In 2020, CalRecycle was conducting compliance evaluations on eleven jurisdictions, including five new jurisdictions that were referred to enforcement.

CalRecycle monitored five other jurisdictions for implementation of compliance orders issued in previous years, three of which completed the terms of their compliance orders in 2020.

Over the last three years (2018-2020), CalRecycle issued a total of five compliance orders to jurisdictions.

Beverage Container Recycling Program Enforcement

In 2020, the Division of Recycling, Recycling Program Enforcement Branch (RPEB) continued to create and implement new enforcement tools and measures to reduce fraud in the program. The branch developed a new enforcement program in 2018 and worked on staffing the Data Analysis and Risk Evaluation (DARE) unit in 2020. Using the tools developed from DARE, RPEB was able to identify fraud and recommend revocation for 7 recycling facilities in 2020. Additionally, the CalRecycle Legal Office filed nearly \$5 million dollars in accusations and the Probationary Review unit assessed more than four hundred thousand dollars in restitution and civil penalties in 2020. Our partners with the California Department of Justice made 31 total arrests in 2020.

Extended Producer Responsibility

Mattresses

SB 254 (Hancock, Chapter 388, Statutes of 2013) established an industry-run, statewide extended producer responsibility (EPR) program to increase the recovery and recycling of mattresses. The Mattress Recycling Council (MRC) is the certified stewardship organization responsible for developing, implementing, and administering the program, under CalRecycle's oversight. The MRC collected over 1.5 million mattresses in 2020. Over 32,000 tons of materials were recycled, donated, reused, renovated, or converted to biomass in 2020. Of total mattress weight, there was an increase of 6.6 percentage points (to a total of 77.10 percent) that was recycled, reused, or sent to biomass conversion facilities compared to 2019. Overall, 69.7 percent of material was recycled into commodities, 3.8 percent was sent to biomass conversion,

and 3.5 percent was reused or renovated for a total of 77.1 percent recycled and 22.9 percent landfilled.

Carpet

CalRecycle also oversees the carpet EPR program mandated by AB 2398 (Perez, Chapter 681, Statutes of 2010) and amended by AB 1158 (Chu, Chapter 794, Statutes of 2017) and AB 729 (Chu, Chapter 680, Statutes of 2019). Carpet America Recovery Effort (CARE) reported that 251.5 million pounds of carpet were discarded in 2020 with 52.6 million pounds of recycled output. This resulted in a 21 percent annual recycled output rate. CARE reached a 23.2 percent recycling rate in Quarter 4 of 2020, which was the highest ever for the program.

Paint

The California Paint Stewardship Law (AB 1343, Huffman, Chapter 420, Statutes of 2010) created an EPR program to reduce the generation of paint waste, promote its reuse, and properly manage unwanted leftover paint. PaintCare is the certified stewardship organization responsible for developing, implementing, and administering the program with oversight from CalRecycle. PaintCare reported that 3.5 million gallons of architectural paint were processed in FY 2019-20. Of the 2.8 million gallons of latex paint that were processed, 68 percent was recycled back into latex paint, and five percent was reused. Of the over 700 thousand gallons of oil-based paint processed in FY 2019-20, 2 percent was reused. By the end of FY 2019-20, PaintCare had partnered with 793 collection sites to provide 98.9 percent of California's population with access to a paint drop-off site within 15 miles of their residence.

Sharps & Pharmaceuticals

SB 212 (Allen, Chapter 1004, Statutes of 2018) was passed to establish safe and convenient disposal options for pharmaceutical drug and home-generated sharps waste. Regulations were adopted in 2020 and became effective in January 2021. Statute requires CalRecycle to adopt regulations with an effective date of no later than January 1, 2021.

Measurement

Recycling and Disposal Reporting System

AB 901 (Gordon, Chapter 746, Statutes of 2015) established a mandate to increase solid waste and recycling reporting through a new database application called the Recycling and Disposal Reporting System (RDRS). Registration began on April 1, 2019, and over 1,368 reporting entities have registered as of 12/31/2020. RDRS serves as the main electronic reporting system for disposal and recycling data in California, and 2020 was the first full year in which data was collected.

Waste Characterization Studies

CalRecycle gathers information on the types and amounts of specific materials in the waste stream in California through waste characterization studies. These studies are conducted periodically and CalRecycle awarded two contracts in 2020 to conduct two studies: the 2021 Disposal Facility-based Waste Characterization Study and the 2021 Food Waste Generator Waste Characterization Study. The Disposal Facility-based study estimates material disposed at California landfills and includes a moisture content sub-study that focuses on select fiber types. For the first time, CalRecycle is characterizing incoming waste at landfills from transfer trucks to determine the differences in the composition of materials that pass through a transfer station or mixed waste processor compared to material that is delivered directly from a collection route. The Edible Food Waste Generator study focuses on recoverable (potentially donatable) food items being disposed of at sites identified as commercial edible food generators.

Conclusion

California has clear and ambitious environmental goals for reducing waste and managing materials. In 2020, California's recycling rate was 42 percent, up from 37 percent in 2019. Despite the increase in the recycling rate, California did not meet the 75 percent recycling goal by 2020 as set out in AB 341 (Chesbro, Chapter 476, Statutes of 2011).

Despite the challenges of 2020, California made strides towards achieving the 75 percent recycling goal. The CARE program reached its highest ever recycling rate for carpet in 2020. Additionally, mattress recycling rates under the EPR program went up by about six percentage points. CalRecycle also collected its first full calendar year of data through the new Recycling and Disposal Reporting System (RDRS).

CalRecycle will continue to monitor the state's progress, through a robust mix of research and reporting. As California builds a circular economy, we will use the information gained to make necessary and scientifically sound course corrections and innovations to protect California's resources, climate, and communities.

Appendix 1: Table Data for Figures in the Report

Figure 1 Data Table. Estimated Management of 77.4 Million Tons of Materials Generated in California in 2020

The figure displays tonnage estimates for how the 77.4 million tons of materials generated in California in 2020 were managed, including a percent of total generation for each.

Management Option	Tons	Percent of Total Generation
Landfill	39,970,881	52%
Exported Recyclables	13,201,284	17%
Compost/Anaerobic Digestion/Mulch	9,522,164	12%
Source Reduction & Recycling	9,850,707	13%
Green Material Alternative Daily Cover (ADC)	389,658	1%
Non-Green Material Alternative Daily Cover (ADC)	2,372,018	3%
Construction Beneficial Reuse	1,024,820	1%
Landscaping and Erosion Beneficial Reuse	320,219	0%
Transformation	653,256	1%
Waste-Tire Derived Fuel	57,600	0%
Alternative Intermediate Cover (AIC)	58,852	0%
Engineered Municipal Solid Waste (EMSW)	3,005	0%

CalRecycle derived quantities of landfilled waste, transformation, ADC, AIC, EMSW, and other beneficial reuse from the Recycling and Disposal Reporting System (RDRS). CalRecycle calculated waste tire-derived fuel based on data reported to CalRecycle⁽¹⁾. CalRecycle collected exported recyclables data from WISERTrade⁽²⁾. CalRecycle collected estimates for materials composted, anaerobically digested, and mulched based on published reports^(3; 4)

Figure 2 Data Table. California’s Statewide Per Resident and Total Disposal from 2010 to 2020

The bar chart in this figure displays tons of landfill disposal and disposal-related activities from 2010 to 2020. The scatter plot displays the per resident total disposal rate, including disposal and disposal-related activities, in terms of pounds per resident per year.

Year	Landfill Disposal (Tons)	Disposal-Related Activities (Tons)	Per Resident Disposal (pounds per resident per year)
2010	30,403,163	6,627,901	5.4
2011	29,890,010	7,176,418	5.4
2012	29,268,861	7,292,221	5.3
2013	30,182,493	6,799,744	5.3
2014	31,195,061	6,611,871	5.4
2015	33,241,828	7,150,561	5.7
2016	35,197,922	7,495,276	6.0
2017	37,810,918	6,654,730	6.2
2018	39,918,872	6,336,633	6.4
2019	42,246,199	6,328,547	6.7
2020	39,970,881	4,879,427	6.2

Data is from the RDRS with population from the California Department of Finance⁽⁵⁾. Accessed May and August, 2021.

Figure 3. Source Sector Breakdown of Material Disposed in California from Q3 2019 to Q4 2020

This figure displays the percentage breakdown of disposal by source sector: commercial, residential, and self-haul from quarter three of 2019 to quarter four of 2020.

Quarter	Self-Haul	Residential	Commercial
2019 Q3	19%	30%	51%
2019 Q4	20%	30%	49%
2020 Q1	21%	32%	48%
2020 Q2	21%	34%	46%
2020 Q3	19%	34%	47%
2020 Q4	20%	33%	47%

Figure 4 Data Table. Green Material ADC Utilization Across Q3 & Q4 of 2019-2020

This figure displays the total tons of green material alternative daily cover (ADC) that was utilized from quarter three of 2019 to quarter four of 2020.

Year	Q1	Q2	Q3	Q4
2019	n/a	n/a	370,488.35	373,260.45
2020	101,486.49	117,824.60	94,400.32	75,807.67

Figure 5 Data Table. Disposal-Related Tonnage in California in 2020

The figure displays tons of material managed in disposal-related activities which totaled 4.8 million tons in California in 2020. Figure 4 also displays the percent of all disposal-related activities for each activity type.

Disposal-Related Activity	Tons	Percent of Total
Green Material ADC	389,658	8%
Non-Green Material ADC	2,372,018	49%
Construction Beneficial Reuse	1,024,820	21%
Landscape and Erosion Beneficial Reuse	320,219	7%
Transformation	653,256	13%
Waste Tire-Derived Fuel	57,600	1%
Alternative Intermediate Cover (AIC)	58,852	1%
Engineered Municipal Solid Waste (EMSW)	3,005	0%

Data is from the RDRS and waste tire-derived fuel reports submitted to CalRecycle⁽¹⁾



Figure 6 Data Table. Source Sector for Woody Biomass Sent to Biomass Conversion Facilities in 2020

This figure displays the tons of woody biomass accepted in California in 2020 by material source.

Material Source	Tons Accepted	Percent of Total
Mill Residue	1,334,054	33%
Agriculture	1,095,998	27%
Urban	913,930	23%
In-Forestry	701,421	17%

Biomass conversion facilities reported data directly to CalRecycle pursuant to Public Resources Code Section 44107.

Figure 7 Data Table. Trends in Disaster Debris Disposal in California Landfills in 2020

The figure displays the tons of disaster debris that was disposed in landfills in California across four quarters of 2020.

Quarter	Tons of Disaster Debris Disposed
Q1	32,352.78
Q2	41,634.83
Q3	13,887.96
Q4	73,393.94

Figure 8 Data Table. California’s Statewide Recycling Rate Since 2010

This figure displays the percent recycling rate in California from 2010 to 2020.

Year	Recycling Rate
2010	49%
2011	49%
2012	50%
2013	50%
2014	50%
2015	47%
2016	44%
2017	42%
2018	40%
2019	37%
2020	42%

Figure 9 Data Table. Trends in End Use Outflows in California in 2020

This figure displays the tons of materials sent as end use outflows across all four quarters in 2020 in California.

Quarter	Tons Sent
Q1	3,135,421.35
Q2	3,176,396.46
Q3	3,339,310.34
Q4	3,667,362.92

Figure 10 Data Table. Seaborne Recyclable Materials Exports from California from 2010 to 2020, by Weight

This figure displays the tons of recyclable materials shipped from California ports by sea from 2010 to 2020.

Year	Recyclable Materials Exports (Tons)
2010	18,684,429
2011	22,421,208
2012	19,898,054
2013	18,720,553
2014	18,093,858
2015	16,425,408
2016	15,004,650
2017	14,563,476
2018	15,419,541
2019	14,443,411
2020	13,201,284

Figure 11 Data Table. Seaborne Recyclable Materials Exports from California from 2010 to 2020, by Vessel Value

This figure displays the vessel value (USD) of recyclable materials shipped from California ports by sea from 2010 to 2020.

Year	Recyclable Materials Exports Vessel Value (USD)
2010	\$7,656,043,029
2011	\$10,028,140,634
2012	\$8,237,767,017
2013	\$7,605,086,054
2014	\$6,970,882,999
2015	\$5,386,926,247
2016	\$4,571,461,619
2017	\$5,119,174,368
2018	\$5,594,550,006
2019	\$4,819,248,316
2020	\$4,467,521,954

Figure 12 Data Table. Seaborne Recyclable Materials Exports from California by Country of Import from 2010 to 2020, by Weight

This figure shows the tons imported by the top five countries and all other aggregated countries importing the most recyclable material from California by weight from 2010 to 2020.

Year	China	Taiwan	Vietnam	Korea, Republic Of	Malaysia	All Other Countries
2010	10,849,144	2,003,141	473,324	2,750,160	327,520	2,281,140
2011	13,288,115	2,838,129	450,464	3,145,938	500,933	2,197,629
2012	11,482,347	3,020,865	323,867	2,709,196	510,384	1,851,394
2013	10,930,494	2,639,315	404,530	2,566,027	575,172	1,605,014
2014	10,309,377	2,582,826	311,298	2,104,577	346,749	2,439,032
2015	10,158,486	1,505,953	210,103	1,687,983	61,358	2,801,524
2016	9,272,618	1,551,196	340,523	1,607,322	67,926	2,165,064
2,017	8,121,472	1,619,378	869,390	1,178,663	239,571	2,535,003
2018	6,587,928	2,288,539	1,402,893	1,639,981	577,839	2,922,361
2019	4,719,291	2,299,526	1,542,043	1,913,601	831,137	3,137,813
2020	3,696,339	2,128,881	1,333,203	1,319,330	1,281,250	3,442,279

Figure 13 Data Table. Top Five Exported Recyclable Materials from California in 2020, by Weight

This figure shows the top categories of seaborne recyclable materials exported from California by weight (tons) in 2020.

Material Category	Tons	Percent of Total Seaborne Recyclable Exports
Ferrous Metal	5,209,189	39%
OCC and Kraft Paper	4,976,543	38%
Other Misc. Paper	1,463,159	11%
Nonferrous metal	611,929	7%
Unsorted Mixed Paper	368,445	3%

Figure 14. Data Table. Top Five Exported Recyclable Materials from California in 2020, by Vessel Value

This figure shows the top categories of seaborne recyclable materials exported from California by vessel value (USD) in 2020.

Material Category	Vessel Value (USD)	Percent of Total Seaborne Recyclable Exports
Nonferrous Metal	\$1,620,751,071	36%
Ferrous Metal	\$1,392,188,039	31%
OCC and Kraft Paper	\$697,519,082	16%
Other Misc. Paper	\$258,491,800	6%
Copper Wire	\$166,781,664	4%

Figure 15. Data Table. Seaborne Exports of Ferrous Metals from California by Country of Import from 2010 to 2020, by Weight

This figure shows the amounts of Ferrous Metals exported as a recyclable material from California to other countries, by weight (tons). The amount is broken out by country for the top five countries importing ferrous metals in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	Taiwan	Malaysia	Bangladesh	Vietnam	Korea, Republic of	All Other Countries
2010	1,786,480	300,163	3,832	363,611	1,854,565	2,305,845
2011	2,623,917	469,010	3,553	289,677	2,140,553	2,644,229
2012	2,788,377	473,701	1,054	196,536	1,712,661	1,525,682
2013	2,396,742	527,373	441	296,435	1,679,458	1,382,013
2014	2,382,819	300,729	3,372	209,004	1,157,059	1,619,142
2015	1,337,092	11,108	95,697	102,555	833,733	1,866,564
2016	1,321,948	19,673	219,174	239,595	808,583	1,225,712
2017	1,385,514	141,446	275,978	573,666	499,394	1,743,918
2018	1,782,175	278,289	389,863	880,846	700,307	1,198,170
2019	1,609,512	474,250	608,486	814,097	928,596	938,262
2020	1,499,215	759,856	714,595	643,160	429,337	1,163,025

Figure 16. Data Table Seaborne Recyclable Materials Exports of Ferrous Metals from California by Country of Import from 2010 to 2020, by Vessel Value

This figure shows the amounts of ferrous metals exported as a recyclable material from California to other countries, by vessel value (USD). The amount is broken out by country for the top five countries importing ferrous metals in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	Taiwan	Bangladesh	Vietnam	Korea, Republic of	Malaysia	All Other Countries
2010	\$757,611,295	\$1,473,657	\$117,638,646	\$621,373,411	\$110,257,433	\$1,168,667,599
2011	\$1,193,023,622	\$1,638,093	\$115,682,721	\$876,022,576	\$192,057,862	\$1,368,554,152
2012	\$1,128,001,030	\$478,000	\$72,629,289	\$662,270,781	\$175,903,130	\$908,856,871
2013	\$880,875,577	\$215,500	\$99,108,751	\$584,775,959	\$179,119,430	\$794,317,061
2014	\$837,190,530	\$1,009,495	\$66,339,117	\$398,648,378	\$95,947,257	\$846,528,459
2015	\$390,364,012	\$22,516,316	\$21,447,886	\$211,681,458	\$3,247,714	\$715,121,652
2016	\$329,241,818	\$41,958,672	\$51,370,594	\$174,205,264	\$5,710,941	\$474,936,307
2017	\$401,976,832	\$68,456,482	\$147,301,921	\$144,138,733	\$38,511,118	\$697,883,715
2018	\$581,025,237	\$123,312,283	\$261,064,835	\$215,268,590	\$100,806,142	\$514,869,379
2019	\$487,484,743	\$157,429,543	\$215,851,899	\$251,466,309	\$135,605,927	\$355,447,838
2020	\$411,620,979	\$171,272,766	\$170,129,394	\$125,890,220	\$111,337,714	\$401,936,966

Figure 17. Data Table. Seaborne Exports of OCC and Kraft Paper from California by Country of Import from 2010 to 2020, by Weight

This figure shows the amount of old corrugated cardboard (OCC) and kraft paper exported as a recyclable material from California to other countries, by weight (tons). The amount is broken out by country for the top five countries importing OCC and kraft paper in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	China	Vietnam	Taiwan	Korea, Republic Of	Malaysia	All Other Countries
2010	3,293,602	33,703	71,647	164,059	336	146,508
2011	4,932,102	60,961	79,288	155,834	10,676	125,041
2012	4,819,125	35,398	80,724	173,226	11,973	136,420
2013	4,350,710	33,692	79,210	154,556	4,408	106,922
2014	4,486,509	36,308	66,248	238,465	11,187	101,228
2015	4,818,620	62,619	59,658	296,635	7,244	139,381
2016	4,469,992	54,969	147,649	201,362	2,908	148,730
2017	3,736,835	163,661	145,323	142,173	6,312	149,574
2018	4,276,757	371,991	315,741	309,314	22,641	380,445
2019	3,206,058	659,724	447,735	358,144	42,033	542,249
2020	2,663,201	684,901	481,491	357,567	227,970	561,414

Figure 18. Data Table. Seaborne Exports of OCC and Kraft Paper from California by Country of Import from 2010 to 2020, by Vessel Value

This figure shows the amounts of old corrugated cardboard (OCC) and kraft paper exported as a recyclable material from California to other countries, by vessel value (USD). The amount is broken out by country for the top five countries importing OCC and kraft paper in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	China	Vietnam	Taiwan	Korea, Republic Of	Malaysia	All Other Countries
2010	\$442,291,621	\$6,516,677	\$12,558,258	\$22,309,025	\$110,709	\$33,214,397
2011	\$669,678,009	\$12,646,649	\$15,190,186	\$19,393,665	\$2,576,902	\$29,957,624
2012	\$718,311,019	\$6,855,509	\$13,706,560	\$20,404,534	\$2,285,201	\$28,023,926
2013	\$642,837,906	\$6,518,544	\$14,223,492	\$23,662,048	\$794,471	\$22,027,113
2014	\$673,819,685	\$6,314,441	\$11,368,598	\$34,003,090	\$2,008,551	\$23,692,382
2015	\$694,114,003	\$9,038,042	\$10,166,056	\$48,522,326	\$1,274,438	\$22,519,003
2016	\$614,876,396	\$7,769,676	\$23,672,223	\$34,209,883	\$521,530	\$22,343,230
2017	\$547,987,974	\$22,531,228	\$22,662,634	\$26,640,593	\$1,104,860	\$23,992,618
2018	\$667,874,293	\$53,596,327	\$43,425,728	\$44,498,419	\$2,986,664	\$49,193,618
2019	\$478,710,868	\$78,684,346	\$56,109,353	\$42,005,453	\$5,436,129	\$66,869,401
2020	\$401,674,508	\$84,789,155	\$67,218,320	\$45,131,927	\$28,855,526	\$69,849,646

Figure 19 Data Table. Seaborne Exports of Plastics 1 and 2 from California by Country of Import from 2010 to 2020, by Weight

This figure shows the amounts of plastics 1 and 2 exported as a recyclable material from California to other countries, by weight (tons). The amount is broken out by country for the top five countries importing plastics 1 and 2 in 2020, plus China. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	Malaysia	Vietnam	Taiwan	Hong Kong	Germany	China	All Other Countries
2010	1,687	1,899	1,429	151,425	0	321,435	2,440
2011	4,879	2,887	1,754	132,857	0	346,062	6,630
2012	3,591	3,326	5,244	119,151	0	348,116	9,327
2013	22,154	8,161	10,636	119,477	23	316,167	27,329
2014	9,943	12,212	13,213	166,185	0	409,254	34,497
2015	9,839	10,902	22,496	171,451	0	276,359	23,149
2016	11,252	9,022	16,526	160,515	0	251,676	16,571
2017	25,766	31,732	19,634	94,013	251	182,253	36,660
2018	38,614	18,193	22,235	29,932	2,818	17,529	67,600
2019	9,565	6,548	20,277	15,665	63	10,953	44,460
2020	31,002	14,689	11,889	8,187	7,816	1,630	36,782

Figure 20 Data Table. Seaborne Exports of Plastics 1 and 2 from California by Country of Import from 2010 to 2020, by Vessel Value

This figure shows the amounts of plastics 1 and 2 exported as recyclable material from California to other countries, by vessel value (USD). The amount is broken out by country for the top five countries importing plastics 1 and 2 in 2020, plus China. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	Malaysia	El Salvador	Vietnam	Taiwan	Germany	China	All Other Countries
2010	\$62,845	\$0	\$593,137	\$661,671	\$0	\$104,650,746	\$55,685,147
2011	\$2,135,568	\$85,081	\$864,935	\$923,966	\$0	\$126,129,208	\$55,366,498
2012	\$1,454,631	\$116,268	\$954,484	\$1,925,836	\$0	\$120,469,677	\$44,935,277
2013	\$4,439,897	\$1,978,163	\$1,530,786	\$2,827,091	\$3,390	\$110,136,562	\$54,726,795
2014	\$2,220,691	\$2,975,380	\$3,174,616	\$3,797,511	\$0	\$142,380,927	\$71,938,951
2015	\$2,323,295	\$2,779,956	\$2,815,114	\$7,161,274	\$0	\$92,492,663	\$64,000,999
2016	\$2,048,232	\$2,248,216	\$2,398,934	\$4,035,821	\$0	\$84,251,493	\$51,472,968
2017	\$5,304,243	\$2,889,237	\$11,051,790	\$4,447,946	\$62,000	\$56,061,897	\$40,801,654
2018	\$11,325,433	\$4,934,187	\$5,981,781	\$8,984,737	\$783,000	\$4,276,395	\$35,570,809
2019	\$2,394,371	\$4,218,626	\$1,622,295	\$8,613,802	\$15,000	\$3,381,052	\$19,917,655
2020	\$6,344,670	\$4,154,565	\$3,113,129	\$2,783,243	\$2,558,163	\$839,439	\$12,748,376

Figure 21 Data Table. Seaborne Exports of Mixed Plastics 3 through 7 from California by Country of Import from 2010 to 2020, by Weight

This figure shows the amounts of mixed plastics 3 through 7 exported as a recyclable material from California to other countries, by weight (tons). The amount is broken out by country for the top five countries importing mixed plastics 3 through 7 in 2020, plus China. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	Malaysia	Vietnam	Hong Kong	Taiwan	Korea, Republic Of	China	All Other Countries
2010	8,290	3,144	341,669	3,819	4,188	279,691	38,231
2011	6,785	13,559	262,859	7,247	3,695	445,678	14,805
2012	8,446	4,308	186,083	6,696	2,835	434,473	15,958
2013	12,516	4,182	171,641	10,228	4,602	378,014	27,598
2014	13,773	8,656	202,324	10,066	3,520	342,508	44,402
2015	15,181	7,456	248,251	19,276	2,093	305,975	25,008
2016	11,283	16,830	260,320	7,419	1,885	207,532	16,342
2017	40,501	31,973	132,456	6,540	2,756	162,304	24,241
2018	82,254	19,319	29,260	7,861	9,654	11,165	39,544
2019	18,543	5,676	13,077	4,451	7,544	2,768	10,740
2020	23,094	6,456	5,406	4,610	3,789	541	4,613

Figure 22 Data Table. Seaborne Exports of Mixed Plastics 3 through 7 from California by Country of Import from 2010 to 2020, by Vessel Value

This figure shows the amounts of mixed plastics 3 through 7 exported as a recyclable material from California to other countries, by vessel value (USD). The amount is broken out by country for the top five countries importing mixed plastics 3 through 7 in 2020, plus China. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	Malaysia	Korea, Republic Of	Hong Kong	Vietnam	Taiwan	China	All Other Countries
2010	990,291	3,394,561	102,143,145	13,003,397	2,896,741	121,946,652	19,919,357
2011	1,776,842	2,425,108	90,582,493	7,431,494	5,686,713	209,267,705	10,528,674
2012	2,825,700	2,112,265	69,007,862	1,643,521	5,290,857	163,918,921	8,833,651
2013	3,533,421	3,368,748	58,741,418	1,564,892	3,382,582	134,389,549	11,585,352
2014	3,659,202	2,222,139	66,887,887	2,448,569	3,241,699	116,949,724	17,828,132
2015	3,218,392	1,890,625	82,394,056	2,467,174	5,180,837	91,550,736	8,907,619
2016	2,064,834	617,515	70,424,811	4,739,895	1,988,201	58,236,389	4,084,486
2017	8,854,452	896,579	37,666,638	8,219,635	1,820,784	45,602,661	7,081,491
2018	17,759,163	3,171,552	9,407,605	5,340,345	2,498,132	4,165,367	13,083,701
2019	3,828,638	2,818,452	3,911,435	1,350,671	1,328,180	1,954,302	3,147,018
2020	3,569,788	1,622,521	1,528,140	1,492,621	1,180,365	219,074	1,400,160

Figure 23 Data Table. Seaborne Exports of Nonferrous Metals from California by Country of Import from 2010 to 2020, by Weight

This figure shows the amounts of nonferrous metals exported as a recyclable material from California to other countries, by weight (tons). The amount is broken out by country for the top five countries importing nonferrous metals in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	Korea, Republic Of	Malaysia	China	India	Taiwan	All Other Countries
2010	141,633	5,537	1,058,331	4,038	90,675	136,331
2011	157,244	4,195	1,299,121	5,628	76,540	114,386
2012	146,404	3,931	1,157,292	4,997	73,072	100,397
2013	121,970	1,287	1,086,726	7,347	73,379	137,865
2014	144,138	3,854	941,941	8,949	66,577	108,640
2015	151,472	13,357	788,358	9,317	29,937	92,194
2016	135,337	16,178	674,937	13,423	26,491	103,188
2017	162,514	18,038	713,377	24,121	19,647	119,054
2018	227,603	118,741	352,200	66,050	67,856	177,480
2019	246,006	216,978	154,598	65,346	70,424	227,187
2020	240,739	239,792	116,029	75,817	45,738	204,659

Figure 24 Data Table. Seaborne Exports of Nonferrous Metals from California by Country of Import from 2010 to 2020, by Vessel Value

This figure shows the amounts of nonferrous metals exported as a recyclable material from California to other countries, by vessel value (USD). The amount is broken out by country for the top five countries importing nonferrous metals in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	Korea, Republic Of	Malaysia	China	Japan	India	All Other Countries
2010	\$242,393,667	\$6,730,990	\$2,097,213,364	\$160,839,903	\$7,884,598	\$319,963,925
2011	\$301,760,633	\$6,041,429	\$2,966,216,561	\$161,837,038	\$11,976,027	\$354,122,417
2012	\$268,898,703	\$6,736,595	\$2,421,475,210	\$141,021,475	\$9,767,859	\$264,802,161
2013	\$238,877,367	\$1,782,528	\$2,345,546,397	\$160,959,741	\$12,052,222	\$293,451,282
2014	\$275,913,121	\$5,190,724	\$1,903,918,316	\$237,195,715	\$14,626,827	\$263,557,639
2015	\$269,410,847	\$12,789,212	\$1,435,709,687	\$151,201,148	\$14,062,628	\$226,318,238
2016	\$205,318,227	\$16,641,002	\$1,040,177,841	\$201,715,633	\$19,029,442	\$281,070,394
2017	\$256,957,851	\$21,921,188	\$1,247,207,090	\$209,209,358	\$31,006,903	\$243,042,372
2018	\$419,715,521	\$157,270,662	\$756,683,273	\$238,004,823	\$87,224,560	\$378,678,981
2019	\$402,427,773	\$271,394,876	\$254,877,657	\$189,938,370	\$81,350,318	\$478,447,394
2020	\$404,511,312	\$284,595,715	\$253,935,630	\$165,357,303	\$95,493,732	\$416,857,379

Appendix 2: Additional Information on Total Exports and Recyclable Materials Exports from California Seaports

California Total Seaborne Exports

Table 12. Total Seaborne Exports from California in 2020, by Weight

Recyclable Materials Exports (Tons)	Other Exports (Tons)	Total Exports (Tons)
13.2 million	44.8 million	58.0 million

Figure 25. Total Seaborne Exports from California from 1998 to 2020, by Weight

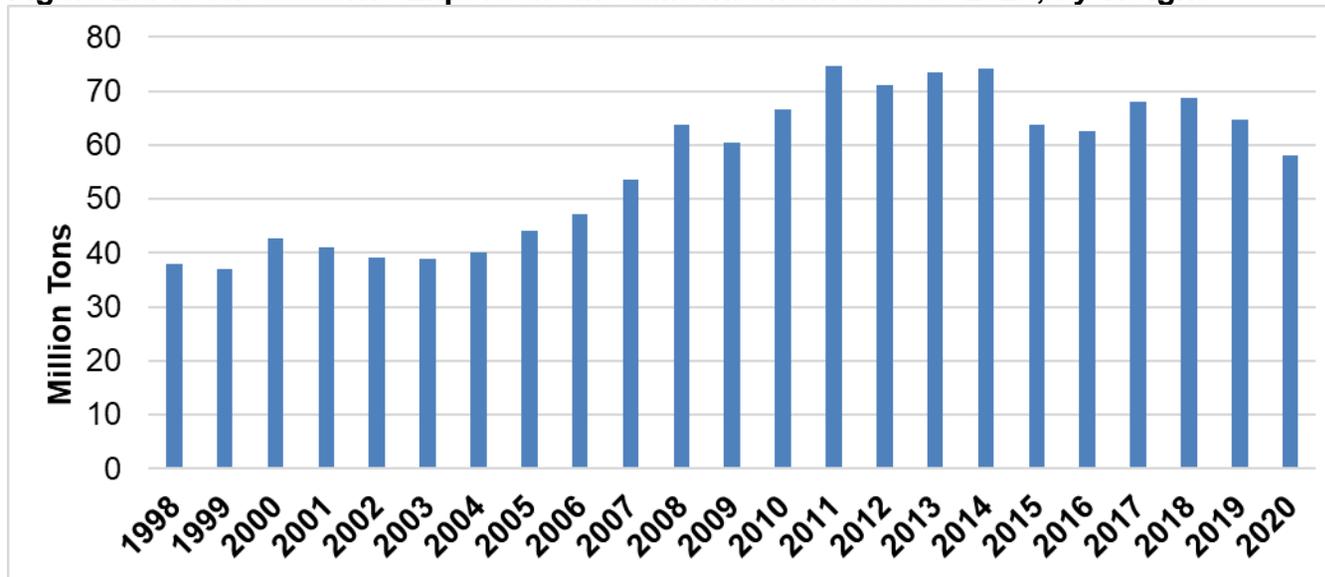


Figure 25 Data Table. Total Seaborne Exports from California from 1998 to 2020, by Weight

This figure shows total California exports split by recyclable materials and other exports from 1998 to 2020, by weight (tons).

Year	Recyclable Materials Exports (Tons)	All Other Exports (Tons)
1998	4,272,994	33,768,365
1999	5,083,108	31,990,150
2000	6,320,731	36,334,233
2001	7,271,304	33,849,628
2002	7,630,840	31,418,742
2003	9,549,578	29,444,761
2004	10,087,098	29,903,460
2005	11,938,685	32,122,320
2006	13,153,708	34,026,039
2007	16,243,610	37,222,845
2008	19,598,613	44,169,922
2009	18,687,562	41,681,572
2010	18,684,429	47,797,744
2011	22,421,208	52,290,877
2012	19,898,054	51,162,076
2013	18,720,553	54,792,012
2014	18,093,858	56,148,543
2015	16,425,408	47,352,623
2016	15,004,650	47,513,804
2017	14,563,476	53,391,789
2018	15,419,541	53,342,734
2019	14,443,411	50,179,851
2020	13,201,284	44,800,043

Table 13. Total Seaborne Exports from California in 2020, by Vessel Value

Recyclable Materials Exports (USD)	Other Exports (USD)	Total Exports (USD)
\$4.5 billion	\$81.1 billion	\$85.6 billion

Figure 26. Total Seaborne Exports from California from 1998 to 2020, by Vessel Value

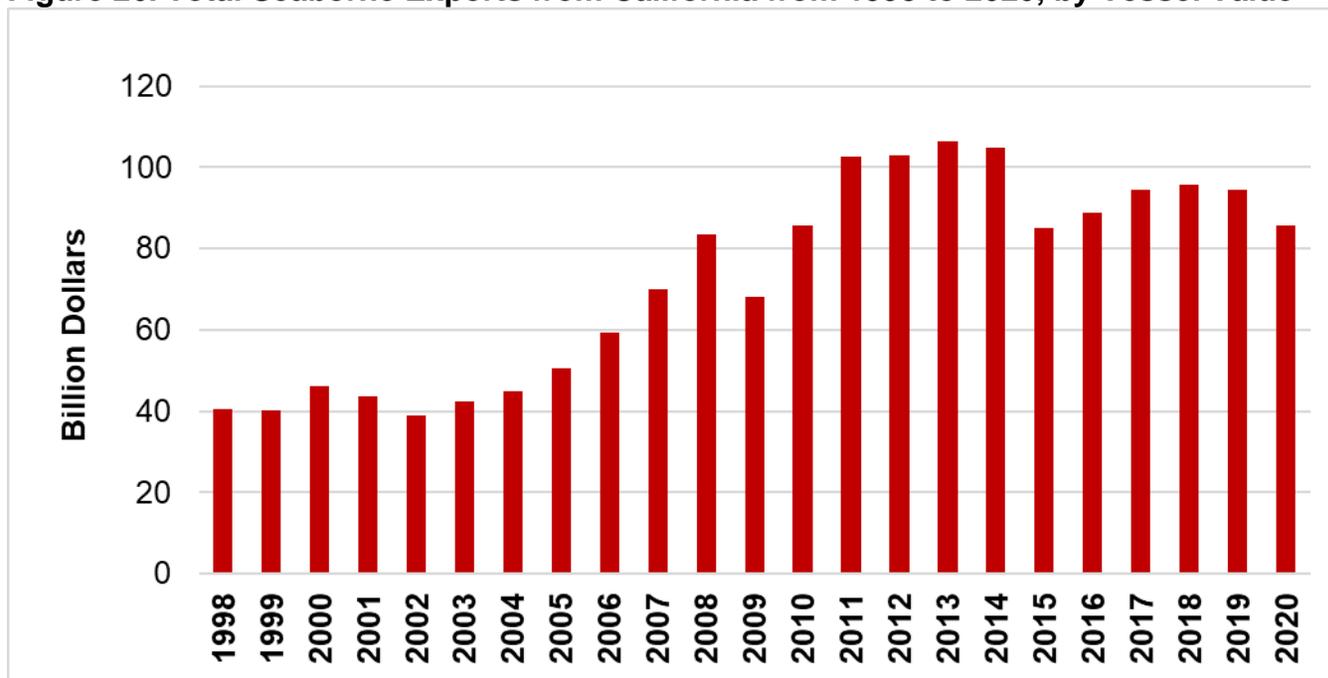


Figure 26 Data Table. Total Seaborne Exports from California from 1998 to 2020, by Vessel Value

This figure shows total California exports split by recyclable materials and all other exports from 1998 to 2020, by vessel value (USD).

Year	Recyclable Materials Exports Vessel Value (USD)	All Other Exports Vessel Value (USD)
1998	\$775,658,290	\$39,821,934,564
1999	\$875,236,881	\$39,216,984,750
2000	\$1,299,866,371	\$44,913,919,500
2001	\$1,288,651,784	\$42,438,765,714
2002	\$1,303,679,253	\$37,769,985,010
2003	\$1,757,906,800	\$40,720,710,629
2004	\$2,407,187,755	\$42,386,450,467
2005	\$3,344,559,648	\$47,200,806,881
2006	\$5,223,647,937	\$53,976,563,513
2007	\$7,235,559,060	\$62,665,140,333
2008	\$8,806,032,285	\$74,519,026,702
2009	\$5,830,066,873	\$62,279,753,431
2010	\$7,656,043,029	\$77,889,749,335
2011	\$10,028,140,634	\$92,457,038,362
2012	\$8,237,767,017	\$94,697,754,139
2013	\$7,605,086,054	\$98,735,641,688
2014	\$6,970,882,999	\$97,856,396,567
2015	\$5,386,926,247	\$79,810,156,226
2016	\$4,571,461,619	\$84,373,944,003
2017	\$5,119,174,368	\$89,410,020,707
2018	\$5,594,550,006	\$90,263,534,375
2019	\$4,819,248,316	\$89,575,667,108
2020	\$4,467,521,954	\$81,112,312,302

Seaborne Recyclable Materials Exports from California in 2020, by Vessel Value

Table 14. Seaborne Recyclable Materials Exports from California in 2020 by Top Countries of Import, by Vessel Value

Top 10 Countries	2020 Vessel Value (USD)	Vessel Value Change 2019 to 2020 (USD)	Percent Change in Vessel Value from 2019 to 2020	Percent of Total Recyclable Materials Exports
China (CHN)	\$947,106,697	-\$155,418,079	-14%	21%
Korea (KOR)	\$665,081,798	-\$130,333,653	-16%	15%
Taiwan (TWN)	\$601,887,223	-\$117,164,395	-16%	13%
Malaysia (MYS)	\$442,291,052	\$11,264,588	3%	10%
Vietnam (VNM)	\$300,456,559	-\$20,341,362	-6%	7%
India (IND)	\$217,857,473	\$23,337,243	12%	5%
Japan (JPN)	\$215,348,211	-\$58,920,675	-21%	5%
Thailand THA	\$177,356,150	\$57,574,241	48%	4%
Bangladesh (BGD)	\$171,372,179	\$13,352,807	8%	4%
Indonesia (IDN)	\$102,342,344	\$9,016,845	10%	2%

Figure 27. Seaborne Recyclable Materials Exports from California by Country of Import from 2010 to 2020 by Vessel Value

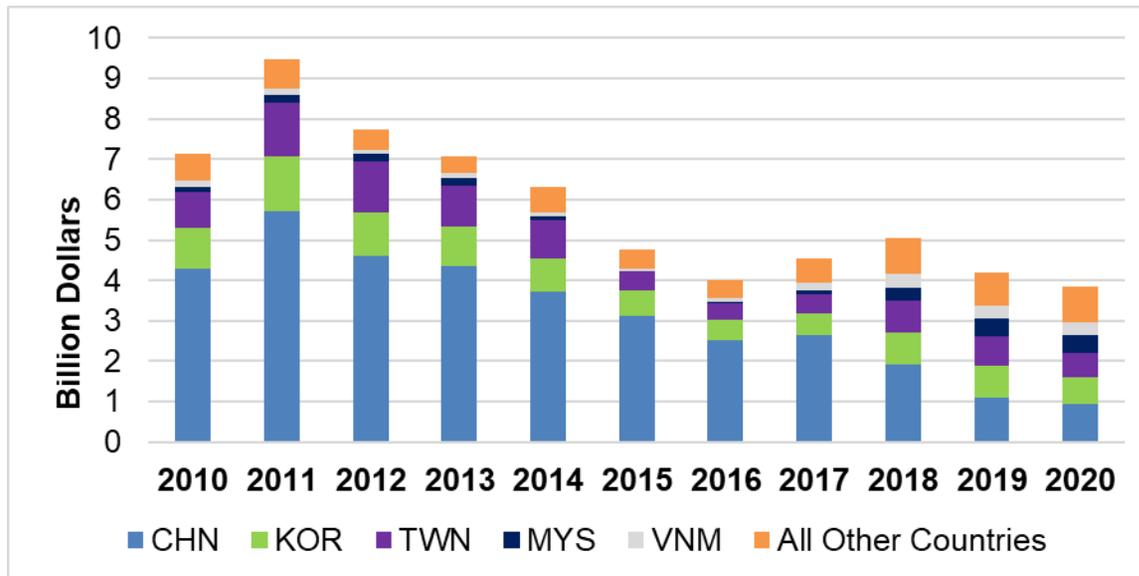


Figure 27 Data Table. Seaborne Recyclable Materials Exports from California by Country of Import from 2010 to 2020, by Vessel Value

This figure shows the amount of seaborne recyclable materials exports from California to other countries, by vessel value (USD). Amount is broken out by country for the top five countries importing recyclable materials in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	China	Korea, Republic Of	Taiwan	Malaysia	Vietnam	All Other Countries
2010	\$4,292,595,861	\$1,012,377,552	\$890,229,363	\$120,766,457	\$161,593,980	\$1,178,479,816
2011	\$5,701,204,117	\$1,357,753,102	\$1,331,618,865	\$206,773,858	\$164,602,722	\$1,266,187,970
2012	\$4,594,985,500	\$1,084,261,827	\$1,252,329,238	\$191,239,781	\$102,323,625	\$1,012,627,046
2013	\$4,347,730,436	\$975,437,267	\$1,009,625,862	\$192,189,515	\$129,523,103	\$950,579,871
2014	\$3,707,647,215	\$834,624,761	\$947,128,980	\$111,904,537	\$89,834,753	\$1,279,742,753
2015	\$3,112,412,503	\$627,294,614	\$475,959,284	\$25,331,567	\$46,294,748	\$1,099,633,531
2016	\$2,510,105,479	\$517,267,475	\$420,911,201	\$29,041,076	\$73,559,347	\$1,020,577,041
2017	\$2,657,359,030	\$523,027,809	\$484,933,974	\$77,813,208	\$201,322,259	\$1,174,718,088
2018	\$1,919,674,076	\$804,202,194	\$784,785,220	\$298,186,790	\$344,795,734	\$1,442,905,992
2019	\$1,102,524,776	\$795,415,451	\$719,051,618	\$431,026,464	\$320,797,921	\$1,450,432,086
2020	\$947,106,697	\$665,081,798	\$601,887,223	\$442,291,052	\$300,456,559	\$1,510,698,625

Seaborne Recyclable Materials Exports from California by Individual Recyclable Material Category

Ferrous Metals

Table 15. Ferrous Metals Exported as Recyclable Materials from California in 2020, by Weight and Vessel Value

Tons Exported	Percent Change in Tons from 2019	Vessel Value (USD)	Percent Change in Vessel Value from 2019
5,209,189	-3%	\$1,392,188,039	-13%

Figure 28. Seaborne Recyclable Materials Exports of Ferrous Metals from California by Country of Import from 2010 to 2020, by Weight

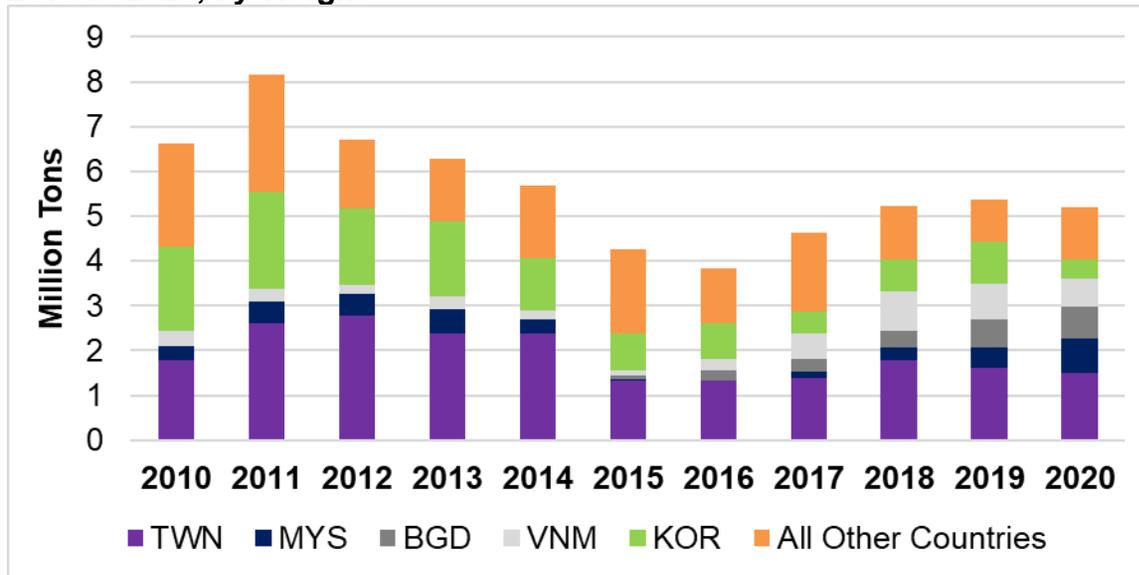


Figure 28 Data Table: Seaborne Recyclable Materials Exports of Ferrous Metals from California by Country of Import from 2010 to 2020, by Weight

This figure shows the amount of Ferrous Metals exported as a recyclable material from California to other countries, by weight (tons). The amount is broken out by country for the top five countries importing Ferrous Metals in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	Taiwan	Malaysia	Bangladesh	Vietnam	Korea, Republic Of	All Other Countries
2010	1,786,480	300,163	3,832	363,611	1,854,565	2,305,845
2011	2,623,917	469,010	3,553	289,677	2,140,553	2,644,229
2012	2,788,377	473,701	1,054	196,536	1,712,661	1,525,682
2013	2,396,742	527,373	441	296,435	1,679,458	1,382,013
2014	2,382,819	300,729	3,372	209,004	1,157,059	1,619,142
2015	1,337,092	11,108	95,697	102,555	833,733	1,866,564
2016	1,321,948	19,673	219,174	239,595	808,583	1,225,712
2017	1,385,514	141,446	275,978	573,666	499,394	1,743,918
2018	1,782,175	278,289	389,863	880,846	700,307	1,198,170
2019	1,609,512	474,250	608,486	814,097	928,596	938,262
2020	1,499,215	759,856	714,595	643,160	429,337	1,163,025

Other Miscellaneous (Misc.) Mixed Paper

Table 16. Other Misc. Mixed Paper Exported as Recyclable Materials from California in 2020, by Weight and Vessel Value

Tons Exported	Percent Change in Tons from 2019	Vessel Value (USD)	Percent Change in Vessel Value from 2019
1,463,159	-12%	\$258,491,800	-12%

Figure 29. Seaborne Recyclable Materials Exports of Other Misc. Mixed Paper from California by Country of Import from 2010 to 2020, by Weight

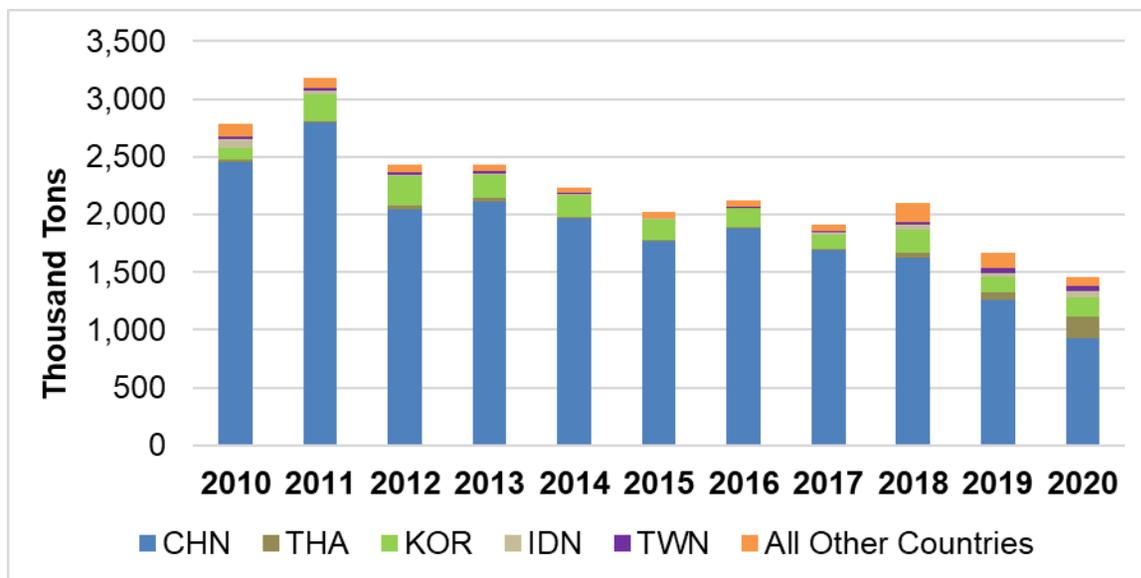


Figure 29 Data Table: Seaborne Recyclable Materials Exports of Other Misc. Mixed Paper from California by Country of Import from 2010 to 2020, by Weight

This figure shows the amount of Other Misc. Mixed Paper exported as a recyclable material from California to other countries, by weight (tons). The amount is broken out by country for the top five countries importing Other Misc. Mixed Paper in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	China	Thailand	Korea, Republic Of	Indonesia	Taiwan	All Other Countries
2010	2,450,270	23,933	101,521	80,665	17,532	107,160
2011	2,792,669	13,515	234,008	34,750	17,898	92,588
2012	2,046,568	31,679	254,114	8,267	25,024	60,977
2013	2,113,779	24,574	202,649	8,967	31,436	52,290
2014	1,963,063	14,743	187,071	8,588	14,226	41,170
2015	1,768,424	10,245	179,961	9,877	1,856	46,059
2016	1,877,122	11,414	165,530	5,022	4,141	62,900
2017	1,690,181	9,262	126,979	20,965	4,450	54,441
2018	1,626,521	42,252	197,823	49,568	15,378	165,534
2019	1,259,226	69,454	133,565	26,940	40,971	140,686
2020	921,968	187,734	165,690	61,706	41,484	84,577

Mechanical Pulp Paper (Subset of Other Misc. Mixed Paper)

Table 17. Mechanical Pulp Paper Exported as Recyclable Materials from California in 2020, by Weight and Vessel Value

Tons Exported	Percent Change in Tons from 2019	Vessel Value (USD)	Percent Change in Vessel Value from 2019
1,130,005	-8%	\$207,126,952	-10%

Figure 30. Seaborne Recyclable Materials Exports of Mechanical Pulp Paper from California by Country of Import from 2010 to 2020, by Weight

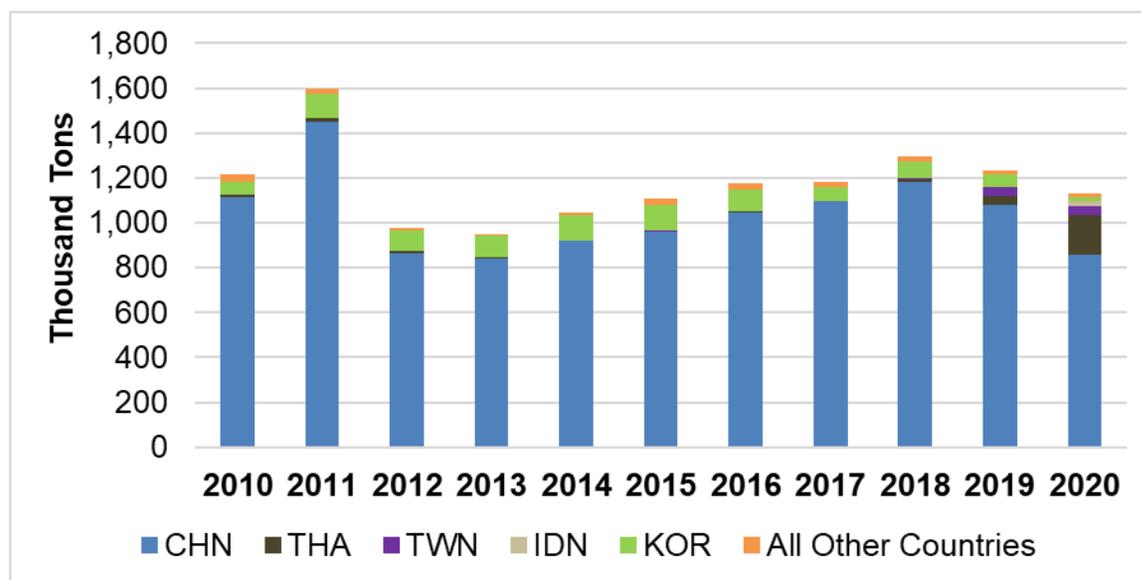


Figure 30 Data Table: Seaborne Recyclable Materials Exports of Mechanical Pulp Paper from California by Country of Import from 2010 to 20120, by Weight

This figure shows the amount of Mechanical Pulp Paper exported as a recyclable material from California to other countries, by weight (tons). The amount is broken out by country for the top five countries importing Mechanical Pulp Paper in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	China	Taiwan	Thailand	Indonesia	Korea, Republic Of	All Other Countries
2010	1,113,127	13,480	0	119	57,203	33,377
2011	1,452,206	11,563	691	0	109,530	21,711
2012	862,844	9,233	403	499	92,828	8,919
2013	842,232	4,190	243	0	94,341	9,187
2014	917,871	1,656	1,224	148	114,608	7,727
2015	961,672	1,326	702	61	114,592	29,664
2016	1,044,691	6,686	770	78	97,491	27,909
2017	1,094,381	116	334	115	66,015	20,648
2018	1,183,904	7,221	8,777	490	74,694	18,826
2019	1,080,624	39,366	40,345	1,190	55,114	13,934
2020	856,345	177,983	39,448	25,207	17,657	13,363

Chemical Pulp Paper (Subset of Other Misc. Mixed Paper)

Table 18. Chemical Pulp Paper Exported as Recyclable Materials from California in 2020, by Weight and Vessel Value

Tons Exported	Percent Change in Tons from 2019	Vessel Value (USD)	Percent Change in Vessel Value from 2019
57,992	-37%	\$13,224,051	-32%

Figure 31. Seaborne Recyclable Materials Exports of Chemical Pulp Paper from California by Country of Import from 2010 to 2020, by Weight

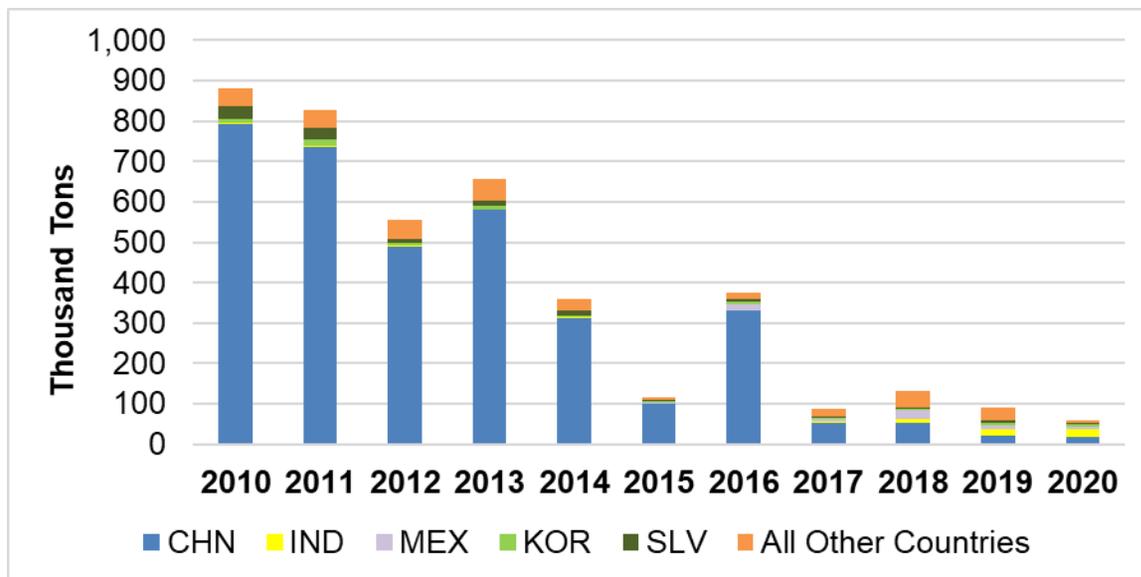


Figure 31 Data Table: Seaborne Recyclable Materials Exports of Chemical Pulp Paper from California by Country of Import from 2010 to 2020, by Weight

This figure shows the amount of Chemical Pulp Paper exported as a recyclable material from California to other countries, by weight (tons). The amount is broken out by country for the top five countries importing Chemical Pulp Paper in 2020. Material exported to all other countries is aggregated into “All Other Countries” category.

Year	China	India	Mexico	El Salvador	Korea, Republic Of	All Other Countries
2010	792,007	3,832	581	9,841	32,015	42,825
2011	735,381	4,241	0	15,909	27,262	46,090
2012	489,357	3,063	512	5,280	10,386	47,017
2013	579,709	1,239	572	10,250	11,738	51,655
2014	313,434	850	444	5,227	10,435	30,236
2015	98,890	1,502	2,073	3,389	5,350	6,083
2016	330,253	671	15,645	8,152	4,873	14,734
2017	54,026	2,169	5,433	3,009	4,652	17,172
2018	54,444	7,812	22,092	2,171	4,838	41,471
2019	21,038	16,191	10,045	4,714	6,736	32,680
2020	19,572	17,316	8,127	3,540	3,425	6,012

Appendix 3: Applicable Country Code Abbreviations

Table 19. Codes for Countries Included in the Report

Country Code	Country
AUS	Australia
BGD	Bangladesh
CHN	China
DEU	Germany
HKG	Hong Kong
IDN	Indonesia
IND	India
JPN	Japan
KOR	Korea, Republic Of
MEX	Mexico
MYS	Malaysia
SLV	El Salvador
THA	Thailand
TWN	Taiwan
VNM	Vietnam

Abbreviations and Acronyms

AB – Assembly Bill

ADC – Alternative Daily Cover

AIC – Alternative Intermediate Cover

CalRecycle – California Department of Resource Recycling and Recovery

CARE – Carpet America Recovery Effort

DARE – Data Analysis and Risk Evaluation

DRS – Disposal Reporting System

EPR – Extended Producer Responsibility

EMSW – Engineered Municipal Solid Waste

FY – Fiscal Year

GDP – Gross Domestic Product

GHG – Greenhouse Gas

HS – Harmonized System

LCC – Local Conservation Corps

MCR – Mandatory Commercial Recycling

MORe – Mandatory Commercial Organics Recycling

MRC – Mattress Recycling Council

MSW – Municipal Solid Waste

RDRS – Recycling and Disposal Reporting System

RMDZ - Recycling Market Development Zone

RPEB – Recycling Program Enforcement Branch

SB – Senate Bill

SCLP – Short-Lived Climate Pollutants

TDA – Tire-Derived Aggregate

TDP – Tire-Derived Product

TRP – Rubberized Pavement

Glossary of Terms

Alternative daily cover (ADC) and Alternative intermediate cover (AIC): The use of materials to cover disposed waste in a landfill cell at the end of the landfill operating day (daily cover) or at some other interval (intermediate cover) to control odors, fire, vectors, litter, and scavenging.

Biomass conversion: The process of using controlled combustion of specified types of organic materials (usually wood, lawn, or crop residue) to produce electricity.

Disposal Reporting System (DRS): The retired system used to track disposal information in California.

Landfill Disposal: Disposal of waste materials at a landfill, excluding materials disposed as part of disposal-related activities.

Disposal-Related Activities: A set of activities considered as part of overall disposal: alternative daily cover, alternative intermediate cover, other beneficial reuse at landfills (such as construction activities, landscaping, and erosion control), transformation, engineered municipal solid waste, and waste-tire derived fuel.

Landfill: A permitted facility that provides a legal site for final disposal of materials, including mixed solid waste, beneficial materials used for landfill construction, ADC, and specialized material sites such as waste tires and construction and demolition waste.

Municipal solid waste (MSW): Refuse that may be mixed with or contain nonorganic material, processed industrial materials, plastics, or other recyclables with the potential for recovery. It includes residential, commercial, and institutional wastes.

Other beneficial reuse: The use of a waste byproduct or other low-value material for a productive use, other than ADC/AIC, at a landfill within regulatory guidelines.

Per-capita disposal: A numeric indicator of reported disposal divided by the population (residents) specific to a county, region, or state.

Recyclable Materials Exports: Recyclable materials exported via seaborne container vessels from California ports

Recycling and Disposal Reporting System (RDRS): The new system used to track recycling and disposal information. For more information go to: [Recycling and Disposal Reporting System Information](#)

Transformation: The use of incineration, pyrolysis, distillation, or biological conversion to combust unprocessed or minimally processed solid waste to produce electricity. Transformation does not include gasification, composting, or biomass conversion.

Vessel Value: The value of exports at the U.S. seaport, airport, or border port of export, based on the transaction price, including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier at the U.S. port of exportation.

The value, as defined, excludes the cost of loading the merchandise and any charges or transportation costs beyond the port of exportation. Also known as the “free alongside ship value.

Waste tire-derived fuel: Waste tires used as fuel in a power plant or cement kiln.



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