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Asphalt Pavement Industry Survey on

Recycled Materials and Warm-Mix Asphalt Usage 2023

Information Series 138

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14th Annual Asphalt Pavement Industry Survey
IS 138
Produced April 2025

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
Information Series 138 (13th edition)		

4. Title and Subtitle	5. Report Date
Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage: 2023	April 2025
	6. Performing Organization Code

7. Author(s)	8. Performing Organization Report No.
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9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
National Asphalt Pavement Association 6406 Ivy Lane, Suite 350 Greenbelt, MD 20770-1441	**11. Contract or Grant No.** HIF180121PR

12. Sponsoring Organization Name and Address	13. Type of Report and Period Covered
Federal Highway Administration Office of Preconstruction, Construction, and Pavements 1200 New Jersey Ave. SE Washington, DC 20590	Final Report; January–December 2023
	14. Sponsoring Agency Code FHWA-HICP-40

15. Supplementary Notes

FHWA Agreement Officer's Representative: Timothy B. Aschenbrener, P.E.

16. Abstract

A shared goal of the Federal Highway Administration (FHWA) and the National Asphalt Pavement Association (NAPA) is to support and promote resource efficient practices, such as the use of recycled materials and warm-mix asphalt (WMA). The use of recycled materials, primarily reclaimed asphalt pavement (RAP) and reclaimed asphalt shingles (RAS), in asphalt pavements conserves raw materials and reduces overall asphalt mixture costs, as well as reduces the stream of material going into landfills.

WMA technologies have been introduced to reduce production and compaction temperatures for asphalt mixtures, which reduces the energy needed during mixture production. Additional benefits include improved low-temperature compaction of asphalt mixtures leading to improved pavement performance, as well as a longer paving season. WMA was chosen for accelerated deployment in federal-aid highway, state department of transportation, and local road projects as part of FHWA's 2010 Every Day Counts initiative.

The objective of this survey, first conducted for the 2009 and 2010 construction seasons, is to quantify recycled materials used and WMA produced annually by the asphalt pavement industry to document the deployment of these technologies to understand where they are being used and where they are underutilized. Results show significant growth in the use of RAP, RAS, and WMA technologies since 2009, although the rate of year-over-year growth has generally slowed since 2013.

The asphalt industry remains the country's most diligent recycler with more than 99 percent of reclaimed asphalt pavement being put back to use. The average percentage of RAP used in asphalt mixtures has increased from 15.6 percent in 2009 to 21.9 percent in 2023. In 2023, the estimated RAP tonnage used in asphalt mixtures was 96.1 million tons. This represents 4.8 million tons (26.4 million barrels) of asphalt binder conserved, along with the replacement of more than 91 million tons of virgin aggregate. The use of RAS in asphalt pavement mixtures has increased from 701,000 tons in 2009 to an estimated 797,000 tons in 2023 with the use of RAS increasing (18 percent) from 2022 to 2023.

The combined savings of asphalt binder and aggregate from using RAP and RAS in asphalt mixtures is estimated at $4.5 billion and more than 67 million cubic yards of landfill space.

More than 813,000 tons of other recycled materials were reported as being incorporated into about 5.8 million tons of asphalt pavement mixtures during the 2023 construction season, including recycled tire rubber, blast furnace slag, steel slag, and cellulose fibers.

The estimated total production of asphalt with WMA technologies during the 2023 construction season was 172.0 million tons of which about 46 percent was produced at reduced temperatures. This was a 1.7 percent decrease from the estimated 175.0 million tons of WMA in 2022. Utilization of WMA technologies in 2023 was 924 percent more than the estimated 16.8 million tons in the 2009 construction season.

Asphalt produced with WMA technology made up 39.1 percent of the total estimated asphalt mixture market in 2023. Chemical additive technologies, representing 68 percent of the market, is the most commonly used warm-mix technology; production plant foaming accounted for 30 percent of the market. Slight differences were seen in which WMA technologies were used when production temperatures were or were not reduced.

17. Key Words	18. Distribution Statement
reclaimed asphalt pavement, reclaimed asphalt shingles, warm-mix asphalt, recycled tire rubber, ground tire rubber, slag, fly ash, RAP, RAS, WMA, GTR, RTR, recycled materials, economics, engineering	No restrictions.

19. Security Classification (of this report)	20. Security Classification (of this page)	21. No. of Pages	22. Price
Unclassified.	Unclassified.	51	NA

Form DOT F 1700.7 (8-72) **Reproduction of completed page authorized**

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Suggested Citation:

Williams, B.A., & J.R. Willis (2025). *Annual Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage: 2023, 14th Annual Survey* (IS 138). National Asphalt Pavement Association, Greenbelt, Maryland. DOI: 10.13140/RG.2.2.31233.36960

List of Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
CCP	Coal Combustion Product
CCPR	Cold Central Plant Recycling
CIR	Cold In-Place Recycling
CRM	Crumb Rubber Modifier
DOT	Department of Transportation
FDR	Full-Depth Reclamation
FHWA	Federal Highway Administration
GTR	Ground Tire Rubber
HIR	Hot In-Place Recycling
HMA	Hot-Mix Asphalt
MWAS	Manufacturing Waste Asphalt Shingles
NAPA	National Asphalt Pavement Association
NCAT	National Center for Asphalt Technology
NCAUPG	North Central Asphalt User/Producer Group
NEAUPG	North East Asphalt User/Producer Group
NSA	National Slag Association
OGFC	Open-Graded Friction Course
PCAS	Post-Consumer Asphalt Shingles
PCCAS	Pacific Coast Conference on Asphalt Specifications
RAP	Reclaimed Asphalt Pavement
RAS	Reclaimed Asphalt Shingles
RBR	Recycled Binder Ratio
RMA	Rubber Manufacturers Association
RMAUPG	Rocky Mountain Asphalt User/Producer Group
RTR	Recycled Tire Rubber
SAPA	State Asphalt Pavement Association
SEAUPG	Southeastern Asphalt User/Producer Group
UPG	User/Producer Group
WMA	Warm-Mix Asphalt

Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage: 2023

Executive Summary

The results of the asphalt pavement industry survey for the 2023 construction season show that asphalt mixture producers have a strong record of employing resource efficient practices and continue to increase their use of recycled materials and warm-mix asphalt (WMA). The use of recycled materials, particularly reclaimed asphalt pavement (RAP) and reclaimed asphalt shingles (RAS), conserves raw materials and reduces overall asphalt mixture costs, allowing road owners to achieve more roadway maintenance and construction activities within limited budgets. WMA technologies can improve compaction at reduced temperatures, ensuring pavement performance and long life; conserve energy during production operations; and improve conditions for workers.

The objective of this survey, first conducted for the 2009 and 2010 construction seasons, was to quantify the use of recycled materials, primarily RAP and RAS, as well as the use of WMA technologies by the asphalt pavement industry. For the 2023 construction season, the National Asphalt Pavement Association (NAPA) conducted a voluntary survey of asphalt mixture producers across the United States on tons produced, along with a survey of state asphalt pavement associations (SAPAs) regarding total tons of asphalt pavement mixture produced in their state.

Asphalt mixture producers from 49 states, and the District of Columbia completed the 2023 construction season survey. A total of 201 companies and 1,079 production plants were represented in the survey. Comparing the 2023 results to the 2022 construction season, estimated total asphalt mixture production saw a 0.5 percent decrease from 441.9 million tons to 439.7 million tons.

A degree of fluctuation in year-to-year comparisons of data is influenced by which companies responded to the 2023 construction season survey versus prior year survey respondents. Respondents to the 2023 construction season survey decreased by 34 companies compared to 2022. Of the companies responding to the 2023 survey, 37 did not respond to the 2022 construction season survey.

The following are highlights of the survey of usage during the 2023 construction season:

Reclaimed Asphalt Pavement

- Asphalt mixture producers remain the country's most diligent recyclers, with more than 89 percent of asphalt mixture reclaimed from old asphalt pavements being put back to use in new asphalt pavements and the remaining 11 percent being used in other civil engineering applications, such as unbound aggregate bases.
- The total estimated tons of RAP used in asphalt mixtures was 96.1 million tons in 2023. This represents a 71.6 percent increase from the total estimated tons of RAP used in 2009. Since 2009, total asphalt mixture tonnage has increased by only 22.7 percent.
- The percentage of producers reporting use of RAP was 99.5 percent of respondents, which was slightly down from 100 percent in 2021 and 2022. Two producers reported landfilling a minor amount (62,000 tons, or 0.2 percent) of RAP during 2023.
- RAP usage during the 2023 construction season is estimated to have reduced the need for 4.8 million tons (26.4 million barrels) of asphalt binder and more than 91 million tons of aggregate with a total estimated value of $4.5 billion.
- The total estimated amount of RAP stockpiled nationwide at the end of the 2023 construction season was about 171 million tons.

- Fractionated RAP represents about 21 percent of RAP use nationwide, and the tons of RAP mixtures produced using softer binders are estimated at 16 percent while tons produced using recycling agents is estimated at 5 percent.
- Reclaiming 111 million tons of RAP for future use saved about 67.3 million cubic yards of landfill space, and more than $5.4 billion in gate fees for disposal in landfills.

Reclaimed Asphalt Shingles

- The total estimated tons of RAS used in asphalt mixtures increased 18 percent to an estimated 797,000 tons in 2023. The increase in the use of RAS reported during the 2023 construction season still leaves utilization at about 59 percent below the 2014 peak level of reported usage.
- The total estimated amount of RAS stockpiled nationwide at the end of the 2023 construction season was about 1.18 million tons, a 17 percent decrease from 2022.
- RAS usage during the 2023 construction season is estimated to have reduced the need for 159,000 tons (more than 870,000 barrels) of asphalt binder and about 398,000 tons of aggregate with a total estimated value of more than $109 million.
- Reclaiming 839,000 tons of unprocessed RAS for future use saved about 510,000 cubic yards of landfill space, and more than $47 million in gate fees for disposal in landfills.

Other Findings

- The use of softer binders and recycling agents with mixtures incorporating RAP and RAS was reported nationwide. There was little correlation between the level of RAP and RAS used and the use of softer binders and/or recycling agents.
- Other recycled materials commonly reported as being used in asphalt mixtures during the 2023 construction season were recycled tire rubber, blast furnace slag, steel slag, cellulose fibers, and fly ash.
- More than 813,000 tons of other recycled materials were reported as being used in 5.8 million tons of asphalt mixtures by 64 companies in 21 states during the 2023 construction season.

Warm-Mix Asphalt Technologies

- The estimated total tonnage of asphalt pavement mixtures produced with WMA technologies for the 2023 construction season was 172.0 million tons. This was a 1.7 percent decrease from the estimated 175.0 million tons of WMA in 2022, led by decreased WMA tonnage in the Other Agency and Commercial & Residential sectors.
- Mixtures produced with WMA technologies made up 39.1 percent of the total estimated asphalt mixture market in 2023. About 45.8 percent (78.8 million tons) of these mixtures were produced with a temperature reduction of at least 10°F.
- Production plant foaming, representing nearly 30 percent of the market in 2023, a decrease from their use (about 68.2 percent) in the 2011 construction season.
- Chemical additive technologies accounted for 68 percent of the market in 2023, an increase from their use (6 percent) in the 2022 construction season.
- About 56 percent of survey respondents produce asphalt with WMA technologies; 113 producers in 45 states reported using WMA technologies.

Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage: 2023

Background

A shared goal of the Federal Highway Administration (FHWA) and the National Asphalt Pavement Association (NAPA) is to support and promote resource efficient practices, such as incorporation of recycled materials in pavement mixtures and the use of warm-mix asphalt (WMA) technologies. Reclaimed asphalt pavement (RAP) is recycled at a greater rate than any other material in the United States and helps lower overall material costs, allowing road owners to achieve more roadway maintenance and construction activities within limited budgets. Another recycled material used in asphalt mixtures is reclaimed asphalt shingles (RAS) from both manufacturing waste (MWAS) and post-consumer asphalt shingles (PCAS). The use of RAP and RAS in asphalt pavements can reduce the amount of new asphalt binder and aggregates required in mixtures, which can help stabilize the price of asphalt mixtures and save natural resources. Other recycled materials commonly incorporated into asphalt pavements include recycled tire rubber (RTR), steel and blast furnace slags, and cellulose fibers. By putting waste materials and byproducts to a practical use, the asphalt pavement industry helps reduce the amount of material going to landfills while improving the resource efficiency of asphalt mixtures.

WMA technologies reduce the mixing and compaction temperatures for asphalt mixtures. Environmental benefits include reductions in both fuel consumption and airborne impacts. Construction benefits include the ability to extend the paving season into the cooler months, haul material longer distances, improve compaction at lower temperatures, and use higher percentages of RAP (Prowell et al., 2012; West et al., 2014). As part of FHWA's original group of Every Day Counts initiatives, WMA was chosen in 2010 for accelerated deployment in federal-aid highway, state department of transportation (DOT), and local road projects (FHWA, 2013). In 2013, WMA was honored with the Construction Innovation Forum's NOVA Award for its engineering, economic, and environmental benefits (CIF, 2013).

FHWA works closely with the pavement industry through associations and other stakeholders to promote pavement recycling technologies and WMA. From 2007 to 2011, the American Association of State Highway and Transportation Officials (AASHTO) conducted a biennial survey of state DOT use of recycled materials (Copeland et al., 2010; Copeland, 2011; Pappas, 2011) and results were presented at FHWA Expert Task Group meetings. FHWA partners with NAPA to document industry use of RAP, RAS, other recycled materials, as well as WMA technologies used by asphalt mixture producers. These efforts have established a baseline for RAP, RAS, and WMA usage, and have tracked the growth in use of these resource efficient practices by the road construction industry since 2009.

FHWA first partnered with NAPA to capture annual RAP, RAS, and WMA use for the 2009 construction season (Hansen & Newcomb, 2011; Hansen & Copeland, 2013a; 2013b; 2014; 2015; 2017; Hansen et al., 2017; Williams et al., 2018; 2019; 2020, 2021, 2022, 2024). Compared to the findings of the first survey (Hansen & Newcomb, 2011), asphalt mixture producers have shown significant growth in the use of these technologies, although the year-over-year rate of growth has slowed since the 2013 construction season. Since 2012, the survey has also asked about other recycled materials used in asphalt mixtures. Prior-year versions of this report are available at *https://www.asphaltpavement.org/expertise/sustainability/sustainability-resources/recycling*.

This report documents the results of the industry survey for the 2023 construction season, including the results, trends, and changes from 2009 through 2023. The survey methodology and survey instrument are included in Appendix A, and state-level data are included in Appendix B.

Objective and Scope

The objective of this effort is to quantify the use of recycled materials and WMA technologies by the asphalt pavement industry. From January to December 2024, NAPA fielded a voluntary survey of asphalt mixture producers in the United States on tons produced, along with a survey of state asphalt pavement associations (SAPAs) regarding total tons of asphalt pavement mixture produced in their state during the 2023 construction season. While keeping specific producer data confidential, NAPA staff compiled the amount of asphalt mixtures produced; the amount of RAP, RAS, and other recycled material used; and the amount of WMA produced in the United States. A separate survey was conducted in parallel to document the use of in-place asphalt pavement recycling techniques, which include full-depth reclamation (FDR), cold in-place recycling (CIR), hot in-place recycling (HIR), and cold central plant recycling (CCPR).

Survey Methodology

The survey methodology used to collect and analyze the data in this report is detailed in Appendix A. Note that when reporting data at the state level, to keep specific producer information confidential, no state-specific results are provided in the tables or appendixes if fewer than three producers from that state responded to the survey. Information from states with fewer than three responding companies is included in the estimated national values, however.

Producer Survey Results

Asphalt mixture producers from 49 states, and the District of Columbia completed the survey for the 2023 construction season. A total of 201 companies and a total of 1,079 production plants are represented in the 2023 survey. The reported total asphalt mixture tons for 2023 was 439.7 million tons, and the average tons produced per plant decreased from 2023 levels to be in line with the 2022 average.

A degree of fluctuation in year-to-year comparisons of data is influenced by which companies responded to the 2023 construction season survey versus prior-year survey respondents.

In the 2023 construction season survey, there was a 17 percent decrease in the total number of responding companies and a 21 percent decrease in the number of plants. Additionally, 18 percent of companies and 12 percent of plants that responded in 2023 did not participate in the 2022 survey. About 5.0 percent of responding companies, representing about 1.3 percent of the total reported tonnage, were not NAPA members.

Table 1 summarizes the number of asphalt mixture production companies and the number of production plants reporting for each state. Branches, subsidiaries, and operating units are counted as unique companies in Table 1 and throughout this report.

Table 1: Number of Companies Completing 2023 Construction Season Survey in Each State/Territory

State	Cos.	Prod. Plants	State	Cos.	Prod. Plants	State	Cos.	Prod. Plants
Alabama	3	35	Kentucky	5	31	Ohio	8	66
Alaska	*	*	Louisiana	4	11	Oklahoma	6	19
American Samoa	NCR	NCR	Maine	3	18	Oregon	3	13
Arizona	4	19	Maryland	5	12	Pennsylvania	6	25
Arkansas	6	20	Massachusetts	3	9	Puerto Rico	NCR	NCR
California	4	31	Michigan	8	49	Rhode Island	*	*
Colorado	3	11	Minnesota	3	17	South Carolina	6	16
Connecticut	*	*	Mississippi	3	24	South Dakota	NCR	NCR
Delaware	*	*	Missouri	3	17	Tennessee	6	21
District of Columbia	*	*	Montana	*	*	Texas	5	65
Florida	6	42	Nebraska	*	*	U.S. Virgin Islands	NCR	NCR
Georgia	3	12	Nevada	*	*	Utah	7	16
Guam	NCR	NCR	New Hampshire	*	*	Vermont	*	*
Hawaii	*	*	New Jersey	3	16	Virginia	6	31
Idaho	6	24	New Mexico	*	*	Washington	6	36
Illinois	11	35	New York	6	31	West Virginia	3	15
Indiana	8	48	North Carolina	11	75	Wisconsin	3	69
Iowa	6	19	North Dakota	*	*	Wyoming	*	*
Kansas	*	*	No. Mariana Islands	NCR	NCR	**Total†**	201	1079

NCR = No Companies Responding
* = Fewer than 3 Companies Reporting
† = Total includes companies/production plants from states with fewer than 3 companies reporting

Table 2 summarizes the total number of companies and production plants responding in previous years, as well as the average tons of asphalt pavement mixture produced by each plant.

Table 2: Summary of Jurisdictions (States or Territories), Companies, and Production Plants Responding, 2009–2023

Year	No. Jurisdictions Reporting	No. of Companies Reporting	No. of Production Plants Represented in Survey	Average Tons Produced per Plant
2009	48	196	1,027	121,000
2010	48	196	1,027	117,000
2011	49	203	1,091	121,000
2012	49	213	1,141	122,000
2013	52	249	1,281	115,000
2014	50	228	1,185	127,000
2015	49	214	1,119	137,000
2016	50	229	1,146	136,000
2017	52	237	1,146	141,000
2018	52	272	1,328	143,000
2019	50	212	1,101	147,000
2020	51	274	1,406	138,000
2021	51	261	1,388	143,000
2022	51	235	1,305	147,000
2023	50	201	1,079	143,000

Table 3 includes state-by-state 2023 construction season total estimated asphalt mixture tonnage, as estimated by the SAPA or from Equation A1 (see Survey Methodology in Appendix A); tonnage reported by survey respondents; and the percentage of reported tons included in estimated tons. The closer a state's percentage is to 100 percent indicates the completeness of reported tonnage compared to estimated tonnage. At the national level, survey responses make up 35 percent of the estimated total tons for the 2023 construction season.

Table 3: Summary of 2023 Estimated and Reported Asphalt Mixture Tons in Each State

State	Tons, Millions		Reported % of Estimated	State	Tons, Millions		Reported % of Estimated
	Estimated	**Reported**			**Estimated**	**Reported**	
Alabama	7.0	3.7	53%	**Montana**	4.3	*	*
Alaska	5.5	*	*	**Nebraska**	2.9	*	*
American Samoa	0.02	NCR	NCR	**Nevada**	3.6	*	*
Arizona	8.2	4.4	53%	**New Hampshire**	1.2	*	*
Arkansas	5.9	2.5	42%	**New Jersey**	12.0	3.3	27%
California	26.6	4.3	16%	**New Mexico**	3.8	*	*
Colorado	9.4	1.0	11%	**New York**	19.0	3.2	17%
Connecticut	5.2	*	*	**North Carolina**	12.3	8.8	72%
Delaware	1.3	*	*	**North Dakota**	2.6	*	*
District of Columbia	1.1	*	*	**No. Mariana Isl.**	0.02	NCR	NCR
Florida	19.0	9.4	49%	**Ohio**	18.0	8.6	48%
Georgia	15.4	0.9	6%	**Oklahoma**	5.1	2.4	47%
Guam	0.1	NCR	NCR	**Oregon**	5.1	1.8	35%
Hawaii	1.2	*	*	**Pennsylvania**	21.5	3.5	16%
Idaho	2.8	2.2	80%	**Puerto Rico**	1.2	NCR	NCR
Illinois	15.2	3.9	25%	**Rhode Island**	1.9	*	*
Indiana	14.0	9.0	64%	**South Carolina**	7.9	3.7	47%
Iowa	5.5	2.5	45%	**South Dakota**	2.6	NCR	NCR
Kansas	3.4	*	*	**Tennessee**	9.9	2.0	21%
Kentucky	7.0	3.7	53%	**Texas**	48.5	8.3	17%
Louisiana	8.3	2.0	24%	**U.S. Virgin Isl.**	0.1	NCR	NCR
Maine	2.2	2.1	97%	**Utah**	3.6	2.9	82%
Maryland	6.6	2.5	38%	**Vermont**	1.6	*	*
Massachusetts	6.4	1.8	28%	**Virginia**	12.5	5.2	41%
Michigan	15.1	10.9	72%	**Washington**	6.0	3.5	59%
Minnesota	9.3	2.8	30%	**West Virginia**	4.8	2.0	42%
Mississippi	5.4	3.3	61%	**Wisconsin**	10.3	9.7	94%
Missouri	8.0	2.8	35%	**Wyoming**	2.4	*	*
				Total	439.9	153.0 †	35%

NCR No Companies Responding

***** Fewer than 3 Companies Reporting

† Total Reported Tons includes values from state with fewer than 3 Companies Reporting

SAPA Estimated Tons

Numbers do not add up exactly due to rounding

Figure 1 shows the number of production plants, as well as the average tons produced per production plant, separated by User/Producer Group (UPG) region. The number of production plants responding from each UPG region decreased from 2022 to 2023 apart from the Rocky Mountains Asphalt User/Producer Group (RMAUPG) and Pacific Coast Conference on Asphalt Specification (PCCAS) region increasing by 1 facility. The Rocky Mountains Asphalt User/Producer Group (RMAUPG) and Pacific Coast Conference on Asphalt Specification (PCCAS) region and North Central Asphalt User/Producer Group (NCAUPG) saw a decrease in tonnage produced per plant during the 2023 construction season while the North East Asphalt User/Producer Group (NEAUPG) was unchanged in 2023 and South East Asphalt User/Producer Group (SEAUPG) had an increase in tonnage produced per plant.

NEAUPG

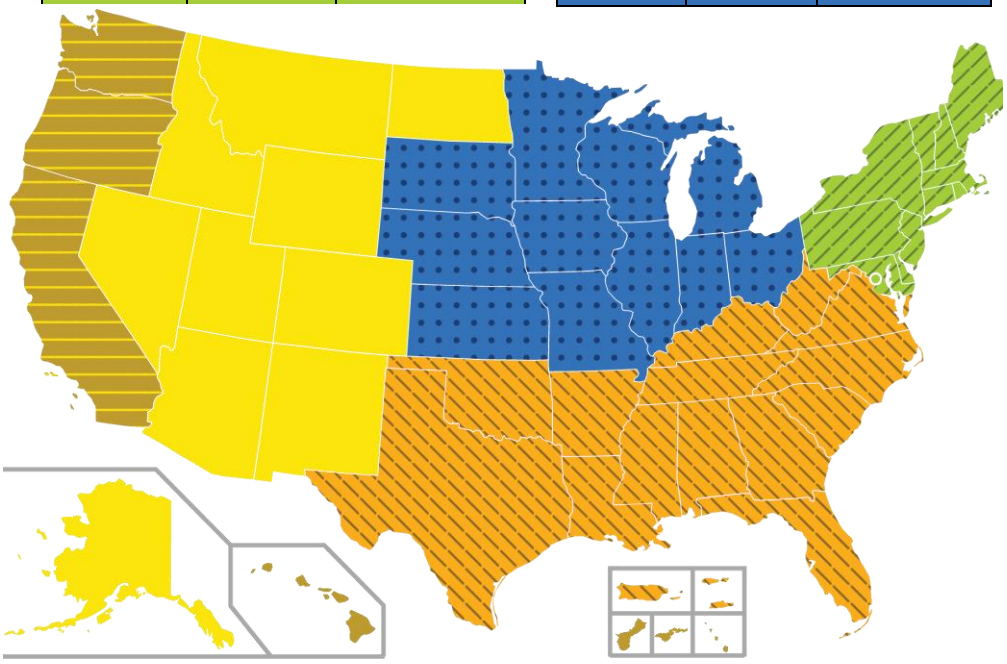
Year	Plants	Tons/Plant
2009	232	123,000
2010	232	122,000
2011	195	115,000
2012	252	119,000
2013	258	111,000
2014	193	122,000
2015	207	137,000
2016	218	136,000
2017	239	142,000
2018	247	144,000
2019	186	138,000
2020	237	132,000
2021	202	135,000
2022	212	142,000
2023	148	142,000

NCAUPG

Year	Plants	Tons/Plant
2009	239	106,000
2010	239	106,000
2011	311	114,000
2012	298	116,000
2013	377	123,000
2014	374	136,000
2015	324	152,000
2016	313	136,000
2017	337	153,000
2018	373	153,000
2019	295	152,000
2020	422	147,000
2021	405	158,000
2022	381	162,000
2023	335	155,000

SEAUPG

Year	Plants	Tons/Plant
2009	348	106,000
2010	348	106,000
2011	406	114,000
2012	430	116,000
2013	434	113,000
2014	416	125,000
2015	402	129,000
2016	401	140,000
2017	386	134,000
2018	502	135,000
2019	415	146,000
2020	481	134,000
2021	579	132,000
2022	534	138,000
2023	417	139,000



RMAUPG **PCCAS**

Year	Plants	Tons/Plant
2009	208	118,000
2010	208	112,000
2011	179	124,000
2012	161	113,000
2013	212	110,000
2014	202	122,000
2015	186	123,000
2016	214	128,000
2017	184	134,000
2018	206	157,000
2019	205	146,000
2020	266	142,000
2021	202	151,000
2022	178	148,000
2023	179	128,000

Figure 1: Number of Production Plants Responding to Survey by User/Producer Group Region and Estimated Tonnage Per Plant, 2009–2023

Data Summary and National Estimates

Table 4: Summary of RAP, RAS, WMA Data

NATIONAL SUMMARY					
Material	**Sectors**	**Reported Values**		**Estimated Values**	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	191.9	153.9	441.9	439.7
	DOT	74.0	64.2	170.5	183.3
	Other Agency	53.5	42.0	123.2	120.1
	Commercial & Residential	64.3	47.7	148.2	136.3
	No. of Companies Reporting	235	201		
RAP (Tons, Millions)	Accepted	50.7	39.1	112.6	111.0
	Used in HMA/WMA Mixtures	44.4	35.3	98.1	96.1
	Used as Aggregate	2.0	1.1	5.8	11.0
	Used in Cold-Mix Asphalt	0.1	0.1	0.1	0.1
	Used in Other	0.3	0.1	0.8	0.7
	Landfilled	0.1	0.1	0.2	0.2
	Total Tons of RAP Stockpiled at Year-End	63.12	51.10	154.6	171.8
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	20.9%	20.6%		
	Average % for Other Agency Mixtures[1]	20.7%	20.9%		
	Average % for Commercial & Residential Mixtures[1]	25.0%	24.7%		
	National Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			22.2%	21.9%
RAP	No. of Companies Reporting Using RAP	235	200		
RAS (Tons, Thousands)	Unprocessed PCAS Shingles Accepted	210	244	483	698
	Unprocessed MWAS Shingles Accepted	69	49	158	141
	Processed Shingles Accepted	154	186	356	532
	Used in HMA/WMA Mixtures	292	279	673	797
	Used as Aggregate	0	70	0	200
	Used in Cold-Mix Asphalt	0	0	0	0
	Used in Other	0	21	0	61
	Landfilled	0	0	0	0
	Total Tons of RAS Stockpiled at Year-End	621	414	1,430	1,182
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.169%	0.184%		
	Average % for Other Agency Mixtures[1]	0.129%	0.166%		
	Average % for Commercial & Residential Mixtures[1]	0.170%	0.220%		
	National Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.152%	0.181%
RAS	No. of Companies Reporting Using RAS	50	48		
WMA Technologies	Total Tons Produced With WMA Technology at Reduced Temperature			103.9	78.8
	Total Tons Produced With WMA Technology at HMA Temperatures			71.1	93.2
	DOT	46.6%	44.9%	79.4	82.4
	Other Agency	40.7%	39.3%	50.2	47.1
	Commercial & Residential	30.7%	31.2%	45.5	42.5
	No. of Companies Reporting Using WMA Technologies	144	113		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.
[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

Table 4 summarizes the RAP, RAS, and WMA data from the 2023 construction season survey alongside data from the 2022 construction season survey (Williams et al., 2023) for comparison. The information requested in the survey is summarized in Appendix A. In the column labeled "Reported Values" are national summaries of the values from asphalt mixture producers completing the survey. The column labeled "Estimated Values" for the category labeled "Tons of HMA/WMA Produced" was determined as outlined in the Survey Methodology section of Appendix A.

For the amount of RAP accepted, asphalt mixture producers were asked “How many tons of removed asphalt pavement and asphalt millings were accepted/delivered to your facilities in the state in 2023?” For the amount of RAS accepted, producers were asked “How many tons of shingles were accepted/delivered to your facilities in the state in 2023?” Producers were asked to report tons of unprocessed PCAS and unprocessed MWAS accepted/delivered, as well as tons of processed RAS acquired from shingle processors. These data are reported in Table 4 as the tonnage of material accepted. Producers were also asked for the tonnage of RAP and RAS used in the production of asphalt pavement mixtures, cold-mix asphalt, as aggregate, or for other purposes, such as in a chip seal. The tons of reclaimed material sent to landfills were also requested, along with the tons of material stockpiled at year-end.

For each state, the tons of RAS and RAP reported as accepted and used were multiplied by the ratio of total estimated production to total reported production, and these values were summed to arrive at the national estimated tons for these materials, which is reported in the “Estimated Values” column of Table 4.

To understand the average percentage of recycled material used in mixtures, producers were asked to report the percent of RAP or RAS averaged across all asphalt mixtures produced for each sector (DOT, Other Agency, Commercial & Residential). If precise data were not available, respondents were asked to provide their best estimate. These responses are reported in the “Average % Used in Mixtures” section of Table 4 for RAP and RAS. A “National Average All Mixtures Based on Tons Used in HMA/WMA” was calculated and reported in Table 4 for both RAP and RAS based on reported tonnage of each material used in HMA/WMA mixtures divided by the total reported tons produced. Producers were not asked about allowable RAP or RAS limits or binder replacement requirements, which can influence demand for mixtures that incorporate these materials.

Producers were asked to give their best estimate of the percentage of tons of asphalt paving mixture produced for each sector using WMA technologies with a temperature reduction of at least 10°F. A separate question was asked about the percentage of tons of asphalt paving mixture produced for each sector with WMA technologies but without reducing production temperatures. These percentages were multiplied by the total mixture production for each sector to determine the total estimated tons of asphalt mixture produced using WMA technologies for each sector.

Total Asphalt Mixture Production

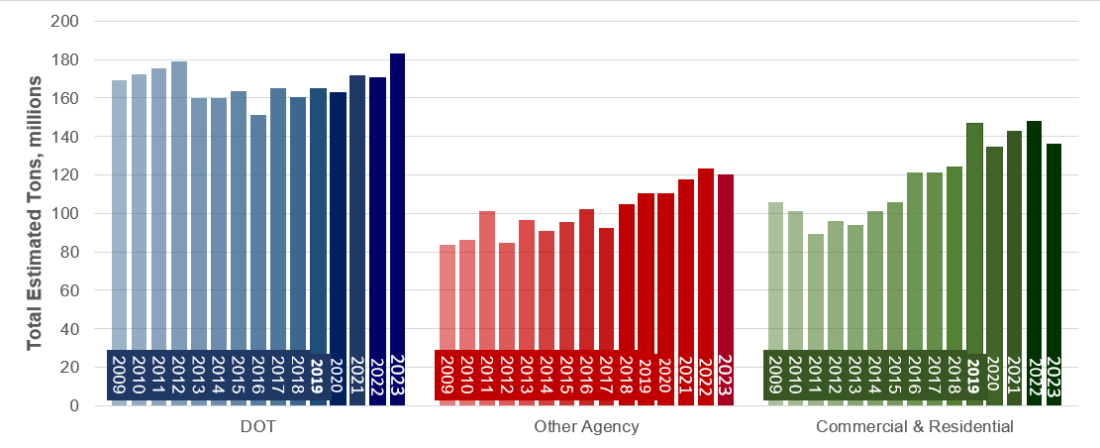


Figure 2a: Estimated Total Asphalt Mixture Production by Sector, 2009–2023

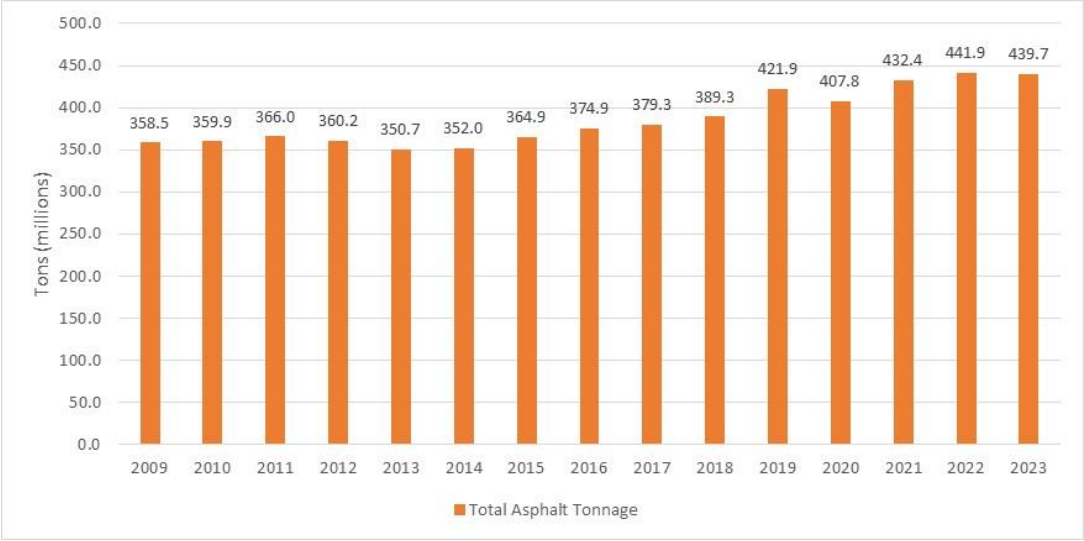


Figure 2b: Estimated Total Asphalt Mixture Production in Total, 2009–2023

Table 4 includes the national summary of asphalt mixture production data from the 2022 and 2023 construction season surveys. The information requested in the survey is detailed in Appendix A and summarized in Table A1, Section 2. State-level data are reported in Appendix B.

From 2022 to 2023, the estimated total amount of asphalt mixture produced in the United States decreased from 441.9 million tons to 439.7 million tons, a decrease of 0.5 percent.

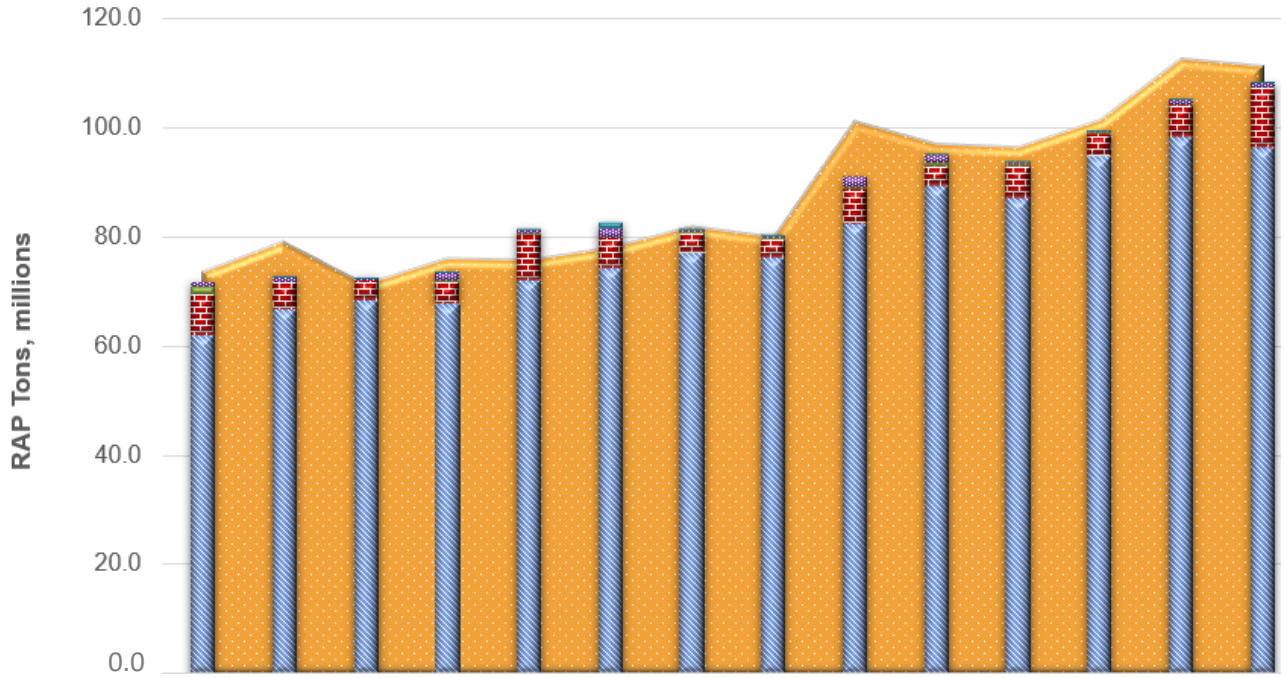
Asphalt pavement mixture producers' customers can be divided into two broad sectors: the private sector (Commercial & Residential) and the public sector (DOT or Other Agency). The "Other Agency" sector includes asphalt pavement mixtures produced for public works agencies; toll authorities; and city, county, and tribal transportation agencies, as well as the U.S. military and federal agencies, such as the Federal Aviation Administration, National Park Service, and U.S. Forest Service.

As seen in Figure 2, increases and decreases in total tonnage production estimates by sector have varied from year to year. Compared to the 2022 construction season, 2023 asphalt mixture tonnage produced for the DOT sector increased 7.5 percent, mixture production for the Other Agency sector decreased by 2.5 percent, and the Commercial and Residential sector decreased 8.0 percent from 2022 to 2023.

Reclaimed Asphalt Pavement

Table 4 includes the national summary of RAP data from the 2022 and 2023 construction season surveys. The information requested in the survey is detailed in Appendix A and summarized in Table A1, Section 2. State-level data is reported in Appendix B. Figure 3 is a visual representation of the estimated total tons of RAP used in asphalt mixtures, aggregate, cold-mix asphalt, and other uses, as well as the amount landfilled, from the 2009 to 2023 construction season surveys. The overwhelming majority of RAP is used in hot-mix asphalt (HMA) or warm-mix asphalt (WMA) mixtures, which is the most optimal use of RAP.

From the 2022 to 2023 construction season, the amount of RAP used in HMA/WMA decreased from 98.1 million to 96.1 million tons. The average percent RAP used in asphalt mixtures decreased to 21.9 percent in 2023 from 22.2% percent in 2022. For 2023, 99.5 percent of companies responding to the survey reported using RAP. This was slightly down from the 100 percent of companies reporting using RAP in 2022 and 2021.



RAP	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Accepted	73.5	79.1	71.3	76.1	75.8	78.0	81.8	79.9	101.1	97.0	96.3	101.3	112.6	111.0
Landfilled	0.0	0.3	0.2	0.1	0.2	1.0	0.1	0.0	0.0	0.1	0.2	0.1	0.2	0.2
Used in Other	0.8	0.7	0.2	1.5	0.6	1.6	0.4	0.2	2.0	1.4	0.3	0.2	0.8	0.7
Used in Cold Mix	1.6	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.1	0.1	0.1
Used in Aggregate	7.3	4.9	3.6	4.0	8.5	5.5	3.7	3.4	6.4	3.8	5.8	4.2	5.8	11.0
Used in HMA/WMA	62.1	66.7	68.3	67.8	71.9	74.2	76.9	76.2	82.2	89.2	87.0	94.6	98.1	96.1

Figure 3: Comparison of Tons of RAP Accepted and Tons of RAP Used or Landfilled (Million Tons), 2010–2023

Placement of RAP in construction and demolition landfills is rare. Since the beginning of the survey in 2009, the average amount of RAP landfilled is less than 172,000 tons per year. In 2023, 191,528 tons, less than 0.2 percent, of RAP was landfilled. The amount of RAP accepted during the 2023 construction season saved about 67.3 million cubic yards of landfill space.

RAP Use by Sector

Figure 4 shows the total estimated tons of RAP used in each sector. These values were calculated using the average percentages of RAP reported by producers for each sector and adjusted to account for differences between reported RAP tonnage and tons calculated from the percentage by sector.

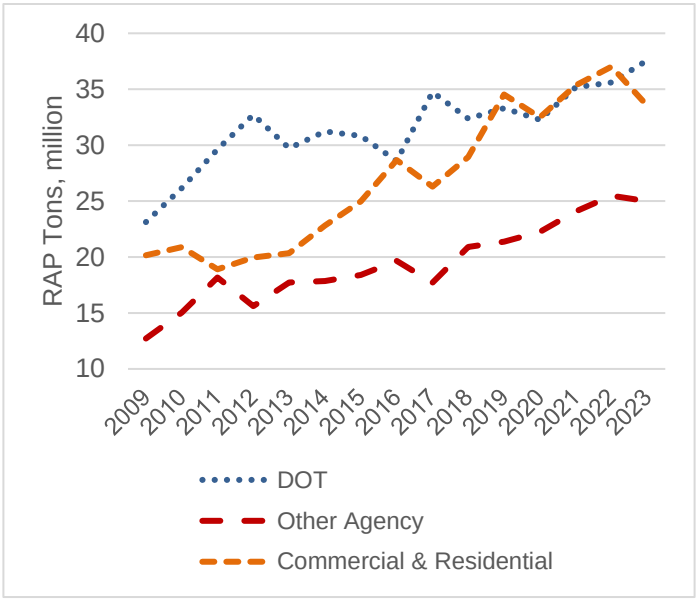


Figure 4: RAP Use by Sector (Million Tons)

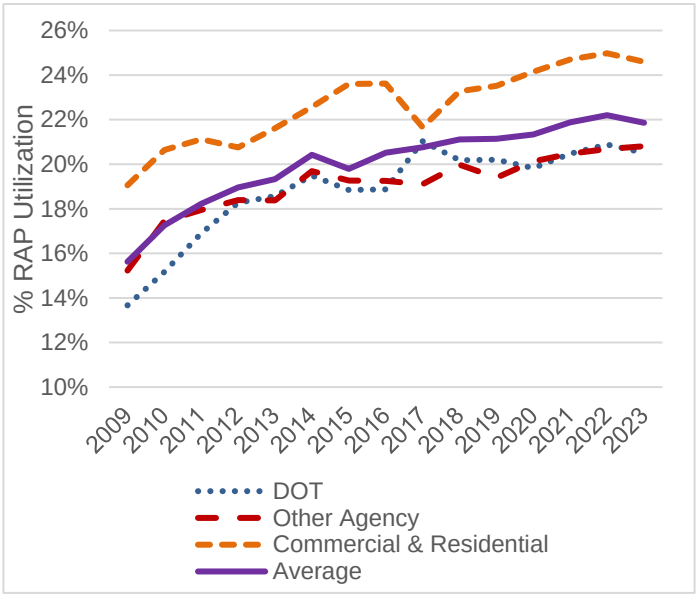


Figure 5: Average Percent RAP Used by Sector

Figure 5 shows the average percentage of RAP used by each sector and overall across all asphalt pavement mixtures. In 2023, the average percent RAP used by all sectors was 21.9 percent. Previously, the average percent RAP had seen steady growth from 2009 to 2014 before plateauing around 20 percent through 2017. The percent of RAP used in each sector during 2023 remained steady with the utilization percentages from 2020 to 2022.

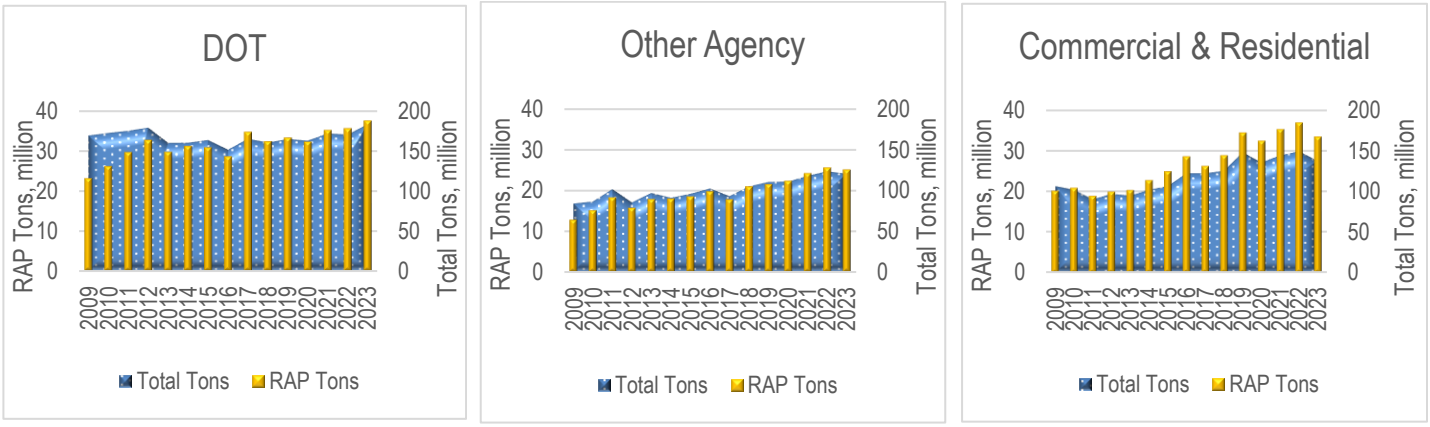


Figure 6: RAP Tons and Total Mixture Tons Comparison (Million Tons)

Since the 2012 construction season, the tonnage of RAP used by each sector has generally moved up or down with the total tonnage used by the sector, which is shown in Figure 6. For the 2023 construction season, the tons of RAP used increased in the DOT sector and decreased in the Other Agency and Commercial and Residential sectors. The changes in RAP tonnage were in line with changes in mix tonnages for each sector, and the DOT and Commercial and Residential sectors had slight decreases in their percent utilization, which resulted in the national average percentage of RAP used decreasing from 22.2 percent in 2022 to 21.9 percent 2023 season.

RAP Use in Each State

Table 5 and Figure 7 show the average percentage of RAP used in HMA/WMA mixtures in each state by construction season based on reported RAP tons used in HMA/WMA mixtures and total reported tonnage. It should be noted that the accuracy of data for individual states varies depending on the number of responses received from producers in each state and the total number of tons accounted for in the responses.

Figure 8 revisualizes Table 5 data, showing the number of states with producers reporting average RAP percentages used at the various ranges by construction season from 2009 to 2023. The number of states with producers reporting average RAP percentages 20 percent or greater has increased significantly, rising from 10 states in 2009 to 27 states in 2014; 29 states in 2016, decreasing to 24 states in 2017, 30 states in 2018, and peaking at 31 states in 2019, falling back to 26 states in 2020, reaching 32 states in 2021, falling to 31 states in 2022, and then peaking at 34 states in 2023. The number of states with producers reporting RAP percentages less than 15 percent has decreased from 23 states in 2009 to just two states in 2014 and then remained relatively steady at 10 or 11 states in 2015 through 2017, before dropping to six states in 2018, five states in 2019, slightly increasing to seven states in 2020, returning to 5 states in 2021, 6 states in 2022, and then 7 states in 2023.

Table 5: Average Estimated Percentage of RAP Used in Each State, 2019–2023

State	Average RAP Percent					State	Average RAP Percent				
	2019	2020	2021	2022	2023		2019	2020	2021	2022	2023
Alabama	25%	24%	26%	25%	22%	Montana	*	*	*	*	*
Alaska	*	*	*	*	*	Nebraska	*	20%	*	*	*
American Samoa	*	NCR	NCR	NCR	NCR	Nevada	*	17%	19%	*	*
Arizona	9%	7%	4%	*	8%	New Hampshire	*	17%	22%	*	*
Arkansas	13%	14%	11%	15%	14%	New Jersey	20%	17%	20%	21%	21%
California	16%	15%	17%	17%	22%	New Mexico	*	*	*	*	
Colorado	20%	19%	22%	19%	20%	New York	17%	18%	14%	20%	23%
Connecticut	21%	*	*	*	*	North Carolina	24%	31%	31%	24%	30%
Delaware	NCR	*	*	*	*	North Dakota	*	*	*	*	*
Dist. of Columbia	*	*	*	*	*	No. Mariana Isl.	NCR	NCR	NCR	NCR	NCR
Florida	31%	34%	32%	34%	29%	Ohio	32%	28%	27%	28%	27%
Georgia	*	28%	31%	30%	19%	Oklahoma	19%	19%	19%	17%	21%
Guam	NCR	NCR	NCR	NCR	NCR	Oregon	26%	27%	29%	26%	27%
Hawaii	19%	*	18%	*	*	Pennsylvania	13%	20%	21%	19%	20%
Idaho	24%	26%	26%	33%	23%	Puerto Rico	NCR	NCR	NCR	NCR	NCR
Illinois	23%	26%	28%	29%	28%	Rhode Island	*	*	*	*	*
Indiana	21%	24%	23%	24%	24%	South Carolina	22%	21%	27%	24%	24%
Iowa	19%	17%	17%	18%	20%	South Dakota	NCR	*	*	*	NCR
Kansas	*	26%	25%	26%	*	Tennessee	24%	19%	20%	22%	20%
Kentucky	16%	18%	17%	18%	22%	Texas	16%	19%	18%	20%	18%
Louisiana	22%	17%	21%	*	21%	U.S. Virgin Islands	NCR	NCR	NCR	NCR	NCR
Maine	*	17%	18%	18%	19%	Utah	28%	26%	29%	23%	18%
Maryland	30%	28%	28%	29%	30%	Vermont	*	*	*	*	*
Massachusetts	16%	15%	18%	17%	21%	Virginia	28%	31%	31%	29%	30%
Michigan	29%	26%	27%	28%	23%	Washington	23%	24%	23%	23%	27%
Minnesota	24%	24%	22%	23%	22%	West Virginia	18%	17%	16%	14%	17%
Mississippi	23%	20%	20%	20%	20%	Wisconsin	21%	21%	21%	21%	24%
Missouri	27%	23%	27%	26%	22%	Wyoming	*	*	*	*	*

NCR No Company Responding	* < 3 Companies Reporting	0–9%	10–14%	15–19%	20–29%	≥ 30%

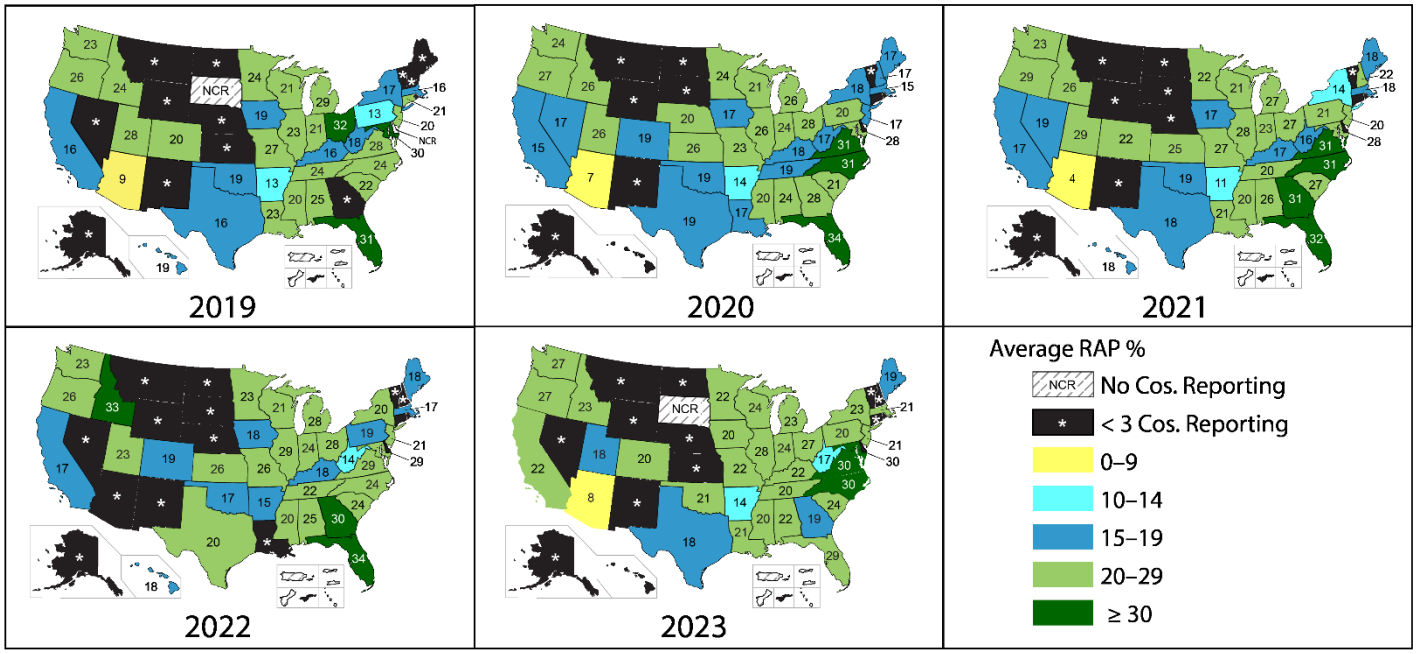


Figure 7: Estimated Average Percentage of RAP Used in Each State, 2019–2023

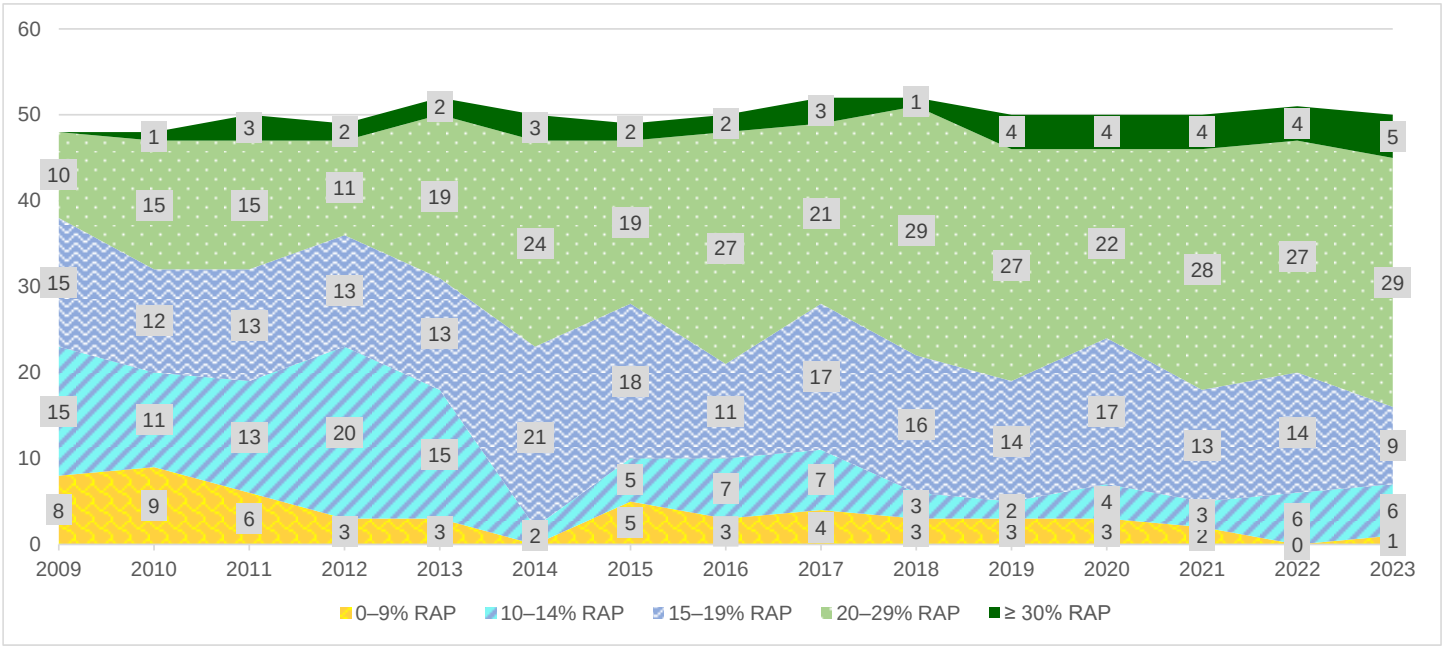


Figure 8: Number of States at Different Average Percentage of RAP Used in HMA/WMA Mixtures, 2009–2023

RAP Stockpiles

During the 2023 construction season, an estimated 111.0 million tons of RAP was accepted by asphalt mixture producers, and 107.9 million tons of RAP was used across all purposes during the year. In 2023, as in 2022, 2021, 2020, 2019, 2018, and 2016, more RAP was received than was utilized, indicating an increase in producer inventory. By comparison, in 2012, 2014, and 2015, more RAP was used than was received, indicating producers were drawing upon stockpiled RAP. In 2017, RAP acceptance and use were about equal. In 2023, the estimated amount of RAP stockpiled nationwide increased to 171.8 million tons, a 11 percent increase from the 154.6 million tons of RAP stockpiled at the end of the 2022 construction season. The increase in stockpiled inventory grew faster than the difference in the amount of RAP used and accepted, which can occur due to variance in companies responding to the 2023 construction season survey versus the prior-year survey. For 2023, 99.0 percent of producers reported having stockpiled RAP, up from 97.4 percent of producers in 2022. The reported RAP stockpiled represents about 1.6 years of inventory at 2023 utilization levels. Table 6 shows the reported and estimated amount of RAP stockpiled in each state at the end of the 2023 construction season. To calculate the estimated values, reported tons of RAP stockpiled were divided by the ratio of total reported tons of mixture produced to estimate tons of mixture produced. The total tonnage row in Table 6 includes stockpiled tonnages from states with fewer than three producers reporting.

Table 6: Reported Tons of RAP Stockpiled

State	Reported Tons Stockpiled (Million)		Estimated Tons Stockpiled (Million)		State	Reported Tons Stockpiled (Million)		Estimated Tons Stockpiled (Million)	
	2022	2023	2022	2023		2022	2023	2022	2023
Alabama	1.57	1.90	2.88	3.61	Montana	*	*	*	*
Alaska	*	*	*	*	Nebraska	*	*	*	*
American Samoa	NCR	NCR	NCR	NCR	Nevada	*	*	*	*
Arizona	*	0.73	*	1.37	New Hampshire	*	*	*	*
Arkansas	0.36	0.48	0.75	1.14	New Jersey	10.24	10.87	27.27	40.00
California	0.65	1.14	1.86	7.06	New Mexico	*	*	*	*
Colorado	0.80	0.40	3.16	3.66	New York	0.56	0.75	1.87	4.47
Connecticut	*	*	*	*	North Carolina	4.85	2.96	5.07	4.12
Delaware	*	*	*	*	North Dakota	*	*	*	*
District of Columbia	*	*	*	*	No. Mariana Isl.	NCR	NCR	NCR	NCR
Florida	1.81	2.44	4.29	4.93	Ohio	4.35	2.74	7.67	5.72
Georgia	3.06	0.19	6.27	3.28	Oklahoma	0.85	0.20	1.28	0.43
Guam	NCR	NCR	NCR	NCR	Oregon	1.24	0.62	2.33	1.79
Hawaii	*	*	*	*	Pennsylvania	1.78	0.64	5.29	3.92
Idaho	0.63	0.66	1.03	0.82	Puerto Rico	NCR	NCR	NCR	NCR
Illinois	1.66	1.57	3.63	6.21	Rhode Island	*	*	*	*
Indiana	1.22	2.28	2.51	3.55	South Carolina	0.77	0.50	1.15	1.07
Iowa	0.30	0.54	0.97	1.20	South Dakota	*	NCR	*	NCR
Kansas	0.72	*	1.15	*	Tennessee	1.97	1.15	5.19	5.57
Kentucky	2.86	1.29	3.24	2.44	Texas	1.51	1.32	9.56	7.67
Louisiana	*	0.20	*	0.83	U.S. Virgin Islands	NCR	NCR	NCR	NCR
Maine	0.20	0.23	0.22	0.24	Utah	1.01	0.62	2.20	0.76
Maryland	1.29	0.60	3.00	1.59	Vermont	*	*	*	*
Massachusetts	3.60	1.30	7.18	4.64	Virginia	2.44	2.01	4.33	4.85
Michigan	2.32	1.68	2.96	2.32	Washington	0.44	0.84	0.84	1.44
Minnesota	1.90	1.40	1.99	4.62	West Virginia	0.44	0.35	0.83	0.83
Mississippi	0.50	0.65	0.93	1.07	Wisconsin	2.18	2.59	2.65	2.76
Missouri	0.60	1.17	1.44	3.34	Wyoming	*	*	*	*
					Total[†]	63.12	51.10	154.55	171.83

NCR No Companies Responding for the State to the Survey
* Fewer than 3 Companies Reporting

† Includes Values from States with Fewer than 3 Companies Reporting

RAP Fractionation

Table 7 shows the average percentage of RAP fractionated into two or more sizes in each state, as reported by survey participants. **These results are representative *only* of the survey participants and do not completely reflect practices in a given state.** This also helps explain the state-level variability from year to year. Producers and SAPAs were not questioned about state specifications regarding fractionation and recycled material content.

Previous reports have shown that fractionation of RAP does not correlate to increased RAP utilization percentages. This holds true for the 2023 data, with an example being Oklahoma, which reports 67 percent of RAP being fractionated and averaging 21 percent RAP in mixtures, while Maryland reported 0 percent of RAP being fractionated but averaged 30 percent RAP in mixtures.

Table 7: Reported Percentage of RAP Fractionated, in Each State, 2022–2023

State	% Fractionated		State	% Fractionated		State	% Fractionated	
	2022	2023		2022	2023		2022	2023
Alabama	45%	23%	Kentucky	58%	45%	Ohio	19%	29%
Alaska	*	*	Louisiana	*	18%	Oklahoma	43%	67%
American Samoa	NCR	NCR	Maine	33%	33%	Oregon	0%	0%
Arizona	*	0%	Maryland	25%	0%	Pennsylvania	3%	17%
Arkansas	17%	19%	Massachusetts	0%	0%	Puerto Rico	NCR	NCR
California	26%	25%	Michigan	26%	18%	Rhode Island	*	*
Colorado	16%	33%	Minnesota	7%	0%	South Carolina	56%	75%
Connecticut	*	*	Mississippi	5%	5%	South Dakota	*	NCR
Delaware	*	*	Missouri	35%	0%	Tennessee	63%	38%
Dist. of Columbia	*	*	Montana	*	*	Texas	34%	24%
Florida	3%	8%	Nebraska	*	*	U.S. Virgin Isl.	NCR	NCR
Georgia	0%	0%	Nevada	*	*	Utah	6%	1%
Guam	NCR	NCR	New Hampshire	*	*	Vermont	*	*
Hawaii	*	*	New Jersey	33%	33%	Virginia	43%	33%
Idaho	0%	0%	New Mexico	*	*	Washington	22%	5%
Illinois	61%	49%	New York	14%	17%	West Virginia	0%	0%
Indiana	35%	44%	North Carolina	26%	15%	Wisconsin	6%	8%
Iowa	7%	4%	North Dakota	*	*	Wyoming	*	*
Kansas	30%	*	No. Mariana Isl.	NCR	NCR			
						Average, Where Used†	20%	21%

NCR No Companies Responding for the State to the Survey

* Fewer than 3 Companies Reporting

† Includes Values from States with Fewer than 3 Companies Reporting

RAP Recycling Agent Use

Table 8 shows the percentage of reported tons of RAP-containing mixtures produced using softer binder or recycling agents in each state. **These results are representative *only* of the survey participants and do not completely reflect practices in a given state.** While there is no strong relationship between the amount of RAP mixtures using softer binder or recycling agents and percentage of RAP used by the state, it should be noted that of the 34 states using 20 percent or more RAP, 27 of them report using softer binders and or recycling agents in a percentage of their RAP mixtures and eight of these states reported no use of softer binders or recycling agents in RAP mixtures.

Table 8: Percentage of RAP Mixes Using Softer Binder and/or Recycling Agents in Each State, 2023

State	Softer Binder	Recyc. Agent	State	Softer Binder	Recyc. Agent	State	Softer Binder	Recyc. Agent
Alabama	0%	0%	Kentucky	0%	8%	Ohio	49%	29%
Alaska	*	*	Louisiana	21%	0%	Oklahoma	18%	5%
American Samoa	NCR	NCR	Maine	7%	0%	Oregon	0%	0%
Arizona	24%	3%	Maryland	0%	12%	Pennsylvania	8%	0%
Arkansas	0%	0%	Massachusetts	0%	7%	Puerto Rico	NCR	NCR
California	22%	11%	Michigan	10%	1%	Rhode Island	*	*
Colorado	0%	0%	Minnesota	0%	4%	South Carolina	17%	3%
Connecticut	*	*	Mississippi	0%	0%	South Dakota	NCR	NCR
Delaware	*	*	Missouri	48%	1%	Tennessee	2%	20%
Dist. of Columbia	*	*	Montana	*	*	Texas	21%	7%
Florida	40%	4%	Nebraska	*	*	U.S. Virgin Isl.	NCR	NCR
Georgia	0%	0%	Nevada	*	*	Utah	45%	0%
Guam	NCR	NCR	New Hampshire	*	*	Vermont	*	*
Hawaii	*	*	New Jersey	0%	15%	Virginia	0%	0%
Idaho	71%	0%	New Mexico	*	*	Washington	16%	0%
Illinois	60%	20%	New York	0%	5%	West Virginia	0%	0%
Indiana	10%	0%	North Carolina	28%	0%	Wisconsin	20%	1%
Iowa	25%	21%	North Dakota	*	*	Wyoming	*	*
Kansas	*	*	No. Mariana Isl.	NCR	NCR			
						Average, When Used[†]	16%	5%

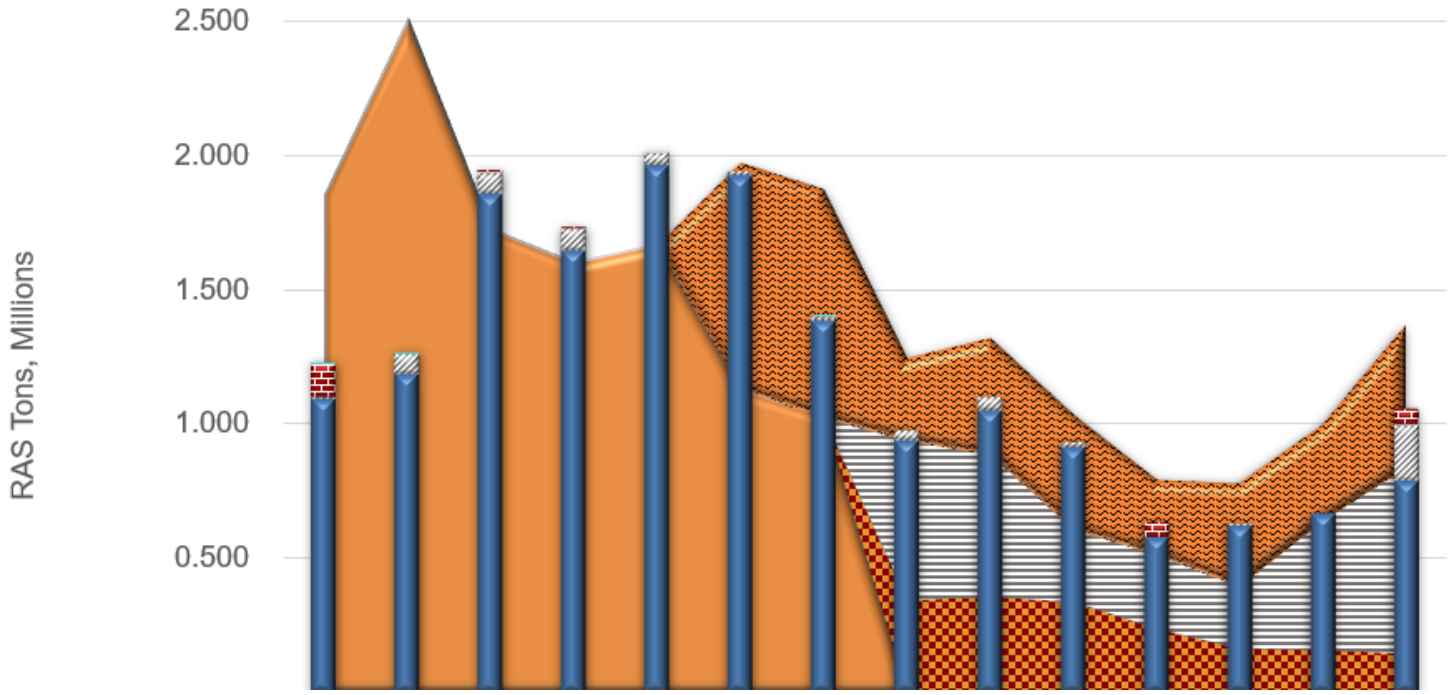
NCR No Companies Responding for the State to the Survey
* Fewer than 3 Companies Reporting
[†] Includes Values from States with Fewer than 3 Companies Reporting

Although the data is highly dependent upon the companies responding to the survey each year, the average percentage of RAP mixtures incorporating softer binders was 16 percent during the 2023 construction season, which is down from 18 percent in the 2022 survey. The percentage of RAP mixtures incorporating recycling agents has fluctuated year to year with 5 percent in 2023, 7 percent in 2022, 5 percent in 2021, 6 percent in 2020, 4 percent in 2019, 4 percent in 2018, 4 percent in 2017, 7 percent in 2016, and 3 percent in 2015.

Reclaimed Asphalt Shingles

Table 4 includes the national summary of RAS data from the 2022 and 2023 construction season surveys. The information requested in the survey is detailed in Appendix A and summarized in Table A1, Section 3. State-level data is reported in Appendix B. Producers and SAPAs were not asked about allowable RAS limits or binder replacement requirements for their states. Figure 9 is a visual representation of the estimated total tons of RAS used in asphalt mixtures, aggregate, cold-mix asphalt, and other uses, as well as the amount landfilled, from the 2009 to 2023 construction season surveys.

During the 2023 construction season, the total estimated amount of unprocessed and processed shingles received by producers was 1,371,000 tons, which is more than the amount of RAS used in asphalt mixtures (797,000 tons) for the year. This is a 37 percent increase from the 997,000 total tons of RAS from all sources accepted during the 2022 construction season. The use of 797,000 tons of RAS in asphalt pavement mixtures during 2023 is an 18 percent increase from the 673,000 tons used in 2022.



RAS	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Processed Shingles Accepted	-	-	-	-	-	0.842	0.846	0.311	0.430	0.423	0.278	0.385	0.356	0.532
PCAS	-	-	-	-	-	-	-	0.591	0.534	0.277	0.277	0.230	0.483	0.698
MWAS	-	-	-	-	-	-	-	0.344	0.356	0.334	0.237	0.165	0.158	0.141
Unprocessed Shingles Accepted	1.851	2.500	1.724	1.599	1.684	1.129	1.027	-	-	-	-	-	-	-
Landfilled	0.007	0.000	-	-	-	-	0.005	-	-	-	-	-	-	-
Used in Other	0.125	-	0.012	0.005	0.006	-	-	-	-	-	0.055	-	-	0.061
Used in Cold Mix	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Used in Aggregate	0.003	0.074	0.073	0.082	0.043	0.009	0.009	0.036	0.050	0.018	-	0.003	-	0.200
Used in HMA/WMA	1.100	1.192	1.863	1.647	1.964	1.931	1.390	0.944	1.053	0.921	0.586	0.630	0.673	0.797

Figure 9: Comparison of Tons of RAS Accepted and Tons of RAS Used or Landfilled (Million Tons), 2010–2023. Processed RAS Acceptance First Tracked in 2015

As shown in Figure 9, from the 2012 to 2014 construction seasons, producers reported using RAS in greater quantities than they accepted. When this trend was first noticed, producers were contacted to confirm the reported values. All

producers contacted indicated they either had RAS stockpiled or were purchasing RAS from shingle processors. To capture the volume of processed shingles accepted by producers, the 2015 survey began asking producers “How many tons of processed shingles were accepted/delivered to your facilities in the state?” Beginning with the 2017 construction season survey producers were asked to report the tons of unprocessed PCAS, unprocessed MWAS, and processed RAS accepted separately.

As seen in Table 4, there was a 10 percent decrease in the acceptance of MWAS and a 44 percent increase in the acceptance of PCAS in 2023 compared to 2022, with a 49 percent increase in the acceptance of processed shingles, leading to a significant (37 percent) increase in the total amount of RAS accepted during the 2023 construction season. The total estimated amount of unprocessed shingles accepted by producers increased 31 percent from 641,000 tons in 2022 to 839,000 tons in 2023. Acceptance of processed shingles increased 49 percent during the same time period, from 356,000 tons in 2022 to 532,000 tons in 2023.

No RAS accepted by producers was reported as landfilled during the 2023 construction season. By accepting 839,00 tons of unprocessed RAS from both PCAS and MWAS sources, asphalt mixture producers saved about 510,000 cubic yards of landfill space.

According to the United States Environmental Protection Agency (U.S. EPA, 2020), about 15.1 million tons of waste shingles are generated annually. Therefore, asphalt mixture producers in 2022 diverted about 5.6 percent of the total available supply of waste shingles from landfills.

The number of companies using RAS decreased from 50 in 2022 to 48 during the 2023 construction season. The percentage of producers reporting use of RAS increased from 21 percent of respondents in 2022 to 24 percent in 2023.

RAS Use by Sector

Figure 10 shows the total estimated amount of RAS used in each of the three sectors of the paving market. These values were calculated using the average percentages of RAS reported by producers for the sectors and adjusted to account for differences between reported RAS tonnage and tons calculated from the percentage by sector. There was an increase in the tons of RAS used by all sectors from the 2022 to 2023 construction season. All sectors also saw an increase in the percentage of RAS use from 2022 to 2023.

Figure 11 shows the average percentage of RAS used by each sector and overall across all asphalt pavement mixtures. These values were calculated using the average percentages of RAS reported for the different sectors and adjusted to account for differences between reported RAS tonnage and tons calculated from the percentage by sector. Although previous years’ surveys saw relatively steady growth across all sectors from 2009 to 2014 with some year-to-year variation, there was a leveling of total RAS use from 2012 to 2015 until a notable decline began

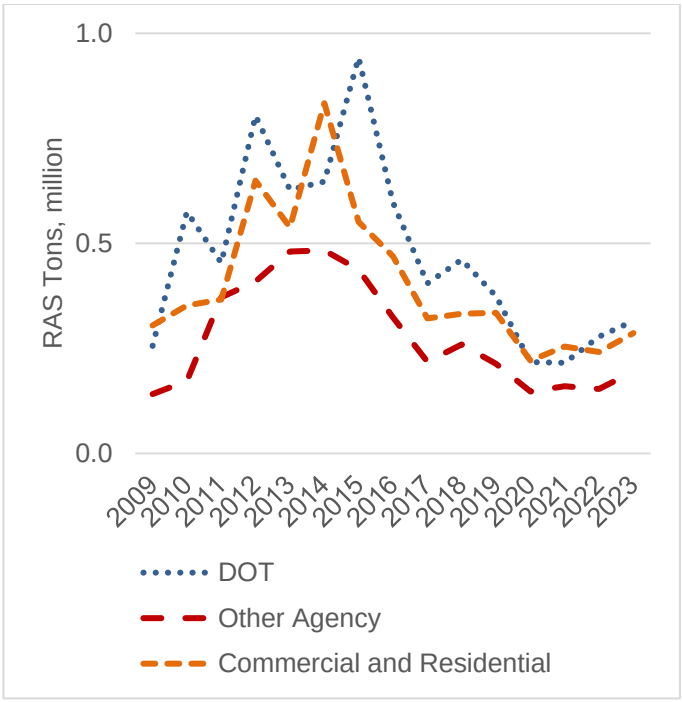


Figure 10: Estimated RAS Use by Sector (Million Tons)

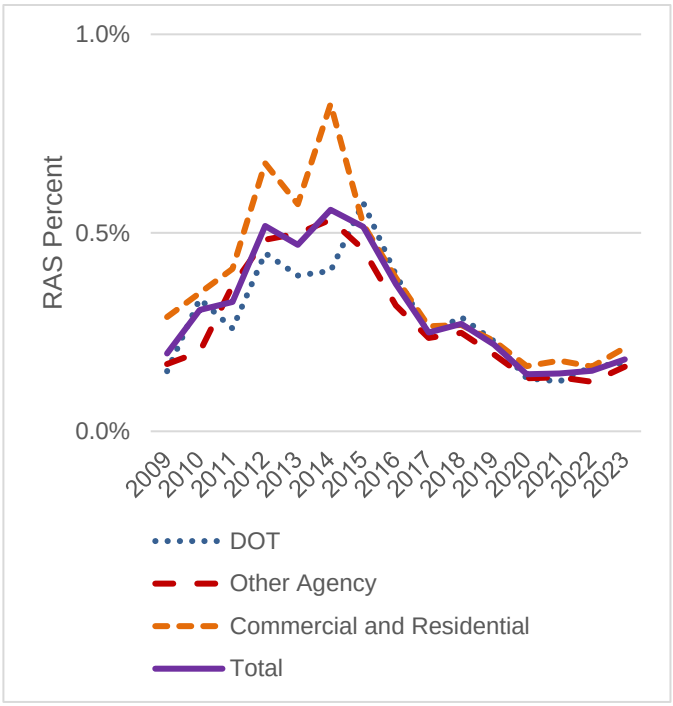


Figure 11: Average Percent RAS Used by Sector

in 2016 and continued into the 2023 season. The average percentage of RAS peaked at 0.56% in 2012, then declined from 0.54% in 2014 to 0.15% during the 2021 and 2022 construction seasons, before increasing to 0.18% in 2023.

In 2023, producers and SAPAs were asked which sectors allow RAS to be included in asphalt mixtures. Responses came from 49 states, and this information is summarized in Table 9. In cases where conflicting answers were provided, a middle ground was assumed with SAPA responses being given greater weight regarding the public sectors' RAS use and contractors' responses being given greater weight for the private sector. Most respondents reported that RAS is allowed in at least some mixtures and sectors. According to responses from producers and SAPAs, 26 DOTs reportedly allow RAS in some asphalt pavement mixtures, and five other DOTs allow it in all mixtures. RAS use is allowed in some Other Agency sector mixtures in 34 states, with no additional states allowing RAS in all mixtures for that sector. Similarly, RAS is allowed in at least some Commercial & Residential sector mixtures in 44 states. There were no reports of states allowing RAS in all mixtures for all sectors, while five states — Alaska, Hawaii, Louisiana, North Dakota, and Wyoming — reportedly do not allow the use of RAS in mixtures for any sector.

Table 9: Sectors Allowing RAS, 2023

State	RAS Allowed In?			State	RAS Allowed In?		
	DOT Mixtures	Other Agency Mixtures	Commercial & Residential Mixtures		DOT Mixtures	Other Agency Mixtures	Commercial & Residential Mixtures
Alabama	Some	Some	Some	Montana	Some	None	Some
Alaska	None	None	None	Nebraska	Some	Some	Some
American Samoa	NCR	NCR	NCR	Nevada	None	None	Some
Arizona	None	None	Some	New Hampshire	None	Some	Some
Arkansas	Some	Some	Some	New Jersey	None	None	Some
California	Some	Some	Some	New Mexico	Some	Some	Some
Colorado	None	None	Some	New York	Some	Some	Some
Connecticut	Some	Some	Some	North Carolina	All	Some	Some
Delaware	Some	Some	Some	North Dakota	None	None	None
District of Columbia	DNA	DNA	DNA	No. Mariana Isl.	NCR	NCR	NCR
Florida	None	None	Some	Ohio	Some	Some	Some
Georgia	None	Some	Some	Oklahoma	None	Some	Some
Guam	NCR	NCR	NCR	Oregon	Some	Some	Some
Hawaii	None	None	None	Pennsylvania	All	Some	Some
Idaho	None	Some	Some	Puerto Rico	NCR	NCR	NCR
Illinois	All	Some	Some	Rhode Island	None	None	Some
Indiana	All	Some	Some	South Carolina	Some	Some	Some
Iowa	Some	Some	Some	South Dakota	NCR	NCR	NCR
Kansas	Some	Some	Some	Tennessee	Some	Some	Some
Kentucky	Some	Some	Some	Texas	Some	Some	Some
Louisiana	None	None	None	U.S. Virgin Islands	NCR	NCR	NCR
Maine	Some	None	Some	Utah	None	None	Some
Maryland	Some	Some	Some	Vermont	None	Some	Some
Massachusetts	Some	Some	Some	Virginia	Some	Some	Some
Michigan	Some	Some	Some	Washington	Some	Some	Some
Minnesota	All	Some	Some	West Virginia	Some	Some	Some
Mississippi	None	None	Some	Wisconsin	Some	Some	Some
Missouri	Some	Some	Some	Wyoming	None	None	None

DNA Did Not Answer
NCR No Companies Responding

Table 10: States With Reported RAS Use, 2013–2023

State	RAS Used?										
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Alabama	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Alaska	No	No	No	No	No	No	No	No	No	No	No
American Samoa	NCR	NCR	NCR	NCR	No	No	No	NCR	NCR	NCR	NCR
Arizona	No	No	No	No	No	No	No	No	No	No	No
Arkansas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
California	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Colorado	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Connecticut	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Delaware	Yes	Yes	Yes	Yes	No	No	NCR	Yes	No	No	No
District of Columbia	No	NCR	NCR	NCR	No	No	No	No	No	No	No
Florida	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No
Georgia	Yes	No	No	Yes	No	No	No	No	No	No	No
Guam	NCR	NCR	NCR	NCR	NCR	NCR	NCR	NCR	NCR	NCR	NCR
Hawaii	No	No	No	No	No	No	No	No	No	No	No
Idaho	No	No	No	No	No	No	No	No	No	No	No
Illinois	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Indiana	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Iowa	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes
Kansas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kentucky	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Louisiana	Yes	No	No	Yes	No	No	No	No	No	No	No
Maine	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maryland	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Massachusetts	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Michigan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Minnesota	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Mississippi	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No
Missouri	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Montana	No	No	No	No	No	No	No	No	No	No	No
Nebraska	Yes	No	No	Yes	No	No	No	No	No	No	No
Nevada	No	No	No	Yes	Yes	No	No	No	No	No	No
New Hampshire	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
New Jersey	Yes	No	No	No	No	No	Yes	No	No	No	No
New Mexico	No	No	NCR	Yes	Yes	No	No	No	No	No	No
New York	Yes	Yes	Yes	No	Yes	No	No	No	No	No	Yes
North Carolina	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
North Dakota	NCR	No	No	No	No	No	No	No	No	No	No
N. Mariana Islands	NCR	NCR	NCR	NCR	NCR	NCR	NCR	NCR	NCR	NCR	NCR
Ohio	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Oklahoma	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Oregon	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pennsylvania	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Puerto Rico	No	NCR	No	NCR	NCR	NCR	NCR	NCR	NCR	NCR	NCR
Rhode Island	No	No	No	No	No	No	No	No	No	No	No
South Carolina	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes
South Dakota	Yes	Yes	NCR	Yes	No	NCR	NCR	No	No	No	NCR
Tennessee	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
Texas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
U.S. Virgin Islands	NCR	NCR	NCR	NCR	NCR	No	NCR	NCR	NCR	NCR	NCR
Utah	No	No	No	No	No	No	No	No	No	No	No
Vermont	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No
Virginia	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	Yes
Washington	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
West Virginia	No	No	No	No	No	No	No	No	No	No	No
Wisconsin	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wyoming	Yes	No	No	Yes	No	No	No	No	No	No	No

NCR	= No Companies Responding
Yes	= RAS Use Reported
No	= No RAS Use Reported

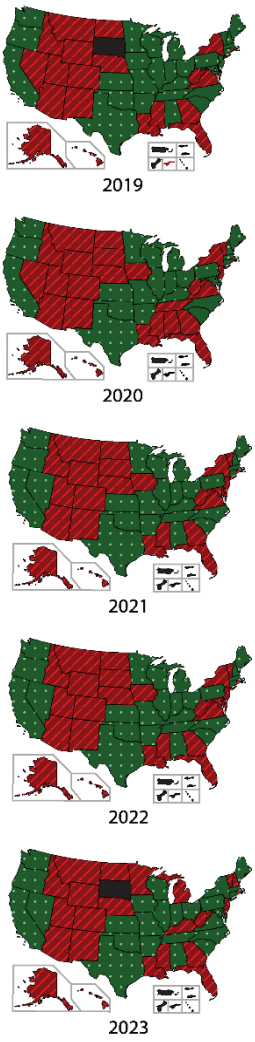


Figure 12: States with Companies Reporting RAS Use by Construction Season, 2019–2023

RAS Use in Each State

Table 10 shows states where asphalt pavement mixture producers reported using RAS in 2013 through 2023, and Figure 12 shows states where producers reported using RAS from 2019 through 2023. Red indicates a state where RAS use was not reported for that construction season. The number of states where producers reported using RAS increased annually from 22 in 2009 to 38 in 2013, but decreased to 34 in 2014, 32 in 2015, 29 in 2017, 27 in 2018, 28 in 2019, 24 in 2020, and 25 in 2021 and 2022. During the 2023 construction season, asphalt mixture producers in 24 states report RAS use.

RAS Stockpiles

In 2023, 98 percent of the 48 producers using RAS reported having inventories of stockpiled RAS, compared to 98 percent of the 50 producers using RAS in 2022. Some 1.18 million tons of RAS was reported as stockpiled at year-end 2023, a (17.3 percent) decrease from the 1.43 million tons of RAS in stockpiles at the end of 2022. The reported RAS stockpiled represents about 1.5 years of inventory at 2023 utilization levels.

Table 11: Reported Tons of RAS Stockpiled, 2022–2023

State	Reported Tons Stockpiled (Thousands)		Estimated Tons Stockpiled (Thousands)		State	Reported Tons Stockpiled (Thousands)		Estimated Tons Stockpiled (Thousands)	
	2022	2023	2022	2023		2022	2023	2022	2023
Alabama	6.5	2.5	11.9	4.7	Montana	*	*	*	*
Alaska	*	*	*	*	Nebraska	*	*	*	*
American Samoa	NCR	NCR	NCR	NCR	Nevada	*	*	*	*
Arizona	*	0.0	*	0.0	New Hampshire	*	*	*	*
Arkansas	6.0	0.4	12.6	0.9	New Jersey	0.0	0.0	0.0	0.0
California	0.9	0.0	2.4	0.0	New Mexico	*	*	*	*
Colorado	0.0	0.0	0.0	0.0	New York	0.0	0.1	0.0	0.3
Connecticut	*	*	*	*	North Carolina	190.6	52.0	199.3	72.5
Delaware	*	*	*	*	North Dakota	*	*	*	*
District of Columbia	*	*	*	*	No. Mariana Isl.	NCR	NCR	NCR	NCR
Florida	5.0	0.0	11.8	0.0	Ohio	70.0	17.5	123.5	36.5
Georgia	0.0	0.0	0.0	0.0	Oklahoma	0.3	10.1	0.4	21.5
Guam	NCR	NCR	NCR	NCR	Oregon	34.1	28.9	64.2	83.2
Hawaii	*	*	*	*	Pennsylvania	70.2	37.2	208.2	227.2
Idaho	0.0	0.0	0.0	0.0	Puerto Rico	NCR	NCR	NCR	NCR
Illinois	2.7	105.0	5.9	414.2	Rhode Island	*	*	*	*
Indiana	2.6	1.2	5.3	1.8	South Carolina	22.0	42.0	32.9	89.0
Iowa	4.0	19.0	12.9	42.2	South Dakota	*	NCR	*	NCR
Kansas	16.5	*	26.6	*	Tennessee	5.6	8.6	14.7	41.7
Kentucky	0.0	0.0	0.0	0.0	Texas	4.1	5.4	26.0	31.2
Louisiana	*	0.0	*	0.0	U.S. Virgin Isl.	NCR	NCR	NCR	NCR
Maine	0.1	0.7	0.1	0.8	Utah	0.0	0.0	0.0	0.0
Maryland	20.2	0.5	46.9	1.3	Vermont	*	*	*	*
Massachusetts	11.2	11.2	22.4	39.9	Virginia	4.0	1.9	7.1	4.5
Michigan	1.5	0.0	1.9	0.0	Washington	12.1	5.1	23.2	8.7
Minnesota	6.0	5.0	6.3	16.5	West Virginia	0.0	0.0	0.0	0.0
Mississippi	0.0	8.3	0.0	13.7	Wisconsin	98.7	49.9	119.9	53.1
Missouri	30.0	0.1	71.9	0.3	Wyoming	*	*	*	*
					Total†	620.9	413.9	1430.0	1182.4

NCR No Companies Responding
* Fewer than 3 Companies Reporting
† Includes Values from States with Fewer than 3 Companies Reporting

Table 11 shows the reported and estimated amount of RAS stockpiled in each state at the end of the 2022 and 2023 construction seasons. To calculate the estimated values, reported tons of RAS stockpiled were divided by the ratio

of total reported tons of mix produced to estimated tons of mix produced. The total tonnage row in Table 11 includes stockpiled tonnages from states with fewer than three producers reporting.

RAS Recycling Agent Use

Table 12 shows the percentage of reported tons of RAS-containing mixtures produced using softer binder or recycling agents in each state. **These results are representative *only* of the survey participants and do not completely reflect practices in a given state.** Similar to the RAP, there does not appear to be a relationship between the amount of RAS mixtures using softer binder and/or recycling agents and percentage of RAS used by the state.

Table 12: Percentage of RAS Mixtures Using Softer Binder and/or Recycling Agents in Each State, 2023

State	Softer Binder	Recyc. Agent	State	Softer Binder	Recyc. Agent	State	Softer Binder	Recyc. Agent
Alabama	0%	0%	Kentucky	0%	0%	Ohio	100%	0%
Alaska	*	*	Louisiana	0%	0%	Oklahoma	100%	25%
American Samoa	NCR	NCR	Maine	33%	0%	Oregon	0%	0%
Arizona	0%	0%	Maryland	0%	0%	Pennsylvania	0%	0%
Arkansas	0%	0%	Massachusetts	0%	0%	Puerto Rico	NCR	NCR
California	50%	25%	Michigan	0%	0%	Rhode Island	*	*
Colorado	0%	0%	Minnesota	0%	0%	South Carolina	0%	0%
Connecticut	*	*	Mississippi	0%	0%	South Dakota	NCR	NCR
Delaware	*	*	Missouri	100%	0%	Tennessee	3%	0%
Dist. of Columbia	*	*	Montana	*	*	Texas	0%	0%
Florida	0%	0%	Nebraska	*	*	U.S. Virgin Isl.	NCR	NCR
Georgia	0%	0%	Nevada	*	*	Utah	0%	0%
Guam	NCR	NCR	New Hampshire	*	*	Vermont	*	*
Hawaii	*	*	New Jersey	0%	0%	Virginia	0%	0%
Idaho	0%	0%	New Mexico	*	*	Washington	50%	0%
Illinois	33%	6%	New York	0%	0%	West Virginia	0%	0%
Indiana	30%	0%	North Carolina	100%	0%	Wisconsin	39%	3%
Iowa	30%	0%	North Dakota	*	*	Wyoming	*	*
Kansas	*	*	No. Mariana Isl.	NCR	NCR			
						Average, When Used[†]	21%	2%

NCR No Companies Responding for the State to the Survey
* Fewer than 3 Companies Reporting
[†] Includes Values from States with Fewer than 3 Companies Reporting

Although the data is highly dependent upon the companies responding to the survey each year, in states where RAS is reportedly used, the average percentage of RAS mixtures incorporating softer binders was 21 percent during the 2023 construction season, while the percentage of RAS mixtures incorporating recycling agents was at 2 percent. In 2022, producers reported a lower average percentage (20 percent) of RAS mixtures incorporating softer binders and a higher percentage (8 percent) of RAS mixtures incorporating recycling agents, as compared to the 2023 construction season.

The Importance of Engineering Recycled Asphalt Mixtures for Quality

For more than three decades, two guiding principles of asphalt recycling have been: asphalt mixtures containing recycled materials should 1) meet the same requirements as asphalt mixtures with all virgin materials, and 2) perform equal to or better than asphalt mixtures with all virgin materials. This is at the heart of the "Three E's of Recycling," which state that recycled materials should provide Environmental, Economic, and Engineering benefits.

Quality recycled mixtures have been successfully designed and produced for many years. When successfully engineered, designed, produced, and constructed, the proof is in performance. A recent study comparing the performance of recycled versus virgin mixtures based on Long-Term Pavement Performance (LTPP) data from 16 U.S. states and two Canadian provinces shows that overlays containing at least 30 percent RAP performed equal to overlays using virgin mixtures (Carvalho et al., 2010; West et al., 2011). At the NCAT Test Track, test sections containing 50 percent RAP using Superpave mixture design procedures for each layer outperformed companion test sections with all virgin materials in all pavement performance measures.

However, as the amount of recycled materials in asphalt pavement mixtures increase, additional considerations for material handling, engineering, mixture design, quality, and performance testing become more important. In particular, RAP and RAS should be tested and classified to determine the amount, properties, and quality of available asphalt binder. These values have an impact on pavement performance and are important to assess when developing a high recycled content mixture design. In some cases, it may be necessary to make use of recycling agents or a softer asphalt binder to ensure the final mixture design delivers the desired level of product performance.

For more information about processing and using reclaimed asphalt pavement and recycled asphalt shingles, consult the NAPA publication *Best Practices for RAP and RAS Management* (Quality Improvement Series 129).

Cost Savings from RAP and RAS

The use of RAP and RAS both reduce the need for virgin materials, conserving valuable asphalt and aggregates. Beyond the environmental benefits of resource preservation, the use of RAP and RAS can help lower initial material costs for road construction, allowing road owners to achieve more roadway maintenance and construction activities within limited budgets. Table 13 summarizes the individual and cumulative savings from the use of RAP and RAS in asphalt mixtures realized during the 2023 construction season. In total, the use of RAP and RAS saved $4.5 billion during the 2023 construction season compared to the use of all virgin materials. This is $244 million less than in 2022 due to decreases in virgin binder prices (Table 14) and decreased total asphalt mixture tonnages in 2023.

Table 13: Material Savings, 2022–2023

Material	Material Quantity, Million Tons		% Agg.	% AC	Aggregate Cost Savings, $ Billion		Asphalt Binder Cost Savings, $ Billion		Total Cost Savings, $ Billion	
	2022	2023			2022	2023	2022	2023	2022	2023
RAP	98.1	96.1	95	5	$1.178	$1.264	$3.466	$3.126	$4.644	$4.390
RAS	0.673	0.797	50*	20	$0.004	$0.006	$0.095	$0.104	$0.099	$0.110
Total					$1.182	$1.269	$3.561	$3.230	$4.743	$4.500

* Includes granules and mineral filler

The estimated savings shown in Table 13 were based on the cost factors shown in Table 14. Asphalt binder prices were estimated based upon an average of publicly available 2023 asphalt price indexes for 37 states (see Figure 13). The average price of unmodified asphalts from these states for 2023 was about $619.70 per ton, down from the 2022 average price of $679.26. Eight of the states (Alabama, Connecticut, Florida, Louisiana, New Jersey and Virginia) also provide price indexes for modified asphalts. The average modified asphalt prices from these states for 2023 was $763.41 per ton,

down from $706.61 in 2022. Assuming 10 percent of asphalt mixtures use modified asphalt binders, the 2023 average price of asphalt binders used in asphalt mixtures was $650.60 per ton, down 8.6 percent from 2022.

Most asphalt mixtures today use crushed stone as the primary aggregate, but they often include a small percentage of natural sand. The U.S. Geological Survey (USGS) reports the average price of Stone (Crushed) increased to $14.15 per ton and Sand and Gravel (Construction) increased to $11.07 per ton for 2023 (USGS, 2025). Assuming the average asphalt pavement mixture contains 10 percent natural sand and 90 percent crushed stone, the average price of aggregate in an asphalt mixture was $13.84 per ton for the 2022 construction season, up 9.5 percent from 2022.

Table 14: Material Cost Factors, 2020–2023

Material		% of Market	Cost/Ton			
			2020	2021	2022	2023
Asphalt	Unmodified	90	$442.35	$490.65	$679.26	$619.70
	Modified	10	$572.89	$614.01	$794.99	$763.41
	Weighted Average		$473.72	$519.45	$706.61	$650.60
Aggregate	Crushed Stone	90	$11.06	$11.79	$12.91	$14.15
	Sand and Gravel	10	$8.70	$8.98	$10.21	$11.07
	Weighted Average		$10.82	$11.51	$12.64	$13.84

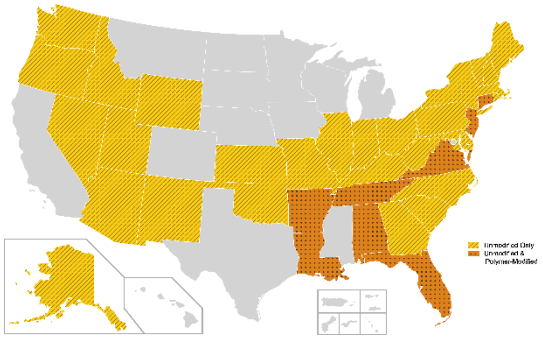


Figure 13: States With Publicly Available Asphalt Price Indexes, 2023

Minor additional cost savings, not calculated for this report, are associated with the use of RAS in stone-matrix asphalt and other specialty asphalt mixtures where shingle fibers may potentially replace mineral or cellulose fibers.

Additional cost savings are realized by diverting RAP and RAS from landfills. The national average gate fee for disposing of mixed construction and demolition (C&D) material in landfills is relatively close to the national average for municipal solid waste (MSW) landfill disposal (Tolaymat et al., 2017). Based upon a 2023 national average for MSW landfill gate fees of $56.80 per ton, not sending more than 111 million tons of RAP and RAS to landfills (more than 67 million cubic yards of material) saved more than $5.5 billion dollars in gate fees, down from $5.7 billion in 2022, due in part to a 3 percent decrease in MSW gate fees from 2022 to 2023 (EREF, 2024).

Warm-Mix Asphalt Technology

Table 4 includes the national summary of WMA technology usage data from the 2022 and 2023 construction season surveys. The information requested in the survey is detailed in Appendix A and summarized in Table A1, Section 4. State-level data is reported in Appendix B. Producers were also asked about the different WMA technologies used.

Prior to the 2018 construction season, producers were asked to report primarily the use of WMA technologies to reduce production temperatures by at least 10°F from typical mixture production temperatures. However, because of potential compaction, antistrip, and workability benefits, the use of WMA technologies at HMA temperatures is common. To better understand the use of WMA technologies at different temperatures, the 2018, 2019, 2020, 2021, 2022, and 2023 construction season surveys asked additional questions to ensure disaggregation of WMA technology use at different temperatures. The results indicate that prior survey reports have better captured the use of WMA technologies than the use of WMA technologies at reduced temperature. Table 4 and this section report both aggregated data on the use of WMA technologies and disaggregated data on its use by mixture temperature where possible.

The percentage of companies reporting the use of WMA technologies saw rapid increases from the 2009 to 2011 construction seasons, but has gradually declined from 78 percent of respondents in 2015 to 62 percent of respondents in the 2019, rebounding to 67 percent in 2020, dropping to 62 percent in 2021, sliding to 61 percent in 2022, and then declining slightly to 56% for the 2023 construction season, as shown in Figure 15. Increases in tonnage with WMA technologies as a percent of total tonnage plateaued between 2013 and 2016, as seen in Figure 16. The 2023 construction season had a 2 percent decrease in the production of asphalt with WMA technologies to 172.0 million tons, 39.1 percent of total asphalt pavement tonnage. A total of 113 companies,56 percent of respondents, reported using WMA technologies during the 2023 construction season.

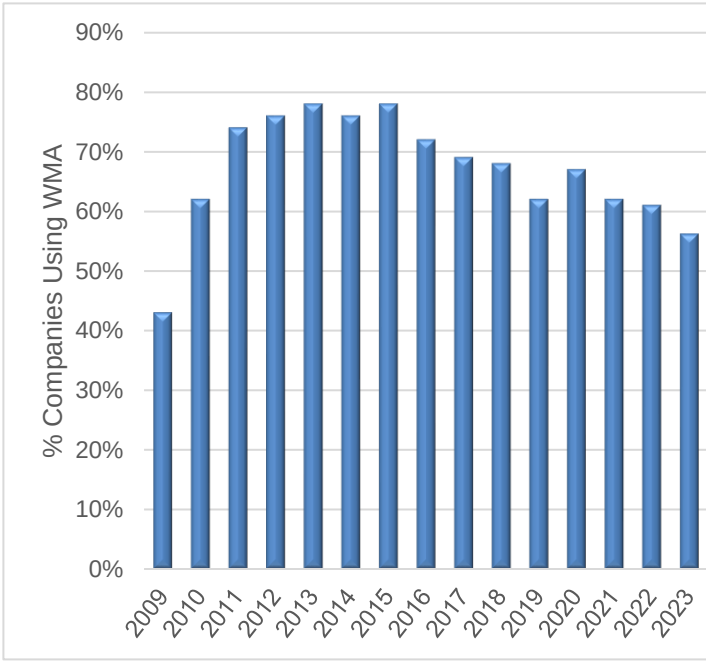


Figure 14: Percent of Companies Using WMA Technologies

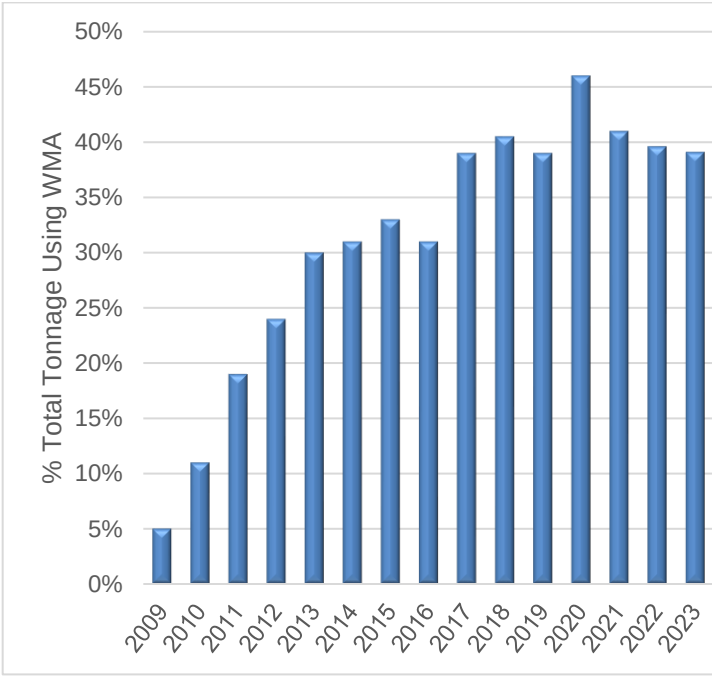
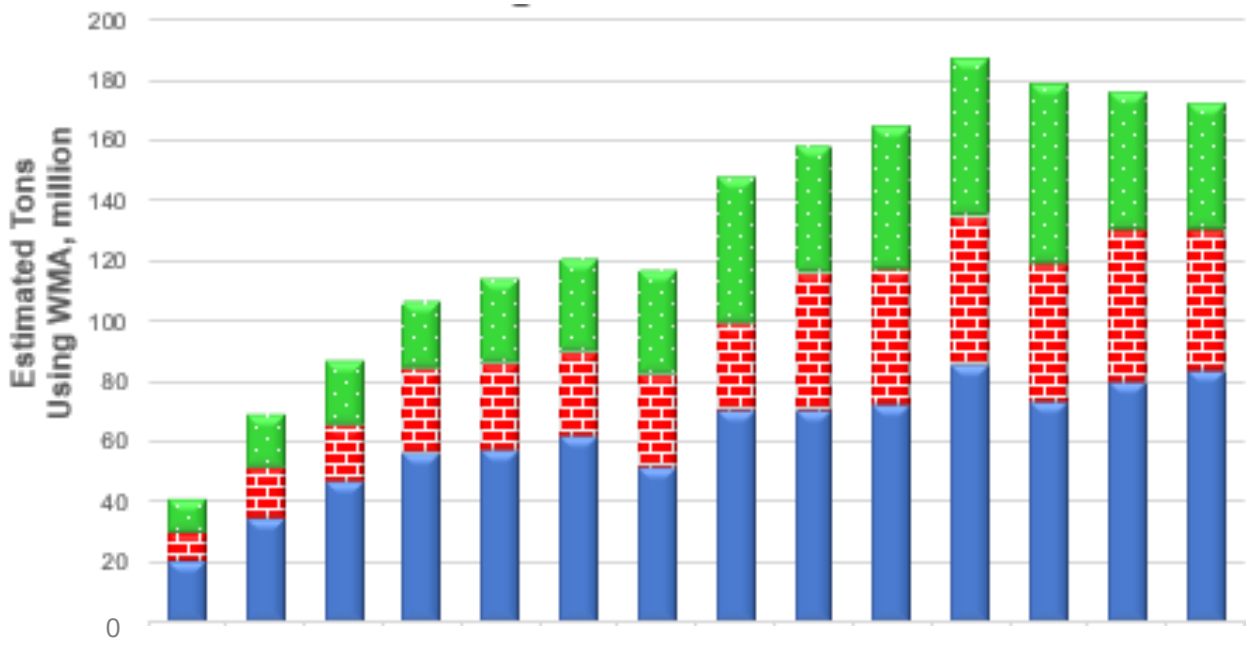


Figure 15: Percent Total Tonnage Produced Using WMA Technologies

WMA Technology Use by Sector

Figure 16 shows a steady increase in the number of tons of mixture produced using WMA technologies for each customer sector from 2011 to 2013, with use showing minor changes for the 2014 though 2016 construction seasons. In 2017, however, WMA technology use grew substantially due to notable increases in mixtures produced for the DOT and Commercial & Residential sectors. During 2018, growth in tonnage produced with WMA technologies was driven largely by a 58 percent increase in tons produced for the Other Agency sector. In 2019, tons produced with WMA technology in the Other Agency sector was down, while the DOT and the Commercial & Residential sectors were up from the 2018 construction season. The 2022 construction season saw an increase for the DOT and Other Agency Sectors, with a decline in tonnage for the Commercial & Residential sector. For 2023, WMA tonnage increased for DOT sector and decreased for the Other Agency and Commercial and Residential sectors. All in all, during the 2023 construction season, 44.9 percent of all DOT sector tonnage, 39.3 percent of Other Agency sector tonnage, and 31.2 percent of Commercial & Residential sector tonnage was produced using WMA technologies.



Sector	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Commercial & Residential	11.3	17.8	21.4	22.8	28.5	30.4	34.6	48.4	42.0	48.0	52.0	59.8	45.5	42.5
Other Agency	9.8	16.3	18.9	27.9	28.4	28.5	31.5	29.4	46.5	44.8	49.9	45.1	50.1	47.1
DOT	20	34.6	46.4	55.7	56.9	60.9	50.7	69.6	69.3	71.7	84.5	73.0	79.4	82.4

Figure 16: Estimated Tons (Millions) Produced With WMA Technologies by Sector, 2010–2023

WMA Technology Use in Each State

In Figure 17, the estimated percentage of total tons produced as WMA in each state is depicted. The national trend from 2009 through 2020 reveals increased tons of asphalt mixture produced with WMA technologies, with a slight decrease in tonnage observed in 2021, 2022, and 2023.; however, a degree of fluctuation year-to-year is seen at the state level. The accuracy of data for individual states varies noticeably depending on the number of responses received from each state and the total number of tons represented by the respondents each year.

From 2022 to 2023, 10 states saw an increase of 10 percentage points or more in WMA production, while 9 states had a decrease of 10 percentage points or more. Five states — Alaska, Arkansas, Nebraska, Rhode Island, and Vermont — had an increase of 30 percentage points or more in mixture production with WMA technologies. Six states —Colorado, Illinois, Kansas, Kentucky, Minnesota, and Oklahoma— had a decrease of 30 percentage points or more in mixture production with WMA technologies.

Mixture production with WMA technologies made up over half of the total asphalt mixture production in 17 states during 2023, six of these states —Connecticut, Louisiana, Nevada, New Mexico, Oregon, and Pennsylvania — reported WMA as 75 percent or more of total production in 2023. Delaware, Hawaii, Kansas, Montana, and North Dakota had no reported asphalt production with WMA technologies in 2023.

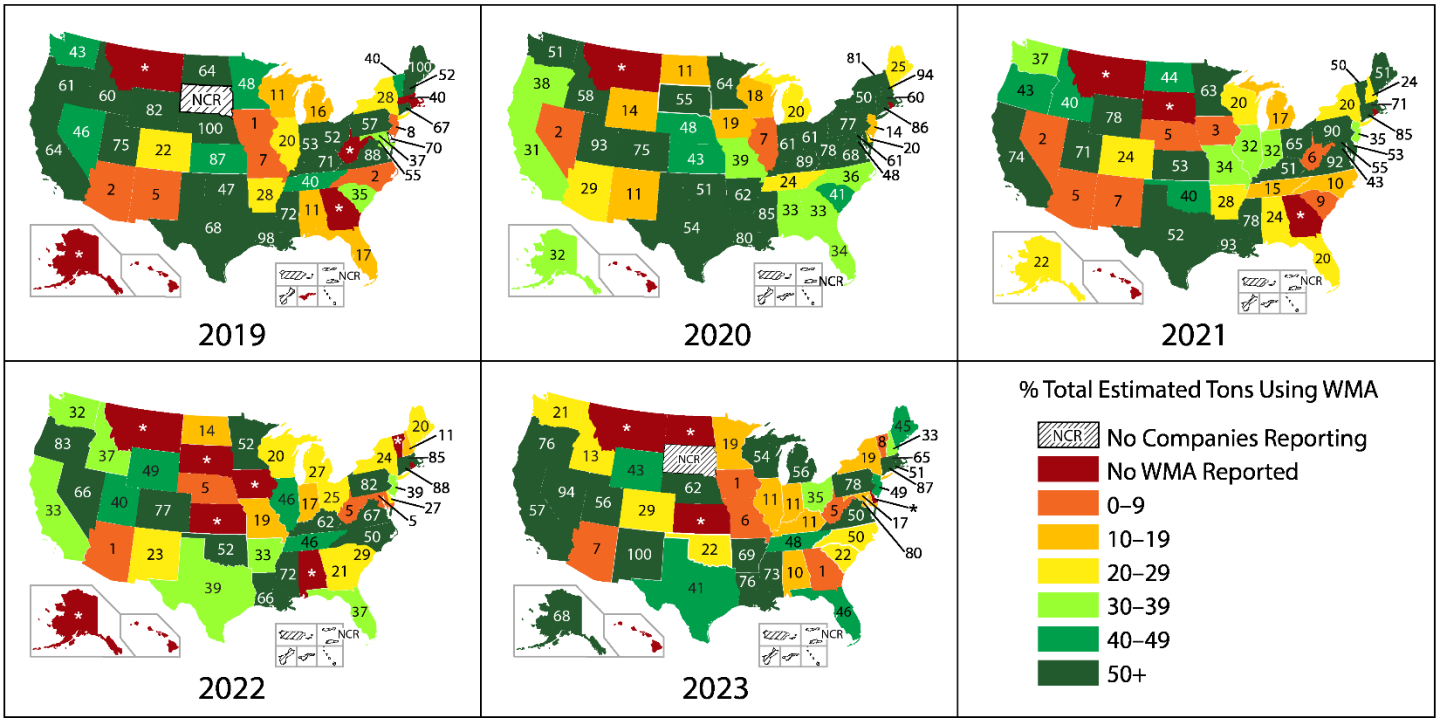


Figure 17: Estimated Percent of Total Production Using WMA Technologies in Each State, 2019–2023

WMA Technologies

As Table 15 and Figure 18 show, production plant foaming continued to fall from its previous spot as the most commonly used WMA production technology, being used for around 30 percent of the WMA produced in 2023. This is a decrease of about 10 percent from the 2022 season. The use of chemical additive technologies at 67.9 percent represents a 6 percent increase for the 2023 construction season compared to 2022. Organic additives represented 1.2 percent of the market. Additive foaming had no reported use during 2023. The percentage of WMA produced with additive technologies has grown significantly since 2011 when they made up less than 5 percent of the WMA technologies used, and plant-based foaming has seen a general decrease over the same time period.

Table 15: Percent Production of WMA Technologies, 2010–2023

WMA Technology	% Production													
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Production Plant Foaming %	92.0%	95.4%	88.3%	87.0%	84.5%	72.0%	76.9%	64.7%	63.2%	51.0%	49.2%	37.7%	33.5%	30.3%
Additive Foaming %	1.0%	0.2%	2.0%	0.3%	0.0%	2.1%	0.0%	0.0%	0.7%	0.0%	2.6%	0.3%	0.8%	0.0%
Chemical Additive %	6.0%	4.1%	9.4%	12.1%	15.0%	25.2%	21.1%	32.2%	34.3%	48.3%	46.6%	60.2%	64.0%	67.9%
Organic Additive %	1.0%	0.3%	0.2%	0.0%	0.5%	0.7%	1.9%	3.1%	1.8%	0.7%	1.6%	1.8%	1.7%	1.2%

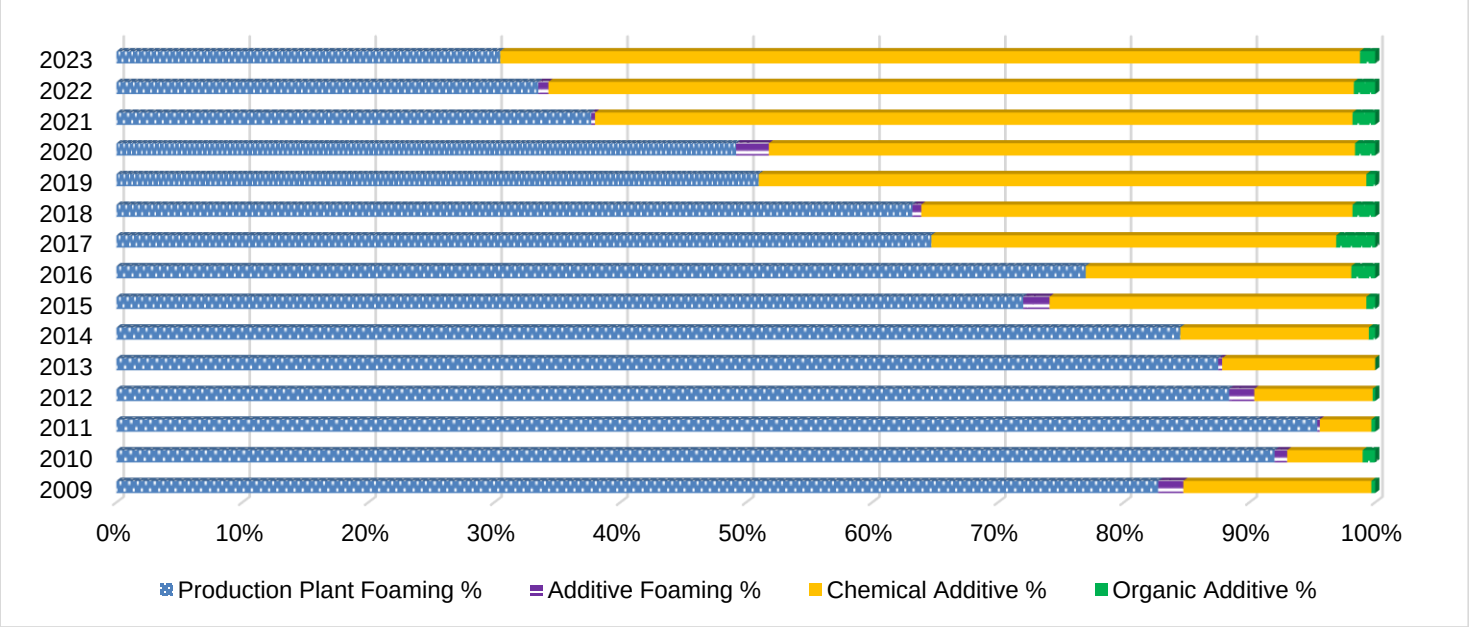


Figure 18: WMA Technologies Used as Percent of WMA Production, 2009–2023

Use of WMA Technologies at Different Temperatures

WMA additives can have compaction, workability, antistrip, and other benefits that encourage their use even when a reduction in production temperature is not sought or achieved by the producer. For this reason, producers were asked to report use of WMA technologies for asphalt production both at traditional HMA temperatures and at reduced temperatures. About 45.8 percent (78.8 million tons) of total tonnage produced using WMA technologies was produced with a temperature reduction of at least 10°F.

Of the respondents, 113 producers in 45 states, reported using WMA technologies. Of these, 52 producers reporting using WMA technologies at both reduced and HMA temperatures; 32 producers used WMA technologies only at reduced temperatures; and 29 producers reported using WMA technologies only at HMA temperatures.

Table 16 shows the percentage of reported tons produced using each WMA technologies at both reduced temperatures and at traditional HMA temperatures, along with the total tonnages produced with WMA technologies. While there is variation in the utilization of different WMA technologies at different production temperatures, producers reporting the use of WMA technologies at all temperatures typically did not report varying the technology by temperature. Therefore, much of the difference between the Reduced Temperatures and the HMA Temperatures columns in Table 16 is attributable to the technologies employed by producers that only utilize WMA technologies at either reduced temperatures or HMA temperatures.

The national average of the responses is shown in Table 16.

Table 16: WMA Technologies Utilization Detail, 2023

WMA Technology	% of Market		
	Reduced Temperatures	HMA Temperatures	At All Temperatures
Chemical Additive	68.4%	67.4%	67.9%
Plant Foaming	29.8%	30.8%	30.3%
Additive Foaming	0.0%	0.0%	0.0%
Organic Additive	0.5%	1.8%	1.2%
2023 Tons (Millions)	78.8	93.2	172.0

Producers were also asked to indicate the average temperature reduction achieved for WMA produced at reduced temperature. The distribution of temperature reductions achieved is provided in Table 17. The majority (69.3%) of mix produced at reduced temperature using WMA technology was in the range of 10° - 30°F. Smaller percentages (28.4% and 2.3%) of mix was produced at reduced temperature in the range of 31° - 50°F and 51° or more, respectively. The weighted average temperature reduction achieved among asphalt mix produced at reduced temperature was 26.4°F (compared to 25.9°F in 2022). The weighted average temperature reduction achieved among all asphalt mix produced during the 2023 construction season was 4.7°F (compared to 6.1°F in 2022).

Table 17: Temperature Distribution of WMA Production at Reduced Temperature

WMA Technology at Reduced Temperature	10° – 30° F	31° – 50° F	51° F or more
Percentage	69.3%	28.4%	2.3%
Total (Tons, Millions)	54.6	22.4	1.8

Other Recycled Materials

Starting with the 2012 construction season survey, a series of questions was asked about the use of other recycled materials in asphalt mixtures. The information requested in the survey is detailed in Appendix A and summarized in Table A1, Section 5.

Producers were asked how many tons of mixture were produced that incorporated other recycled materials, as well as how many tons of specific materials were used in mixture production during the 2023 construction season. In some cases, respondents provided only the tons of asphalt mixture produced using other recycled materials or only the tons of the other recycled materials used, not both. Four recycled materials — recycled tire rubber (RTR), steel slag, blast furnace slag, and cellulose fibers — were specifically listed in the survey. Respondents could specify up to two additional recycled materials used in mixtures.

Because the response rate to these questions about other recycled materials was expected to be low and because producers may not track the use of these materials, state and national estimates of total quantities used for these materials were not calculated. **All values in this section are reported values *only* and do not represent estimates of the total quantity of these materials used in each state or nationally.** Year-to-year variation in reported values is entirely dependent upon the makeup of the respondents to each year's survey. Where available, third-party data is referenced to provide an understanding of the estimated total usage of these materials.

A total of 70 companies from 22 states, 34.3 percent of survey respondents, reported using more than 813,000 tons of other recycled materials in about 5.8 million tons of asphalt mixtures during the 2023 construction season.

Recycled Tire Rubber

Table 18 summarizes reported information on the use of RTR, also referred to as ground tire rubber (GTR). Ten producers from 7 states reported using RTR in some asphalt mixtures. Information about the use of RTR in surface treatments, such as chip seals, was not within the scope of this survey. About 68 percent of the total reported asphalt mixture tonnage produced using RTR came from California, where legislative mandates require the wide-spread use of RTR in asphalt pavements (Caltrans, 2017). The total reported tons of asphalt mixture using RTR decreased approximately 85 percent to 459,349 tons (about 0.1 percent of total reported tons for 2023) in the 2023 construction season survey.

While the tonnage produced that incorporates RTR is relatively straightforward to track and report, the tons of RTR used is harder to document due to different methods of producing mixtures that incorporate RTR and the likelihood that RTR is either preblended with binder at the terminal or blended onsite by a third party. Given these factors,

producer reports of tons of RTR used versus tons of asphalt mixture produced using RTR were given a heightened level of scrutiny to determine if the reported data was within a reasonable range. When reported tons of RTR fell outside the expected range, producers were contacted to obtain correct values.

To give a picture of the total market size for RTR, the U.S. Tire Manufacturers Association (USTMA) reports that an estimated 1.3 million tons of U.S. scrap tires were ground into RTR in 2023. Of this, about 12 percent (160,000 tons) of RTR was used in asphalt pavement mixtures and surface treatments, such as seal coats, in 2023 (USTMA, 2024). USTMA conducts its scrap tire analysis biennially, the RTR use reported by 2023 construction season survey respondents makes up more than 34 percent of the total RTR estimated by USTMA as used in asphalt pavement mixtures and surface treatments.

Table 18: Reported Tons of Asphalt Mixtures Using Recycled Tire Rubber and Reported Tons of RTR Used, 2019–2023

State	Reported Tons of Asphalt Mixtures Using RTR					Reported Tons of RTR Used				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Alabama	—	—	7300	—	—	—	—	54	—	—
Arizona	251,350	214,408	158,135	339,642	86,000	2,554	1,689	1,077	1,698	1,200
Arkansas	—	—	—	—	—	—	—	—	—	—
California	706,014	542,718	726,455	2,624,054	311,972	8,587	8,901	11,342	47,416	3,675
Georgia	6,667	200,000	102,455	50,000	—	33	1200	675	250	—
Illinois	—	15,400	66,755	146,533	—	—	100	583	1,310	—
Kentucky	1,000	—	5,000	2,500	2,757	5	—	60	8	6
Maine	—	—	12,000	—	—	—	—	80	—	—
Massachusetts	145,218	172,380	8,000	25,400	23,108	2,463	2,998	105	352	320
Michigan	3,500	80,000	—	5,000	12,500	5	3,000	—	30	101
Minnesota	—	—	—	250	—	—	—	—	1	—
Missouri	30,000	25,000	10,000	9,200	1,012	1,500	157	70	36	5
Oklahoma	—	15,000	30,000	25,000	—	—	12	300	600	—
Pennsylvania	40,000	69,000	—	—	—	160	890	—	—	—
Texas	5,500	9,500	5,025	8,715	22,000	52	78	60	32	151
Utah	—	—	—	38,661	—	—	—	—	386	—
Virginia	34,000	—	—	—	—	156	—	—	—	—
Total	1,223,249	1,343,406	1,131,125	3,274,955	459,349	15,515	19,025	14,406	52,146	5,458
No. of Companies	14	18	20	18	10					

NCR = No Companies Responding

— = No Use Reported

Steel & Blast Furnace Slag

Table 19 summarizes the reported use of steel slag and blast furnace slag in asphalt mixtures. Producers in eight states reported using steel slag, and in five states reported using blast furnace slag during the 2023 construction season; in four of these states —Alabama, Indiana, Iowa, and Michigan— producers reported using both. Not surprisingly, the reported use of slags in asphalt pavement mixtures is most common in regions with steel and iron production industries and thus a relatively available supply of slag aggregates (NSA, n.d.), as seen in Figure 19.

While the total tons of asphalt mixture and materials for each slag type vary from year to year, there was a downward trend in the reported combined use of both slags for 2014 through 2016, as illustrated in Figure 20, but rebounded significantly in 2017 and 2018. The reported slag utilization had been on the decline, with use in 2019 decreasing 36 percent and then 2020 decreasing 31 percent, rebounding in 2021 by 54 percent, then declining 41 percent again in 2022, but with a slight increase of 1.7 percent in 2023 in year over comparisons. The fluctuating number of companies reporting slag use and the specific companies that did or did not participate in each survey impact these utilization trends. There was no reported use of foundry sand in 2023, which matched 2022, 2021, 2020 and 2019.

The U.S. Geologic Survey estimates that about 16.0 million tons of iron and steel slag was sold in 2023, divided as 54 percent blast furnace slag and the remaining percentage being steel slag (USGS, 2025). About 13 percent of this (2.08 million tons) was estimated as used in asphalt pavement mixtures in 2019 (Tuck, 2024). With 789,172 tons of slag materials reported as being used in asphalt mixtures during the 2023 construction season, this survey captures approximately 38 percent of total slag estimated to be used in asphalt pavement mixtures. For the states reporting slag use, more than 8 percent of their total reported asphalt pavement mixture tonnage includes steel and/or blast furnace slag.

Table 19: Reported Tons for Steel Slag, Blast Furnace Slag, & Foundry Sand and Tons of Asphalt Mixture Using Each Material, 2019–2023

State & Material	Reported Tons of Mixture Using Material					Reported Tons of Material Used				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Alabama	985,015	741,000	1,104,097	250,000	334,083	190,252	163,500	225,179	62,500	77,484
Arkansas	63,901	131,500	25,874	147,000	49,767	5,195	24,500	4,770	29,000	9,953
Illinois	1,466	81,000	105,000	25,000	12,000	450	19,000	31,500	3,000	2,200
Indiana	84,997	194,546	214,614	49,659	114,285	72,937	54,301	63,591	9,492	31,894
Iowa	2,500	30,000	12,500	30,000	50,000	900	7,500	2,500	4,500	10,000
Kentucky	25,000	—	—	—	—	2,500	—	—	—	—
Michigan	1,400,000	1,964,335	1,739,824	615,947	175,000	215,000	285,000	121,755	148,189	23,500
Minnesota	102,000	25,000	—	—	—	15,000	5,000	—	—	—
Mississippi	36,187	120,075	—	—	—	1,394	4,683	—	—	—
Missouri	22,430	—	—	25,000	2,028	3,645	—	—	5,000	304
Ohio	155,000	225,000	130,000	45,000	—	32,000	45,000	28,000	9,000	—
Washington	367,000	338,000	350,000	357,000	431,000	36,000	35,000	49,000	48,000	55,000
Total	3,245,496	3,850,456	3,681,909	1,544,606	1,168,163	575,273	643,484	526,295	318,681	210,335
No. of Companies	14	18	17	13	15					
Blast Furnace Slag										
Alabama	252,653	122,000	173,279	—	100,000	54,530	13,500	15,145	—	20,000
Illinois	505	8,000	—	—	—	100	4,00	—	—	—
Indiana	972,970	256,356	1,431,913	194,303	447,561	319,465	29,000	434,037	42,916	144,581
Iowa	1,000	—	12,500	—	34,500	350	—	2,500	—	4,665
Kentucky	80,000	—	—	—	—	20,000	—	—	—	—
Michigan	319,449	138,889	1,005,778	1,700,302	2,218,726	116,670	14,000	183,875	318,045	326,559
Missouri	—	—	—	55,000	—	—	—	—	3,000	—
Ohio	623,238	590,996	628,558	278,560	184,099	155,758	151,770	156,945	93,702	83,032
Pennsylvania	—	5,000	—	—	—	—	2,500	—	—	—
Total	2,249,815	1,121,241	3,252,028	2,228,165	2,984,886	666,873	214,770	792,502	457,663	578,837
No. of Companies	14	13	12	11	13					

— = No Use Reported

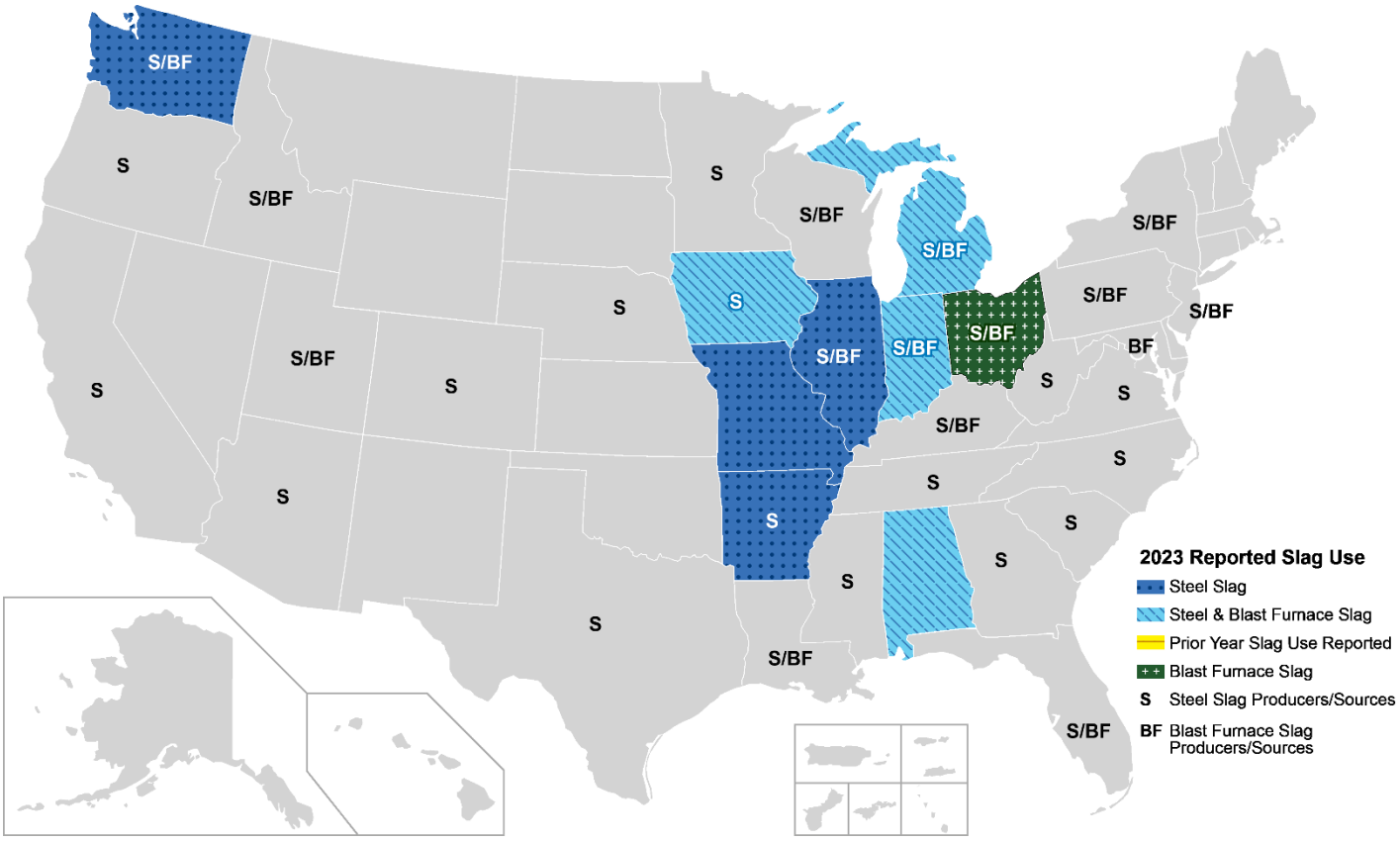


Figure 19: States Reporting Steel and/or Blast Furnace Slag Use and Slag Producers/Sources, 2023

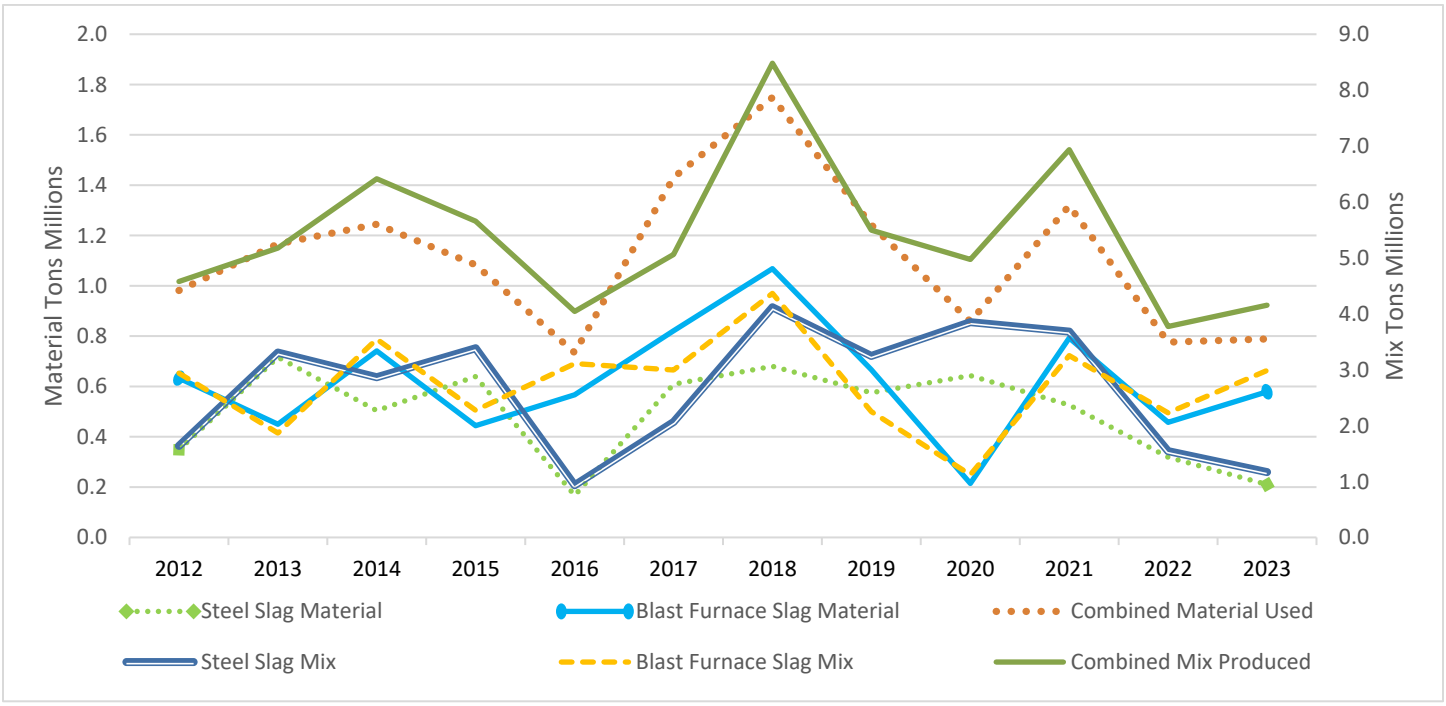


Figure 20: Steel and Blast Furnace Slag Use, 2012–2023

Recycled Fibers

Table 20 summarizes the use of various types of recycled fibers used in asphalt mixtures. For the 2019 through 2023 construction season, producers only reported using recycled cellulose fibers. The reported use of cellulose fiber increased significantly beginning in 2015, due to the specific request for data about cellulose fiber starting with the 2015 construction season survey. As explained in Appendix A, in previous years, reporting data about cellulose fiber use was at the discretion of the respondent. During the 2023 construction season, producers from 15 states reported using more than 1,800 tons of recycled fibers in more than 837,000 tons of asphalt pavement mixture.

Table 20: Recycled Fibers, 2019–2023

State & Material	Reported Tons of Mixture Produced Using Recycled Fibers*					Reported Tons of Other Recycled Fibers*				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Cellulose Fibers										
Alabama	4,232	132,817	40,000	100,000	301,665	18	773	90	55	556
Arkansas	—	600	—	—	—	—	2	—	—	—
California	33,621	57,148	43,726	98,350	—	109	86	22	49	—
Colorado	—	—	—	59,335	—	—	—	—	130	—
Connecticut	—	2200	1,758	1,102	1,322	—	7	1	1	2
Delaware	—	15,000	20,000	15,000	—	—	500	6	15	—
Dist. of Columbia	28,000	1,065	500	—	—	100	4	1	—	—
Florida	35,500	—	161,300	324,918	88,881	124	—	484	749	398
Georgia	304,877	425,000	113,384	93,300	—	1,045	1,300	304	189	—
Idaho	—	—	—	—	—	—	—	—	—	—
Illinois	—	442,900	90,131	109,995	30,400	—	1,320	283	250	91
Indiana	—	—	—	—	25,000	—	—	—	—	2
Kentucky	—	—	—	150,000	—	—	—	—	150	—
Louisiana	—	—	—	1,000	47,752	—	—	—	2	94
Maryland	—	115,000	65,000	65,000	25,000	—	2090	87	150	10
Massachusetts	—	350	—	—	—	—	1	—	—	—
Michigan	152,865	60,000	4,100	15,000	—	174	80	4	35	—
Minnesota	12,000	152,200	5,800	4,700	—	100	506	2	3	—
Mississippi	133,236	218,794	18,899	71,324	101,532	513	534	57	146	178
Missouri	36,458	153,000	63,400	55,000	—	166	325	190	128	—
New York	1,160	9,000	1,000	—	200	5	5	1	—	1
North Carolina	—	—	—	3,000	—	—	—	—	7	—
North Dakota	—	60,000	—	—	20,000	—	180	—	—	20
Ohio	1,350	—	—	—	—	3	—	—	—	—
Oklahoma	—	47,000	—	45,000	5,000	—	26	—	110	3
Oregon	50,000	—	—	—	—	165	—	—	—	—
Pennsylvania	17,717	63,880	5,000	11,000	—	52	540	10	17	—
South Carolina	—	—	—	—	40,000	—	—	—	—	2
South Dakota	—	—	20,000	—	—	—	—	65	—	—
Tennessee	—	—	16,000	41,430	15,466	—	—	48	92	46
Texas	215,000	63,000	50,016	177,000	50,000	235	13	146	198	150
Utah	277,000	128,400	71,301	500	—	530	302	213	1	—
Virginia	90,000	50,000	55,500	137,224	—	271	50	167	337	—
Washington	—	—	100,000	—	—	—	—	300	—	—
Wisconsin	—	52,000	500	67,000	85,000	—	104	1	133	300
Total	1,825,618	1,393,016	2,249,354	1,646,178	837,218	3,610	8,748	2,482	2,947	1,853
No. of Companies	28	42	31	34	20					

*Not all producers reporting tonnages of mixtures using other recycled materials provided quantities of recycled materials used and vice versa.
NCR = No Companies Responding; — = No Use Reported

Coal Combustion Products

Several waste and by-products associated with the burning of coal to produce electricity, including fly ash, bottom ash, boiler slag and flue-gas desulfurization (FGD) materials, are used in asphalt pavement mixtures as a cost-effective mineral filler that can help increase mixture stiffness and reduce asphalt drain down. In the 2023 construction season survey, fly ash was the only one of these coal combustion products (CCP) reported as being used, as shown in Table 21. In previous survey years, limited use of bottom ash was reported in 2012 in South Dakota and in 2015 in Texas.

To give a picture of the total use of CCP in asphalt pavement mixtures, the American Coal Ash Association found that some 12,663 tons of fly ash, no bottom ash, no boiler slag, and no FGD material from dry scrubbers and others were used as mineral filler in asphalt in 2022 (ACAA, 2023). Fly ash usage reported for the 2023 construction season survey is about 78 percent of total fly ash used as a mineral filler in asphalt pavements; however, only a very small amount (0.005 percent) of the 46.8 million tons of coal combustion products produced in 2023 were used in asphalt mixtures, according to ACAA (2023). Unlike with slags, there has not been an apparent correlation between the location of coal-fired power plants and the use of CCP in asphalt pavement mixtures.

Table 21: Reported Tons of Asphalt Mixtures Using Coal Combustion Products and Reported Tons of CCP Used, 2019–2023

State & Material	Reported Tons of Asphalt Mixtures Using CCP*					Reported Tons of CCP Used*				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Fly Ash										
Alabama	—	51,417	—	—	—	—	2,007	—	—	—
Georgia	—	50,000	—	—	—	—	2,000	—	—	—
Illinois	—	12,000	—	—	—	—	300	—	—	—
Michigan	30,000	—	—	—	—	700	—	—	—	—
Mississippi	39,687	120,075	—	—	37.000	1,076	3,242	—	—	1,475
Missouri	—	110,000	—	—	—	—	2,334	—	—	—
North Dakota	—	60,000	—	—	20,000	—	2,400	—	—	20
Oklahoma	—	—	—	—	16,000	—	—	—	—	200
South Carolina	—	—	10,000	30,550	108,198	—	—	700	1,528	6,400
South Dakota	—	—	20,000	—	—	—	—	400	—	—
Texas	175,000	—	—	—	—	8,750	—	—	—	—
Utah	—	—	16,000	—	—	—	—	600	—	—
Wisconsin	—	32,000	—	10,400	43,825	—	1,600	—	775	1,753
Total (All CCP)	244,687	435,492	46,000	40,950	225,023	10,526	13,883	1,700	2,303	9,848
No. of Companies	4	8	3	2	6					

*Not all producers reporting tonnages of mixtures using other recycled materials provided quantities of recycled materials used and vice versa.
NCR = No Companies Responding
— = No Use Reported

Other Recycled Materials

Table 22 summarizes other recycled materials reported as used in asphalt mixtures, for the 2023 construction season producers reported using blasting sand, mineral filler, recycled glass, and recycled plastics. In previous years, producers have also reported the use of plant start-up waste, crushed concrete aggregate, marble production dust, and petroleum-contaminated soil in asphalt pavement mixtures.

Table 22: Other Recycled Materials, 2019–2023

State & Material	Reported Tons of Mixture Produced Using Other Recycled Material*					Reported Tons of Other Recycled Material Used*				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Blasting Sand										
South Carolina	—	25,000	—	—	—	—	5,000	—	—	—
Texas	—	—	—	—	100,000	—	—	—	—	5,000
Marble Production Dust										
Georgia	—	50,000	—	—	—	—	500	—	—	—
Mineral Filler										
Indiana	—	—	—	—	10,000	—	—	—	—	1
Plant Start-Up Waste										
Missouri	—	5,000	6,000	—	—	—	500	600	—	—
Recycled Glass										
Michigan	—	—	—	—	750	—	—	—	—	125
Recycled Toner Pellets										
Virginia	—	—	125,200	113,250	—	—	—	375	340	—
Recycled Plastic - Polyethylene & LDPE (rPE)										
Louisiana	—	—	—	1,000	—	—	—	—	5	—
Michigan	—	—	—	—	3,000	—	—	—	—	1
Missouri	—	—	—	—	1,712	—	—	—	—	9
Pennsylvania	—	—	1,600	—	—	—	—	1	—	—
Texas	—	—	—	—	45,000	—	—	—	—	2,250
Wisconsin	—	1,000	—	—	—	—	5	—	—	—
Total	—	81,000	132,800	114,250	160,462	—	6,005	976	345	7,386

* Not all producers reporting tonnages of mixtures using other recycled materials provided quantities of recycled materials used and vice versa.
NCR = No Companies Responding; — = No Use Reported

In-place Recycling

Starting with the 2019 construction season survey, a supplemental survey was conducted to gather information about the use of in-place recycling techniques. The specific in-place recycling techniques the survey asked about included cold in-place recycling, hot in-place recycling, cold central plant recycling, and full-depth reclamation techniques. The information requested in the survey is detailed in Appendix A and summarized in Table A3, Sections 1 and 2.

Contractors were asked the quantity of recycled asphalt pavement processed as part of each in-place recycling technology during the 2023 construction season. Because different units of measurement may be used for each in-place recycling technology, respondents were asked to provide both a quantity and the unit of measure, for example tons, metric tonnes, cubic yards, square yards at inches of thickness, and so forth. All values provided within this report will be in tons; respondent quantities that were provided in a unit of volume were converted to tons with a compacted unit weight of 149.3 lbs. per cubic foot.

Because the response rate to the supplemental survey on in-place recycling remains low, state and national estimates of total quantities used for these materials were not calculated. **All values in this section are reported values *only* and do not represent estimates of the total quantity of these materials used in each state or nationally.**

A total of 25 companies, from the four User Producer Group regions, reported using more than 6.4 million tons of recycled asphalt pavement while completing the in-place recycling process during the 2023 construction season.

In-Place Recycling Use by User Producer Group Region

Figure 21 shows the total reported tons for cold in-place recycling, hot in-place recycling, cold central plant recycling, and full-depth reclamation techniques separated by User/Producer Group (UPG) region during the 2023 construction season. The North Central Asphalt User/Producer Group (NCAUPG) region had the most respondents (11 companies); the region also accounted for 38 percent of the in-place recycling tonnage reported for 2023. The NCAUPG region had tonnage reported for HIR, CIR and FDR techniques with FDR being 64 percent and the highest tonnage for the region. The North East Asphalt User/Producer Group (NEAUPG) had the lowest response rate, 3 respondents, to the in-place recycling survey in 2023. The Southeastern Asphalt User/Producer Group (SEAUPG) and the combined Rocky Mountains Asphalt User/Producer Group (RMAUPG) and Pacific Coast Conference on Asphalt Specification (PCCAS) regions, had 6 and 5 companies respond respectively. The combined RMAUPG and PCCAS regions had tonnage reported for CCPR, CIR, and FDR techniques, while the SEAUPG region had no reported tonnage for CCPR. The total reported tonnage was down (70 percent) from 11.1 million tons in 2022, to 6.4 million tons in 2023, with responses decreasing (52 percent) from 38 companies in 2022 to 25 companies in 2023.

Region	Companies	(tons)			
		HIR	CCPR	CIR	FDR
NCAUPG	11	6,944	0	868,764	1,621,526
SEAUPG	6	95,200	0	107,260	1,283,246
RMAUPG / PCCAS	5	0	32,328	481,003	869,176
NEAUPG	3	0	0	259,000	854,122
2023 Totals	**25**	**102,144**	**32,328**	**1,7116,027**	**4,628,070**
2022 Totals	**38**	**609,840**	**115,000**	**5,305,960**	**5,110,927**
2021 Totals	**25**	**50,000**	**93,205**	**1,669,084**	**3,013,494**
2020 Totals	**21**	**430,682**	**494,500**	**1,317,655**	**1,461,807**
2019 Totals	**28**	**319,600**	**8,400**	**2,100,952**	**1,830,416**

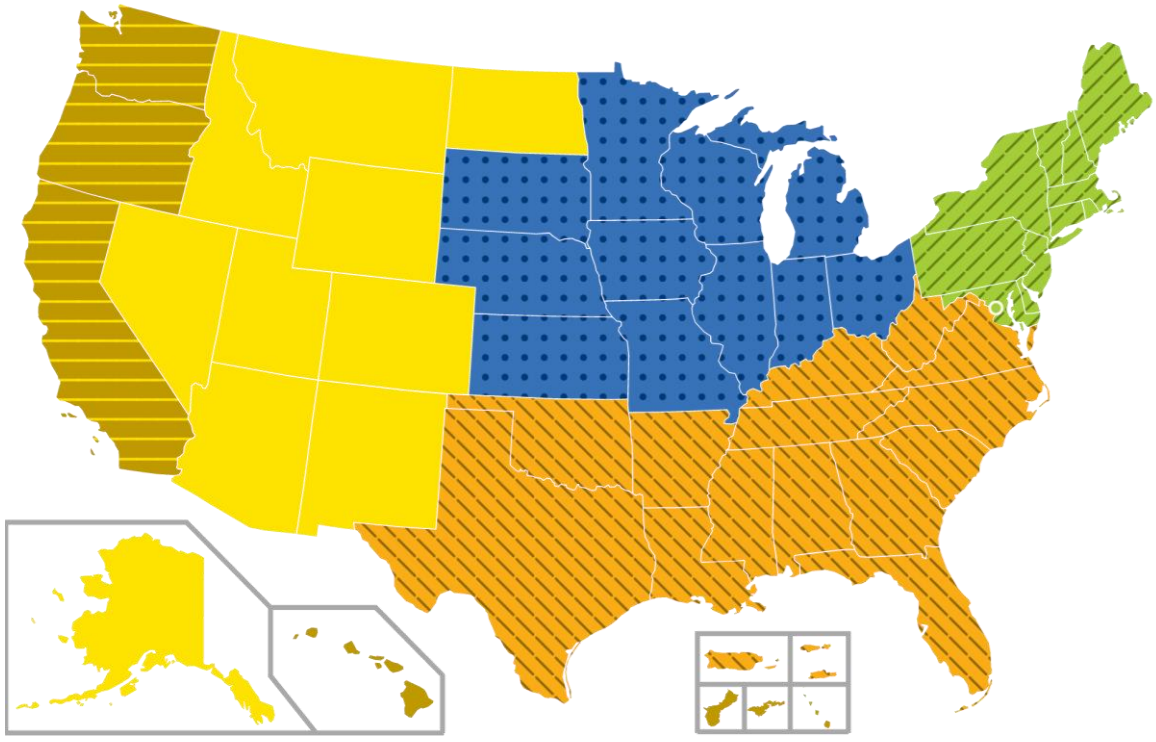


Figure 21: In-place Recycling Tonnages, 2023

Historical Trends

Since 2009 this annual survey has quantified and documented the use of recycled materials and WMA produced by the asphalt pavement mixture production industry. Throughout the report there are figures and tables provided which show production changes and trends that have occurred over this time period.

Historical trends from the 2009 to 2023 construction season surveys:

- The year over year change in total asphalt mixture production has been relatively stable over the history of the survey, with 2019 (8% increase in tonnage compared to 2018) and 2021 (6% increase in tonnage compared to 2020) being the only years with over a 5 percent change. Figure 2 provides the annual asphalt mixture production estimates and illustrates that 2012, 2013, 2020 and 2023 are the four construction seasons that saw a downturn in production, with - 2 percent, - 3 percent, - 3 percent, and -0.5 percent respectively.
- The national average percent RAP utilized in asphalt mixtures has gradually increased since 2009, with a 40 percent overall increase in average percent RAP, starting at 15.6 percent RAP in 2009 and reaching 21.9 percent in 2023. Figure 3 provides a graphical illustration of the tonnage of RAP that has been utilized as a result of the increased percent utilization on the asphalt production tonnages over the history of the survey.
- RAS tons utilized in asphalt mixtures peaked in 2014 and steadily decreased in utilization for all sectors through 2020, but then had a 7 percent increase in utilization for 2021 and 2022, followed by an 18 percent increase for the 2023 construction season. Figure 9 and Figure 10 show the annual tonnages of RAS utilization and provide visuals on the decreasing use by all sectors since reaching the peak utilization level.
- WMA has seen growth in all sectors since 2009, with the accumulated growth over the history of the survey in 2023 of more than 924 percent from the estimated 16.8 million tons of WMA production in the 2009 construction season. The estimated annual WMA production for each sector is provided in Table 16.
- The majority of the WMA market is made up of two WMA technologies, plant-based foaming, and chemical additives. Plant-based foaming peaked in 2011 at over 95 percent of the market while that was the low for the chemical additive technology at just 4 percent of the market in 2011. As seen in Table 15 and Figure 18, plant-based foaming has steadily decreased since 2011 and chemical additives have steadily increased market share, with plant-based foaming at 30 percent and chemical additives at 68 percent in 2023.
- Additionally, the survey has collected new information and provided further details over its history. Most recently collecting additional information on amount of temperature reduction while employing warm mix additives, which started with the 2021 Construction season. Other recent additions include the collection of in-place recycling techniques which started for the 2019 construction season.

Summary and Conclusions

The objective of this survey was to quantify the use of recycled materials and WMA produced by the asphalt pavement mixture production industry during the 2023 construction season. Asphalt mixture producers from 49 states and the District of Columbia completed the 2023 survey. Responses came from 201 companies with data from 1,079 production plants. Data collected was compared to annual data from previous surveys since the 2009 construction season.

The survey findings for 2023 regarding the use of RAP, RAS, and WMA are summarized in Table 4.

Comparing the 2023 results to the 2022 construction season, estimated total asphalt mixture production saw a decrease to 439.7 million tons from 441.9 million tons, a 0.5 percent decrease. DOT tonnage increased 7.5 percent, mixture production for the Other Agency sector decreased by 2.5 percent, and the Commercial and Residential sector also decreased by 8 percent from 2022 to 2023.

The use of RAP has risen dramatically since the 2009 construction season survey; but 2023 saw a small decrease in RAP tonnage used in asphalt mixtures of 2 percent below 2022, which was driven by both decreased asphalt mixture tonnage in 2023 and a decrease (0.3 percent) in the average percentage of RAP utilized in the production of new asphalt mixtures.

The 2023 construction season survey shows:

Reclaimed Asphalt Pavement

- The total estimated tons of RAP used in asphalt mixtures was 96.1 million tons in 2023. This represents a 71.6 percent increase in the total estimated tons of RAP used in 2009. During the same time frame, total asphalt mixture tonnage increased only 22.7 percent.
- The percentage of producers reporting use of RAP was 99.5 percent of respondents for 2023.
- The average percent RAP used by all sectors has seen variable growth from 2009 to 2023. The average estimated percentage of RAP used in asphalt mixtures has increased from 15.6 percent in 2009 to 21.9 percent in 2023.
- Companies reporting having stockpiled RAP on hand at year-end increased from 97.4 percent in 2022 to 99.0 percent in 2023. In total, producers accepted an estimated 111.0 million tons and used an estimated 108.1 million tons in 2023.
- Reclaiming 111 million tons of RAP for future use saved about 67.3 million cubic yards of landfill space.
- The total estimated amount of RAP stockpiled nationwide at the end of the 2023 construction season was 172 million tons.
- Producers from 29 states reported fractionating RAP. Nationally, a reported 21 percent of RAP is fractionated.
- Producers from 25 states reported using softer binders and 21 states reported using recycling agents in RAP mixtures. There was little correlation between the percentage of RAP used in asphalt pavement mixtures and the use of softer binders and/or recycling agents in a given state.

Reclaimed Asphalt Shingles

- Use of both recycled MWAS and PCAS in asphalt mixtures increased (18 percent) from an estimated 673,000 tons in 2022 to 797,000 tons in 2023.
- The amount of unprocessed RAS accepted by asphalt mixture producers increased from 641,000 tons in 2022 to 839,000 tons in 2023. An estimated 532,000 tons of processed RAS was also accepted by producers, which was about 176,000 tons more processed RAS than was accepted in 2022. The combined amount of unprocessed and processed RAS accepted in 2023 was 1,371,000 tons, which was 313,000 tons more RAS than was used for all purposes during the 2023 construction season.
- Of the unprocessed RAS accepted by producers in 2023, 698,000 tons was PCAS and 141,000 tons was MWAS.
- Of the RAS used in 2023, 75 percent of the reported use was in asphalt mixtures, with 19% being used as aggregate, and 6% being used for other civil engineering applications. No producers reported landfilling of RAS during the 2023 construction season.
- The percent of producers reporting use of RAS increased from 21.2 percent of respondents in 2022 to 23.9 percent in 2023.
- The total estimated amount of RAS stockpiled nationwide at the end of the 2023 construction season was 1.18 million tons.
- Accepting 839,00 tons of unprocessed RAS from both PCAS and MWAS sources diverted about 510,000 cubic yards of material from landfills.

- The number of states with producers reporting RAS use was 24 in 2023.
- Commercial & Residential sectors allow the use of RAS in most states, with more limited use in DOT and Other Agency public sector mixtures, according to producer and SAPA reports. No states reportedly allow the use of RAS in all mixes for all sectors, and five states reportedly do not approve the use of RAS in asphalt pavement mixtures for any sector.
- Producers from 13 states reported using softer binders and five states reported using recycling agents in RAS mixtures.

Material Cost Savings

- The use of RAP and RAS saved more than $4.5 billion during the 2023 construction season compared to the use of all virgin materials. These savings help reduce material costs for asphalt pavement mixtures, allowing road owners to achieve more roadway maintenance and construction activities within limited budgets.
- The diversion of RAP and RAS from landfills during the 2023 construction season saved more than 67 million cubic yards of space in construction and demolition landfills, as well as more than $5.5 billion in gate fees associated with the disposal of RAP and RAS.

Other Recycled Materials

- A reported total of more than 813,000 tons of other recycled materials was used in about 5.8 million tons of asphalt mixtures by 70 companies in 22 states during the 2023 construction season.
- Ten producers from 7 states reported use of recycled tire rubber (RTR) in asphalt mixtures during the 2023 construction season. The total reported tons of asphalt mixture using RTR decreased 86 percent from 2022 to 459,349 tons in the 2023 construction season.
- Producers in 9 states reported use of steel or blast furnace slags, and no states reported the use of foundry sand in 2023. Compared to reported use in 2022, the reported tons of mixtures including steel slag and mixtures including blast furnace slag increased 10 percent during the 2023 construction season. Reported use of these materials was concentrated along the Mississippi and Ohio River Valleys, where much of U.S. steel and iron production is concentrated.
- Producers in five states reported using fly ash in asphalt mixtures in 2023. Fly ash was the only coal combustion product (CCP) reported as being used in asphalt pavement mixtures during the 2023 construction season.
- Producers in 15 states reported use of more than 1,800 tons of recycled cellulose fiber in more than 837,000 tons of asphalt pavement mixtures during 2023.

Warm Mix Asphalt

The use of WMA technologies has increased significantly since 2009. The 2023 construction season survey shows:

- The estimated total tonnage of asphalt pavement mixtures produced with WMA technologies for the 2023 construction season was 172.0 million tons. This was a 1.7 percent decrease from the estimated 175.0 million tons of mixture produced with WMA technologies in 2022 and a more than 923 percent increase from the estimated 16.8 million tons in the 2009 construction season.
- Mixtures produced with WMA technologies made up 39.1 percent of the total estimated asphalt mixture market in 2023. About 45.8 percent (78.8 million tons) of these mixtures were produced with a temperature reduction of at least 10°F.
- In addition, producers using WMA technologies in six states — Connecticut, Louisiana, Nevada, New Mexico, Oregon, and Pennsylvania — reported producing more than 75 percent of their total tonnage with WMA technologies.

- Production plant foaming, representing 30 percent of the market in 2023, was again the second most commonly used warm-mix technology, with utilization decreasing about 68.2 percent since its peak in the 2011 construction season.
- Chemical additive technologies accounted for 68 percent of the market in 2023, a 6 percent increase from their use in the 2022 construction season.
- The decrease in plant-based foaming technologies has been seen in the survey since 2011.
- There appears to be some variation in the use of WMA technology based upon production temperature.
- About 56 percent of survey respondents reported producing asphalt mixture with WMA technologies; 113 producers in 45 states reported using WMA technologies.

Conclusions

The 2023 survey results show that the asphalt pavement mixture production industry has a strong record of resource efficient practices and continues to innovate through the use of recycled materials and WMA. Since the initial industry survey of the 2009 construction season, producers have significantly increased their use of recycled materials and WMA; however, since the 2013 survey, indicators are that the rate of increase of adoption has slowed.

The amount of RAP received was 3.1 million tons more than what producers utilized during the 2023 construction season, with 99 percent of producers indicated they have stockpiled RAP on hand. With an estimated 171.8 million tons of RAP stockpiled nationwide at year-end 2023, opportunities remain to increase the amount of RAP used in asphalt mixtures through engineering, performance-based specifications, education, improved RAP processing, production equipment, and procedures.

RAS use saw an 18 percent increase in 2023 in asphalt pavement mixtures; by accepting 839,000 tons of waste shingles during 2023, producers diverted about 5.6 percent of the nation's available waste shingles for use in asphalt mixtures. An estimated 1.18 million tons of RAS was stockpiled nationwide at year-end 2023. As with RAP, performance-based specifications, education, improved processing, production equipment, and procedures will help increase the amount and percentages of RAS used in asphalt mixtures.

The asphalt pavement mixture production industry repurposes many products from other industries. The survey shows that, for the 2023 construction season, slag use was reported in 9 states, RTR use was reported in 10 states, recycled cellulose use was reported in 20 states, and fly ash use in five states.

The tonnage of asphalt pavement mixtures produced with WMA technologies saw a 1.7 percent decrease during the 2023 construction season with a total production of 172.0 million tons, which represents 39.1 percent of total estimated asphalt mixture production for the year. Producers in Delaware, Hawaii, Kansas, Montana, and North Dakota reported not producing mixtures with WMA technologies in 2023.

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14th Annual Asphalt Pavement Industry Survey
IS 138

NAPA
NATIONAL ASPHALT PAVEMENT ASSOCIATION

Asphalt Pavement Industry Survey on

Recycled Materials and Warm-Mix Asphalt Usage 2023

IS-138 Appendix A:
Methodology & Survey Forms

Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage: 2023 Appendix A

Appendix A to the fourteenth edition of *Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage* (Williams et al., 2025) provides details on the methodology used to collect and analyze the 2023 construction season survey data and reproduces the primary survey instruments used to collect data from asphalt pavement mixture producers and State Asphalt Pavement Associations (SAPA). Producers were asked primarily to provide company-/plant-level data, while SAPAs were asked to provide industry-level data for their state. In 2023, the supplemental survey was again fielded to gather information about the use of in-place recycling techniques.

Survey Methodology

To collect and analyze the data summarized in the main *Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage* report for the 2023 construction season survey, the following tasks were conducted:

1. Develop a survey instrument that enables an analysis of the quantities of recycled materials used in asphalt mixtures and the total amount of WMA produced nationally.
2. Conduct a voluntary survey of asphalt mix producers throughout the United States and follow up via telephone, email, and in-person requests for information in locations where responses were low.
3. Estimate the total asphalt mixture market in each state or territory by using data provided by SAPAs through the survey instrument and the U.S. Department of Transportation federal-aid highway apportionment to determine a weighting factor for each state and reconciling the total U.S. asphalt mix tonnage with national estimates.
4. Analyze and summarize the information nationally and in each state and to prepare a final report.

The survey was conducted using an online survey platform, SurveyMonkey®. Table A1 summarizes the questions asked in each section of the survey instrument. Sections 1 through 4 of the survey instrument remained consistent from the 2009 to 2014 construction seasons. Questions were added to or modified in Sections 2 through 4 for the 2015 to 2023 construction seasons to gather additional information about RAP and RAS stockpiling, fractionation, the use of softer binders and recycling agents, the acceptance of processed RAS, and the use of WMA technologies at HMA temperatures. In 2021, the Section 4 question on WMA production temperature reduction ranges was added to gather additional information. In 2017, the Section 3 question about tons of unprocessed shingles accepted was modified to ask about the type of unprocessed shingles accepted. In 2018, the Section 4 questions about the use of WMA additives at HMA temperatures were modified to gather additional information. Section 5 was added in the 2012 construction season survey to collect information on the use of other recycled material in asphalt mixtures. Starting in 2015, the Section 5 question asking about specific recycled materials was modified to replace one user-provided response with cellulose fiber. A copy of the survey used to gather information for the 2023 construction season is provided in the Survey Instrument section of Appendix A.

Producers were notified of the survey through several forums and electronic media. Notice were placed in NAPA's e-newsletter, *NAPA Weekly*, informing members of the survey and asking for their participation. SAPAs solicited participation by placing notices on their websites and in their newsletters. Announcements were made at NAPA meetings, as well as at several State Asphalt Pavement Association conferences. A press release was sent to construction industry trade media and was published in print and online. Notices of the survey and links were also shared through social media channels, primarily Facebook, and LinkedIn. Follow up with producers and SAPAs was conducted via email, social media, and telephone.

Table A1: Survey Instrument Summary: Producer Questions, 2023

Section 1: General Information	Section 2: RAP	Section 3: RAS	Section 4: WMA	Section 5: Other Recycled Materials
Type of Survey Respondent	Tons RAP Accepted	Tons Unprocessed Tear-Off Shingles Accepted	Average % Produced for DOT Tons With ≥10°F Reduction	Other Recycled Materials Used (Y/N)
Contact Information	Tons Used in HMA/WMA Mixes	Tons Unprocessed Manufacturers' Waste Shingles Accepted	Average % Produced for Other Agency Tons With ≥10°F Reduction	Type of Other Recycled Materials Used (GTR, Steel Slag, Blast Furnace Slag, Cellulose Fiber, Up to Two User-Provided Responses)
State Information Is Provided for	Tons Used in Aggregate Base	Tons Processed Shingles Accepted	Average % Produced for Commercial & Residential Tons With ≥10°F reduction	Tons of HMA/WMA Produced Using Each Other Recycled Material
Number of Production Plants	Tons Used in Cold-Mix Asphalt	Tons Used in HMA/WMA Mixes	Average % Produced with 10°F - 30°F, 31°F - 50°F, ≥50°F reduction	Tons of Each Other Recycled Product Used
DOT Tons	Tons Used in Other	Tons Used in Aggregate Base	Chemical Admixture % With ≥10°F Reduction	
Other Agency Tons	Tons Landfilled	Tons Used in Cold-Mix Asphalt	Additive Foaming % With ≥10°F Reduction	
Commercial & Residential Tons	Average % for DOT Mixtures	Tons Used in Other	Production Plant Foaming % With ≥10°F Reduction	
	Average % for Other Agency Mixtures	Tons Landfilled	Organic Additive % With ≥10°F Reduction	
	Average % for Commercial & Residential Mixtures	Average % for DOT Mixtures	Average % Produced for DOT Tons at HMA Temperatures	
	Excess RAP (Y/N)	Average % for Other Agency Mixtures	Average % Produced for Other Agency Tons at HMA Temperatures	
	Tons of RAP Stockpiled	Average % for Commercial & Residential Mixtures	Average % Produced for Commercial & Residential Tons at HMA Temperatures	
	Percentage of RAP Fractionated	Excess RAS (Y/N)	Chemical Admixture % at HMA temperatures	
	Percentage of RAP Mixtures Using Softer Asphalt Binder	Tons of RAS Stockpiled	Additive Foaming % at HMA temperatures	
	Percentage of RAP Mixtures Using Recycling Agents	What Sectors Allow What Level of RAS	Plant Foaming % at HMA temperatures	
		Percentage of RAP Mixtures Using Softer Asphalt Binder	Organic Additive % at HMA temperatures	
		Percentage of RAP Mixtures Using Recycling Agents		

Asphalt mixture producers then went to the SurveyMonkey website to complete the survey form. Because data was collected on a state-by-state basis, producers could complete the survey multiple times, providing information for operations in different states on each visit. Some producers submitted data through PDF versions of the survey instrument or through a Microsoft Excel spreadsheet developed by NAPA. After the initial data was gathered and analyzed, anomalies in individual producer records were identified and reconciled.

To collect industry-wide data from the SAPAs, the survey instrument included 7 questions focused on state-level information, as opposed to specific producer information. Table A2 summarizes these questions. In a few states without SAPAs, industry-wide data was provided by an Associated General Contractors (AGC) chapter or a similar knowledgeable source. Prior to 2018, this data was collected via a separate survey; starting in 2018, a single survey instrument was used with the first question ("Are you an Asphalt Producer, State Asphalt Pavement Association, or Other") determining whether the respondent should answer the producer or SAPA survey questions. Respondents indicating "Other" were not surveyed.

Table A2: Survey Instrument Summary: SAPA Questions, 2023

Section 1: General Information	Section 2: Tonnage	Section 3: RAP	Section 4: RAS	Section 5: Other Requirements
Type of Survey Respondent	Estimate of Total Tons Produced in State (All Sectors	Do Producers in State Fractionate RAP (Y/N)	What Sectors Allow What Level of RAS (DOT, Other Agency, Commercial & Residential)	Require, Allow, or Prohibit Use of Recycling Agents With RAP, RAS, RAP+RAS
Contact Information				
State Information Is Provided for				

Appendix B and certain tables in this report provide survey responses and estimated values at the state/territory level. To keep specific producer data confidential, no state-specific information is provided in the tables or appendixes if fewer than three producers from the state/territory responded to the survey. Information from states/territories with fewer than three responding companies is included in the estimated national values, however.

To gather information about the use of cold in-place recycling, hot in-place recycling, cold central plant recycling, and full-depth reclamation techniques, a supplemental survey was developed in 2019. All respondents to the main survey were asked to complete the supplemental survey if their company provided any in-place recycling or cold central plant recycling services. In addition to promoting the supplemental survey using the same channels as the main survey, NAPA worked with the Asphalt Recycling & Reclaiming Association (ARRA) to promote participation among its membership.

The supplemental survey was conducted using an online survey platform, SurveyMonkey®. Table A3 summarizes the six questions asked in the two sections of the survey instrument. A copy of the supplemental survey is also provided in the Survey Instrument section of Appendix A. Respondents were asked to complete separate copies of the survey for each state in which they operated. Because different units of measurement may be used for each in-place recycling technology, respondents were asked to provide either a quantity or the volume unit of measure, for example tons, metric tonnes, cubic yards, square yards at inches of thickness, and so forth.

Table A3: Survey Instrument Summary: Supplemental Survey on In-Place Recycling Questions, 2023

Section 1: General Information	Section 2: Total Quantities
Contact Information	Hot In-Place Recycling (HIR)
State Information Is Provided for	Cold Central Plant Recycling (CCPR)
	Cold In-Place Recycling (CIR)
	Full-Depth Reclamation (FDR)

Data Estimation Method

To determine the estimated total amount of RAP and RAS used and WMA produced nationwide and in each state/territory, the total amount of asphalt mix produced in each state/territory needed to be determined. Total tonnage of asphalt mix produced represents both commercial (i.e., private sector) and governmental (i.e., DOT and Other Agency) tonnages. Estimated tonnages were provided by SAPAs for 24 states, totaling more than 255 million tons.

To estimate the total tons in states where a SAPA estimate of total tonnage was not available, a linear relationship based on an examination of the relationship between SAPA-estimated tons and FY2023 federal-aid highway estimated apportionments (FHWA, 2025) for those states was determined, resulting in Equation A1. This is the same methodology used to estimate tonnage in previous versions of this survey, with the exception of using the estimated apportionments (before post-apportionment setasides; before penalties; before sequestration) for the first time in 2023, as detailed in Hansen & Newcomb (2011), with the formula updated annually as SAPA-reported estimates and federal apportionments for the states change.

$$\text{Total Estimated Tons} = [0.0111 \times (\text{State Federal Apportionment})] - 828{,}525 \qquad [A1]$$

As shown in Figure A1, 43 states and territories, along with multiple counties and municipalities across the nation, have acted to raise and/or otherwise dedicate additional local funds to transportation since 2012 (T4America, n.d.; Davis, 2019; NCSL, 2025). These additional and/or dedicated funds are not accounted for in Equation A1, which can lead to underestimation of total tonnage in some states. Similarly, because federal funding for the U.S. territories is through the Territorial and Puerto Rico Highway Program instead of state apportionment, estimates for these jurisdictions were calculated using Territorial and Puerto Rico Highway Program FY2023 funding levels (FHWA, 2025).

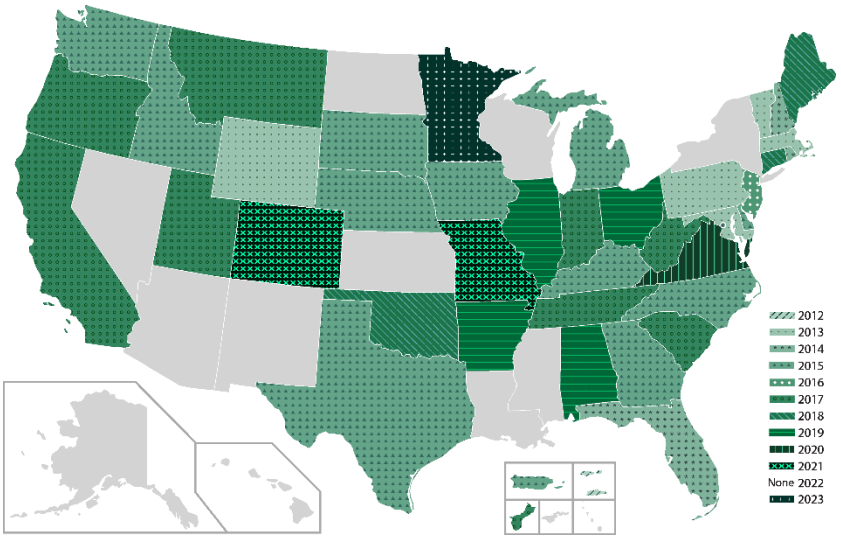

Figure A1: States Approving Measures to Increase and/or Dedicate Transportation Funding, 2012–2023

In addition, in some markets, asphalt pavement mixture may be produced in one state and placed in a neighboring state. Although producers are asked to report tonnage based upon the location where it is placed, it is possible that data about mixtures reported for one state may include data from mixtures placed in two or more states. This can lead to overreporting in one state and underreporting in another. For example, a producer in Washington, D.C., may have produced mixtures used in Virginia and Maryland too, but may report all tons produced as Washington, D.C., tonnage.

These caveats apply to the data reported in Appendix B and other state-level data included in this report; however, they have only minimal impact on the national values in the main report.

Survey Instrument

As outlined earlier, this appendix includes a copy of the survey instruments used to collect responses from participants. The majority of asphalt mixture producers participating in the survey used the online survey platform SurveyMonkey® to provide their responses. Some producers submitted their data through PDF forms or a Microsoft Excel spreadsheet developed by NAPA to collect the same information. The producer section of the survey instrument begins on page 7; the SAPA section begins on page 24. The supplemental survey begins on page 28.

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2023 Construction Season Survey Instrument – Producer Section

Purpose

The National Asphalt Pavement Association is working with the Federal Highway Administration to determine the amount of hot-mix asphalt (HMA), warm-mix asphalt (WMA), and recycled materials being produced and used in each state. This survey will be used to collect this data.

It is important for the industry that you complete this survey so that we have accurate information regarding the use of recycled materials and WMA and to identify areas needing assistance in implementation.

DATA FROM THIS SURVEY WILL BE CONFIDENTIAL AND WILL BE USED ONLY FOR THE PURPOSES OF DETERMINING THESE QUANTITIES. IT WILL NOT BE USED FOR ANY OTHER PURPOSE. DATA WILL BE REPORTED BY STATE ONLY, AND NO STATE-SPECIFIC DATA WILL BE REPORTED WHEN FEWER THAN THREE COMPANIES/BRANCHES RESPOND WITHIN A STATE, **NO COMPANY-SPECIFIC INFORMATION WILL BE DISCLOSED IN ANY WAY.**

Survey results will be shared with industry, government agencies, and officials to help in the implementation of recycling and warm-mix technologies. The data collected from this survey provides insight into trends, current practice, and is utilized to highlight the sustainability of asphalt mixtures. These results are also used by FHWA, Energy Information Administration, Environmental Protection Agency, and other federal, state, and local agencies to determine the impact of recycled materials and WMA.

By completing this survey you will be eligible to receive a complimentary copy of the full report.

Your participation is greatly appreciated.

*** 1. Are you a...**

- o Asphalt Producer
- o State Asphalt Pavement Association (or similar)
- o Other

Industry Contact Information

It is recommended that you print a copy of the full survey — **download a PDF** — to make sure you have the necessary data at hand before beginning the online survey.

Companies with multi-state operations are encouraged to **download a spreadsheet** to report their data. Please return the completed spreadsheet to Brett Williams, NAPA Director of Engineering & Technical Support, at bwilliams@asphaltpavement.org.

The following information will be used only to confirm that we do not get duplicate information from a company and to contact you if we have any questions regarding your answers. Contact Brett Williams at bwilliams@asphaltpavement.org or NAPA by phone at 888-468-6499 if you have any questions.

* **2. Company/Branch Name:**

* **3. Contact Person's Name & Address**

* **4. Contact Person's Email**

* **5. Contact Person's Phone Number**

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State

Please select the state for which you are providing the information.

If your branch operates in more than one state, please complete a separate questionnaire for each state. If a plant provides mix for more than one state, please divide the tonnage accordingly, using your best estimate if specific data is not available.

* **6. Which state is the information provided for?**

- ○ Alabama
- ○ Alaska
- ○ American Samoa
- ○ Arizona
- ○ Arkansas
- ○ California
- ○ Colorado
- ○ Connecticut
- ○ Delaware
- ○ District of Columbia
- ○ Florida
- ○ Georgia
- ○ Guam
- ○ Hawaii
- ○ Idaho
- ○ Illinois
- ○ Indiana
- ○ Iowa
- ○ Kansas
- ○ Kentucky
- ○ Louisiana
- ○ Maine
- ○ Maryland
- ○ Massachusetts
- ○ Michigan
- ○ Minnesota
- ○ Mississippi
- ○ Missouri
- ○ Montana
- ○ Nebraska
- ○ Nevada
- ○ New Hampshire
- ○ New Jersey
- ○ New Mexico
- ○ New York
- ○ North Carolina
- ○ North Dakota
- ○ Northern Mariana Islands
- ○ Ohio
- ○ Oklahoma
- ○ Oregon
- ○ Pennsylvania
- ○ Puerto Rico
- ○ Rhode Island
- ○ South Carolina
- ○ South Dakota
- ○ Tennessee
- ○ Texas
- ○ US Virgin Islands
- ○ Utah
- ○ Vermont
- ○ Virginia
- ○ Washington
- ○ West Virginia
- ○ Wisconsin
- ○ Wyoming

* **7. How many plants does this survey response cover?**

Number of plants

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Total Asphalt Tonnage for 2023

Please complete the following information for the total tonnage of all asphalt production in 2023.

* **8. What was your total tonnage of asphalt mixes in 2023 for the following sectors? (Use best estimate if data is not available.)**

State DOT:

Other Agency (City, County, FAA, Military, Toll Authorities)

Commercial & Residential

RAP Supply and Use 2023

Please complete the following information on the amount of RAP received and used for 2023.

* **9. Did you accept, process, or use RAP in the state during 2023?**

- Yes
- No

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RAP Supply and Use 2023

Please complete the following information regarding the amount of RAP received and used for 2023.

* **10. How many tons of reclaimed asphalt pavement and asphalt millings were accepted/delivered to your facilities in the state in 2023?**

Tons:

* **11. How many tons of RAP were used in 2023 for the following purposes? (Use best estimate if data not available.)**

Recycled Back into HMA/WMA Mixes:

Aggregate Base:

Cold Mix:

Other:

Landfilled:

* **12. What was the average RAP percentage used in asphalt mixes during 2023 for the following sectors? (Use best estimate if data not available.)**

State DOT:

Other Agency (City, County, FAA, Military, Toll Authorities)

Commercial & Residential

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RAP Supply and Use 2023

* **13. At the end of the year 2023 did you have excess RAP (processed or unprocessed) in inventory?**

- ○ Yes
- ○ No

* **14. Please estimate how many tons of RAP you had stockpiled at the end of 2023. (Use best estimate if data not available.)**

* **15. What percentage of the RAP processed is fractionated into two or more sizes? (Use best estimate if data not available.)**

* **16. What percent of mixes using RAP were produced using a softer grade of asphalt binder? (Use best estimate if data not available.)**

* **17. What percent of mixes using RAP were produced using recycling agents? (Use best estimate if data not available.)**

Reclaimed Asphalt Shingles (RAS) Supply and Use for 2023

* **18. Did you accept waste shingles and/or process or use reclaimed asphalt shingles (RAS) in 2023?**

- Yes
- No

Reclaimed Asphalt Shingles (RAS) Supply and Use for 2023

Please complete the following information regarding the amount of waste shingles received (processed and unprocessed) and used during 2023.

* 1**9. How many tons of shingles were accepted/delivered to your facilities in the state in 2023?**

Unprocessed Tear-off Shingles:

Unprocessed Manufacturers' Waste Shingles:

Processed Shingles:

* **20. How many tons of reclaimed asphalt shingles (RAS) were used for the following purposes in 2023? (Use best estimate if data not available.)**

Recycled into HMA/WMA Mixes:

Aggregate Base:

Cold Mix:

Other:

Landfilled:

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Reclaimed Asphalt Shingles (RAS) Supply and Use for 2023

*** 21. What was average RAS percentage used in asphalt mixes in 2023 for the following sectors? (Use best estimate if data not available.)**

State DOT:

Other Agency (City, County, FAA, Military, Toll Authorities):

Commercial & Residential:

*** 22. At the end of the year 2023 did you have any surplus RAS stockpiled? (Include processed and unprocessed shingles.)**

- ○ Yes
- ○ No

*** 23. Please estimate how many tons of RAS you had stockpiled at the end of 2023. (Use best estimate if data not available.)**

*** 24. Is RAS allowed in**

	ALL	SOME	NONE
DOT mixes	○	○	○
Other Agency mixes	○	○	○
Commercial and Residential mixes	○	○	○

*** 25. What percent of mixes using RAS were produced using a softer grade of asphalt binder? (Use best estimate if data not available.)**

*** 26. Please estimate how many tons of RAS you had stockpiled at the end of 2023. (Use best estimate if data not available.)**

Warm-Mix Asphalt Production for 2023

Warm-mix asphalt is the generic term for a variety of technologies that allow the producers of asphalt pavement material to lower the temperatures at which the material is mixed and placed on the road by at least 10°F. The survey will collect data for warm-mix technologies used at reduced temperature and at hot mix temperatures separately.

* **27. Did any of your plants in this state use warm-mix asphalt technologies in 2023?**

- o Yes
- o No

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Warm-Mix Asphalt Production for 2023

Warm-mix asphalt is the generic term for a variety of technologies that allow the producers of asphalt pavement material to lower the temperatures at which the material is mixed and placed on the road by at least 10°F.

* **28. What was average percent of mix tons produced using warm-mix asphalt technologies in 2023 for the different sectors? (Use best estimate if data not available.)**

State DOT:

Other Agency (City, County, FAA, Military, Toll Authorities):

Commercial & Residential:

* **29. Please estimate the percentage of the total warm-mix asphalt (WMA) that was produced in the following ranges of temperature reduction: (Use best estimate if data is not available, entries should total 100%)**

10°F – 30°F	
31°F – 50°F	
51°F or more of temp. reduction	

* **30. What percentage of the total warm-mix asphalt (WMA) for 2023 was produced using the following technologies? (Use best estimate if data not available, entries should total 100%)**

Chemical Admixture	
Additive (Zeolite) Foaming	
Plant Foaming	
Organic (Wax) Additive	
Blend	
* Please specify the Blend:	

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Warm-Mix Asphalt Production for 2023

*** 31. What was average percent of mix tons using warm-mix technologies for mixes produced at hot-mix temperatures (i.e., without lowering temperatures by at least 10°F.)**

State DOT:

Other Agency (City, County, FAA, Military, Toll Authorities):

Commercial & Residential:

*** 32. What percentage of the total warm-mix asphalt (WMA) produced at hot mix temperatures (i.e., without lowering temperatures by at least 10°F.) for 2023 was produced using the following technologies? (Use best estimate if data not available, entries should total 100%)**

Chemical Admixture	
Additive (Zeolite) Foaming	
Plant Foaming	
Organic (Wax) Additive	
Blend	
* Please specify the Blend:	

Other Recycled Material for 2023

Please let us know if you used any other recycled materials in HMA/WMA mixes in 2023.

* **33. Did you use other recycled materials (excluding RAP and RAS) in your mixes in 2023?**

(This includes materials added to the mix such as: ground tire rubber, blast furnace slag, steel slag, boiler slag, fly ash, bottom ash, foundry sand, other coal combustion products, glass, cellulose fibers, etc.)

- Yes
- No

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Other Recycled Material for 2023

*** 34. What other recycled material (excluding RAP and RAS) did you use in your mixes in 2023?**

	ALL	SOME	NONE
Ground Tire Rubber	○	○	○
Steel Slag	○	○	○
Blast Furnace Slag	○	○	○
Recycled Cellulose Fibers	○	○	○
Other 1*	○	○	○
Other 2*	○	○	○

* Please describe the other recycled materials used.

*** 35. How many tons of HMA/WMA was produced using this product? (Use best estimate if data not available.)**

Ground Tire Rubber	
Steel Slag	
Blast Furnace Slag	
Recycled Cellulose	
Other 1	
Other 2	

Other Recycled Material for 2023

*** 36. How many tons of the recycled product was used in 2023? (Enter 0 if you do not have a reasonable estimate of this quantity)**

Ground Tire Rubber	
Steel Slag	
Blast Furnace Slag	
Recycled Cellulose	
Other 1	
Other 2	

Thank You

* **37. Would you like a complimentary copy of the final report?**

- Yes
- No

If your company provides any of the following services: CIR, HIR, CCPR, or FDR, we ask that you to fill out a very short survey providing quantities of these activities in 2023. The link to the survey is here: 2023_IPR_Survey Thank you for your time in helping document some of the asphalt industries efforts in sustainability and recycling.

SAPA Contact Information

This survey is intended to collect information from State Asphalt Pavement Associations or similar associations. Please answer the following questions by May 1, 2023, to assist NAPA in preparing the 2023 Recycled Materials and WMA Survey. The additional information you provide us on RAP and RAS will enhance the information we provide in the survey report. Contact Brett Williams at bwilliams@asphaltpavement.org or NAPA by phone at 888-468-6499 if you have any questions.

* **38. Association Name:**

Contact

* **39. Name:**

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SAPA Information

*** 40. Which state is the information provided for?**

- Alabama
- Alaska
- American Samoa
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware
- District of Columbia
- Florida
- Georgia
- Guam
- Hawaii
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- Nevada
- New Hampshire
- New Jersey
- New Mexico
- New York
- North Carolina
- North Dakota
- Northern Mariana Islands
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Puerto Rico
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- US Virgin Islands
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming

*** 41. What is your best estimate of the total tons of asphalt mixture placed in your state in 2023? (This includes asphalt mixture tonnage for all sectors, ex. DOT, Other Agencies, Commercial & Residential) [2023 Estimates are provided below for your reference.]**

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SAPA Information

Table 3: Summary of 2022 Estimated and Reported Asphalt Mixture Tons in Each State

State	Tons, Millions		Reported % of Estimated	State	Tons, Millions		Reported % of Estimated
	Estimated	**Reported**			**Estimated**	**Reported**	
Alabama	7.0	3.8	55%	**Montana**	4.4	*	*
Alaska	5.3	*	*	**Nebraska**	3.0	*	*
American Samoa	0.02	NCR	NCR	**Nevada**	3.7	*	*
Arizona	7.8	*	*	**New Hampshire**	1.6	*	*
Arkansas	6.0	2.9	48%	**New Jersey**	10.0	3.8	38%
California	26.6	9.3	35%	**New Mexico**	3.9	*	*
Colorado	9.4	2.4	25%	**New York**	18.5	5.8	30%
Connecticut	5.2	*	*	**North Carolina**	13.0	12.4	96%
Delaware	1.6	*	*	**North Dakota**	2.6	*	*
District of Columbia	1.5	*	*	**No. Mariana Isl.**	0.02	NCR	NCR
Florida	19.0	8.0	42%	**Ohio**	18.0	10.2	57%
Georgia	14.1	6.9	49%	**Oklahoma**	5.2	3.5	67%
Guam	0.1	NCR	NCR	**Oregon**	5.4	2.9	53%
Hawaii	1.0	*	*	**Pennsylvania**	21.5	7.3	34%
Idaho	3.0	1.8	61%	**Puerto Rico**	1.4	NCR	NCR
Illinois	14.7	6.7	46%	**Rhode Island**	2.2	*	*
Indiana	14.5	7.0	49%	**South Carolina**	7.4	5.0	67%
Iowa	3.9	1.2	31%	**South Dakota**	2.9	*	*
Kansas	4.0	2.5	62%	**Tennessee**	9.2	3.5	38%
Kentucky	7.0	6.2	88%	**Texas**	52.5	8.3	16%
Louisiana	7.8	*	*	**U.S. Virgin Isl.**	0.1	NCR	NCR
Maine	2.0	1.9	93%	**Utah**	4.2	1.9	46%
Maryland	6.5	2.8	43%	**Vermont**	2.0	*	*
Massachusetts	7.0	3.5	50%	**Virginia**	12.0	6.7	56%
Michigan	15.0	11.8	78%	**Washington**	6.1	3.2	52%
Minnesota	9.5	9.1	96%	**West Virginia**	3.6	1.9	53%
Mississippi	5.8	3.1	54%	**Wisconsin**	11.5	9.5	82%
Missouri	8.0	3.3	42%	**Wyoming**	2.6	*	*
				Total	441.9	191.9[†]	43%

No Companies Responding
Fewer than 3 Companies Reporting
Total Reported Tons includes values from state with fewer than 3 Companies Reporting
SAPA Estimated Tons
Numbers do not add up exactly due to rounding

SAPA Information

* **42. Tonnage Estimate Comments**

* **43. Do producers in your state fractionate RAP?**

- ○ Yes
- ○ No

* **44. Is RAS allowed in**

	ALL	SOME	NONE
DOT mixes	○	○	○
Other Agency mixes	○	○	○
Commercial and Residential mixes	○	○	○

Comments:

* **45. Does your state require, allow, or prohibit the use of recycling agents or softer binders in high Asphalt Binder Replacement mixtures? (RAP, RAS, RAP & RAS)?**

	Require	Allow	Prohibit
Recycling Agent	○	○	○
Softer Binders	○	○	○

Comments:

NATIONAL ASPHALT PAVEMENT ASSOCIATION

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2023 In-Place Recycling Supplemental Survey Instrument

Purpose

The National Asphalt Pavement Association is working with the Federal Highway Administration to determine the amount of recycled materials being utilized for in-place recycling (Cold-In-Place, Hot In-Place, Cold Central Plant Recycling, and Full-Depth Reclamation). This survey will be used to collect this data.

It is important for the industry that you complete this survey so that we have accurate information regarding the use of recycled materials and to identify areas needing assistance in implementation.

DATA FROM THIS SURVEY WILL BE CONFIDENTIAL AND WILL BE USED ONLY FOR THE PURPOSES OF DETERMINING THESE QUANTITIES. IT WILL NOT BE USED FOR ANY OTHER PURPOSE. DATA WILL BE REPORTED REGIONALLY, AND NO REGIONAL DATA WILL BE REPORTED WHEN FEWER THAN THREE COMPANIES/BRANCHES RESPOND, NO COMPANY-SPECIFIC INFORMATION WILL BE DISCLOSED IN ANY WAY.

Survey results will help the industry, government agencies, and officials with the continued implementation of recycling. The data collected from this survey provides insight into trends, current practice, and is utilized to highlight the sustainability of asphalt mixtures. These results are also used by FHWA, Energy Information Administration, Environmental Protection Agency, and other federal, state, and local agencies to determine the impact of recycled materials.

By completing this survey you will be eligible to receive a complimentary copy of the full report.

Your participation is greatly appreciated.

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Industry Contact Information

Companies with multi-state operations will need to fill in the survey for each state.

The following information will be used only to confirm that we do not get duplicate information from a company and to contact you if we have any questions regarding your answers. Contact Brett Williams at bwilliams@asphaltpavement.org or NAPA by phone at 888-468-6499 if you have any questions.

* **1. Company/Branch Name:**

* **2. Contact Person's Name & Address**

* **3. Contact Person's Email**

* **4. Contact Person's Phone Number**

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State

* **5. Which state is the information provided for?**

- Alabama
- Alaska
- American Samoa
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware
- District of Columbia
- Florida
- Georgia
- Guam
- Hawaii
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- Nevada
- New Hampshire
- New Jersey
- New Mexico
- New York
- North Carolina
- North Dakota
- Northern Mariana Islands
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Puerto Rico
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- US Virgin Islands
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming

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Total Quantities for 2023

Please complete the following information for the total quantities of all CIR, HIR, CCPR, and FDR in 2023.

* **6. What was your state-wide total quantity of in-place recycling in 2023? (Use best estimate if exact data is not available. Please provide the units in your answer, either weight or volume can be submitted, so examples of units could be Tons, Metric Tons, Cubic Yards, Square Yards @ inches of thickness, and the list goes on...)**

Hot In-Place Recycling (HIR):

Cold Central Plant Recycling (CCPR)

Cold In-Place Recycling (CIR)

Full-Depth Reclamation (FDR)

Thank You

* **7. Would you like a complimentary copy of the final report?**

- Yes
- No

National Asphalt Pavement Association
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Greenbelt, Maryland 20770-1441
www.AsphaltPavement.org
napa@AsphaltPavement.org
Toll Free: 888-468-6499
Tel: 301-731-4748
Fax: 301-731-4621

14th Annual Asphalt Pavement Industry Survey
IS 138 — Appendix A

NAPA
NATIONAL ASPHALT
PAVEMENT ASSOCIATION

Asphalt Pavement Industry Survey on

Recycled Materials and Warm-Mix Asphalt Usage 2023

IS-138 Appendix B:
State-by-State Use of
Recycled Materials and Warm-Mix Asphalt
In Asphalt Pavement Mixtures

14th Annual Survey

Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage: 2023 Appendix B

Introduction

Appendix B provides a state-by-state breakdown of data reported in the *Asphalt Pavement Industry Survey on Recycled Materials and Warm-Mix Asphalt Usage* report for the 2023 construction season survey (Williams et al., 2025), including information from Tables 5, 6, 7, 8, 11, 12 and 15. **The accuracy of the state-level data and estimates will vary depending upon the number of companies participating in the survey in a given state and the tonnage produced by each respondent.** Appendix A outlines the methodology used to collect data and to generate estimates.

Appendix B reports data for all 50 U.S. states, as well as the District of Columbia and the five U.S. territories. In instances where fewer than three companies in a state/territory responded to the survey, only estimated total tonnages are reported to protect proprietary company data. Table 1 in the main report, republished below, summarizes the number of respondents from each state and territory. A total of 201 companies representing 1,079 production plants responded to the 2023 construction season survey. Branches, subsidiaries, and operating units are counted as unique companies in Table 1 and throughout the report. Throughout the tables, where percentages and totals are calculated, the numbers may not add up exactly due to rounding.

A degree of fluctuation in year-to-year comparisons of data is influenced by which companies responded to the 2023 construction season survey versus prior-year survey respondents. Approximately 68 percent of 2022 responding companies participated in the 2023 survey, too. Additional factors influencing the reliability of state-level data in this appendix are explained in the Data Estimation Method section of Appendix A.

Table 1: Number of Companies Completing 2023 Construction Season Survey in Each State/Territory

State	Cos.	Prod. Plants	State	Cos.	Prod. Plants	State	Cos.	Prod. Plants
Alabama	3	35	Kentucky	5	31	Ohio	8	66
Alaska	*	*	Louisiana	4	11	Oklahoma	6	19
American Samoa	NCR	NCR	Maine	3	18	Oregon	3	13
Arizona	4	19	Maryland	5	12	Pennsylvania	6	25
Arkansas	6	20	Massachusetts	3	9	Puerto Rico	NCR	NCR
California	4	31	Michigan	8	49	Rhode Island	*	*
Colorado	3	11	Minnesota	3	17	South Carolina	6	16
Connecticut	*	*	Mississippi	3	24	South Dakota	NCR	NCR
Delaware	*	*	Missouri	3	17	Tennessee	6	21
District of Columbia	*	*	Montana	*	*	Texas	5	65
Florida	6	42	Nebraska	*	*	U.S. Virgin Islands	NCR	NCR
Georgia	3	12	Nevada	*	*	Utah	7	16
Guam	NCR	NCR	New Hampshire	*	*	Vermont	*	*
Hawaii	*	*	New Jersey	3	16	Virginia	6	31
Idaho	6	24	New Mexico	*	*	Washington	6	36
Illinois	11	35	New York	6	31	West Virginia	3	15
Indiana	8	48	North Carolina	11	75	Wisconsin	3	69
Iowa	6	19	North Dakota	*	*	Wyoming	*	*
Kansas	*	*	No. Mariana Islands	NCR	NCR	**Total†**	201	1079

NCR = No companies responding
* = Fewer than 3 companies reporting
† = Total includes companies/production plants from states with fewer than 3 companies reporting.

ALABAMA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	3.8	3.7	7.0	7.0
	DOT	2.4	2.2	4.5	4.2
	Other Agency	0.6	0.4	1.1	0.8
	Commercial & Residential	0.8	1.1	1.4	2.0
	No. of Companies Reporting	4	3		
RAP (Tons, Millions)	Accepted	0.8	0.7	1.4	1.3
	Used in HMA/WMA Mixtures	0.9	0.8	1.7	1.5
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.57	1.90	2.88	3.61
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	26.3%	21.3%		
	Average % for Other Agency Mixtures[1]	18.3%	25.3%		
	Average % for Commercial & Residential Mixtures[1]	29.5%	20.9%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			24.6%	21.5%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	45%	23%		
	% of RAP Mixtures Using Softer Binders	0%	0%		
	% of RAP Mixtures Using Recycling Agents	0%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	10.0	0.0	19.0
	Processed Shingles Accepted	5.7	0.0	10.5	0.0
	Used in HMA/WMA Mixtures	0.0	7.5	0.0	14.2
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	6.5	2.5	11.9	4.7
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.33%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.33%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.20%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	33%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.0 (Tons, Millions)	0.4 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.0 (Tons, Millions)	0.3 (Tons, Millions)
	DOT	0%	14%	0.0 (Tons, Millions)	0.6 (Tons, Millions)
	Other Agency	0%	5%	0.0 (Tons, Millions)	0.1 (Tons, Millions)
	Commercial & Residential	0%	2%	0.0 (Tons, Millions)	0.0 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	0%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	67%	0%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

ALASKA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	5.3	5.5
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

AMERICAN SAMOA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	NCR	NCR	0.02	0.02
	DOT	NCR	NCR	NCR	NCR
	Other Agency	NCR	NCR	NCR	NCR
	Commercial & Residential	NCR	NCR	NCR	NCR
	No. of Companies Reporting	NCR	NCR		
RAP (Tons, Millions)	Accepted	NCR	NCR	NCR	NCR
	Used in HMA/WMA Mixtures	NCR	NCR	NCR	NCR
	Used as Aggregate	NCR	NCR	NCR	NCR
	Used in Cold-Mix Asphalt	NCR	NCR	NCR	NCR
	Used in Other	NCR	NCR	NCR	NCR
	Landfilled	NCR	NCR	NCR	NCR
	Total Tons of RAP Stockpiled at Year-End	NCR	NCR	NCR	NCR
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	NCR	NCR		
	Average % for Other Agency Mixtures[1]	NCR	NCR		
	Average % for Commercial & Residential Mixtures[1]	NCR	NCR		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			NCR	NCR
RAP (Other Reported Data)	% Companies Reporting Using RAP	NCR	NCR		
	% of RAP Fractionated	NCR	NCR		
	% of RAP Mixtures Using Softer Binders	NCR	NCR		
	% of RAP Mixtures Using Recycling Agents	NCR	NCR		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	NCR	NCR	NCR	NCR
	Processed Shingles Accepted	NCR	NCR	NCR	NCR
	Used in HMA/WMA Mixtures	NCR	NCR	NCR	NCR
	Used as Aggregate	NCR	NCR	NCR	NCR
	Used in Cold-Mix Asphalt	NCR	NCR	NCR	NCR
	Used in Other	NCR	NCR	NCR	NCR
	Landfilled	NCR	NCR	NCR	NCR
	Total Tons of RAS Stockpiled at Year-End	NCR	NCR	NCR	NCR
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	NCR	NCR		
	Average % for Other Agency Mixtures[1]	NCR	NCR		
	Average % for Commercial & Residential Mixtures[1]	NCR	NCR		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			NCR	NCR
RAS (Other Reported Data)	% Companies Reporting Using RAS	NCR	NCR		
	% of RAS Mixtures Using Softer Binders	NCR	NCR		
	% of RAS Mixtures Using Recycling Agents	NCR	NCR		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			NCR	NCR
	Total Tons Produced With WMA Technology at HMA Temperatures			NCR	NCR
	DOT	NCR	NCR	NCR	NCR
	Other Agency	NCR	NCR	NCR	NCR
	Commercial & Residential	NCR	NCR	NCR	NCR
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	NCR	NCR		
	Additive Foaming, % of Market	NCR	NCR		
	Plant Foaming, % of Market	NCR	NCR		
	Organic Additive, % of Market	NCR	NCR		
	% Companies Reporting Using WMA Technologies	NCR	NCR		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

ARIZONA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	4.4	7.8	8.2
	DOT	*	0.6	*	1.2
	Other Agency	*	2.0	*	3.7
	Commercial & Residential	*	1.8	*	3.3
	No. of Companies Reporting	*	4		
RAP (Tons, Millions)	Accepted	*	0.6	*	1.2
	Used in HMA/WMA Mixtures	*	0.3	*	0.7
	Used as Aggregate	*	0.1	*	0.2
	Used in Cold-Mix Asphalt	*	0.0	*	0.0
	Used in Other	*	0.0	*	0.0
	Landfilled	*	0.0	*	0.0
	Total Tons of RAP Stockpiled at Year-End	*	0.73	*	1.37
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	9.2%		
	Average % for Other Agency Mixtures[1]	*	6.3%		
	Average % for Commercial & Residential Mixtures[1]	*	10.8%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	8.0%
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	100%		
	% of RAP Fractionated	*	0%		
	% of RAP Mixtures Using Softer Binders	*	24%		
	% of RAP Mixtures Using Recycling Agents	*	3%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	0.0	*	0.0
	Processed Shingles Accepted	*	0.0	*	0.0
	Used in HMA/WMA Mixtures	*	0.0	*	0.0
	Used as Aggregate	*	0.0	*	0.0
	Used in Cold-Mix Asphalt	*	0.0	*	0.0
	Used in Other	*	0.0	*	0.0
	Landfilled	*	0.0	*	0.0
	Total Tons of RAS Stockpiled at Year-End	*	0.0	*	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	0.00%		
	Average % for Other Agency Mixtures[1]	*	0.00%		
	Average % for Commercial & Residential Mixtures[1]	*	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	0%		
	% of RAS Mixtures Using Softer Binders	*	0%		
	% of RAS Mixtures Using Recycling Agents	*	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	0.0 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			*	0.6 (Tons, Millions)
	DOT	*	1%	*	0.0 (Tons, Millions)
	Other Agency	*	0%	*	0.0 (Tons, Millions)
	Commercial & Residential	*	17%	*	0.6 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	100%		
	Additive Foaming, % of Market	*	0%		
	Plant Foaming, % of Market	*	0%		
	Organic Additive, % of Market	*	0%		
	% Companies Reporting Using WMA Technologies	*	50%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

ARKANSAS

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	2.9	2.5	6.0	5.9
	DOT	1.9	1.6	3.9	3.8
	Other Agency	0.3	0.5	0.6	1.1
	Commercial & Residential	0.7	0.4	1.5	1.0
	No. of Companies Reporting	7	6		
RAP (Tons, Millions)	Accepted	0.2	0.4	0.4	1.0
	Used in HMA/WMA Mixtures	0.4	0.3	0.9	0.8
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.36	0.48	0.75	1.14
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	14.4%	16.2%		
	Average % for Other Agency Mixtures[1]	16.1%	14.2%		
	Average % for Commercial & Residential Mixtures[1]	14.2%	13.7%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			14.5%	14.1%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	17%	19%		
	% of RAP Mixtures Using Softer Binders	0%	0%		
	% of RAP Mixtures Using Recycling Agents	0%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	15.0	0.0	31.4	0.0
	Used in HMA/WMA Mixtures	9.0	0.3	18.8	0.8
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	6.0	0.4	12.6	0.9
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.31%	0.01%		
	Average % for Other Agency Mixtures[1]	0.31%	0.01%		
	Average % for Commercial & Residential Mixtures[1]	0.31%	0.01%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.31%	0.01%
RAS (Other Reported Data)	% Companies Reporting Using RAS	14%	17%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			1.7 (Tons, Millions)	1.9 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.3 (Tons, Millions)	2.2 (Tons, Millions)
	DOT	34%	82%	1.3 (Tons, Millions)	3.1 (Tons, Millions)
	Other Agency	55%	27%	0.4 (Tons, Millions)	0.3 (Tons, Millions)
	Commercial & Residential	21%	68%	0.3 (Tons, Millions)	0.7 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	16%	46%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	84%	54%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	57%	83%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

CALIFORNIA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	9.3	4.3	26.6	26.6
	DOT	2.4	1.6	6.9	9.9
	Other Agency	1.0	2.4	2.8	14.7
	Commercial & Residential	5.9	1.1	16.9	6.9
	No. of Companies Reporting	4	4		
RAP (Tons, Millions)	Accepted	1.8	1.7	5.2	10.8
	Used in HMA/WMA Mixtures	1.5	1.0	4.4	5.9
	Used as Aggregate	0.1	0.0	0.3	0.2
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.65	1.14	1.86	7.06
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	15.8%	26.3%		
	Average % for Other Agency Mixtures[1]	12.5%	20.5%		
	Average % for Commercial & Residential Mixtures[1]	19.3%	19.0%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			16.6%	22.2%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	26%	25%		
	% of RAP Mixtures Using Softer Binders	15%	22%		
	% of RAP Mixtures Using Recycling Agents	40%	11%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.1	0.0	0.3	0.0
	Used in HMA/WMA Mixtures	0.1	1.6	0.1	10.1
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.9	0.0	2.4	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.02%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.25%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.04%
RAS (Other Reported Data)	% Companies Reporting Using RAS	25%	50%		
	% of RAS Mixtures Using Softer Binders	0%	50%		
	% of RAS Mixtures Using Recycling Agents	0%	25%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			8.4 (Tons, Millions)	6.6 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.4 (Tons, Millions)	11.5 (Tons, Millions)
	DOT	79%	62%	5.5 (Tons, Millions)	6.2 (Tons, Millions)
	Other Agency	28%	58%	0.8 (Tons, Millions)	8.5 (Tons, Millions)
	Commercial & Residential	15%	50%	2.5 (Tons, Millions)	3.4 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	62%	36%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	38%	64%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	100%	75%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

COLORADO

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	2.4	1.0	9.4	9.4
	DOT	0.8	0.5	3.2	4.9
	Other Agency	0.8	0.4	3.2	3.2
	Commercial & Residential	0.8	0.1	3.0	1.3
	No. of Companies Reporting	5	3		
RAP (Tons, Millions)	Accepted	0.7	0.2	2.9	1.8
	Used in HMA/WMA Mixtures	0.4	0.2	1.7	1.9
	Used as Aggregate	0.1	0.0	0.2	0.3
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.80	0.40	3.16	3.66
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	16.4%	19.0%		
	Average % for Other Agency Mixtures[1]	18.0%	20.7%		
	Average % for Commercial & Residential Mixtures[1]	22.0%	20.7%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			18.5%	19.7%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	16%	33%		
	% of RAP Mixtures Using Softer Binders	5%	0%		
	% of RAP Mixtures Using Recycling Agents	0%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	0.0	0.0	0.0	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.0	0.0	0.0	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	0%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.9 (Tons, Millions)	0.0 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			6.0 (Tons, Millions)	2.7 (Tons, Millions)
	DOT	32%	34%	1.0 (Tons, Millions)	1.7 (Tons, Millions)
	Other Agency	100%	23%	3.2 (Tons, Millions)	0.7 (Tons, Millions)
	Commercial & Residential	89%	22%	2.7 (Tons, Millions)	0.3 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	86%	100%		
	Additive Foaming, % of Market	2%	0%		
	Plant Foaming, % of Market	11%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	100%	67%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

CONNECTICUT

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	5.2	5.2
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

DELAWARE

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	1.6	1.3
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

DISTRICT OF COLUMBIA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	1.5	1.1
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

FLORIDA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	8.0	9.4	19.0	19.0
	DOT	3.1	4.9	7.3	9.9
	Other Agency	2.0	1.7	4.8	3.4
	Commercial & Residential	2.9	2.8	6.8	5.7
	No. of Companies Reporting	4	6		
RAP (Tons, Millions)	Accepted	2.5	3.3	5.8	6.7
	Used in HMA/WMA Mixtures	2.7	2.7	6.4	5.5
	Used as Aggregate	0.0	0.0	0.0	0.1
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.81	2.44	4.29	4.93
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	29.0%	28.0%		
	Average % for Other Agency Mixtures[1]	33.0%	27.3%		
	Average % for Commercial & Residential Mixtures[1]	37.0%	31.0%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			33.8%	28.8%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	3%	8%		
	% of RAP Mixtures Using Softer Binders	74%	40%		
	% of RAP Mixtures Using Recycling Agents	16%	4%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	10.0	0.0	23.7	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	5.0	0.0	11.8	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	5.0	0.0	11.8	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.10%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.06%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	25%	0%		
	% of RAS Mixtures Using Softer Binders	100%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.4 (Tons, Millions)	3.4 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			6.6 (Tons, Millions)	5.4 (Tons, Millions)
	DOT	61%	76%	4.5 (Tons, Millions)	7.5 (Tons, Millions)
	Other Agency	30%	18%	1.4 (Tons, Millions)	0.6 (Tons, Millions)
	Commercial & Residential	16%	12%	1.1 (Tons, Millions)	0.7 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	100%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	50%	50%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

GEORGIA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	6.9	0.9	14.1	15.4
	DOT	2.8	0.6	5.7	10.6
	Other Agency	2.1	0.2	4.2	2.9
	Commercial & Residential	2.0	0.1	4.1	1.9
	No. of Companies Reporting	5	3		
RAP (Tons, Millions)	Accepted	2.2	0.3	4.5	5.0
	Used in HMA/WMA Mixtures	2.1	0.2	4.2	2.9
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	3.06	0.19	6.27	3.28
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	29.6%	18.6%		
	Average % for Other Agency Mixtures[1]	27.6%	18.3%		
	Average % for Commercial & Residential Mixtures[1]	30.2%	19.7%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			29.8%	18.7%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	0%	0%		
	% of RAP Mixtures Using Softer Binders	0%	0%		
	% of RAP Mixtures Using Recycling Agents	0%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	0.0	0.0	0.0	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.0	0.0	0.0	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	0%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			3.0 (Tons, Millions)	0.3 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.0 (Tons, Millions)	0.0 (Tons, Millions)
	DOT	32%	0%	1.8 (Tons, Millions)	0.0 (Tons, Millions)
	Other Agency	22%	12%	0.9 (Tons, Millions)	0.3 (Tons, Millions)
	Commercial & Residential	6%	0%	0.3 (Tons, Millions)	0.0 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	100%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	20%	33%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

GUAM

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	20223
HMA/WMA (Tons, Millions)	Total	NCR	NCR	0.1	0.1
	DOT	NCR	NCR	NCR	NCR
	Other Agency	NCR	NCR	NCR	NCR
	Commercial & Residential	NCR	NCR	NCR	NCR
	No. of Companies Reporting	NCR	NCR		
RAP (Tons, Millions)	Accepted	NCR	NCR	NCR	NCR
	Used in HMA/WMA Mixtures	NCR	NCR	NCR	NCR
	Used as Aggregate	NCR	NCR	NCR	NCR
	Used in Cold-Mix Asphalt	NCR	NCR	NCR	NCR
	Used in Other	NCR	NCR	NCR	NCR
	Landfilled	NCR	NCR	NCR	NCR
	Total Tons of RAP Stockpiled at Year-End	NCR	NCR	NCR	NCR
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	NCR	NCR		
	Average % for Other Agency Mixtures[1]	NCR	NCR		
	Average % for Commercial & Residential Mixtures[1]	NCR	NCR		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			NCR	NCR
RAP (Other Reported Data)	% Companies Reporting Using RAP	NCR	NCR		
	% of RAP Fractionated	NCR	NCR		
	% of RAP Mixtures Using Softer Binders	NCR	NCR		
	% of RAP Mixtures Using Recycling Agents	NCR	NCR		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	NCR	NCR	NCR	NCR
	Processed Shingles Accepted	NCR	NCR	NCR	NCR
	Used in HMA/WMA Mixtures	NCR	NCR	NCR	NCR
	Used as Aggregate	NCR	NCR	NCR	NCR
	Used in Cold-Mix Asphalt	NCR	NCR	NCR	NCR
	Used in Other	NCR	NCR	NCR	NCR
	Landfilled	NCR	NCR	NCR	NCR
	Total Tons of RAS Stockpiled at Year-End	NCR	NCR	NCR	NCR
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	NCR	NCR		
	Average % for Other Agency Mixtures[1]	NCR	NCR		
	Average % for Commercial & Residential Mixtures[1]	NCR	NCR		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			NCR	NCR
RAS (Other Reported Data)	% Companies Reporting Using RAS	NCR	NCR		
	% of RAS Mixtures Using Softer Binders	NCR	NCR		
	% of RAS Mixtures Using Recycling Agents	NCR	NCR		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			NCR	NCR
	Total Tons Produced With WMA Technology at HMA Temperatures			NCR	NCR
	DOT	NCR	NCR	NCR	NCR
	Other Agency	NCR	NCR	NCR	NCR
	Commercial & Residential	NCR	NCR	NCR	NCR
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	NCR	NCR		
	Additive Foaming, % of Market	NCR	NCR		
	Plant Foaming, % of Market	NCR	NCR		
	Organic Additive, % of Market	NCR	NCR		
	% Companies Reporting Using WMA Technologies	NCR	NCR		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

HAWAII

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	1.0	1.2
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

IDAHO

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	1.8	2.2	3.0	2.8
	DOT	1.1	1.3	1.8	1.6
	Other Agency	0.3	0.4	0.6	0.5
	Commercial & Residential	0.4	0.5	0.6	0.7
	No. of Companies Reporting	6	6		
RAP (Tons, Millions)	Accepted	0.5	0.6	0.9	0.7
	Used in HMA/WMA Mixtures	0.6	0.5	1.0	0.7
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.63	0.66	1.03	0.82
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	27.3%	21.7%		
	Average % for Other Agency Mixtures[1]	30.2%	21.7%		
	Average % for Commercial & Residential Mixtures[1]	39.3%	28.8%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			32.6%	23.3%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	0%	0%		
	% of RAP Mixtures Using Softer Binders	58%	71%		
	% of RAP Mixtures Using Recycling Agents	3%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	0.0	0.0	0.0	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.0	0.0	0.0	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	0%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.6 (Tons, Millions)	0.0 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.5 (Tons, Millions)	0.4 (Tons, Millions)
	DOT	41%	11%	0.7 (Tons, Millions)	0.2 (Tons, Millions)
	Other Agency	24%	21%	0.1 (Tons, Millions)	0.1 (Tons, Millions)
	Commercial & Residential	39%	14%	0.3 (Tons, Millions)	0.1 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	82%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	18%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	67%	17%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

ILLINOIS

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	6.7	3.9	14.7	15.2
	DOT	2.1	2.2	4.5	8.7
	Other Agency	1.6	0.9	3.6	3.5
	Commercial & Residential	3.0	0.8	6.6	3.0
	No. of Companies Reporting	16	11		
RAP (Tons, Millions)	Accepted	2.3	1.3	5.1	5.0
	Used in HMA/WMA Mixtures	2.0	1.1	4.3	4.2
	Used as Aggregate	0.1	0.2	0.3	0.7
	Used in Cold-Mix Asphal2	0.0	0.0	0.0	0.0
	Used in Other	0.1	0.0	0.3	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.66	1.57	3.63	6.21
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	20.5%	25.0%		
	Average % for Other Agency Mixtures[1]	25.8%	27.5%		
	Average % for Commercial & Residential Mixtures[1]	32.9%	29.8%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			29.1%	27.8%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	61%	49%		
	% of RAP Mixtures Using Softer Binders	44%	60%		
	% of RAP Mixtures Using Recycling Agents	4%	20%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	2.0	127.5	4.4	503.2
	Processed Shingles Accepted	23.2	105.8	50.9	417.5
	Used in HMA/WMA Mixtures	25.2	40.5	55.3	159.8
	Used as Aggregate	0.0	70.0	0.0	276.3
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	20.0	0.0	78.9
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	2.7	105.0	5.9	414.2
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.68%	1.12%		
	Average % for Other Agency Mixtures[1]	0.40%	1.00%		
	Average % for Commercial & Residential Mixtures[1]	0.21%	0.92%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.38%	1.05%
RAS (Other Reported Data)	% Companies Reporting Using RAS	44%	64%		
	% of RAS Mixtures Using Softer Binders	43%	33%		
	% of RAS Mixtures Using Recycling Agents	0%	6%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			6.0 (Tons, Millions)	1.0 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.8 (Tons, Millions)	0.6 (Tons, Millions)
	DOT	43%	1%	1.9 (Tons, Millions)	0.1 (Tons, Millions)
	Other Agency	46%	22%	1.7 (Tons, Millions)	0.8 (Tons, Millions)
	Commercial & Residential	49%	24%	3.2 (Tons, Millions)	0.7 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	100%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	44%	36%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

INDIANA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	7.0	9.0	14.5	14.0
	DOT	2.7	2.4	5.5	3.8
	Other Agency	2.2	3.4	4.6	5.3
	Commercial & Residential	2.1	3.2	4.4	4.9
	No. of Companies Reporting	6	8		
RAP (Tons, Millions)	Accepted	1.8	2.1	3.7	3.2
	Used in HMA/WMA Mixtures	1.7	2.2	3.5	3.4
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.22	2.28	2.51	3.55
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	23.2%	23.3%		
	Average % for Other Agency Mixtures[1]	24.7%	24.0%		
	Average % for Commercial & Residential Mixtures[1]	24.7%	24.9%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			24.4%	23.9%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	35%	44%		
	% of RAP Mixtures Using Softer Binders	1%	10%		
	% of RAP Mixtures Using Recycling Agents	0%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	3.8	0.0	6.0
	Used in HMA/WMA Mixtures	1.0	3.0	2.1	4.6
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	1.3	0.0	1.9
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	2.6	1.2	5.3	1.8
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.01%	0.06%		
	Average % for Other Agency Mixtures[1]	0.01%	0.01%		
	Average % for Commercial & Residential Mixtures[1]	0.01%	0.01%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.01%	0.03%
RAS (Other Reported Data)	% Companies Reporting Using RAS	50%	63%		
	% of RAS Mixtures Using Softer Binders	34%	30%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			1.6 (Tons, Millions)	0.8 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.9 (Tons, Millions)	0.7 (Tons, Millions)
	DOT	21%	17%	1.1 (Tons, Millions)	0.6 (Tons, Millions)
	Other Agency	11%	6%	0.5 (Tons, Millions)	0.3 (Tons, Millions)
	Commercial & Residential	19%	11%	0.9 (Tons, Millions)	0.6 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	1%	1%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	99%	99%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	33%	13%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

IOWA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	1.2	2.5	3.9	5.5
	DOT	0.7	1.5	2.4	3.3
	Other Agency	0.2	0.6	0.8	1.4
	Commercial & Residential	0.2	0.4	0.8	0.8
	No. of Companies Reporting	3	6		
RAP (Tons, Millions)	Accepted	0.2	0.4	0.6	0.9
	Used in HMA/WMA Mixtures	0.2	0.5	0.7	1.1
	Used as Aggregate	0.0	0.0	0.1	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.30	0.54	0.97	1.20
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	17.3%	20.0%		
	Average % for Other Agency Mixtures[1]	17.3%	20.3%		
	Average % for Commercial & Residential Mixtures[1]	19.0%	22.8%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			17.9%	20.4%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	7%	4%		
	% of RAP Mixtures Using Softer Binders	0%	25%		
	% of RAP Mixtures Using Recycling Agents	0%	21%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	5.0	0.0	11.1
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	0.3	3.0	0.8	6.7
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	4.0	19.0	12.9	42.2
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.02%	0.12%		
	Average % for Other Agency Mixtures[1]	0.02%	0.12%		
	Average % for Commercial & Residential Mixtures[1]	0.02%	0.12%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.02%	0.12%
RAS (Other Reported Data)	% Companies Reporting Using RAS	33%	17%		
	% of RAS Mixtures Using Softer Binders	0%	30%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.0 (Tons, Millions)	0.0 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.0 (Tons, Millions)	0.0 (Tons, Millions)
	DOT	0%	1%	0.0 (Tons, Millions)	0.0 (Tons, Millions)
	Other Agency	0%	0%	0.0 (Tons, Millions)	0.0 (Tons, Millions)
	Commercial & Residential	0%	0%	0.0 (Tons, Millions)	0.0 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	0%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	0%	17%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

KANSAS

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	2.5	*	4.0	3.4
	DOT	1.5	*	2.5	*
	Other Agency	0.5	*	0.7	*
	Commercial & Residential	0.5	*	0.9	*
	No. of Companies Reporting	3	*		
RAP (Tons, Millions)	Accepted	0.8	*	1.3	*
	Used in HMA/WMA Mixtures	0.7	*	1.1	*
	Used as Aggregate	0.0	*	0.0	*
	Used in Cold-Mix Asphalt	0.0	*	0.0	*
	Used in Other	0.0	*	0.0	*
	Landfilled	0.0	*	0.0	*
	Total Tons of RAP Stockpiled at Year-End	0.72	*	1.15	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	22.7%	*		
	Average % for Other Agency Mixtures[1]	27.0%	*		
	Average % for Commercial & Residential Mixtures[1]	27.5%	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			26.3%	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	*		
	% of RAP Fractionated	30%	*		
	% of RAP Mixtures Using Softer Binders	90%	*		
	% of RAP Mixtures Using Recycling Agents	2%	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	12.0	*	19.4	*
	Processed Shingles Accepted	8.0	*	12.9	*
	Used in HMA/WMA Mixtures	3.5	*	5.6	*
	Used as Aggregate	0.0	*	0.0	*
	Used in Cold-Mix Asphalt	0.0	*	0.0	*
	Used in Other	0.0	*	0.0	*
	Landfilled	0.0	*	0.0	*
	Total Tons of RAS Stockpiled at Year-End	16.5	*	26.6	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.30%	*		
	Average % for Other Agency Mixtures[1]	0.00%	*		
	Average % for Commercial & Residential Mixtures[1]	0.00%	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.14%	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	33%	*		
	% of RAS Mixtures Using Softer Binders	100%	*		
	% of RAS Mixtures Using Recycling Agents	0%	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			2.1 (Tons, Millions)	*
	Total Tons Produced With WMA Technology at HMA Temperatures			0.6 (Tons, Millions)	*
	DOT	72%	*	1.8 (Tons, Millions)	*
	Other Agency	77%	*	0.6 (Tons, Millions)	*
	Commercial & Residential	34%	*	0.3 (Tons, Millions)	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	77%	*		
	Additive Foaming, % of Market	0%	*		
	Plant Foaming, % of Market	23%	*		
	Organic Additive, % of Market	0%	*		
	% Companies Reporting Using WMA Technologies	67%	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

KENTUCKY

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	6.2	3.7	7.0	7.0
	DOT	3.4	2.0	3.8	3.8
	Other Agency	1.3	0.6	1.5	1.1
	Commercial & Residential	1.5	1.1	1.7	2.1
	No. of Companies Reporting	8	5		
RAP (Tons, Millions)	Accepted	1.7	0.5	2.0	0.9
	Used in HMA/WMA Mixtures	1.1	0.8	1.3	1.5
	Used as Aggregate	0.1	0.0	0.1	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	2.86	1.29	3.24	2.44
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	16.9%	18.4%		
	Average % for Other Agency Mixtures[1]	19.8%	20.0%		
	Average % for Commercial & Residential Mixtures[1]	19.3%	26.4%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			17.9%	21.7%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	58%	45%		
	% of RAP Mixtures Using Softer Binders	6%	0%		
	% of RAP Mixtures Using Recycling Agents	1%	8%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	0.0	0.0	0.0	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.0	0.0	0.0	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	0%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			2.9 (Tons, Millions)	0.3 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			1.4 (Tons, Millions)	0.5 (Tons, Millions)
	DOT	43%	16%	2.3 (Tons, Millions)	0.6 (Tons, Millions)
	Other Agency	57%	8%	0.9 (Tons, Millions)	0.1 (Tons, Millions)
	Commercial & Residential	65%	3%	1.1 (Tons, Millions)	0.1 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	29%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	71%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	75%	40%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

LOUISIANA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	2.0	7.8	8.3
	DOT	*	1.5	*	5.9
	Other Agency	*	0.4	*	2.1
	Commercial & Residential	*	0.1	*	0.3
	No. of Companies Reporting	*	4		
RAP (Tons, Millions)	Accepted	*	0.4	*	1.8
	Used in HMA/WMA Mixtures	*	0.4	*	1.8
	Used as Aggregate	*	0.0	*	0.1
	Used in Cold-Mix Asphalt	*	0.0	*	0.0
	Used in Other	*	0.0	*	0.0
	Landfilled	*	0.0	*	0.0
	Total Tons of RAP Stockpiled at Year-End	*	0.20	*	0.83
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	20.5%		
	Average % for Other Agency Mixtures[1]	*	21.3%		
	Average % for Commercial & Residential Mixtures[1]	*	20.5%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	21.1%
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	100%		
	% of RAP Fractionated	*	18%		
	% of RAP Mixtures Using Softer Binders	*	21%		
	% of RAP Mixtures Using Recycling Agents	*	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	0.0	*	0.0
	Processed Shingles Accepted	*	0.0	*	0.0
	Used in HMA/WMA Mixtures	*	0.0	*	0.0
	Used as Aggregate	*	0.0	*	0.0
	Used in Cold-Mix Asphalt	*	0.0	*	0.0
	Used in Other	*	0.0	*	0.0
	Landfilled	*	0.0	*	0.0
	Total Tons of RAS Stockpiled at Year-End	*	0.0	*	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	0.00%		
	Average % for Other Agency Mixtures[1]	*	0.00%		
	Average % for Commercial & Residential Mixtures[1]	*	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	0%		
	% of RAS Mixtures Using Softer Binders	*	0%		
	% of RAS Mixtures Using Recycling Agents	*	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	1.8 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			*	3.7 (Tons, Millions)
	DOT	*	67%	*	4.0 (Tons, Millions)
	Other Agency	*	70%	*	1.4 (Tons, Millions)
	Commercial & Residential	*	22%	*	0.1 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	1%		
	Additive Foaming, % of Market	*	0%		
	Plant Foaming, % of Market	*	99%		
	Organic Additive, % of Market	*	0%		
	% Companies Reporting Using WMA Technologies	*	75%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

MAINE

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	1.9	2.1	2.0	2.2
	DOT	0.6	0.9	0.6	1.0
	Other Agency	0.4	0.7	0.4	0.7
	Commercial & Residential	0.9	0.5	1.0	0.5
	No. of Companies Reporting	3	3		
RAP (Tons, Millions)	Accepted	0.2	0.2	0.2	0.2
	Used in HMA/WMA Mixtures	0.3	0.4	0.4	0.4
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.20	0.23	0.22	0.24
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	18.6%	19.6%		
	Average % for Other Agency Mixtures[1]	16.6%	16.8%		
	Average % for Commercial & Residential Mixtures[1]	19.0%	19.6%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			17.9%	19.0%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	33%	33%		
	% of RAP Mixtures Using Softer Binders	0%	7%		
	% of RAP Mixtures Using Recycling Agents	33%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	6.5	10.3	7.0	10.7
	Used in HMA/WMA Mixtures	6.5	9.6	7.0	9.9
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.1	0.7	0.1	0.8
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.44%	0.60%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.44%	0.25%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.35%	0.45%
RAS (Other Reported Data)	% Companies Reporting Using RAS	33%	67%		
	% of RAS Mixtures Using Softer Binders	0%	33%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.0 (Tons, Millions)	0.5 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.4 (Tons, Millions)	0.5 (Tons, Millions)
	DOT	44%	88%	0.3 (Tons, Millions)	0.8 (Tons, Millions)
	Other Agency	11%	14%	0.0 (Tons, Millions)	0.2 (Tons, Millions)
	Commercial & Residential	8%	0%	0.1 (Tons, Millions)	0.0 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	100%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	67%	100%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

MARYLAND

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	2.8	2.5	6.5	6.6
	DOT	1.2	0.6	2.8	1.6
	Other Agency	0.4	0.7	0.9	1.9
	Commercial & Residential	1.2	1.2	2.8	3.1
	No. of Companies Reporting	6	5		
RAP (Tons, Millions)	Accepted	0.9	1.0	2.1	2.6
	Used in HMA/WMA Mixtures	0.8	0.8	1.9	2.0
	Used as Aggregate	0.0	0.0	0.1	0.1
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.29	0.60	3.00	1.59
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	26.2%	25.0%		
	Average % for Other Agency Mixtures[1]	22.2%	24.0%		
	Average % for Commercial & Residential Mixtures[1]	33.7%	34.5%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			29.4%	30.2%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	25%	0%		
	% of RAP Mixtures Using Softer Binders	17%	0%		
	% of RAP Mixtures Using Recycling Agents	12%	12%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	5.0	0.0	11.6	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	3.6	2.1	8.4	5.6
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	20.2	0.5	46.9	1.3
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.16%	0.10%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.25%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.13%	0.08%
RAS (Other Reported Data)	% Companies Reporting Using RAS	33%	20%		
	% of RAS Mixtures Using Softer Binders	50%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.2 (Tons, Millions)	0.3 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.1 (Tons, Millions)	0.8 (Tons, Millions)
	DOT	8%	0%	0.2 (Tons, Millions)	0.0 (Tons, Millions)
	Other Agency	0%	0%	0.0 (Tons, Millions)	0.0 (Tons, Millions)
	Commercial & Residential	3%	35%	0.1 (Tons, Millions)	1.1 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	0%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	100%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	17%	40%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

MASSACHUSETTS

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	3.5	1.8	7.0	6.4
	DOT	1.0	0.4	2.1	1.5
	Other Agency	1.0	0.4	1.9	1.4
	Commercial & Residential	1.5	1.0	3.0	3.5
	No. of Companies Reporting	4	3		
RAP (Tons, Millions)	Accepted	0.5	0.3	1.0	1.1
	Used in HMA/WMA Mixtures	0.6	0.4	1.2	1.3
	Used as Aggregate	0.1	0.0	0.1	0.1
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	3.60	1.30	7.18	4.64
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	13.8%	18.3%		
	Average % for Other Agency Mixtures[1]	16.0%	18.0%		
	Average % for Commercial & Residential Mixtures[1]	21.0%	23.0%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			17.2%	20.5%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	0%	0%		
	% of RAP Mixtures Using Softer Binders	0%	0%		
	% of RAP Mixtures Using Recycling Agents	3%	7%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	1.3	0.7	2.6	2.6
	Used in HMA/WMA Mixtures	1.7	8.3	3.4	29.4
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	11.2	11.2	22.4	39.9
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.04%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.08%	0.75%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.05%	0.46%
RAS (Other Reported Data)	% Companies Reporting Using RAS	50%	33%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	15%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			3.6 (Tons, Millions)	1.3 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			2.4 (Tons, Millions)	2.0 (Tons, Millions)
	DOT	100%	41%	2.1 (Tons, Millions)	0.6 (Tons, Millions)
	Other Agency	100%	69%	1.9 (Tons, Millions)	1.0 (Tons, Millions)
	Commercial & Residential	65%	49%	2.0 (Tons, Millions)	1.7 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	92%	51%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	0%		
	Organic Additive, % of Market	8%	49%		
	% Companies Reporting Using WMA Technologies	100%	100%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

MICHIGAN

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	11.8	10.9	15.0	15.1
	DOT	3.3	3.2	4.2	4.5
	Other Agency	4.2	3.6	5.3	5.0
	Commercial & Residential	4.3	4.1	5.4	5.6
	No. of Companies Reporting	9	8		
RAP (Tons, Millions)	Accepted	4.5	3.0	5.7	4.2
	Used in HMA/WMA Mixtures	3.3	2.5	4.2	3.5
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0.
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	2.32	1.68	2.96	2.32
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	22.3%	17.5%		
	Average % for Other Agency Mixtures[1]	26.7%	21.0%		
	Average % for Commercial & Residential Mixtures[1]	30.4%	28.9%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			27.8%	23.1%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	26%	18%		
	% of RAP Mixtures Using Softer Binders	23%	10%		
	% of RAP Mixtures Using Recycling Agents	0%	1%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	1.5	0.0	1.9	0.0
	Processed Shingles Accepted	0.5	0.0	0.6	0.0
	Used in HMA/WMA Mixtures	0.5	0.0	0.6	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	1.5	0.0	1.9	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.01%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	11%	0%		
	% of RAS Mixtures Using Softer Binders	25%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			2.9 (Tons, Millions)	4.4 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			1.2 (Tons, Millions)	4.2 (Tons, Millions)
	DOT	27%	69%	1.1 (Tons, Millions)	3.1 (Tons, Millions)
	Other Agency	33%	45%	1.8 (Tons, Millions)	2.3 (Tons, Millions)
	Commercial & Residential	22%	57%	1.2 (Tons, Millions)	3.2 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	1%	43%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	99%	57%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	33%	63%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

MINNESOTA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	9.1	2.8	9.5	9.3
	DOT	1.8	0.4	1.9	1.5
	Other Agency	4.3	1.7	4.5	5.6
	Commercial & Residential	3.0	0.7	3.1	2.2
	No. of Companies Reporting	6	3		
RAP (Tons, Millions)	Accepted	2.7	0.8	2.9	2.5
	Used in HMA/WMA Mixtures	2.1	0.6	2.2	2.0
	Used as Aggregate	0.7	0.1	0.7	0.3
	Used in Cold-Mix Asphalt	0.1	0.0	0.1	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.90	1.40	1.99	4.62
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	21.0%	20.0%		
	Average % for Other Agency Mixtures[1]	21.0%	21.7%		
	Average % for Commercial & Residential Mixtures[1]	23.9%	24.3%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			22.7%	22.0%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	7%	0%		
	% of RAP Mixtures Using Softer Binders	30%	0%		
	% of RAP Mixtures Using Recycling Agents	2%	4%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	12.0	0.0	12.5	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	12.0	0.0	12.5	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	6.0	5.0	6.3	16.5
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.13%	0.00%		
	Average % for Other Agency Mixtures[1]	0.13%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.13%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.13%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	17%	0%		
	% of RAS Mixtures Using Softer Binders	10%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			5.0 (Tons, Millions)	0.4 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			1.4 (Tons, Millions)	1.4 (Tons, Millions)
	DOT	52%	20%	1.0 (Tons, Millions)	0.3 (Tons, Millions)
	Other Agency	69%	13%	3.0 (Tons, Millions)	0.7 (Tons, Millions)
	Commercial & Residential	76%	37%	2.4 (Tons, Millions)	0.8 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	11%	22%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	89%	78%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	67%	67%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

MISSISSIPPI

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	3.1	3.3	5.8	5.4
	DOT	2.0	1.3	3.8	2.1
	Other Agency	0.6	1.0	1.0	1.6
	Commercial & Residential	0.5	1.0	1.0	1.7
	No. of Companies Reporting	3	3		
RAP (Tons, Millions)	Accepted	0.3	0.5	0.6	0.9
	Used in HMA/WMA Mixtures	0.6	0.6	1.2	1.1
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.50	0.65	0.93	1.07
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	19.3%	18.7%		
	Average % for Other Agency Mixtures[1]	20.8%	20.3%		
	Average % for Commercial & Residential Mixtures[1]	22.2%	22.7%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			20.1%	19.8%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	5%	5%		
	% of RAP Mixtures Using Softer Binders	0%	0%		
	% of RAP Mixtures Using Recycling Agents	0%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	0.0	0.0	0.0	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.0	8.3	0.0	13.7
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	0%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			2.5 (Tons, Millions)	2.1 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			1.7 (Tons, Millions)	1.9 (Tons, Millions)
	DOT	74%	64%	2.8 (Tons, Millions)	1.4 (Tons, Millions)
	Other Agency	81%	84%	0.8 (Tons, Millions)	1.3 (Tons, Millions)
	Commercial & Residential	57%	75%	0.6 (Tons, Millions)	1.3 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	0%	94%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	100%	6%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	67%	67%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

MISSOURI

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	3.3	2.8	8.0	8.0
	DOT	1.2	1.2	2.8	3.3
	Other Agency	0.6	0.5	1.5	1.4
	Commercial & Residential	1.5	1.1	3.7	3.3
	No. of Companies Reporting	5	3		
RAP (Tons, Millions)	Accepted	0.8	0.7	1.9	1.9
	Used in HMA/WMA Mixtures	0.9	0.6	2.1	1.8
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.60	1.17	1.44	3.34
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	26.0%	21.7%		
	Average % for Other Agency Mixtures[1]	24.5%	21.7%		
	Average % for Commercial & Residential Mixtures[1]	26.7%	23.3%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			25.9%	22.0%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	35%	0%		
	% of RAP Mixtures Using Softer Binders	55%	48%		
	% of RAP Mixtures Using Recycling Agents	14%	1%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	5.0	0.0	12.0	0.0
	Processed Shingles Accepted	1.3	0.4	3.1	1.2
	Used in HMA/WMA Mixtures	25.6	0.6	61.3	1.8
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	30.0	0.1	71.9	0.3
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	1.10%	0.00%		
	Average % for Other Agency Mixtures[1]	0.82%	0.05%		
	Average % for Commercial & Residential Mixtures[1]	0.36%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.77%	0.02%
RAS (Other Reported Data)	% Companies Reporting Using RAS	60%	67%		
	% of RAS Mixtures Using Softer Binders	68%	100%		
	% of RAS Mixtures Using Recycling Agents	34%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.8 (Tons, Millions)	0.2 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.7 (Tons, Millions)	0.2 (Tons, Millions)
	DOT	30%	10%	0.8 (Tons, Millions)	0.2 (Tons, Millions)
	Other Agency	22%	12%	0.4 (Tons, Millions)	0.2 (Tons, Millions)
	Commercial & Residential	9%	0%	0.3 (Tons, Millions)	0.0 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	57%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	43%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	40%	33%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

MONTANA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	4.4	4.3
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

NEBRASKA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	3.0	2.9
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

NEVADA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	3.7	3.6
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

NEW HAMPSHIRE

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	1.6	1.2
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

NEW JERSEY

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	3.8	3.3	10.0	12.0
	DOT	0.4	0.1	1.1	0.5
	Other Agency	2.3	2.0	6.1	7.2
	Commercial & Residential	1.0	1.2	2.8	4.3
	No. of Companies Reporting	3	3		
RAP (Tons, Millions)	Accepted	1.6	1.4	4.2	5.0
	Used in HMA/WMA Mixtures	0.8	0.7	2.1	2.5
	Used as Aggregate	0.0	0.0	0.0	0.1
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.1	0.0	0.1	0.2
	Total Tons of RAP Stockpiled at Year-End	10.24	10.87	27.27	40.00
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	16.8%	15.0%		
	Average % for Other Agency Mixtures[1]	16.5%	15.0%		
	Average % for Commercial & Residential Mixtures[1]	30.6%	31.3%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			21.1%	20.8%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	33%	33%		
	% of RAP Mixtures Using Softer Binders	3%	0%		
	% of RAP Mixtures Using Recycling Agents	31%	15%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	0.0	0.0	0.0	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.0	0.0	0.0	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	0%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.0 (Tons, Millions)	0.8 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			3.9 (Tons, Millions)	5.1 (Tons, Millions)
	DOT	22%	48%	0.2 (Tons, Millions)	0.2 (Tons, Millions)
	Other Agency	60%	51%	3.7 (Tons, Millions)	3.7 (Tons, Millions)
	Commercial & Residential	0%	46%	0.0 (Tons, Millions)	2.0 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	17%	86%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	83%	14%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	33%	33%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

NEW MEXICO

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	3.9	3.8
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

NEW YORK

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	5.6	3.2	18.5	19.0
	DOT	1.2	0.4	4.1	2.4
	Other Agency	2.3	1.2	7.5	7.2
	Commercial & Residential	2.1	1.6	6.9	9.4
	No. of Companies Reporting	9	6		
RAP (Tons, Millions)	Accepted	1.5	0.6	5.0	3.7
	Used in HMA/WMA Mixtures	1.1	0.7	3.8	4.3
	Used as Aggregate	0.1	0.0	0.2	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.1	0.0
	Used in Other	0.1	0.1	0.4	0.5
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.56	0.75	1.87	4.47
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	18.5%	15.8%		
	Average % for Other Agency Mixtures[1]	23.8%	21.8%		
	Average % for Commercial & Residential Mixtures[1]	25.9%	25.2%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			20.3%	22.5%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	14%	17%		
	% of RAP Mixtures Using Softer Binders	0%	0%		
	% of RAP Mixtures Using Recycling Agents	5%	5%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	0.4	0.0	2.2
	Used in HMA/WMA Mixtures	0.0	0.4	0.0	2.1
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.0	0.1	0.0	0.3
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.05%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.01%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	17%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			3.9 (Tons, Millions)	3.1 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.5 (Tons, Millions)	0.5 (Tons, Millions)
	DOT	86%	93%	3.5 (Tons, Millions)	2.2 (Tons, Millions)
	Other Agency	9%	12%	0.7 (Tons, Millions)	0.9 (Tons, Millions)
	Commercial & Residential	3%	5%	0.2 (Tons, Millions)	0.5 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	56%	49%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	39%	51%		
	Organic Additive, % of Market	5%	0%		
	% Companies Reporting Using WMA Technologies	78%	67%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

NORTH CAROLINA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	12.4	8.8	13.0	12.3
	DOT	8.0	5.7	8.3	7.9
	Other Agency	1.4	0.7	1.5	1.0
	Commercial & Residential	3.0	2.4	3.2	3.4
	No. of Companies Reporting	10	11		
RAP (Tons, Millions)	Accepted	3.3	2.8	3.5	3.9
	Used in HMA/WMA Mixtures	3.0	2.6	3.1	3.6
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	4.85	2.96	5.07	4.12
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	27.8%	29.2%		
	Average % for Other Agency Mixtures[1]	22.2%	30.7%		
	Average % for Commercial & Residential Mixtures[1]	25.4%	29.2%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			24.0%	29.5%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	91%		
	% of RAP Fractionated	26%	15%		
	% of RAP Mixtures Using Softer Binders	32%	28%		
	% of RAP Mixtures Using Recycling Agents	0%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	50.0	42.0	52.3	58.5
	Processed Shingles Accepted	36.2	3.5	37.9	4.9
	Used in HMA/WMA Mixtures	38.7	53.4	40.5	74.4
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	190.6	52.0	199.3	72.5
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.41%	0.70%		
	Average % for Other Agency Mixtures[1]	0.19%	0.60%		
	Average % for Commercial & Residential Mixtures[1]	0.36%	0.50%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.31%	0.60%
RAS (Other Reported Data)	% Companies Reporting Using RAS	50%	45%		
	% of RAS Mixtures Using Softer Binders	80%	100%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			2.4 (Tons, Millions)	1.8 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			4.1 (Tons, Millions)	0.9 (Tons, Millions)
	DOT	67%	12%	5.6 (Tons, Millions)	0.9 (Tons, Millions)
	Other Agency	25%	28%	0.4 (Tons, Millions)	0.3 (Tons, Millions)
	Commercial & Residential	16%	45%	0.5 (Tons, Millions)	1.5 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	71%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	0%		
	Organic Additive, % of Market	29%	0%		
	% Companies Reporting Using WMA Technologies	50%	9%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

NORTH DAKOTA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	2.6	2.6
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

NORTHERN MARIANA ISLANDS

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	NCR	NCR	0.02	0.02
	DOT	NCR	NCR	NCR	NCR
	Other Agency	NCR	NCR	NCR	NCR
	Commercial & Residential	NCR	NCR	NCR	NCR
	No. of Companies Reporting	NCR	NCR		
RAP (Tons, Millions)	Accepted	NCR	NCR	NCR	NCR
	Used in HMA/WMA Mixtures	NCR	NCR	NCR	NCR
	Used as Aggregate	NCR	NCR	NCR	NCR
	Used in Cold-Mix Asphalt	NCR	NCR	NCR	NCR
	Used in Other	NCR	NCR	NCR	NCR
	Landfilled	NCR	NCR	NCR	NCR
	Total Tons of RAP Stockpiled at Year-End	NCR	NCR	NCR	NCR
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	NCR	NCR		
	Average % for Other Agency Mixtures[1]	NCR	NCR		
	Average % for Commercial & Residential Mixtures[1]	NCR	NCR		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			NCR	NCR
RAP (Other Reported Data)	% Companies Reporting Using RAP	NCR	NCR		
	% of RAP Fractionated	NCR	NCR		
	% of RAP Mixtures Using Softer Binders	NCR	NCR		
	% of RAP Mixtures Using Recycling Agents	NCR	NCR		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	NCR	NCR	NCR	NCR
	Processed Shingles Accepted	NCR	NCR	NCR	NCR
	Used in HMA/WMA Mixtures	NCR	NCR	NCR	NCR
	Used as Aggregate	NCR	NCR	NCR	NCR
	Used in Cold-Mix Asphalt	NCR	NCR	NCR	NCR
	Used in Other	NCR	NCR	NCR	NCR
	Landfilled	NCR	NCR	NCR	NCR
	Total Tons of RAS Stockpiled at Year-End	NCR	NCR	NCR	NCR
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	NCR	NCR		
	Average % for Other Agency Mixtures[1]	NCR	NCR		
	Average % for Commercial & Residential Mixtures[1]	NCR	NCR		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			NCR	NCR
RAS (Other Reported Data)	% Companies Reporting Using RAS	NCR	NCR		
	% of RAS Mixtures Using Softer Binders	NCR	NCR		
	% of RAS Mixtures Using Recycling Agents	NCR	NCR		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			NCR	NCR
	Total Tons Produced With WMA Technology at HMA Temperatures			NCR	NCR
	DOT	NCR	NCR	NCR	NCR
	Other Agency	NCR	NCR	NCR	NCR
	Commercial & Residential	NCR	NCR	NCR	NCR
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	NCR	NCR		
	Additive Foaming, % of Market	NCR	NCR		
	Plant Foaming, % of Market	NCR	NCR		
	Organic Additive, % of Market	NCR	NCR		
	% Companies Reporting Using WMA Technologies	NCR	NCR		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

OHIO

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	10.2	8.6	18.0	18.0
	DOT	2.7	2.9	4.7	6.2
	Other Agency	3.9	1.8	7.0	3.8
	Commercial & Residential	3.6	3.9	6.3	8.0
	No. of Companies Reporting	12	8		
RAP (Tons, Millions)	Accepted	2.8	2.1	4.9	4.5
	Used in HMA/WMA Mixtures	2.8	2.3	5.0	4.8
	Used as Aggregate	0.1	0.0	0.2	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	4.35	2.74	7.67	5.72
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	24.2%	25.1%		
	Average % for Other Agency Mixtures[1]	27.1%	24.5%		
	Average % for Commercial & Residential Mixtures[1]	29.5%	30.4%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			27.9%	26.9%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	19%	29		
	% of RAP Mixtures Using Softer Binders	38%	49%		
	% of RAP Mixtures Using Recycling Agents	10%	29%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	5.0	0.0	8.8	0.0
	Processed Shingles Accepted	0.0	1.8	0.0	3.8
	Used in HMA/WMA Mixtures	7.6	1.8	13.4	3.8
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	70.0	17.5	123.5	36.5
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.09%	0.03%		
	Average % for Commercial & Residential Mixtures[1]	0.09%	0.03%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.07%	0.02%
RAS (Other Reported Data)	% Companies Reporting Using RAS	17%	13%		
	% of RAS Mixtures Using Softer Binders	100%	100%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			2.7 (Tons, Millions)	6.1 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			1.9 (Tons, Millions)	0.4 (Tons, Millions)
	DOT	31%	42%	1.5 (Tons, Millions)	2.6 (Tons, Millions)
	Other Agency	23%	32%	1.6 (Tons, Millions)	1.2 (Tons, Millions)
	Commercial & Residential	23%	33%	1.5 (Tons, Millions)	2.7 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	26%	56%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	74%	44%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	42%	75%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

OKLAHOMA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	3.5	2.4	5.2	5.1
	DOT	1.4	1.0	2.0	2.2
	Other Agency	1.0	0.6	1.5	1.2
	Commercial & Residential	1.1	0.8	1.7	1.7
	No. of Companies Reporting	7	6		
RAP (Tons, Millions)	Accepted	0.7	0.5	1.0	1.0
	Used in HMA/WMA Mixtures	0.6	0.5	0.9	1.1
	Used as Aggregate	0.0	0.0	0.1	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.85	0.20	1.28	0.43
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	16.2%	19.5%		
	Average % for Other Agency Mixtures[1]	16.2%	20.5%		
	Average % for Commercial & Residential Mixtures[1]	20.9%	23.7%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			17.1%	21.1%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	43%	67%		
	% of RAP Mixtures Using Softer Binders	16%	18%		
	% of RAP Mixtures Using Recycling Agents	1%	5%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	3.0	10.0	4.5	21.3
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	4.6	6.0	6.9	12.8
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.3	10.1	0.4	21.5
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.13%	0.30%		
	Average % for Commercial & Residential Mixtures[1]	0.28%	0.30%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.13%	0.25%
RAS (Other Reported Data)	% Companies Reporting Using RAS	14%	17%		
	% of RAS Mixtures Using Softer Binders	100%	100%		
	% of RAS Mixtures Using Recycling Agents	100%	25%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			1.7 (Tons, Millions)	0.5 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			1.0 (Tons, Millions)	0.6 (Tons, Millions)
	DOT	64%	26%	1.3 (Tons, Millions)	0.6 (Tons, Millions)
	Other Agency	68%	20%	1.0 (Tons, Millions)	0.2 (Tons, Millions)
	Commercial & Residential	22%	18%	0.4 (Tons, Millions)	0.3 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	40%	43%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	60%	57%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	57%	83%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

OREGON

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	2.9	1.8	5.4	5.1
	DOT	0.6	0.3	1.1	0.8
	Other Agency	1.0	0.6	1.8	1.6
	Commercial & Residential	1.3	0.9	2.5	2.7
	No. of Companies Reporting	4	3		
RAP (Tons, Millions)	Accepted	0.8	0.5	1.6	1.3
	Used in HMA/WMA Mixtures	0.7	0.5	1.4	1.4
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.24	0.62	2.33	1.79
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	24.3%	24.7%		
	Average % for Other Agency Mixtures[1]	25.7%	27.3%		
	Average % for Commercial & Residential Mixtures[1]	27.0%	27.7%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			25.6%	26.9%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	0%	0%		
	% of RAP Mixtures Using Softer Binders	1%	0%		
	% of RAP Mixtures Using Recycling Agents	0%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	0.1	2.8	0.2	8.1
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	34.1	28.9	64.2	83.2
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.01%	0.00%		
	Average % for Other Agency Mixtures[1]	0.01%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.01%	0.35%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.01%	0.16%
RAS (Other Reported Data)	% Companies Reporting Using RAS	25%	33%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	10%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			1.3 (Tons, Millions)	. (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			3.3 (Tons, Millions)	. (Tons, Millions)
	DOT	100%	915	1.1 (Tons, Millions)	. (Tons, Millions)
	Other Agency	86%	68%	1.6 (Tons, Millions)	. (Tons, Millions)
	Commercial & Residential	74%	76%	1.9 (Tons, Millions)	. (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	17%	17%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	83%	83%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	100%	100%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

PENNSYLVANIA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	7.3	3.5	21.5	21.5
	DOT	3.4	1.8	10.0	11.2
	Other Agency	1.8	0.6	5.4	3.7
	Commercial & Residential	2.1	1.1	6.1	6.6
	No. of Companies Reporting	8	6		
RAP (Tons, Millions)	Accepted	1.3	0.7	3.8	4.6
	Used in HMA/WMA Mixtures	1.4	0.7	4.0	4.3
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.78	0.64	5.29	3.92
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	18.6%	18.7%		
	Average % for Other Agency Mixtures[1]	17.8%	16.8%		
	Average % for Commercial & Residential Mixtures[1]	19.0%	24.3%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			18.7%	20.0%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	3%	17%		
	% of RAP Mixtures Using Softer Binders	8%	8%		
	% of RAP Mixtures Using Recycling Agents	5%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	35.0	36.7	103.8	224.1
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	42.4	37.7	125.7	230.7
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	70.2	37.2	208.2	227.2
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.51%	1.10%		
	Average % for Other Agency Mixtures[1]	0.51%	1.00%		
	Average % for Commercial & Residential Mixtures[1]	0.70%	1.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.58%	1.07%
RAS (Other Reported Data)	% Companies Reporting Using RAS	13%	33%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			8.6 (Tons, Millions)	. (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			9.1 (Tons, Millions)	. (Tons, Millions)
	DOT	88%	99%	8.8 (Tons, Millions)	. (Tons, Millions)
	Other Agency	70%	83%	3.8 (Tons, Millions)	. (Tons, Millions)
	Commercial & Residential	83%	42%	5.1 (Tons, Millions)	. (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	75%	71%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	25%	28%		
	Organic Additive, % of Market	0%	1%		
	% Companies Reporting Using WMA Technologies	100%	100%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

PUERTO RICO

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	NCR	NCR	1.4	1.2
	DOT	NCR	NCR	NCR	NCR
	Other Agency	NCR	NCR	NCR	NCR
	Commercial & Residential	NCR	NCR	NCR	NCR
	No. of Companies Reporting	NCR	NCR		
RAP (Tons, Millions)	Accepted	NCR	NCR	NCR	NCR
	Used in HMA/WMA Mixtures	NCR	NCR	NCR	NCR
	Used as Aggregate	NCR	NCR	NCR	NCR
	Used in Cold-Mix Asphalt	NCR	NCR	NCR	NCR
	Used in Other	NCR	NCR	NCR	NCR
	Landfilled	NCR	NCR	NCR	NCR
	Total Tons of RAP Stockpiled at Year-End	NCR	NCR	NCR	NCR
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	NCR	NCR		
	Average % for Other Agency Mixtures[1]	NCR	NCR		
	Average % for Commercial & Residential Mixtures[1]	NCR	NCR		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			NCR	NCR
RAP (Other Reported Data)	% Companies Reporting Using RAP	NCR	NCR		
	% of RAP Fractionated	NCR	NCR		
	% of RAP Mixtures Using Softer Binders	NCR	NCR		
	% of RAP Mixtures Using Recycling Agents	NCR	NCR		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	NCR	NCR	NCR	NCR
	Processed Shingles Accepted	NCR	NCR	NCR	NCR
	Used in HMA/WMA Mixtures	NCR	NCR	NCR	NCR
	Used as Aggregate	NCR	NCR	NCR	NCR
	Used in Cold-Mix Asphalt	NCR	NCR	NCR	NCR
	Used in Other	NCR	NCR	NCR	NCR
	Landfilled	NCR	NCR	NCR	NCR
	Total Tons of RAS Stockpiled at Year-End	NCR	NCR	NCR	NCR
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	NCR	NCR		
	Average % for Other Agency Mixtures[1]	NCR	NCR		
	Average % for Commercial & Residential Mixtures[1]	NCR	NCR		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			NCR	NCR
RAS (Other Reported Data)	% Companies Reporting Using RAS	NCR	NCR		
	% of RAS Mixtures Using Softer Binders	NCR	NCR		
	% of RAS Mixtures Using Recycling Agents	NCR	NCR		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			NCR	NCR
	Total Tons Produced With WMA Technology at HMA Temperatures			NCR	NCR
	DOT	NCR	NCR	NCR	NCR
	Other Agency	NCR	NCR	NCR	NCR
	Commercial & Residential	NCR	NCR	NCR	NCR
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	NCR	NCR		
	Additive Foaming, % of Market	NCR	NCR		
	Plant Foaming, % of Market	NCR	NCR		
	Organic Additive, % of Market	NCR	NCR		
	% Companies Reporting Using WMA Technologies	NCR	NCR		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

RHODE ISLAND

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	2.2	1.9
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

SOUTH CAROLINA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	5.0	3.7	7.4	7.9
	DOT	2.7	2.2	4.0	4.6
	Other Agency	0.9	0.7	1.3	1.5
	Commercial & Residential	1.4	0.8	2.1	1.8
	No. of Companies Reporting	8	6		
RAP (Tons, Millions)	Accepted	1.5	0.9	2.2	1.9
	Used in HMA/WMA Mixtures	1.2	0.9	1.8	1.9
	Used as Aggregate	0.0	0.0	0.0	0.1
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.77	0.50	1.15	1.07
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	23.6%	22.3%		
	Average % for Other Agency Mixtures[1]	20.0%	24.8%		
	Average % for Commercial & Residential Mixtures[1]	25.8%	27.2%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			23.8%	24.1%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	56%	75%		
	% of RAP Mixtures Using Softer Binders	0%	17%		
	% of RAP Mixtures Using Recycling Agents	0%	3%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	15.5	17.5	23.1	37.1
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	5.0	11.0	7.5	23.2
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	22.0	42.0	32.9	89.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.10%	0.29%		
	Average % for Other Agency Mixtures[1]	0.10%	0.29%		
	Average % for Commercial & Residential Mixtures[1]	0.10%	0.29%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.10%	0.29%
RAS (Other Reported Data)	% Companies Reporting Using RAS	25%	33%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.6 (Tons, Millions)	0.9 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			1.6 (Tons, Millions)	0.9 (Tons, Millions)
	DOT	32%	30%	1.3 (Tons, Millions)	1.4 (Tons, Millions)
	Other Agency	44%	20%	0.6 (Tons, Millions)	0.3 (Tons, Millions)
	Commercial & Residential	13%	4%	0.3 (Tons, Millions)	0.1 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	99%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	1%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	100%	83%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

SOUTH DAKOTA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	NCR	2.9	2.6
	DOT	*	NCR	*	NCR
	Other Agency	*	NCR	*	NCR
	Commercial & Residential	*	NCR	*	NCR
	No. of Companies Reporting	*	NCR		
RAP (Tons, Millions)	Accepted	*	NCR	*	NCR
	Used in HMA/WMA Mixtures	*	NCR	*	NCR
	Used as Aggregate	*	NCR	*	NCR
	Used in Cold-Mix Asphalt	*	NCR	*	NCR
	Used in Other	*	NCR	*	NCR
	Landfilled	*	NCR	*	NCR
	Total Tons of RAP Stockpiled at Year-End	*	NCR	*	NCR
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	NCR		
	Average % for Other Agency Mixtures[1]	*	NCR		
	Average % for Commercial & Residential Mixtures[1]	*	NCR		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	NCR
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	NCR		
	% of RAP Fractionated	*	NCR		
	% of RAP Mixtures Using Softer Binders	*	NCR		
	% of RAP Mixtures Using Recycling Agents	*	NCR		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	NCR	*	NCR
	Processed Shingles Accepted	*	NCR	*	NCR
	Used in HMA/WMA Mixtures	*	NCR	*	NCR
	Used as Aggregate	*	NCR	*	NCR
	Used in Cold-Mix Asphalt	*	NCR	*	NCR
	Used in Other	*	NCR	*	NCR
	Landfilled	*	NCR	*	NCR
	Total Tons of RAS Stockpiled at Year-End	*	NCR	*	NCR
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	NCR		
	Average % for Other Agency Mixtures[1]	*	NCR		
	Average % for Commercial & Residential Mixtures[1]	*	NCR		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	NCR
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	NCR		
	% of RAS Mixtures Using Softer Binders	*	NCR		
	% of RAS Mixtures Using Recycling Agents	*	NCR		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	NCR
	Total Tons Produced With WMA Technology at HMA Temperatures			*	NCR
	DOT	*	NCR	*	NCR
	Other Agency	*	NCR	*	NCR
	Commercial & Residential	*	NCR	*	NCR
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	NCR		
	Additive Foaming, % of Market	*	NCR		
	Plant Foaming, % of Market	*	NCR		
	Organic Additive, % of Market	*	NCR		
	% Companies Reporting Using WMA Technologies	*	NCR		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

TENNESSEE

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	3.5	2.0	9.2	9.9
	DOT	1.3	0.9	3.4	4.2
	Other Agency	0.9	0.4	2.4	2.1
	Commercial & Residential	1.3	0.7	3.4	3.6
	No. of Companies Reporting	8	6		
RAP (Tons, Millions)	Accepted	0.9	0.4	2.3	2.0
	Used in HMA/WMA Mixtures	0.8	0.4	2.0	2.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.97	1.15	5.19	5.57
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	19.6%	20.2%		
	Average % for Other Agency Mixtures[1]	22.8%	14.5%		
	Average % for Commercial & Residential Mixtures[1]	24.6%	24.3%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			22.3%	20.2%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	63%	38%		
	% of RAP Mixtures Using Softer Binders	1%	2%		
	% of RAP Mixtures Using Recycling Agents	16%	20%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	3.6	4.9	9.5	23.8
	Processed Shingles Accepted	10.9	8.0	28.7	38.8
	Used in HMA/WMA Mixtures	11.1	10.0	29.2	48.3
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	5.6	8.6	14.7	41.7
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.61%	0.50%		
	Average % for Other Agency Mixtures[1]	0.00%	0.40%		
	Average % for Commercial & Residential Mixtures[1]	0.74%	0.60%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.32%	0.49%
RAS (Other Reported Data)	% Companies Reporting Using RAS	25%	33%		
	% of RAS Mixtures Using Softer Binders	0%	3%		
	% of RAS Mixtures Using Recycling Agents	50%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.9 (Tons, Millions)	0.6 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			3.3 (Tons, Millions)	4.2 (Tons, Millions)
	DOT	48%	51%	1.6 (Tons, Millions)	2.2 (Tons, Millions)
	Other Agency	43%	62%	1.0 (Tons, Millions)	1.3 (Tons, Millions)
	Commercial & Residential	45%	37%	1.5 (Tons, Millions)	1.3 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	70%	82%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	30%	18%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	100%	50%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

TEXAS

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	8.3	8.3	52.5	48.5
	DOT	3.3	4.3	20.8	25.2
	Other Agency	2.5	1.6	15.6	9.4
	Commercial & Residential	2.5	2.4	16.0	13.9
	No. of Companies Reporting	4	5		
RAP (Tons, Millions)	Accepted	1.8	1.2	11.3	6.9
	Used in HMA/WMA Mixtures	1.7	1.5	10.5	8.6
	Used as Aggregate	0.0	0.1	0.0	0.5
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.51	1.32	9.56	7.67
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	15.0%	13.6%		
	Average % for Other Agency Mixtures[1]	17.2%	20.2%		
	Average % for Commercial & Residential Mixtures[1]	24.2%	23.4%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			20.0%	17.8%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	34%	24%		
	% of RAP Mixtures Using Softer Binders	8%	21%		
	% of RAP Mixtures Using Recycling Agents	1%	7%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	2.8	0.0	16.2
	Processed Shingles Accepted	6.5	3.0	41.2	17.4
	Used in HMA/WMA Mixtures	16.7	4.5	105.8	26.2
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	4.1	5.4	26.0	31.2
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.20%	0.04%		
	Average % for Other Agency Mixtures[1]	0.20%	0.06%		
	Average % for Commercial & Residential Mixtures[1]	0.20%	0.04%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.20%	0.05%
RAS (Other Reported Data)	% Companies Reporting Using RAS	75%	40%		
	% of RAS Mixtures Using Softer Binders	36%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			13.5 (Tons, Millions)	5.9 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			7.2 (Tons, Millions)	14.3 (Tons, Millions)
	DOT	50%	44%	10.4 (Tons, Millions)	11.2 (Tons, Millions)
	Other Agency	35%	51%	5.5 (Tons, Millions)	4.8 (Tons, Millions)
	Commercial & Residential	30%	30%	4.8 (Tons, Millions)	4.2 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	100%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	75%	60%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

U.S. VIRGIN ISLANDS

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	NCR	NCR	0.1	0.1
	DOT	NCR	NCR	NCR	NCR
	Other Agency	NCR	NCR	NCR	NCR
	Commercial & Residential	NCR	NCR	NCR	NCR
	No. of Companies Reporting	NCR	NCR		
RAP (Tons, Millions)	Accepted	NCR	NCR	NCR	NCR
	Used in HMA/WMA Mixtures	NCR	NCR	NCR	NCR
	Used as Aggregate	NCR	NCR	NCR	NCR
	Used in Cold-Mix Asphalt	NCR	NCR	NCR	NCR
	Used in Other	NCR	NCR	NCR	NCR
	Landfilled	NCR	NCR	NCR	NCR
	Total Tons of RAP Stockpiled at Year-End	NCR	NCR	NCR	NCR
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	NCR	NCR		
	Average % for Other Agency Mixtures[1]	NCR	NCR		
	Average % for Commercial & Residential Mixtures[1]	NCR	NCR		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			NCR	NCR
RAP (Other Reported Data)	% Companies Reporting Using RAP	NCR	NCR		
	% of RAP Fractionated	NCR	NCR		
	% of RAP Mixtures Using Softer Binders	NCR	NCR		
	% of RAP Mixtures Using Recycling Agents	NCR	NCR		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	NCR	NCR	NCR	NCR
	Processed Shingles Accepted	NCR	NCR	NCR	NCR
	Used in HMA/WMA Mixtures	NCR	NCR	NCR	NCR
	Used as Aggregate	NCR	NCR	NCR	NCR
	Used in Cold-Mix Asphalt	NCR	NCR	NCR	NCR
	Used in Other	NCR	NCR	NCR	NCR
	Landfilled	NCR	NCR	NCR	NCR
	Total Tons of RAS Stockpiled at Year-End	NCR	NCR	NCR	NCR
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	NCR	NCR		
	Average % for Other Agency Mixtures[1]	NCR	NCR		
	Average % for Commercial & Residential Mixtures[1]	NCR	NCR		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			NCR	NCR
RAS (Other Reported Data)	% Companies Reporting Using RAS	NCR	NCR		
	% of RAS Mixtures Using Softer Binders	NCR	NCR		
	% of RAS Mixtures Using Recycling Agents	NCR	NCR		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			NCR	NCR
	Total Tons Produced With WMA Technology at HMA Temperatures			NCR	NCR
	DOT	NCR	NCR	NCR	NCR
	Other Agency	NCR	NCR	NCR	NCR
	Commercial & Residential	NCR	NCR	NCR	NCR
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	NCR	NCR		
	Additive Foaming, % of Market	NCR	NCR		
	Plant Foaming, % of Market	NCR	NCR		
	Organic Additive, % of Market	NCR	NCR		
	% Companies Reporting Using WMA Technologies	NCR	NCR		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

UTAH

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	1.9	2.9	4.2	3.6
	DOT	0.6	1.1	1.3	1.4
	Other Agency	0.6	1.3	1.3	1.5
	Commercial & Residential	0.7	0.5	1.6	0.7
	No. of Companies Reporting	6	7		
RAP (Tons, Millions)	Accepted	0.5	0.7	1.0	0.8
	Used in HMA/WMA Mixtures	0.4	0.5	1.0	0.7
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	1.01	0.62	2.20	0.76
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	20.9%	17.5%		
	Average % for Other Agency Mixtures[1]	20.8%	18.2%		
	Average % for Commercial & Residential Mixtures[1]	24.8%	23.7%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			22.7%	18.4%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	6%	1%		
	% of RAP Mixtures Using Softer Binders	35%	45%		
	% of RAP Mixtures Using Recycling Agents	13%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	0.0	0.0	0.0	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.0	0.0	0.0	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	0%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.6 (Tons, Millions)	0.3 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			1.1 (Tons, Millions)	1.7 (Tons, Millions)
	DOT	48%	63%	0.6 (Tons, Millions)	0.9 (Tons, Millions)
	Other Agency	41%	52%	0.6 (Tons, Millions)	0.8 (Tons, Millions)
	Commercial & Residential	32%	49%	0.5 (Tons, Millions)	0.3 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	91%	48%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	9%	52%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	83%	57%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

VERMONT

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	2.0	1.6
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

VIRGINIA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	6.7	5.2	12.0	12.5
	DOT	2.8	2.5	5.1	6.0
	Other Agency	1.6	0.7	2.8	1.6
	Commercial & Residential	2.3	2.0	4.1	4.9
	No. of Companies Reporting	12	6		
RAP (Tons, Millions)	Accepted	2.4	1.5	4.4	3.6
	Used in HMA/WMA Mixtures	2.0	1.5	3.5	3.7
	Used as Aggregate	0.1	0.0	0.1	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	2.44	2.01	4.33	4.85
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	27.8%	29.2%		
	Average % for Other Agency Mixtures[1]	27.8%	25.3%		
	Average % for Commercial & Residential Mixtures[1]	31.3%	30.7%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			29.0%	29.6%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	43%	33%		
	% of RAP Mixtures Using Softer Binders	9%	0%		
	% of RAP Mixtures Using Recycling Agents	5%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	4.0	5.9	7.1	14.3
	Used in HMA/WMA Mixtures	0.0	5.9	0.0	14.3
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	4.0	1.9	7.1	4.5
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.20%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.11%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	17%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			6.0 (Tons, Millions)	5.4 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			2.0 (Tons, Millions)	0.9 (Tons, Millions)
	DOT	68%	53%	3.4 (Tons, Millions)	3.2 (Tons, Millions)
	Other Agency	72%	23%	2.0 (Tons, Millions)	0.4 (Tons, Millions)
	Commercial & Residential	62%	56%	2.6 (Tons, Millions)	2.7 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	88%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	12%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	83%	67%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

WASHINGTON

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	3.2	3.5	6.1	6.0
	DOT	0.5	0.5	0.9	0.9
	Other Agency	1.1	1.7	2.1	3.0
	Commercial & Residential	1.6	1.3	3.1	2.1
	No. of Companies Reporting	6	6		
RAP (Tons, Millions)	Accepted	0.7	1.4	1.3	2.3
	Used in HMA/WMA Mixtures	0.7	0.9	1.4	1.6
	Used as Aggregate	0.1	0.1	0.2	0.2
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.1	0.0
	Total Tons of RAP Stockpiled at Year-End	0.44	0.84	0.84	1.44
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	20.8%	24.3%		
	Average % for Other Agency Mixtures[1]	20.8%	24.7%		
	Average % for Commercial & Residential Mixtures[1]	26.2%	29.8%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			23.4%	27.0%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	22%	5%		
	% of RAP Mixtures Using Softer Binders	32%	16%		
	% of RAP Mixtures Using Recycling Agents	3%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	35.5	5.0	68.1	8.5
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	24.4	9.3	46.8	16.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	12.1	5.1	23.2	8.7
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.57%	0.20%		
	Average % for Other Agency Mixtures[1]	0.57%	0.20%		
	Average % for Commercial & Residential Mixtures[1]	0.99%	0.35%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.77%	0.27%
RAS (Other Reported Data)	% Companies Reporting Using RAS	33%	33%		
	% of RAS Mixtures Using Softer Binders	50%	50%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.9 (Tons, Millions)	0.1 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			1.0 (Tons, Millions)	1.2 (Tons, Millions)
	DOT	41%	23%	0.4 (Tons, Millions)	0.2 (Tons, Millions)
	Other Agency	27%	25%	0.6 (Tons, Millions)	0.7 (Tons, Millions)
	Commercial & Residential	33%	16%	1.0 (Tons, Millions)	0.4 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	0%	14%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	100%	86%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	67%	67%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

NCR = No companies responding

* = Fewer than 3 companies reporting

WEST VIRGINIA

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	1.9	2.0	3.6	4.8
	DOT	1.4	1.5	2.7	3.7
	Other Agency	0.2	0.2	0.3	0.4
	Commercial & Residential	0.3	0.3	0.5	0.7
	No. of Companies Reporting	3	3		
RAP (Tons, Millions)	Accepted	0.3	0.3	0.6	0.7
	Used in HMA/WMA Mixtures	0.3	0.3	0.5	0.8
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	0.44	0.35	0.83	0.83
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	14.1%	17.0%		
	Average % for Other Agency Mixtures[1]	13.0%	14.3%		
	Average % for Commercial & Residential Mixtures[1]	14.1%	18.0%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			13.7%	17.2%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	0%	0%		
	% of RAP Mixtures Using Softer Binders	0%	0%		
	% of RAP Mixtures Using Recycling Agents	0%	0%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	0.0	0.0	0.0	0.0
	Processed Shingles Accepted	0.0	0.0	0.0	0.0
	Used in HMA/WMA Mixtures	0.0	0.0	0.0	0.0
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	0.0	0.0	0.0	0.0
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.00%	0.00%		
	Average % for Other Agency Mixtures[1]	0.00%	0.00%		
	Average % for Commercial & Residential Mixtures[1]	0.00%	0.00%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.00%	0.00%
RAS (Other Reported Data)	% Companies Reporting Using RAS	0%	0%		
	% of RAS Mixtures Using Softer Binders	0%	0%		
	% of RAS Mixtures Using Recycling Agents	0%	0%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			0.0 (Tons, Millions)	0.0 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.2 (Tons, Millions)	0.2 (Tons, Millions)
	DOT	6%	5%	0.2 (Tons, Millions)	0.2 (Tons, Millions)
	Other Agency	1%	1%	0.0 (Tons, Millions)	0.0 (Tons, Millions)
	Commercial & Residential	5%	5%	0.0 (Tons, Millions)	0.0 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	100%	0%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	100%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	33%	33%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

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WISCONSIN

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	9.5	9.7	11.5	10.3
	DOT	4.3	4.4	5.3	4.6
	Other Agency	2.2	2.9	2.6	3.1
	Commercial & Residential	3.0	2.4	3.6	2.5
	No. of Companies Reporting	4	3		
RAP (Tons, Millions)	Accepted	2.3	2.9	2.8	3.1
	Used in HMA/WMA Mixtures	1.9	2.3	2.4	2.5
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAP Stockpiled at Year-End	2.18	2.59	2.65	2.76
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	19.8%	24.0%		
	Average % for Other Agency Mixtures[1]	20.1%	24.3%		
	Average % for Commercial & Residential Mixtures[1]	21.7%	28.3%		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			20.5%	24.3%
RAP (Other Reported Data)	% Companies Reporting Using RAP	100%	100%		
	% of RAP Fractionated	6%	8%		
	% of RAP Mixtures Using Softer Binders	21%	20%		
	% of RAP Mixtures Using Recycling Agents	1%	1%		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	83.4	32.4	101.3	34.5
	Processed Shingles Accepted	31.5	29.5	38.3	31.4
	Used in HMA/WMA Mixtures	44.3	47.5	53.8	50.6
	Used as Aggregate	0.0	0.0	0.0	0.0
	Used in Cold-Mix Asphalt	0.0	0.0	0.0	0.0
	Used in Other	0.0	0.0	0.0	0.0
	Landfilled	0.0	0.0	0.0	0.0
	Total Tons of RAS Stockpiled at Year-End	98.7	49.9	119.9	53.1
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	0.47%	0.49%		
	Average % for Other Agency Mixtures[1]	0.47%	0.49%		
	Average % for Commercial & Residential Mixtures[1]	0.47%	0.49%		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			0.47%	0.49%
RAS (Other Reported Data)	% Companies Reporting Using RAS	100%	100%		
	% of RAS Mixtures Using Softer Binders	30%	39%		
	% of RAS Mixtures Using Recycling Agents	3%	3%		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			5.6 (Tons, Millions)	5.2 (Tons, Millions)
	Total Tons Produced With WMA Technology at HMA Temperatures			0.3 (Tons, Millions)	0.3 (Tons, Millions)
	DOT	54%	59%	2.8 (Tons, Millions)	2.7 (Tons, Millions)
	Other Agency	55%	66%	1.5 (Tons, Millions)	2.1 (Tons, Millions)
	Commercial & Residential	47%	29%	1.7 (Tons, Millions)	0.7 (Tons, Millions)
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	100%	100%		
	Additive Foaming, % of Market	0%	0%		
	Plant Foaming, % of Market	0%	0%		
	Organic Additive, % of Market	0%	0%		
	% Companies Reporting Using WMA Technologies	100%	100%		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

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WYOMING

Material	Sectors	Reported Values		Estimated Values	
		2022	2023	2022	2023
HMA/WMA (Tons, Millions)	Total	*	*	2.6	2.4
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
	No. of Companies Reporting	*	*		
RAP (Tons, Millions)	Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAP Stockpiled at Year-End	*	*	*	*
RAP (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAP Tons Used in HMA/WMA[2]			*	*
RAP (Other Reported Data)	% Companies Reporting Using RAP	*	*		
	% of RAP Fractionated	*	*		
	% of RAP Mixtures Using Softer Binders	*	*		
	% of RAP Mixtures Using Recycling Agents	*	*		
RAS (Tons, Thousands)	Unprocessed Shingles Accepted	*	*	*	*
	Processed Shingles Accepted	*	*	*	*
	Used in HMA/WMA Mixtures	*	*	*	*
	Used as Aggregate	*	*	*	*
	Used in Cold-Mix Asphalt	*	*	*	*
	Used in Other	*	*	*	*
	Landfilled	*	*	*	*
	Total Tons of RAS Stockpiled at Year-End	*	*	*	*
RAS (Average % Used in Mixtures)	Average % for DOT Mixtures[1]	*	*		
	Average % for Other Agency Mixtures[1]	*	*		
	Average % for Commercial & Residential Mixtures[1]	*	*		
	State Average All Mixtures Based on RAS Tons Used in HMA/WMA[2]			*	*
RAS (Other Reported Data)	% Companies Reporting Using RAS	*	*		
	% of RAS Mixtures Using Softer Binders	*	*		
	% of RAS Mixtures Using Recycling Agents	*	*		
WMA	Total Tons Produced With WMA Technology at Reduced Temperature			*	*
	Total Tons Produced With WMA Technology at HMA Temperatures			*	*
	DOT	*	*	*	*
	Other Agency	*	*	*	*
	Commercial & Residential	*	*	*	*
WMA Technologies (Other Reported Data)	Chemical Additive, % of Market	*	*		
	Additive Foaming, % of Market	*	*		
	Plant Foaming, % of Market	*	*		
	Organic Additive, % of Market	*	*		
	% Companies Reporting Using WMA Technologies	*	*		

[1] Average percent based on contractor's reported percentage for each sector, adjusted based upon reported tonnage.

[2] Average percent based on total reported tons of RAP or RAS used in HMA/WMA divided by reported total tons HMA/WMA produced.

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14th Annual Asphalt Pavement Industry Survey
IS 138 — Appendix B