AASHTO Revisions: Shingle Specifications and Procedures

North Central Asphalt Users Producers Group

Lee Gallivan – FHWA
Asphalt Pavement Engineer and Recycled Programs Manager

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Kansas City, Mo.

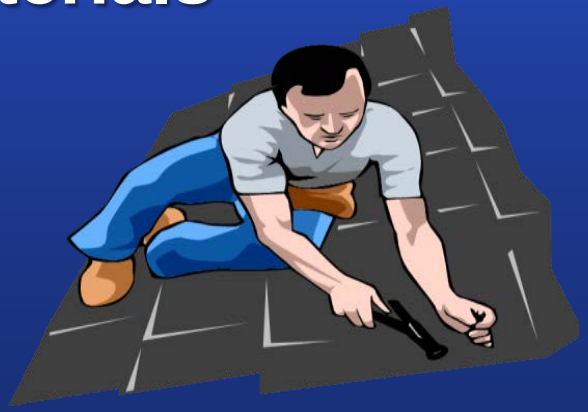
U.S. Department of Transportation
Federal Highway Administration

Todays Outline

- AASHTO Reclaimed Asphalt Shingles Materials Revisions
- NAPA Statistics 2012
- Innovative Asphalt Program Technologies

Recycled Asphalt Shingles

- Manufactured Waste
- Post Consumer Tear Offs
  - Cleaning and sorting of shingles
  - Asbestos Testing
  - Removing Deleterious Materials
  - Homogenous Product

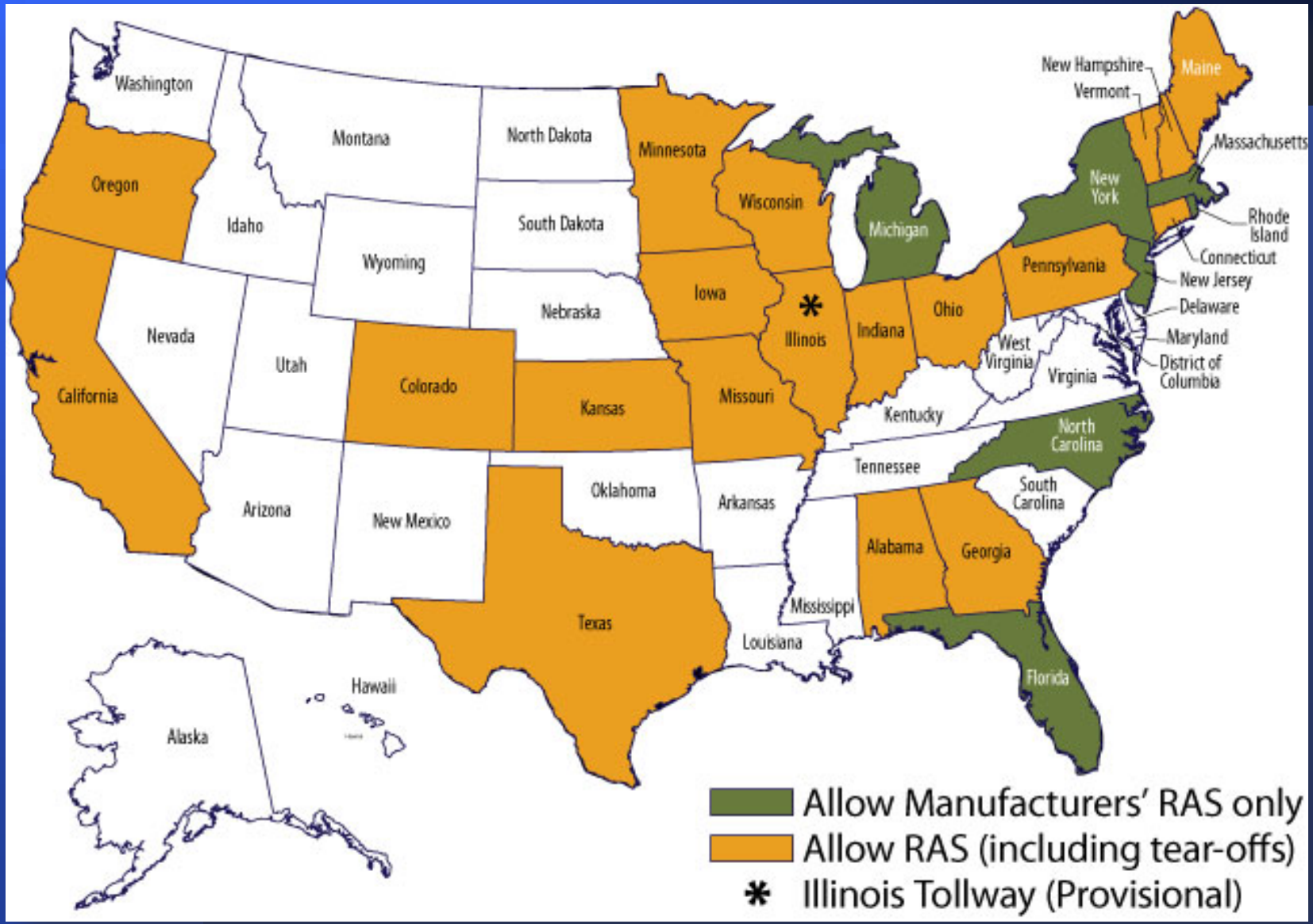


What Are Shingles Made of ?

- 35% granules
- 30% asphalt
- 15% fiberglass
- 20% mineral filler

Recycled Asphalt Shingles

Recycled Asphalt Shingle Use in US



Source: 2011, http://your.kingcounty.gov/solidwaste/linkup/eNewslink/eNewslink_2011-fall.asp

Current FHWA Involvement

- Pooled Fund Study for RAS
- Engineering Properties of Recycled Asphalt Shingles
- Asphalt Shingle Recycling Forums
- Support for Highway Agencies

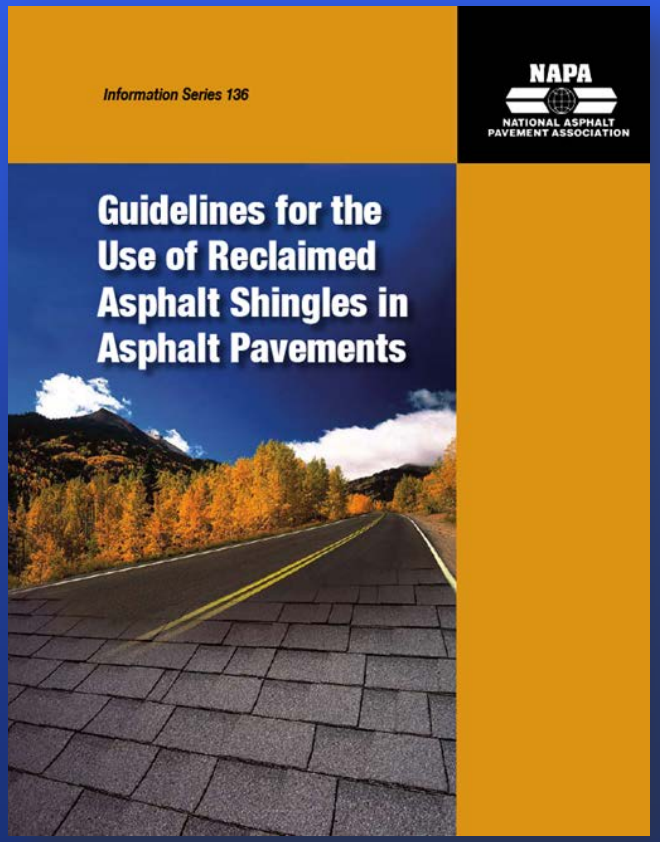
Asphalt Roofing Shingles

- *12 million tons* of waste asphalt roofing shingles are generated in the US per year.
  - Manufacturing Waste ~ 1 million tons
  - Roofing tear-offs ~ 11 million tones
- Reclaimed Asphalt Shingles - RAS
  - Crushed/ground and screened
  - Used in hot mix asphalt
  - High beneficial reuse

Reclaimed Asphalt Shingles (RAS) Industry Guidance

CMRA

NAPA



Construction Materials Recycling Association (CMRA)

STANDARDS

- M323 Modifications; Binder replacement revisions for RAP and/or RAS (part 1 completed)
- MP15/PP53 Modifications regarding RAS (completed and submitted to AASHTO)
- Development of Technical Information on Shingles to replace the existing standards

MP 15- Specifications

EXISTING

- Grind Size: 100 percent passes the 12.5-mm (0.5-in.) sieve
- Rates of RAS additions
- Deleterious Substances 3% of mass and Non-Metallic 1.5%
- Reference Documents and Terminology

NEW

- Grind Size reduced to 100 percent passes the 9.5 mm (3/8-in.) sieve
- Deleted –moved to PP53
- Deleterious Criteria reduced to: 1% of mass and Non-Metallic reduced to 0.5%
- Reference Documents and Terminology updated

PP 53- Practice

EXISTING

- Shingle Binder Availability Factor Given 0.70
- Binder Grade Determinations
- Instructions only referred to RAS
- Binder Grade Adjustments Left Open

NEW

- Corrected SAF process Range from 0.70 to 0.85 to be calculated
- BGD process revised
- New Equations for RAS and RAS+RAP
- New Table 1 included Guidelines on when to adjust (see next slide)

PP53, Table 1—Binder Grade Adjustment Guidelines for Mixtures with Reclaimed Asphalt Shingles (RAS) - the percentage of available shingle binder and RAP binder in the design asphalt binder

Type equation here.

Binder Grade	w/RAS or RAS+RAP
No Change in Virgin Binder Selection	<15 %
Select Virgin Binder Grade, one grade softer	>15% to <25%
Blending Chart Recommendations	≥25

Numbering

EXISTING

- Provisional Standards
- MP15 – 06(09) and PP53 – 06(09)

Both To be replaced

NEW

- New Provisional Standards
- MP XX (14) and PP XX (14) (XX- TBD)

ASTM Shingles Effort

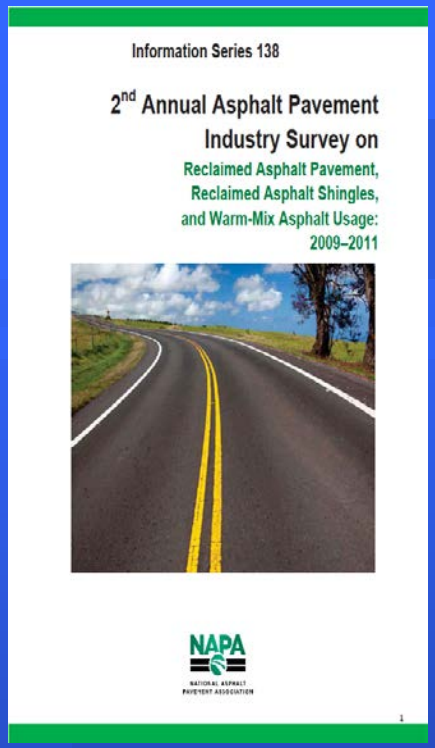
- Nazli Yesiller, nyesille@calpoly.edu

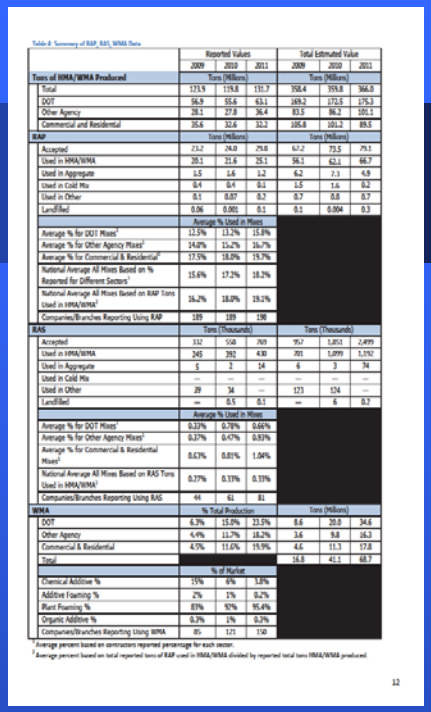
  Chair: D18:14
- "We are in the process of preparing the next version of the specification for ballot. It will be very similar to the AASHTO Version"

NATIONAL ASPHALT PAVEMENT ASSOCIATION

U.S. Department of Transportation
Federal Highway Administration

NAPA/FHWA 2012 Survey of Recycled Materials Usage





	Reported Values			Total Estimated Value		
	2009	2010	2011	2009	2010	2011
Tons of HMA/WMA Produced	Tons (Millions)			Tons (Millions)		
Total	173.9	179.8	171.7	358.4	359.8	366.0
DOT	56.9	55.6	63.1	169.2	172.5	175.3
Other Agency	28.1	27.8	36.4	83.5	86.2	101.1
Commercial and Residential	35.6	32.6	32.2	105.8	101.2	89.5
RAP	Tons (Millions)			Tons (Millions)		
Accepted	23.2	24.0	29.8	67.2	73.5	79.1
Used in HMA/WMA	20.1	21.6	25.1	56.1	62.1	66.7
Used in Aggregate	1.5	1.6	1.2	6.2	7.3	4.9
Used in Cold Mix	0.4	0.4	0.1	1.5	1.6	0.2
Used in Other	0.1	0.07	0.2	0.7	0.8	0.7
Landfilled	0.06	0.001	0.1	0.1	0.004	0.3
	Average % Used in Mixes					
Average % for DOT Mixes[1]	12.5%	13.2%	15.8%			
Average % for Other Agency Mixes[1]	14.0%	15.2%	16.7%			
Average % for Commercial & Residential[1]	17.5%	18.0%	19.7%			
National Average All Mixes Based on % Reported for Different Sectors[1]	15.6%	17.2%	18.2%			
National Average All Mixes Based on RAP Tons Used in HMA/WMA[2]	16.2%	18.0%	19.1%			
Companies/Branches Reporting Using RAP	189	189	190			
RAS	Tons (Thousands)			Tons (Thousands)		
Accepted	332	558	769	957	1,851	2,499
Used in HMA/WMA	245	292	430	701	1,099	1,192
Used in Aggregate	5	2	14	6	3	34
Used in Cold Mix	--	--	--	--	--	--
Used in Other	89	34	--	173	174	--
Landfilled	--	0.5	0.1	--	6	0.2
	Average % Used in Mixes					
Average % for DOT Mixes[1]	0.33%	0.78%	0.66%			
Average % for Other Agency Mixes[1]	0.37%	0.47%	0.93%			
Average % for Commercial & Residential Mixes[1]	0.63%	0.81%	1.04%			
National Average All Mixes Based on RAS Tons Used in HMA/WMA[2]	0.27%	0.33%	0.33%			
Companies/Branches Reporting Using RAS	44	61	81			
WMA	% Total Production			Tons (Millions)		
DOT	6.3%	15.0%	23.5%	8.6	20.0	34.6
Other Agency	4.4%	11.7%	18.2%	3.6	9.8	16.3
Commercial & Residential	4.5%	11.6%	19.9%	4.6	11.3	17.8
Total				16.8	41.1	68.7
	% of Market					
Chemical Additive %	15%	6%	3.8%			
Additive Foaming %	2%	1%	0.2%			
Plant Foaming %	83%	92%	95.4%			
Organic Additive %	0.3%	1%	0.3%			
Companies/Branches Reporting Using WMA	85	171	150			

[1] Average percent based on contractors reported percentage for each sector.
[2] Average percent based on total reported tons of RAP used in HMA/WMA divided by reported total tons HMA/WMA produced.

12

2nd Annual Asphalt Pavement Industry Survey on Reclaimed Asphalt Pavement, Reclaimed Asphalt Shingles, and Warm-Mix Asphalt Usage: 2009–2011

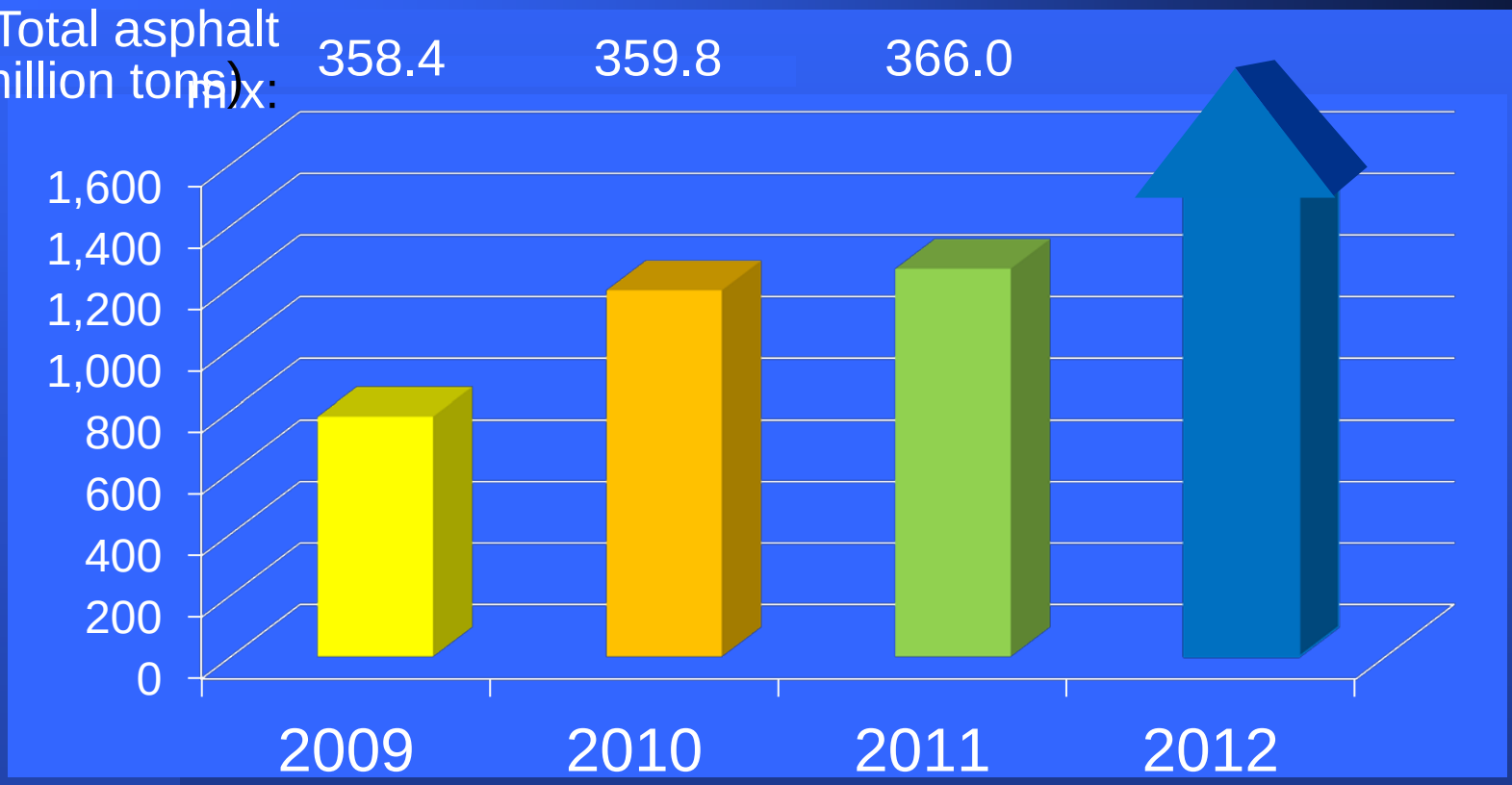
NAPA WEBSITE: www.asphaltpavement.org

NAPA -RAP, RAS, WMA Usage Survey

- RAP usage 68.3 Million Tons = +22%
- RAS usage 1.9 Million Tons = +56%
- WMA usage 86.7 Million Tons = +26%
- Overall of RAP Usage 19.6% = +3%

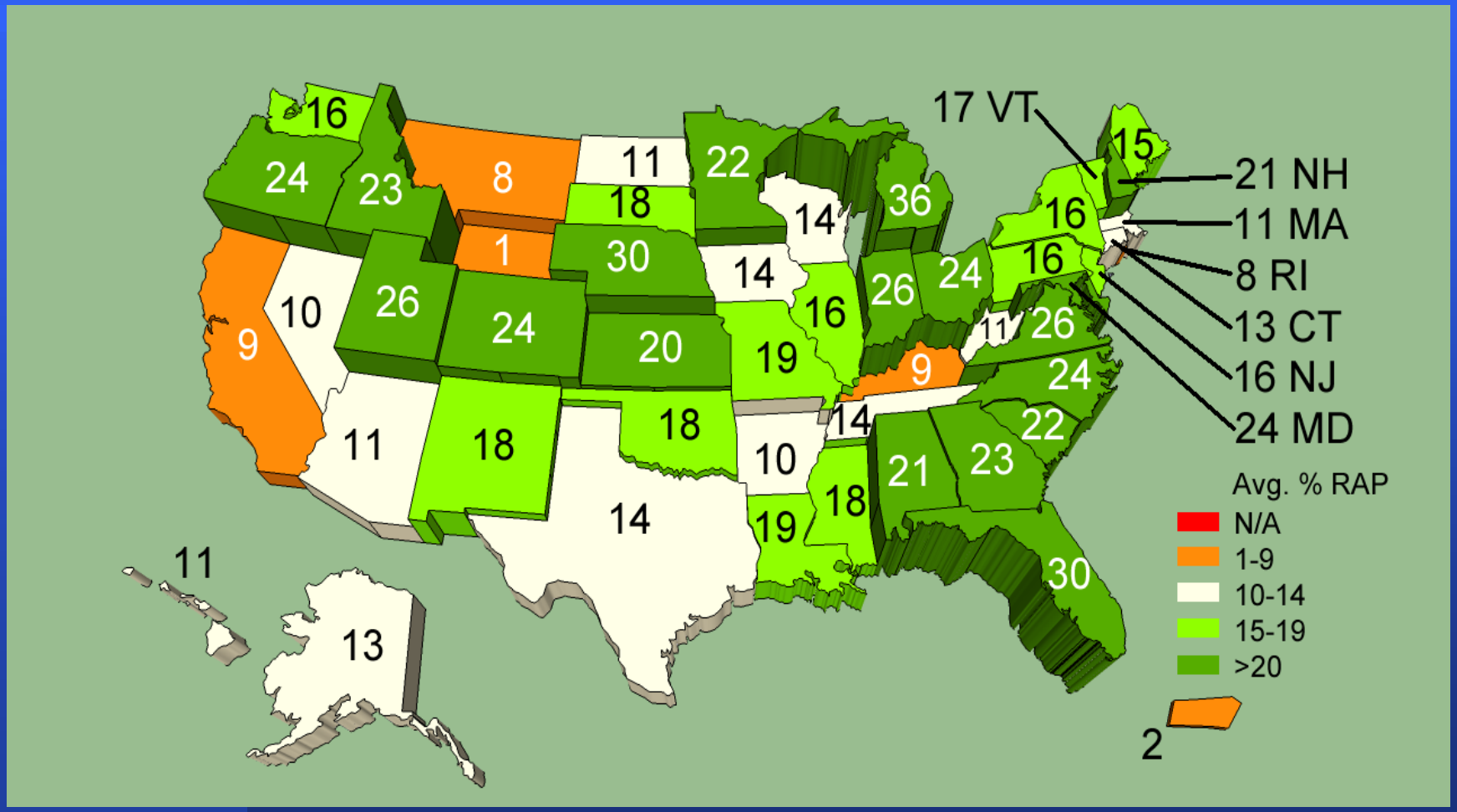
RAS Usage in HMA/WMA

***Total* RAS tons used for mix production**

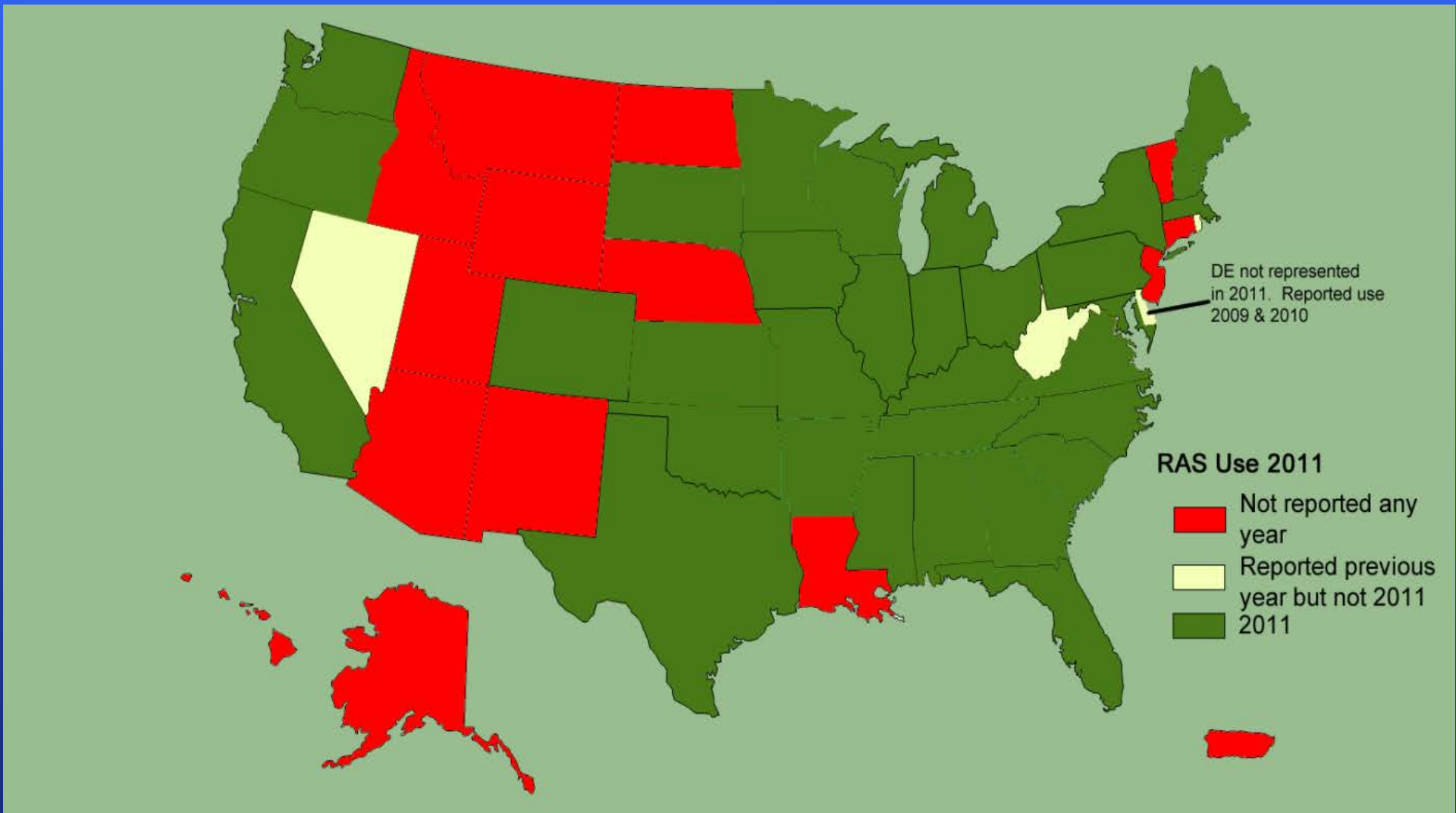


2009	2010	2011	2012
701 thousand tons	1,099 thousand tons	1,192 thousand tons	data being collected

2011 Average RAP Content by State



2011 RAS Reported Usage by State (33 Yes's)

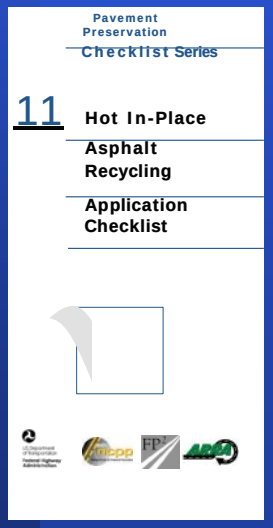


In-Place Recycling Construction Checklists

*Full Depth Reclamation FHWA-HIF-036

*Hot In-Place FHWA-HIF-13-061

Cold In-Place FHWA-HIF-13-062



*Completed and posted on FHWA and National Center for Preservation websites

Thank you…For More Information…

Victor (Lee) Gallivan, PE
Recycled Material Program Coordinator
Victor.Gallivan@dot.gov
Ph: 317-226-7493
Cl: 317-605-4704

The secret of a good ~~sermon~~/presentation is to have a good beginning and a good ending, and to have the two as close together as possible: George Burns