

The Science of PFAS

Piecing Together the Puzzle

March 11-13, 2025 • Raleigh, NC

www.awma.org/PFAS









































GENERAL INFORMATION

CONFERENCE OVERVIEW

Each year, we learn more about per- and polyfluoroalkyl substances (PFAS) through research, testing, and collaboration from all sectors working together to find answers and develop solutions. A&WMA continues this premier conference to build on past experience, share new information, and bring together scientists, researchers, academics, practitioners, regulators, and the regulated community to further the conversation on the current state of PFAS science and solutions for the future. Sessions will explore health effects, current regulatory approaches, forensics, and guidance for PFAS in water, soils and biosolids, landfills and leachate, and air, as well as methods for their measurement, treatment, destruction, and disposal.

LOCATION

Hilton Raleigh North Hills

3415 Wake Forest Rd Raleigh, NC 27609 919-872-2323

Find hotel info on the conference website at www.awma.org/pfaslocation.

REGISTRATION AND REFUND POLICY

Register online at www.awma.org/PFASregistration. On site badge pick-up and registration will be located in the Grand Ballroom Foyer and be open during the following hours:

 Monday, March 10:
 3:00 pm - 5:00 pm

 Tuesday, March 11:
 7:30 am - 5:00 pm

 Wednesday, March 12:
 7:00 am - 5:30 pm

 Thursday, March 13:
 7:00 am to 3:00 pm

If written notice of cancellation is received on or before February 10, payment will be refunded, less a \$100 cancellation fee. Substitutions may be made at any time; payment for any difference is due at the time of substitution. This refund policy applies to all occurrences, including weather-related events and other natural disasters. In the unlikely occurrence of event cancellation, the Association is not liable for any expenses incurred by the registrant other than the full refund of fee(s) paid.

SPECIAL ACCOMMODATIONS

The Air & Waste Management Association supports the Americans with Disabilities Act (ADA). Attendees requiring specific equipment, food, or services should contact Tracy Fedkoe at tfedkoe@awma.org to make those needs known in advance. A&WMA will make every reasonable effort to accommodate them.

CONFERENCE PROCEEDINGS

Conference proceedings will include the secured PDF copies of the slides from presenters who have provided permission. The online proceedings will be posted a few weeks following the conference and attendees will be notified when the slides have been posted to a password-protected website.

CONFERENCE COMMITTEE

Conference Co-Chairs:

Michele Karnes, Coterie Environmental Lara Phelps, US EPA, Office of Research and Development (ORD), Center for Environmental Measurement and Modeling (CEMM)

Committee Members:

- Stephanie Bolyard, NC DEQ
- · Ivan Cooper, CEC Environmental
- · Kavitha Dasu, Battelle
- Elizabeth Denly, TRC Companies
- · Michael Devito, US EPA, ORD, CCTE
- · Adam Driscoll, Barr Engineering
- Andrew Gremos, Ramboll
- Mel Keener, Coalition for Responsible Waste Incineration
- · Jonathan Krug, US EPA
- · Johnsie Lang, Arcadis
- · Mingming Lu, University of Cincinnati
- · Loren Lund, Jacobs
- · James McCord, US EPA
- Jeffrey McDonough, CDM Smith
- · Taryn McKnight, Eurofins
- · Marc Mills, US EPA
- · John Offenberg, US EPA, ORD, CEMM
- · Michael Pjetraj, NC DEQ
- Phillip Potter, US EPA
- · William Roberson, US EPA
- · Erin Shields, US EPA
- · Thabet Tolaymat, US EPA
- Matt Traister, Ramboll
- · Bill Troxler, Focus Environmental

CONTINUING EDUCATION UNITS

Conference attendees may be eligible for continuing education credits and can apply to receive a Certificate of Participation for the sessions attended. Please sign the CEU sign in sheet available at the registration desk and order your Certificate through the A&WMA Online Store. Members are eligible for free certificates. For more information, please contact Gloria Henning at +1-412-904-6021 or glhenning@awma.org.

A&WMA MEETINGS POLICY

By registering for this meeting, attendees agree to abide by and accept the terms of the A&WMA Code of Conduct (available at www.awma.org/governance). Additionally, A&WMA conference attendees acknowledge that they may be photographed by A&WMA for promotional purposes while at events.

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Our laboratory service experts provide precision testing, innovative scientific approaches, and high-quality data to support informed decisions. With expertise in federal, state, and local regulations, we deliver best-in-class air, soil, water, sediment, toxicology, Ultratrace, and PFAS testing solutions—empowering people with reliable laboratory data for a cleaner, healthier environment. www.enthalpy.com

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Claros Technologies provides analytical testing services and destruction technologies for PFAS management. Our testing services include PFAS detection down to single digit ppt as well as TOF analysis. The ClarosTech destruction system destroys 99.99% destruction of long, short and ultrashort chain PFAS species. These capabilities enable us to define, target and destroy PFAS, its precursors and resultant byproducts providing a robust and complete on-site PFAS management solution. www.clarostechnologies.com



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GEL provides environmental sampling, and laboratory analysis services to support the characterization of environmental contaminants and pollutants - including PFAS! From developing sampling and analysis plans, to field sampling and sample analysis, to data evaluation, GEL provides clients with turnkey solutions for their emerging contaminant measurement needs. www.gel.com



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Alliance Technical Group

Alliance Technical Group, LLC (Alliance), headquartered in Decatur, AL, is the premier environmental services and solutions company dedicated to helping clients achieve their environmental goals and navigate regulatory changes. With more than 1,700 employees located in 50-plus offices across the U.S. and Canada, Alliance specializes in Environmental Compliance, On-site Testing and Monitoring, and Laboratory Testing and Analysis. Driven by innovation, committed to service, and focused on client success, Alliance delivers on the promise of reliability, results, and responsiveness. Learn more about how we help clients maximize their environmental opportunities at **www.alliancetg.com.**

Cambridge Isotope Laboratories

Cambridge Isotope Laboratories is the world's leading producer of stable isotopes and stable isotope-labeled compounds used in isotope dilution mass spectrometry (IDMS). CIL offers high-quality PFAS analytical standards for environmental, food, water and human exposure testing. Please stop by to discuss how we can help you with your testing needs. isotope.com

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Exhibitor Descriptions, con't.

Entech Intruments

Entech Instruments is a leading developer and manufacturer of analytical instrumentation that supports professionals around the world in Environmental Air Monitoring, Soil & Water Testing, Industrial Hygiene, Food Safety, Flavor & Aroma R&D, Material Emissions Testing, Forensic Investigation, and Clinical Analysis. We specialize in the creation of inert air and gas sample collection equipment, chemical extraction and preconcentration technology, as well as GCMS sample preparation and introduction technologies. Entech has continued to perfect the science of collecting, storing, and analyzing volatile and semi-volatile chemicals by GC and GCMS through Entech's proprietary SiloniteTM surface treatment. SiloniteTM renders sampling devices and GCMS sample handling systems as inert as a GC column, providing better recovery of a wider range of compounds. SiloniteTM can be applied to any stainless steel or glass surface, virtually eliminating the adsorption and reactions that can occur on metal and untreated glass surfaces. www.entechinst.com

LaBella Associates

LaBella Associates is a full-service consulting firm including landfill design & closure, environmental investigation & remediation and water & wastewater treatment. LaBella has been solving PFAS issues for over 10 years and has experts in the treatment of water, landfill leachate and delineation & remediation of PFAS in soil and groundwater. www.labellapc.com

MYCELX Water Technologies

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Nutech Instruments, Inc.

Nutech Instruments, a World leading supplier of Air VOC testing products with headquarters in Dallas, Texas, is announcing another our new PFAS preconcentrator. Some of our products are: Preconcentrators, Auto Samplers, Direct loop injection, Dynamic and Static Diluters, Canister Clean Systems including ovens, Fence Line Systems, products include 6500 PAMS automated system. 6300 TVOC automated system with preconcentrator. (Full Range, Complete Shelters), Automatic air sampling timers 2701, 2703, Multifunctional Automatic Air Sampling first on the market with QA/QC function to graph vacuum, ideal for EPA 327. System 2600ST, Carry-on Automatic Multifunctional Sampling System 2600GT, Portable TVOC analyzer 3000 EPA Method 25 compliant. Custom Designs to meet your unique requirements. www.nutechinst.com

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TRS Group

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United Chemical Technologies (UCT)

UCT is a vertically integrated manufacturer at the forefront of sample prep technology and a leader in chromatography consumables. These high-quality sample preparation products are backed by world-class technical support. Key PFAS products include PFAS Glass Block Manifold, Enviro-Clean® ECWAX, Enviro-Clean® ECHLD, QuEChERS, Selectra® U/HPLC columns, and SelectraCore® Core-Shell columns. www.unitedchem.com

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TECHNICAL TOUR - Monday, March 10

EPA Facilities Tour at Research Triangle Park

Monday, March 10, 11:30 am - 3:30 pm

The tour is sold out. Foreign nationals attending are not allowed to bring any electronics on the premises, including phones, computers, tablets, smart watches, headphones, and more. All tour participants must travel via the group bus to the EPA unless they are an EPA employee.

Registered participants should meet in the hotel lobby 15 minutes prior to departure. Lunch will be on your own prior to departing the hotel.



TECHNICAL PROGRAM - Tuesday, March 11

Registration 7:30 am – 5:00 pm Grand Ballroom Foyer Continental Breakfast 7:30 am – 8:30 am Grand Ballroom 1-3 and Foyer

OPENING KEYNOTE PLENARY

8:30 am - 10:20 am

All conference sessions will be in the Grand Ballroom 4-5

Welcome and Introduction

Michele Karnes, Coterie Environmental Leah Blinn, A&WMA President, Civil & Environmental Consultants Lara Phelps, US EPA, Office of Research and Development (ORD), Center for Environmental Measurement and Modeling (CEMM)









Maureen Gwinn, Ph.D., DABT
Acting Assistant Administrator, US EPA
Office of Research and Development (ORD)



D. Reid Wilson Secretary, North Carolina Department of Environmental Quality (DEQ)



Kenneth Waldroup Executive Director of Cape Fear Public Utility Authority (CFPUA)

10:20 am – 10:40 am Networking Break and Exhibition Viewing Networking Breaks are sponsored by our Silver Sponsors













TECHNICAL AGENDA - Tuesday, March 11, con't.

SESSION 1: USING SCIENCE TO IDENTIFY SOURCES

Co-Chairs: Elizabeth Denly, TRC, and James McCord, US EPA

10:40 am - 11:05 am

Using Positive Matrix Factorization (PMF) to Distinguish Between PFAS Sources Bethany Parker, Arcadis

11:05 am - 11:30 am

Application of High-Resolution Mass Spectrometry and Machine Learning Tools for PFAS Forensic Analysis at a Wastewater Treatment Plant

Shalene Thomas, Battelle

11:30 am - 11:55 am

Two Case Studies: Exploring Commercial, Industrial, and Wastewater Sources of PFAS

Brittany O'Brien-Drake, Jasmine Stefansky, NY Department of Environmental Conservation

11:55 am - 12:05 pm

Question and answer period

12:10 pm – 1:10 pm Lunch for all attendees Grand Ballroom 1-3

SESSION 2: PFAS HEALTH EFFECTS

Co-Chairs: Loren Lund, Jacobs, Mike Devito, US EPA

1:10 pm - 1:35 pm

A Review of Current and Emerging PFAS Health Effects and Regulatory Developments in the US

Jamie DeWitt, Oregon State University

1:35 pm - 2:00 pm

Towards the Development of Chemical Categories for PFAS and their Application to Bioactivity Screening

Mike DeVito, US EPA Center for Computational Toxicology and Exposure

2:00 pm - 2:25 pm

PFAS Surface Water Quality Criteria: Health Effects and Other Considerations, Challenges, and Research Needs Loren Lund, Jacobs

2:25 pm - 2:50 pm

Assessing PFAS Toxicity and Risk in North Carolina: A Regulator Perspective

Frannie Nilsen, North Carolina Dept. of Environmental Quality

2:50 pm - 3:00 pm

Question and answer period

3:00 pm – 3:20 pm Networking Break and Exhibit Viewing

SESSION 3: PFAS MEASUREMENT METHODS, PART 1

Co-Chairs: Bill Troxler, Focus Environmental, and William Roberson, US EPA

3:20 pm - 3:45pm

PFAS Air Testing for Stationary Sources

Jesse Rocha, Alliance Technical Group

3:45 pm - 4:10 pm

False Positives, False Negatives, and Interferences, Oh My!

Elizabeth Denly, TRC Companies

4:10 pm – 4:35 pm

ENTails Toolkit (Resources for Non-targeted Analysis)

James McCord, US EPA

4:35 pm - 4:45 pm

Question and answer period

4:45 pm – 5:15 pm Dedicated poster viewing in the Grand Ballroom 1-3

5:15 pm – 6:15 pm Networking Reception in the Exhibit Area and continued poster viewing

* Student Poster Contest

View the posters and vote on site in the categories of technical depth, innovation, and presentation.

The best student poster will receive an award.

Poster awards provided by:

Cotericenvironmental

TECHNICAL AGENDA - Tuesday, March 11, con't.

Thank you to our Gold Sponsors for sponsoring the Networking Reception













TECHNICAL POSTERS

Co-Chairs: Johnsie Lang, Arcadis, Erin Shields, US EPA

Thermal Plasma Arc Treatment to Mineralize Per- and Polyfluoroalkyl Substances in Impacted Media

Jishnu Adhikari, Arul Ayyaswami, Jitendra Kewalramani, Tetra Tech

Evaluation and Visualization of PFAS Fate and Transport *Candace Beauvais, Scott Anderson, Rob Perkinson, Tetra Tech*

* Tracing PFAS in Homes: Results and Lessons Learned From the IPA Campaign

Clara Eichler, Naomi Chang, Glenn Morrison, Jason Surratt, Barbara Turpin, UNC-Chapel Hill

Treatment of Co-Mingled PFAS and 1,4-Dioxane Contamination Using Flow Reversal Reverse Osmosis (FR-RO) Max Finder, ROTEC

Ultrashorts: Measurement and Relevance for Remediation Monitoring

Jamie Fox, Bharat Chandramouli, SGS North America

Identifying and Communicating PFAS Exposure Risks From Rural Private Wells

Jennifer Hoponick Redmon, Erica Wood, Chamindu Liyanapatirana, Andrea McWilliams, Riley Mulhern, AJ Kondash, Kelly Hoffman, RTI International; Jacqueline MacDonald Gibson, NC State

* Intraparticle PFAS Distribution and Factors Controlling PFAS Adsorption to Granular Activated Carbon

Sarangi Joseph, Detlef Knappe, North Carolina State University; Tsengming Chou, Matthew Libera, Stevens Institute of Technology

Rapid and Inexpensive Delivery of Particulate Carbon for In Situ PFAS Treatment in Groundwater

Bonani Langan, GSI Environmental Inc.

Student posters eligible for the contest are identified by a * before the title and a slightly different color. Don't forget to vote for the best using the QR code!

Filter Considerations for PFAS Sample Preparation

Lindsay Lozeau, Gunjan Shah, Amy Laws, EMD Millipore Corporation; Ranjani Muralidharan, Sigma Aldrich, Inc.

Upstream Strategies and Considerations for PFAS in Lithium-Ion Battery Recycling

Zachary Neigh, Holly Brown, Joshua Collins, William Neese, Rob Fraser, Tanya Hodkinson, Hatch (Environment and Sustainability)

A Preliminary Study of the Effectiveness of a Functionalized Sawdust for PFAS Absorption

Joshua Pridemore, Daniel Knecht, Maobing Tu, Mingming Lu, University of Cincinnati

The Application of the AIM Reactor for Real-Time PFAS Detection

Veronika Pospisilova, Spiro Jorga, Abigail Koss, Maya Abou-Ghanem, Tofwerk USA

* Behavior of PFAS During Thermal Reactivation of Spent Granular Activated Carbon (GAC)

Nathen Silsby, Stefanie Silsby, Lan Cheng, Detlef Knappe, North Carolina State University; Stephen Jackson, Bill Preston, US EPA

* Ultrashort-chain PFAS are Products of Perfluoroalkylether Acids in Total Oxidizable Precursor Assay

Sarah Teagle, Lan Cheng, Detlef Knappe, North Carolina State University Department of Civil, Construction, and Environmental Engineering

Evaluating the Thermal Decomposition of PFAS: Identifying Products of Incomplete Combustion

Nathan Weber, Jonathan Krug, William Roberson, James Mattila, Preston Burnette, Matt Allen, William Preston, and William Linak, Oak Ridge Institute for Science and Education, Office of Research and Development, US EPA

* Method Development for Quantifying PFAS in Various Source Samples Using Thermal Desorption-GC/MS

Gabrielle West, University of North Carolina and US EPA ORD Center for Environmental Measurement and Modeling, M. Ariel Geer Wallace, Jonathan Krug, US EPA ORD CEMM

TECHNICAL AGENDA - Wednesday, March 12

Registration

7:00 am - 5:00 pm

SESSION 4: PEAS IN WATER

Co-chairs: Jeffrey McDonough, CDM Smith, and Phillip Potter, Ph.D., US EPA

8:00 am - 8:25 am

PFAS in Precipitation

Dr. Paul Edmiston, College of Wooster

8:25 am - 8:50 am

PFAS Fate and Transport (In Situ)

Dr. Ian Ross, CDM Smith

8:50 am - 9:15 am

Performance of Commercial Labs in the Application of EPA PFAS Methods for Wastewater Analysis

Cher Lindelien, Waruna Kiridena, Amanda Miller, Giffe Johnson, NCASI

9:15 am - 9:25 am

Question and answer period

9:25 am - 9:50 am

Networking Break and Exhibition Viewing

SESSION 5: PFAS IN APPLIED BIOSOLIDS

Moderators: Andrew Gremos, Ramboll, Stephanie Bolyard, NC DEO

9:50 am - 11:25 am

Biosolids as a beneficial use — This panel will discuss the challenges with and potential considerations for continued land application of biosolids.. Speakers include:

- Elizabeth Biser, Biser Strategies
- Adam Ulishney, North Carolina Department of Environmental Quality
- Erik Martin, Ramboll
- Erin Bulson, Waste Management

11:25 am - 1:00 pm

Lunch sponsored by our Platinum Sponsor

Lunch Presentation

Legal Challenges with Data Collection for PFAS-Related Matters



- Edward (Ned) B. Witte, Partner, Earth & Water Law
- Taryn McKnight, PFAS Practice Leader, Eurofins
- · Leonard Mankowski, VP Emerging Contaminants, WSP

Continental Breakfast

7:00 am - 8:00 am

SESSION 6: PFAS IN LANDFILLS

Co-Chairs: Ivan Cooper, Civil & Environmental Consultants, Inc, and Thabet Tolaymat, US EPA

1:00 pm - 1:25 pm

Low-cost Technology to Enhance Biological Treatment for PFAS Removal from Leachate

Patrick McKeown, ETC2

1:25 pm - 1:50 pm

Per-and Polyfluoroalkyl Substances Release from Spent Granular Activated Carbon in Solid Waste Facilities Onur Apul, University of Maine

1:50 pm - 2:15 pm

Advanced PFAS Removal from Leachate Using AEC Technology Tonya Chandler, Biolargo

2:15 pm-2:25 pm

Question and answer period

2:25 pm – 2:50 pm
Networking Break and Exhibition Viewing

SESSION 7: PFAS IN AIR

Co-chairs: Matt Traister, Ramboll, Lara Phelps, US EPA

2:50 pm – 3:15 pm

Landfill Gas Emissions of PFAS

Ashely Lin, University of Florida

3:15 pm - 3:40 pm

Modeling and Analysis of Background PFAS Deposition Krish Vijayaraghavan, Ramboll

3:40 pm – 4:05 pm

The Implications and Timing of the Multi-State Petition to List Certain PFAS Compounds as HAPs

Daron Ravenborg, Bryan Cave Leighton Paisner, LLP

4:05 pm - 4:15 pm

Question and answer period

TECHNICAL AGENDA - Wednesday, March 12, con't.

SESSION 8: PFAS MEASUREMENTS METHODS AND TECHNIQUES, PART 2

Co-Chairs: Bill Troxler, Focus Environmental, and William Roberson, US EPA

4:15 pm - 4:40 pm

Performance Testing of a Volatile PFAS Method Applicable to Indoor Air, Soil Gas, and/or Sewer Gas

John Zimmerman, US EPA

4:40 pm - 5:05 pm

Method 1633 vs Method 8421 Data Comparison

Stephen Somerville, Pace Labs

5:05 pm - 5:30 pm Analysis of Ultrashort Chain PFAS J. P. Verhuel, Enthalpy

5:30 pm – 5:40 pm Question and answer period

TECHNICAL AGENDA – Thursday, March 13

Registration

7:00 am - 3:00 pm

SESSION 9: PFAS TREATMENT AND DESTRUCTION METHODS

Co-Chairs: Kavitha Dasu, Battelle, and Jonathan Krug, US EPA

8:00 am - 8:25 am

Evaluation PFAS Emissions in Flue Gases: Insights from Multi-Facility Assessments

Johan Strandberg, IVL Swedish Environmental Research Insitutute

8:25 am - 8:50 am

Applying Thermal Conduction Heating for PFAS-Impacted Soil Remediation

Lauren Soos, TRS Group

8:50 am - 9:15 am

PFAS Waste Destruction using Industrial Supercritical Water Oxidation (iSCWO)

John Follin, General Atomics

9:15 am - 9:40 am

An In-Situ Alternative to Pump and Treat for PFAS-impacted Groundwater

Brendan J. Lazar, P.E., TRC Corporation

9:40 am - 9:50 am

Question and answer period

9:50 am -10:00 am

Networking Break and Exhibition Viewing

Continental Breakfast

7:15 am - 8:00 am

SESSION 10: CHALLENGES WITH PFAS TREATMENT RESIDUALS — A UTILITY PERSPECTIVE

Co-Chairs: Johnsie Lang, Arcadis, and Marc Mills, US EPA

10:00 am - 11:30 am

With significant advancements being made in PFAS treatment technologies, managing the residuals generated during these processes still presents a critical challenge. This session addresses the complexities and emerging solutions for handling, transporting, and disposing of PFAS-laden byproducts in a safe and sustainable manner. Panelists will discuss different methods for residual management being implemented by drinking water treatment providers.

Speakers include:

- Dr. Detlef Knappe, Center for Environmental and Health Effects of PFAS, North Carolina State University
- Ben Kearns, Cape Fear Public Utility
- Joseph Pearce, Aqua America
- AnneLu DeWitt, Clean Harbors
- Richard Sanchez, Revive Environmental

Student poster awards will be announced at the end of this session.

11:40 am – 12:10 pm Grab-and-go Lunch and Exhibition Viewing

TECHNICAL AGENDA - Thursday, March 13, con't.

SESSION 11: PFAS INVESTIGATIONS AND REGULATIONS AT THE STATE LEVEL

Co-chairs: Taryn McKnight, Eurofins, and Adam Driscoll, Barr Engineering

12:10 pm - 1:40 pm

This panel session will explore the growing issue of PFAS contamination and the regulatory responses being implemented at the state level. The session will provide several examples of state-led investigations into PFAS contamination in water, soil, and air, and how state agencies are developing regulations to mitigate exposure and clean up affected areas.

Speakers include:

- Dustin Leypoldt and Ray Holberger, South Carolina Department of Environmental Services
- Mike Penzone, Delaware Department of Natural Resources and Environmental Control
- Amy Delinsky, North Carolina Department of Environmental Quality

Conference Wrap-up and Conclusion

Lara Phelps, US EPA CEMM

Thank you for attending!

We hope to see you at future A&WMA conferences. Check out www.awma.org/events for details.

About the Air & Waste Management Association



The Air & Waste Management Association is a not-for-profit, nonpartisan professional organization that enhances knowledge and expertise by providing a neutral forum for technology exchange, professional development, networking opportunities, public education, and outreach to more than 5,000 environmental professionals in 65 countries. A&WMA also promotes global environmental responsibility and increases the effectiveness of organizations to make critical decisions that benefit society. For more information, please visit www.awma.org.