

2nd Virginia Marine Debris Summit



Watermen's Hall, Virginia Institute of Marine Science, Gloucester Point, VA
March 7th-9th, 2016



Virginia Coastal Zone
MANAGEMENT PROGRAM

Welcome to the 2nd Virginia Marine Debris Summit

We hope this summit will inspire and empower you, our partners in marine debris reduction in Virginia and the Mid-Atlantic. You will receive updates on current marine debris science and trends and will explore techniques and tools effective in enhancing knowledge, changing behavior and influencing policies that reduce marine debris. We hope you will depart with a greater capacity to help accomplish the goals of the Virginia Marine Debris Reduction Plan.



Concerns about marine debris have been around for decades, but it seems the effort to do something about it is gaining momentum – especially for us in Virginia and the Mid-Atlantic. Our first Marine Debris Summit held in 2013 led to major new initiatives for the Virginia CZM Program and its partners – writing of a Virginia Marine Debris Reduction Plan – the first of its kind on the East Coast; establishment of a marine debris shoreline monitoring program – also the first on the East Coast that meets NOAA’s national standards and delivers data into NOAA’s national database; and development of a social marketing campaign to stop balloon releases.

These are great strides but we need to do more. We are very excited to be holding our second Marine Debris Summit and look forward to seeing what additional efforts will result. Marine debris is a very solvable problem but we need your help. Thank you for participating this week and we look forward to sharing ideas and hearing your thoughts.

Laura McKay

Manager, Virginia Coastal Zone Management Program



The NOAA Marine Debris Program is the federal lead for addressing marine debris through prevention, removal, research, emergency response, and regional coordination activities. We are proud to be part of the fight against marine debris, but we would not be able to accomplish our goals without working alongside our many different partners. Marine debris is a significant global problem that takes commitment and collaboration, so we are very grateful to work with people and organizations that are dedicated to solving this issue on the local level here in Virginia. Obviously, marine debris challenges are not unique to Virginia waters, but we have a rich history of working with many talented Virginia-based groups that continue to make a difference locally. It makes us proud to continue to support some of the great research, prevention, and removal efforts that you will get to hear about over the next few days. The NOAA Marine Debris Program is honored to be a part of this Second Virginia Marine Debris Summit and I hope all participants leave here pledging to make at least one small change to their daily lives that will help keep debris off of Virginia’s beautiful shorelines and out of its vital coastal waters.

Nancy Wallace

Director, NOAA Marine Debris Program

Monday, March 7, 2016

11:30 AM to 1:00 PM

Registration Desk open. Set up posters and exhibits.

1:00 to 3:10 PM

Opening Session *(break around 2:15 PM)*

Welcome to VIMS

Dr. John T. Wells, Dean & Director, VIMS

Leadership in Marine Debris: Virginia Coastal Zone Management Program & Partners

Laura McKay, Program Manager, Virginia Coastal Zone Management

Young Scientists: Up to a Marine Debris Challenge

Ruling Robot Falcons (Ethan Burks, Luke Marston, and Joshua Nichols)

The Virginia Marine Debris Reduction Plan: A Cleaner Ocean Through Leadership, Prevention, Interception, Innovation, and Removal

Katie Register, Executive Director, Clean Virginia Waterways of Longwood University

Planning for Success: Regional Efforts, Disaster Marine Debris, and Abandoned/Derelict Vessels

*Jason Rolfe, Mid-Atlantic and Caribbean Regional Coordinator,
NOAA Marine Debris Program*

Framework for this Summit: the Five Strategies in The Virginia Marine Debris Reduction Plan

A member of the VMDRP Team

3:10 to 5:20 PM

Influencing behavior change on many levels

Communication & outreach: raising awareness about marine debris before legislative solutions are pursued.

*Alison Hammer Weingast, NOAA Marine Debris Division Deputy Chief,
Office of Response and Restoration*

Social Marketing: Influencing Behaviors to Reduce Marine Debris

Overview of Social Marketing

*Erin Ling, Program Coordinator, Virginia Household Water Quality Program, Biological
Systems Engineering Department, Virginia Tech and Virginia Cooperative Extension*

Social Marketing Research in Action: Understanding The Motives Behind

Mass Releases of Balloons

Steve Raabe, OpinionWorks

Reducing Cigarette Litter by Speaking Smokers' Language: Methods and Results of the Hampton Roads Cigarette Litter Prevention Project

John Deuel, Environmental Sustainability Consultant, GreenQuest, LLC

5:30 to 7:00 PM

Reception at VIMS. Posters and marine debris art projects on display.

Heavy hors d'oeuvres & cash bar (beer and wine.) Water and soft drinks are free.

Tuesday, March 8, 2016 (morning)

8:00 to 8:45 AM

Coffee & networking. View Posters. Registration Desk is open.

8:45 to 9:10 AM



KEY NOTE by David K. Paylor

Director, Virginia Department of Environmental Quality

The Virginia CZM Program is a network of state agencies and coastal localities working to create more vital and sustainable coastal communities and ecosystems. The Virginia Department of Environmental Quality serves as the lead agency for this network, and receives funding from the Office of Coastal Management at the National Oceanic and Atmospheric Administration for initiatives and projects to address coastal management issues including marine debris.

9:10 to 10:50 AM

Influencing behavior change on many levels: Exploring voluntary changes

(continued) (break around 10:25 AM)

Taking Aim: Making Shotgun Wads That Won't Last Forever

Kirk J. Havens, PhD., Director, Coastal Watersheds Program and Asst. Director, Center for Coastal Resources Management, Virginia Institute of Marine Science

Helping Park Guests Consider Consequences of Balloon and Sky Lantern Releases

Irene C. Frentz, Ph.D., District Resource Specialist, Virginia State Parks, Virginia Department of Conservation and Recreation

Incentives That Influence Daily Habits: The Pearl Home & Pearl School Reward Programs

Karen Forget, Executive Director, Lynnhaven Now

Pearls of Faith: Engaging the Faith Communities in Stewardship

Pam Northam, Pearl Home and Pearl Faith Coordinator, Lynnhaven Now

Keep It Beachy Clean: Building Partnerships Reach Beach Visitors

Christina Trapani, Independent Marine Debris Researcher

Discussion & audience polling.

10:50 to 11:30 AM

Increasing collaboration among VA litter and marine debris prevention and removal projects/ Data collection and analysis

Community Awareness and Engagement: Making The Stormwater Connection

LeAnne Astin, Fairfax Co

Citizen Science & Data Collection: Tracking Tools – Standardize Data Collection

Jenna Jambeck, Associate Professor, College of Engineering, University of Georgia (virtual connection)

11:30 AM to Noon

Increasing the marine debris knowledge base

Ecological Threats Posed by the Most Persistent Items of Trash

Allison Schutes, Trash Free Seas Program, Ocean Conservancy

Discussion & audience polling.

Noon to 1:20 PM

LUNCH (in Watermen's Hall Lobby and Classrooms A/B or outside if weather is nice.)

Tuesday, March 8, 2016 (afternoon)

1:20 to 3:15 PM

Increasing the Marine Debris Knowledge Base (continued) (Break around 2:40 PM)

New Stormwater Permit Requirements: Motivating Cities to Take Action to Reduce Marine Debris

*Eben Schwartz, Marine Debris and Public Outreach Manager,
California Coastal Commission (virtual connection)*

Economic Impacts of Derelict Crab Pots

*Andrew Scheld, PhD, Assistant Professor, Fisheries Science,
Virginia Institute of Marine Science*

Microplastics and Human Health: Searching For Links

Robert C. Hale, PhD, Professor of Marine Science, Virginia Institute of Marine Science

Discussion & audience polling.

3:15 to 4:45 PM

Developing regulations to reduce the sources of marine debris

Findings from the Chesapeake Bay Commission's Review on Microplastics and Standards of Biodegradability

*Denice Wardrop, PhD, Senior Scientist & Professor of Geography and Ecology and
Director, Sustainability Institute, Pennsylvania State University (virtual connection)*

Effective Policy Papers: A Scientist's Contribution

*Chelsea Rochman, PhD, Marine Ecologist/Ecotoxicologist, Aquatic Health Program,
University of California Davis (virtual connection)*

Words Matter

Ann Jennings, Virginia Director, Chesapeake Bay Commission

EPA's Support for Source Reduction

Bob Benson, Senior Program Advisor, Trash Free Waters Program, EPA Office of Water

Discussion & audience polling.

4:45 to 5:15 PM

Emerging Issues in Marine Debris

This session will include a brief look at emerging issues (possibly) including:

- Polystyrene building materials
- Plastic Media Blasting
- Hair and body glitter
- Fish Attraction Devices (FADs)
- "Waste to worth" projects
- Microbeads and nanoparticles in waste water sludge which is applied to farm fields
- K-cups and e-cigarette waste
- New research & topics from the Summit participants

Wrap up session, details for Wednesday's "Deep Dives."

5:30 to 7:00 PM

Reception at VIMS. Posters and marine debris art projects on display.

Heavy hors d'oeuvres & cash bar (beer and wine.) Water and soft drinks are free.

Wednesday, March 9, 2016

8 to 8:45 AM

Morning coffee and talk about ideas from the previous day / networking

Dive Deeply Into Solutions to Marine Debris!

Share your experiences and ideas, and ask questions, during the Summit's "Deep Dive" sessions on a variety of topics.

As you know, marine debris is one of the most visible and preventable forms of pollution, but tackling the issue requires a multi-faceted effort of many partners. We need your help in prioritizing the next steps in implementing the Virginia Marine Debris Reduction Plan, and your partnership moving forward.

- Consult the "Deep Dive Schedule" that you received as you arrived at the Summit.
- Select one topic for the first Deep Dive, and one for the second.
- In addition to sharing your ideas, be prepared to also comment on the challenges and barriers to success that you face as you work to address marine debris issues.

Thank you in advance for your participation in this very important segment of the Virginia Marine Debris Summit!

8:45 to 10 AM

Deep Dives, Session #1 *(See separate handout for Deep Dive topics and rooms)*

*Summit participants choose between several options for an in-depth discussion of the issue.
20 to 25 people per session*

10 to 10:15 AM

Break & move to second session

10:15 to 11:15 AM

Deep Dives, Session #2

Summit participants choose between several options for an in-depth discussion of the issue.

11:15 to 11:30 AM

Break & move to final session

11:30 to Noon

Wrap-up & Next Steps

Members of the VA Marine Debris Advisory Committee

Noon

Lunch – Grab a sandwich and hit the road.

1:00 to 2:00 PM

Meeting of the Virginia Marine Debris Advisory Committee



LeAnne Astin

Community Awareness and Engagement: Making The Stormwater Connection
Ecologist II, Stormwater Planning Division, Fairfax County, Virginia

Discharges from municipal separate storm sewer systems (MS4) are regulated under the Virginia Stormwater Management Act, the Virginia Stormwater Management Program Permit regulations, and the Clean Water Act as point source discharges. Storm water (runoff from rain or snow melt that runs off surfaces such as rooftops, paved streets, highways or parking lots) can carry with it many pollutants including trash and litter. Fairfax County, VA has a MS4 permit that requires the county to develop programs to monitor human-generated trash and debris that float (floatables) under the monitoring requirement. In addition, the county is required to reduce the discharge of floatables under the “Illicit Discharge Detection & Elimination/Industrial & High Risk Runoff” section of the permit. The intent of the floatables monitoring program is to determine the loading of floatables to MS4 outfalls, which discharge into county streams and rivers and ultimately to coastal waters. To meet this monitoring goal, Fairfax County’s Stormwater Planning Division is developing a program that enlists county schools to assist in gathering floatables data and become “citizen scientists.”



Bob Benson

EPA Support for Source Reduction
Senior Program Advisor, EPA Trash Free Waters Program, EPA Office of Water

The US EPA offers various programs and tools to help cities and communities make strategically smart decisions on actions they should take to reduce loading of trash into water. EPA-supported tools may be regulatory in nature (e.g., trash standards in MS4 permits, trash TMDL standards) and/or non-regulatory resources and programs to support local trash prevention initiatives.



John Deuel

Reducing Cigarette Litter by Speaking Smokers’ Language: Methods and Results of the Hampton Roads Cigarette Litter Prevention Project
Environmental Sustainability Consultant, GreenQuest, LLC

Keep America Beautiful’s (KAB) Cigarette Litter Prevention Program was implemented at seven sites in to the Hampton Roads region of Virginia. KAB awarded a \$12,500 grant to the Hampton Roads Planning District Commission (HRPDC) to manage the grant its askHRgreen.org outreach committee for litter prevention and recycling. Funding, procurement, training, oversight, and all strategic decisions were managed by the regional committee, with the actual implementation of the on-site strategies and practices for placement of ash receptacles, communication with facility managers and outreach to smokers conducted by local “Project Leaders”. Project results revealed both increases in efficiency in the management of the grants as well as enhanced attributes leading to above average reduction in cigarette litter. Key advantages to administering the CLPP on a regional basis include:

- Exceptional reduction in cigarette litter (Average of 74%)
- Reaching more communities through regional collaboration
- Stretching grant dollars through cost effective strategies
- Fostering a sense of teamwork among Project Leaders
- Sharing best practices and “lessons learned” between Project Leaders
- Utilizing the broader reach of the regional media market to extend messaging
- Reinforcing the campaign by having a consistent anti-cigarette litter message in diverse locations throughout the region

Based on the positive outcomes of this Project, it is recommended that funders develop a marketing approach to identify and solicit grant applications utilizing a regional delivery model. Such an approach will help to expand cigarette litter reduction and increase efficiency in use of grant funding.



Karen Forget

Incentives That Influence Daily Habits: The Pearl Home & Pearl School Reward Program
Executive Director, Lynnhaven Now

The Pearl Home and Pearl Schools programs are two ways that Lynnhaven River NOW is engaging our community in restoring and protecting our natural resources in Virginia Beach. Our Pearl School program began in 2007 with seven schools and has grown in a short time to 72 schools in Virginia Beach. All Pearl Schools are providing environmental education opportunities that will inspire the water stewards of the next generation. Our Pearl Homes program was launched in 2012 and inspires and rewards our residents for examining their practices and adopting more sustainable behaviors. Both programs offer opportunities to educate, engage the public in volunteer activities, and provide guidance on best practices and restoration opportunities.



Irene C. Frentz, PhD

Helping Park Guests Consider Consequences of Balloon and Sky Lantern Releases
District Resources Specialist, Virginia State Parks, Virginia Department of Conservation and Recreation

Virginia State Parks offer excellent settings for celebrations and memorials, offering facilities and beautiful natural scenery. Celebrations frequently involve decorations that include helium balloons. Memorials may incorporate the ceremonial release of helium balloons or sky lanterns. Most park guests are aware that they should place trash and recycling in the appropriate receptacles, but some fail to recognize that balloons eventually become trash. We are currently exploring options to minimize helium balloon and sky lantern releases. This involves a multi-pronged approach, which can be divided into two categories: (1) restrictions; (2) education. Restrictions could involve the banning of helium balloons and sky lanterns or a prohibition of the release of them in state parks. The public could be made aware of such prohibitions on the agency’s web site, in reservation documentation, special use permits, on trail maps, and in kiosk postings.



Robert C. Hale, PhD

Microplastics and Human Health: Searching For Links
Professor of Marine Science, Virginia Institute of Marine Science

We live surrounded by a world of polymers. They are present in diverse products and applications, including home furnishings, vehicles, electronics, food packaging, even facial cleaners and artificial body parts. A widespread view is that all plastics exhibit long environmental half-lives. The greatest “vice” of plastics was long assumed to be their esthetic impacts as “litter”. But polymers vary in their composition and hence their environmental fate and behavior. Plastics do eventually fragment into micro-particles, but the time required varies from days to decades and depends upon composition and ambient conditions. Environmental pollutants, such as PCBs, concentrate onto hydrophobic microplastic surfaces. Additives are also commonly embedded into polymers at percentage levels to modify properties such as color, flexibility or flame retardancy. The key issue is chemical availability. Additives were long believed to be permanently locked in plastics, but recent research shows some may escape over time. Unreacted monomers may also be released. Our understanding of the risks to humans from microplastics in seafood is poor, but believed modest. In contrast, risks in the indoor environment from additives are substantial, occurring through ingestion and inhalation of contaminated dust. Infants and children are the most sensitive and ironically the most exposed. Another exposure route is from leaching of chemicals from packaging of food and water. Ultimately, human health impacts derive from cumulative exposure to multiple toxicants and from different routes. Hence, efforts to limit unnecessary release of plastics and human exposure to toxic chemicals are critical.



Kirk J. Havens, PhD

Taking Aim: Making Shotgun Wads That Won't Last Forever
*Director, Coastal Watersheds Program and Asst. Director, Center for Coastal Resources Management,
Virginia Institute of Marine Science*

Researchers at the Virginia Institute of Marine Science have been working on solutions to plastic pollution affecting the marine environment. Plastic shotgun wads have become a common marine debris item collected during beach cleanups. “Wad” refers to a component of a shotgun shell that is used to separate the shot (pellets) from the powder. Hunters generally recover spent shells or casings but, due to the range of shotguns, there is no practical way to recover the spent non-degradable plastic shotgun wads.

Spent plastic shotgun wads can present safety, nuisance, and environmental impacts in freshwater and estuarine waters. When sportsmen hunt for waterfowl using shotguns, the wads are lost into the adjoining water or marshland and can enter the food web as non-degradable plastic debris. The consumption of plastic compromises fitness and can harm aquatic species. Plastic wads have been found in the stomachs of ocean foraging birds, including albatross presumably due to their resemblance to squid, a common food item. Overtime the spent plastic wads can fragment into smaller and smaller microplastic pieces. Microplastic fragments have become a significant marine debris concern worldwide. Studies have shown uptake of microplastics by worms, mussels, crabs, and fish. This is important because plastics can concentrate toxic pollutants which can be transferred up the food web.

VIMS researchers are developing a completely biodegradable and sustainable shotgun wad that has the same functional characteristics of plastic wads but completely biodegrades. The wad consists of polyhydroxyalkanoate (PHA) which is naturally produced by bacteria and is already present in aquatic environments.



Jenna Jambeck, PhD

Citizen Science & Data Collection: Tracking Tools – Standardize Data Collection
Associate Professor, College of Engineering, University of Georgia

Marine debris and plastic in our oceans is a global issue of increasing concern. The monitoring of litter and debris is challenging at the global scale because of disconnected local organizations and the use of paper and pen for documentation. The Marine Debris Tracker (MDT) mobile app and citizen science program now allow for the collection of global standardized data at a scale, speed and efficiency that was not previously possible. The app also serves as an outreach and education tool. The web portal instantly shows data that users have logged providing additional education. The engagement of users through a top tracker competition and social media keeps users interested in the Marine Debris Tracker community. More than 835,000 items have been tracked and maps provide both global and local distribution of data. The Marine Debris Tracker community and dataset continues to grow daily. Several case studies of use of MDT in Georgia will be presented.



Ann Jennings

Words Matter
Virginia Director, Chesapeake Bay Commission

This presentation will provide specific examples for which words mattered in crafting legislative and policy efforts in Maryland and Virginia. Whether crafting a Bay agreement or new Bay protection laws, individual words, definitions, and exemptions have significant meaning and often unintended, or intended, consequences.



Erin Ling

Overview of Social Marketing

Program Coordinator, Virginia Household Water Quality Program, Biological Systems Engineering Department, Virginia Tech and Virginia Cooperative Extension

We can have all the good intentions, educational campaigns, and best management practices in the world, but success in improving water quality and reducing marine debris from human-induced sources of pollution ultimately comes down to people changing their behavior. This presentation will introduce Community-Based Social Marketing (CBSM), which is the use of marketing principles and techniques to influence a target audience to voluntarily accept, reject, modify or abandon a behavior for the benefit of society as a whole. Audience members will learn the essential components of a CBSM campaign, and how to follow the steps for maximum impact and results.



Laura McKay

Leadership in Marine Debris: Virginia Coastal Zone Management Program & Partners

Program Manager, Virginia Coastal Zone Management

The Virginia Coastal Zone Management (CZM) Program began working on marine debris issues in 2012. This presentation will provide a brief overview of events and efforts that the program has undertaken since 2012 and a preview of plans for the next five years that include work both in the state and in the Mid-Atlantic region. Efforts to date include the 2013 Marine Debris Summit in VA Beach; establishment of and several meetings of a VA Marine Debris Leadership Team; development of the Virginia Marine Debris Reduction Plan; establishment of shoreline monitoring using contractors and volunteers at 4 locations in Virginia (Fisherman Island NWR, Chincoteague NWR, Back Bay NWR and Grandview Nature Preserve in Hampton) following NOAA's national protocols; submittal of the resulting data to the national database; creation of a social marketing campaign to reduce balloon releases that employs focus groups to better understand barriers to desired behavior changes and craft effective messages; and this 2nd Marine Debris Summit. Future planned work includes continuation of the balloon campaign; continuation of the shoreline monitoring; and efforts to work with NOAA, the Mid-Atlantic Regional Council on the Ocean (MARCO) and the Mid-Atlantic Regional Planning Body to develop a Mid-Atlantic marine debris reduction plan that can build upon Virginia's efforts. The Mid-Atlantic RPB is proposing to include work on marine debris reduction in its Ocean Action Plan to be released in June 2016.



The Virginia Eastern Shorekeeper removes a large clam net from the Mockhorn Island Wildlife Management Area. Photo by D. Field, VA DCR.



Pam Northam

Pearls of Faith: Engaging the Faith Communities in Stewardship
Pearl Home and Pearl Faith Coordinator, Lynnhaven Now

“We received this world as an inheritance from past generations but also as a loan from future generations to whom we will have to return it.” -- Pope Francis

Lynnhaven River Now is a non-profit environmental group dedicated to protecting and restoring the Lynnhaven River in Virginia Beach. Realizing the need to connect people of faith to environmental stewardship and the great strength of their activism, we began a journey to develop a new kind of community outreach. Our Pearl Faith Community program has evolved over time and we are happy to share what we have learned.

Lynnhaven River NOW has worked to educate, inspire and equip faith groups with thousands of direct contact hours of communication, presentations, and classes for churches and temples throughout the city.

From community Days of Service to Mitzvah Days, congregations have enthusiastically organized river cleanups and volunteered for many of our events. We have provided guidance and materials for making rain barrels, oyster spat catchers and oyster floats for use within those communities. Congregations have committed to major improvements to their buildings, as well as their parking lots and grounds. They are taking up turf, planting trees, butterfly gardens, and even vegetable gardens to provide food for the community. Our wonderful congregations have come up with many innovative ways to care for creation from bee keeping to solar panels. We are grateful for our faith partners and for the many ways they are working to protect of our waterways, and join the faithful who are making a difference.



Steve Raabe

Social Marketing Research in Action: Understanding The Motives Behind Mass Releases of Balloons
OpinionWorks

A deadly and common source of marine debris is the mass release of balloons and their attachments. Often associated with important events in life, balloon releases evoke powerful emotional responses in participants.

How do we change people’s behavior to lessen such a widespread source of marine debris? The Virginia Coastal Zone Management Program, Clean Virginia Waterways, OpinionWorks, and their partners, are developing a social marketing approach to address this difficult problem. Step One is getting to know the motivations of the target audience. What causes Virginians to participate in balloon releases, whether in celebration, commemoration, or bereavement? How can we prompt people to make a different decision?

In this presentation, a compelling real-life case study will show how to develop an effective social marketing campaign. Through formative research—interviews, focus groups and surveys—project staff have been addressing the underlying drivers of this behavior. Who is more likely to plan and participate in a mass release of balloons? Are the motivations for balloon releases different at a “happy” celebration or “sad” memorial event? How do we communicate with people about this? Designing an effective behavior change campaign requires avoiding premature assumptions about who should be our primary audiences, the attitudes, awareness and knowledge of these audiences and what messaging and strategy will work to change their behavior. This presentation will address surprises that arose in this research, and will help attendees learn from this example how to apply social marketing principals to other problems.



Katie Register

The Virginia Marine Debris Reduction Plan: A Cleaner Ocean Through Leadership, Prevention, Interception, Innovation, and Removal

Executive Director, Clean Virginia Waterways of Longwood University

The Virginia Marine Debris Reduction Plan (created in 2012-14) charts a course to measurably reduce marine debris in mid-Atlantic coastal waters focusing on specific actions (e.g., policies, procedures, outreach campaigns) that are politically, socially, and economically feasible in Virginia and that can be accomplished in the near-term, mid-term, and longer-term. The over-arching goal of the Virginia Marine Debris Reduction Plan is to reduce the amount of trash and marine debris from land-based and water-based sources in Virginia for ecological, social, and economic benefits.

The Plan includes five main Goals:

1. Leadership
2. Prevention
3. Interception
4. Innovation
5. Removal, Cleanup and Mitigation

Under each Goal are five Strategies:

1. Influencing individual behavior change
2. Increasing collaboration
3. Increasing the marine debris knowledge base
4. Identifying and securing necessary funding for implementation
5. Utilizing regulations to reduce the sources of marine debris

This Plan – the first of its kind on the East Coast – identifies more than 50 Actions that will lead to reductions in marine debris. Through improved collaboration and a coordinated approach, stakeholders (including state natural resource agencies, local governments, researchers, manufacturers, the solid waste management industry, businesses, and nonprofit organizations) will prioritize the actions and develop implementation strategies. Just as there are multiple sources of marine debris, the VMDRP has multiple approaches and is targeted to reach and engage multiple audiences. It is a living document – designed to be dynamic.



Chelsea Rochman, PhD

Effective Policy Papers: A Scientist's Contribution

Marine Ecologist/Ecotoxicologist, Aquatic Health Program, University of California Davis

Microplastic has been reported in every major open ocean and in many freshwater lakes and rivers. Microbeads, tiny plastic fragments or beads included in the ingredients of hundreds of products, are one of the many sources of this growing contamination in aquatic habitats. We estimate that the United States alone emits 2.9 trillion beads per year. If you line these microbeads up end to end, the US emits enough microbeads to wrap around the planet >7 times. Among mitigation strategies for microplastic pollution, we saw legislation banning microbeads as the low hanging fruit. This simple solution will prevent one source of microplastic from entering aquatic habitats. Thus, as scientists, we saw an opportunity to engage in the policy process. We used the scientific evidence to inform policy-makers that there was enough scientific evidence regarding microplastic to support a ban on microbeads. We communicated this through the Society for Conservation Biology (SCB) in a policy brief and in a Viewpoint published in *Environmental Science and Technology*. We delivered our work to policy makers who asked us to provide input on the text for several bills, including Maryland and California (the country's strongest bills regarding this issue) and testified in support of the bill in front of California Assembly Members. Today, several states in the US, now including California, have passed bills to ban plastic microbeads from personal care products. In addition, a federal bill has been passed and signed by President Obama. We hope this bill is just the beginning of a whole suite of policies implementing source reduction and thus preventing microplastic pollution from entering aquatic habitats.



Jason Rolfe

Planning for Success: Regional Efforts, Disaster Marine Debris, and Abandoned/Derelict Vessels
Mid-Atlantic and Caribbean Regional Coordinator, NOAA Marine Debris Program

Severe storm events, as well as tsunamis, can cause massive amounts of debris to enter the ocean and impact coastal ecosystems and wildlife. Because of these severe marine debris threats, there is a need to be prepared to respond rapidly in order to reduce the potential impacts. Given its climate, the mid-Atlantic has a long history of large-scale marine debris events caused by tropical storms and hurricanes and each severe event requires a unique combination of responses. The NOAA Marine Debris Program provides coordination and information to assist coastal states develop response plans that clearly delineate rapid-response protocols and leverage state knowledge and capabilities.

A form of large and persistent marine debris that may not be thought of often are the thousands of abandoned and derelict vessels (ADV) that litter ports, waterways, and estuaries all over the country. They threaten our ocean, coasts and waterways by obstructing navigational channels, causing harm to the environment, and diminishing commercial and recreational activities. Assessing, removing, and disposing of these vessels requires significant financial and technical resources. NOAA created an ADV InfoHub as a central source of information regarding ADVs and the policies surrounding them. It explains how ADVs are handled by each coastal state in an effort to bring together information and to create a comprehensive look at this subject.

As another method to assist states and local communities prevent, reduce and remove marine debris, NOAA is helping coastal states develop marine debris reduction plans specific to their state or region. Even though there are many groups that are doing great individual work on marine debris, NOAA is providing a roadmap and focused direction by getting those groups together to work more collaboratively and achieve more success by focusing on priority actions and helping to inform decision makers and ultimately reduce the impacts of marine debris.



Ruling Robot Falcons

Young Scientists: Up to a Marine Debris Challenge
Ethan Burks, Luke Marston, and Joshua Nichols

Every year, school students (ages 9 to 16) engage in researching solutions to a real-world problem through the “FIRST LEGO League Challenge (FLL).” In 2015, the international challenge selected by FLL was TRASH! More than 230,000 students across the globe applied science, technology, engineering, and math concepts (STEM), plus a big dose of imagination, to solve a trash-related problem of their choosing. In Virginia, one of the regional winning teams – The Ruling Robot Falcons (Ethan Burks, Luke Marston, and Joshua Nichols) – looked into many trash-related and litter-related issues before deciding to put their energy into solving a problem dear to their hearts: balloon litter. They interviewed many scientists, including several at VIMS, and spent hours and hours investigating solutions. In this presentation, the researchers will share the results of their experiments to create a balloon that could biodegrade completely and quickly while still being able to float when filled with helium.



Andrew Scheld, PhD

Economic Impacts of Derelict Crab Pots

Assistant Professor, Fisheries Science, Virginia Institute of Marine Science

Derelict fishing gear—the nets, lines, traps, and other recreational or commercial fishing equipment that has been lost, abandoned, or otherwise discarded—pollutes marine environments all over the world. In the Chesapeake Bay, it is thought that tens of thousands of blue crab (*Callinectes sapidus*) pots become derelict each year. Derelict pots and traps have been found to capture and kill target and non-target species and may damage sensitive habitats or create navigational hazards. In this talk, the economic costs of derelict pots are explored. From 2008 through 2014, the Virginia Marine Debris Location and Removal Program hired commercial watermen in Virginia to locate, document, and remove derelict pots and other marine debris. We constructed a novel dataset by spatially matching the 34,408 derelict pot removals with data on commercial blue crab harvests and effort, and then estimated a model of harvest, which explicitly incorporated removals. This model was used to predict commercial fishery harvests under two scenarios: actual removals and a counterfactual of zero removals (i.e., harvests absent the removal program). Comparison of predicted harvests between scenarios indicated that removing derelict pots led to an additional 30 million pounds in harvest valued at US \$21.3 million—a 27% increase above that which would have occurred without removals. By removing rival ghost fishing gear, actively fished pots were found to be significantly more productive, yielding an additional blue crab on every pull.



Allison Schutes

Ecological Threats Posed by the Most Persistent Items of Trash

Trash Free Seas Program, Ocean Conservancy

Marine litter is a growing environmental concern. However, there are limited data about the impacts on debris on marine species from which to draw conclusions about the population consequences of anthropogenic debris. To address this knowledge gap, we elicited information from experts on the ecological threat of entanglement, ingestion and chemical contamination for three major marine taxa: seabirds, sea turtles and marine mammals. Our threat assessment focused on the most common types of litter that are found along the world's coastlines, based on data gathered during three decades of International Coastal Cleanup efforts. Fishing related gear, balloons and plastic bags were estimated to pose the greatest entanglement risk to marine fauna. In contrast, experts identified a broader suite of items of concern for ingestion, with plastic bags and plastic utensils ranked as the greatest threats. Contamination was scored the lowest in terms of its impact, affecting a smaller portion of the taxa and being rated as having solely non-lethal impacts. This work points towards a number of opportunities both for policy-based and consumer-driven changes in plastics use that could have demonstrable effects for a range of ecologically important taxa that serve as indicators of marine ecosystem health.



Eben Schwartz

New Stormwater Permit Requirements: Motivating Cities to Take Action to Reduce Marine Debris

Marine Debris and Public Outreach Manager, California Coastal Commission

California has been combatting marine debris for more than 30 years, ever since the first California Coastal Cleanup Day took place in 1985. Over the years, as the Cleanup became the state's largest and most popular volunteer event, public education efforts ramped up as well. However, the effects of these efforts have been relatively small, as the overall marine debris problem has only grown worse while California's population has increased almost 50% since 1985. But since 2001, local storm water regulations for trash – driven in part by Coastal Cleanup Day data – have brought new tools, attention, and funding to bear, and have been having dramatic impacts along our coast and inland waterways. Now, a recently approved statewide storm water permit will require that, by 2022, no trash whatsoever will be allowed to flow from the state's storm water system into California waters, including the ocean. This new statewide permit will bring widespread changes in reduction and prevention techniques, as demonstrated by the City of Oakland's ongoing efforts to clean up Lake Merritt, and will ultimately result in a significant reduction in the marine debris that California releases to the ocean.



Christina Trapani

Keep It Beachy Clean: Building Partnerships Reach Beach Visitors

Owner, Eco Maniac Company, Marine Debris Researcher & Consultant, Virginia Beach Clean Community Commission

Keep America Beautiful's Cigarette Litter Prevention Program (CLPP) was grounded in extensive social marketing research. The CLPP has been implemented successfully in more than 1,500 communities. In 2015, Clean Virginia Waterways (CVW) proposed to use the CLPP tools to target a new audience with a pilot program: tourists and visitors to a beach community (Virginia Beach Oceanfront).

With funding from Keep America Beautiful, CVW formed partnerships with the Virginia Beach Hotel Association, Virginia Green, Glasdon, Inc., Virginia Beach Resort Management and more. Eleven Oceanfront hotels and one Bayfront hotel participated and were supplied with cigarette receptacles, pockets ashtrays and educational signage. Receptacles were also placed on the busiest section of the Virginia Beach boardwalk from June 1st through September 7th. Volunteers from the Virginia Beach Chapter of Surfrider Foundation and the Navy conducted seven litter scans at four locations along the oceanfront during the project period. While thousands of cigarette butts found their way to the cigarette receptacles, and nearly 5000 pocket ashtrays were distributed by hotels, it was challenging to measure the success of this project using the KAB protocols. This was due to the extreme changes in the Virginia Beach tourist population during our study period as well as the City's beach cleaning efforts. However, we feel that given the opportunity to grow, this project could make a significant impact on the amount of cigarette butts and other litter found in a beach community. This presentation will discuss the CLPP pilot, its challenges, a plan for growth and sharing our protocols, and associated efforts by the City to keep the resort beaches litter free.



Denice H. Wardrop, PhD

Findings from the Chesapeake Bay Commission's Review on Microplastics and Standards of Biodegradability

Senior Scientist & Professor of Geography and Ecology and Director, Sustainability Institute, Pennsylvania State University

The Chesapeake Bay Program's (CBP) Scientific and Technical Advisory Committee (STAC) has worked to enhance scientific communication and outreach throughout the Chesapeake Bay watershed and beyond since 1984, via a portfolio of products including technical reports and position papers, assistance in organizing merit reviews of CBP programs and projects, and technical workshops. In general, STAC serves as a liaison between the region's scientific community and the CBP. In this role, STAC organized a technical review to describe the scientific evidence regarding plastic microbeads as it relates to microplastic contamination in

general and in the Chesapeake Bay in particular. Since the review had been originally requested by the Chesapeake Bay Commission, and had immediate utility in legislative action, STAC implemented a unique process wherein review questions were developed via a collaborative process between the scientists and members of the CBC and additional state legislators. This ensured that the resulting report would be helpful in deciding if legislative action was appropriate, and what aspects of the issue were the critical ones to address. In the interim of writing the report, federal legislation to ban microbeads, the Microbead-Free Waters Act, was signed by President Obama on December 28, 2015; the report was then extended to put this legislation into context.



Alison Hammer Weingast

Communication & Outreach: Raising Awareness About Marine Debris Before Legislative Solutions are Pursued

NOAA Marine Debris Division Deputy Chief, Office of Response and Restoration

Marine debris is a pervasive, global problem created exclusively by the human population. In order to address and mitigate this growing dilemma, efforts to prevent further debris accumulation and encourage behavior change are critical. As the ultimate solution, prevention through communication and outreach is high priority.

By creating an informed public that understands the issue, the sources that cause it, and the many efforts all individuals can make to address it, generating behavior change and gaining support for various actions is possible. The NOAA Marine Debris Program supports outreach as a part of all work against marine debris, including as a supplement to other types of efforts, such as removal and research. By incorporating such messaging into marine debris efforts, the reach of these projects can be maximized and people can make the educated choice to be part of the solution, rather than the problem, of marine debris. Once that decision is made by a growing number of people, real prevention becomes increasingly possible.

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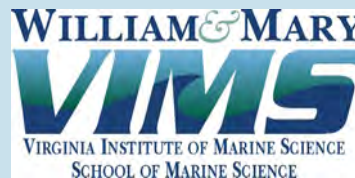
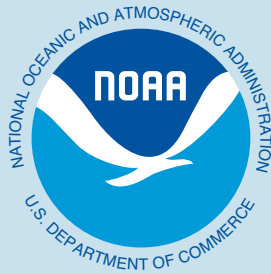
Front Cover: (upper left) Clean Virginia Waterways; (upper right) Clean Virginia Waterways; (lower right) Virginia Institute of Marine Science; (lower left) Northern Neck Soil & Water Conservation District

The Virginia Marine Debris Reduction Plan can be downloaded from the Virginia Coastal Zone Management Program website:
<http://www.deq.virginia.gov/Programs/CoastalZoneManagement/CZMIssuesInitiatives/MarineDebris.aspx>

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Virginia Coastal Zone MANAGEMENT PROGRAM



Visit the Virginia Coastal Zone Management Program's marine debris webpage to stay current on the Virginia Marine Debris Reduction Plan.

<http://www.deq.virginia.gov/Programs/CoastalZoneManagement/CZMIssuesInitiatives/MarineDebris.aspx>