

**COMMENTS ON BAY AREA STORMWATER
MANAGEMENT AGENCIES ASSOCIATION'S
PRELIMINARY BASELINE TRASH GENERATION RATES
FOR SAN FRANCISCO BAY AREA MS4s
AND
TRASH LOAD REDUCTION TRACKING METHOD**

Prepared by:

Michael V. Harding, CPESC

20 March 2012

This report offers my critique of the following Bay Area Stormwater Management Agencies Association (BASMAA) Documents:

1. *Preliminary Baseline Trash Generation Rates for San Francisco Bay Area MS4s – February 1, 2011*. Prepared by EOA, Inc. Oakland, CA
2. *Trash Load Reduction Tracking Method – February 1, 2012*. Prepared by EOA, Inc. Oakland, CA

Specifically, the purpose of this report is to comment on the validity of the BASMA studies and whether or not the BASMAA reports contain adequate scientific evidence to support the proposition that banning polystyrene foam will result in a quantifiable (8%) reduction of trash in the storm drains of the San Francisco Bay area jurisdictions that adopt such bans.

As described in my attached curriculum vitae, I have over 35 years experience in erosion and sediment control, resource management, mined land reclamation, wildlife habitat development, and nonpoint source pollution control both in the United States and overseas.

The purpose of the EOA/BASMAA studies - as I understand them to be - is to assist the Municipal Regional Stormwater NPDES communities in the San Francisco Bay area in the development of plans to reduce trash from their Municipal Separate Storm Sewer Systems (MS4s) by forty percent (40%) by July 14, 2014.

I have also reviewed:

1. *Technical Assessment – 2012 BASMAA Reports* prepared by Environmental Resources Planning, LLC. March 2012
2. “Chapter 3: Water Quality Objectives” from the Regional Water Quality Control Board Basin Plan
3. *Assessing and Monitoring Floatable Debris*, USEPA, August 2002

All documents that I have reviewed included extensive references. Except as noted, I have not reviewed these references in preparing my comments.

Document Review

As I understand it, the purpose of the study, *Preliminary Baseline Trash Generation Rates for San Francisco Bay Area MS4* is to establish a baseline from which Permittees (communities) can demonstrate progress towards trash load reduction goals. The approach is “intended to be cost-effective and consistent, but still provide an adequate level of confidence in estimating trash loads from MS4s, while acknowledging that uncertainty in trash loads still exists.”

Two monitoring events were conducted; one representative of the dry season and one representative of the wet season in the Bay area. Results from the collections were characterized based on monitoring site land use classes (e.g. high density residential, commercial and services, heavy industrial, K-12 schools, etc.) and by the relative percentage volume of various trash types (e.g. plastic, paper, plastic grocery bags, polystyrene foam, etc.). From this information a comparison of trash generation by land use class was presented.

The BASMAA *Trash Load Reduction Tracking Method Technical Report* sets forth two methods to track trash load reductions: 1) trash load reduction quantification formulas; and load reduction credits. Quantification formulas were developed for those trash control measures that were “feasible and practical to quantify load reductions over time”. Load reduction credits were developed for “all other control measures” identified in the report.

Permittees propose to be able to chose and implement any number of these trash control measures to reach the 40% trash load reduction goal. Table 1.1 in the BASMAA Trash Load Reduction Method Report identifies the trash control measures for which load reduction credits or load reduction quantification formulas were developed to track progress towards trash load reduction goals:

Load Reduction Credits:

Single-Use Carryout Plastic Bag Ordinances
Polystyrene Foam Food Service Ware Ordinances
Public Education and Outreach Programs
Activities to Reduce Trash from Uncovered Loads
Anti-Littering and Illegal Dumping Enforcement Activities
Improved Trash Bin/Container Management Activities
Single Use Food and Beverage Ware Ordinances

Quantification Formulas:

On-land Trash Cleanups (Volunteer and/or Municipal)
Enhanced Street Sweeping
Partial-Capture Treatment Devices
Enhanced Storm Drain Inlet Maintenance
Full Capture Treatment Devices
Creek/Channel/Shoreline Cleanups (Volunteer and/or Municipal)

Observations

From my interpretation of the data presented, some things stand out:

- From the BASMAA reports it appears that K-12 Schools exhibit the widest range of trash generation rates and also seemed to have an average rate equivalent to Retail and Wholesale source categories but slightly above that of Commercial and Services and Industrial categories
- In the BASMAA reports there is no accounting for cigarette butt litter which in previous studies has been shown to constitute up to 34% of solid waste entering a storm drain (Caltrans District 7 Erosion Control Pilot Study-2000)
- Section CR-2 of the *Trash Load Reduction Tracking Method*, dealing with a ban of polystyrene, listed one reference—“Assessing and Monitoring Floatable Debris”, USEPA, August 2002. This document provides examples of various strategies concerning monitoring and assessment of floatable debris - as well as some state and/or municipal-specific prevention and mitigation programs – but appears to offer no support for the proposition that banning polystyrene foam food ware would result in a quantifiable (8%) reduction of trash delivered to storm drains.

Opinion

Based on the BASMAA reports, I do not believe an outright ban of polystyrene foam will actually result in a substantial reduction of trash/litter contribution to storm drains. I conclude that neither the BASMAA reports nor the referenced USEPA “Assessing and Monitoring Floatable Debris” report contain evidence supporting a quantifiable reduction of 8% litter to storm drains if a ban is imposed.

The source of all categories of trash and litter is anthropogenic, meaning that if one particular type of container, bag or food ware is banned (i.e., plastic/polystyrene) whatever material takes its place will in all likelihood be discarded and introduced into the storm drain unless public education programs, improved collection management, anti-littering enforcement programs are proportionally increased. The BASMAA reports do not account for this substitution effect. Regardless of its chemical or physical makeup, trash/litter – once it gets into the storm sewer - will never meet the Water Quality Objectives in the Basin Plan because trash in the storm drain will always either be floatable, suspendable or settleable.

I think that BASMAA and the cities have an opportunity to revise their recommendations and propose a more effective combination of both structural best management practices (BMPs) and institutional/administrative practices (IAPs) – including education, enforcement of anti-litter ordinances, improved collection devices and procedures and structural best management practices such as full- and partial-capture devices - to reduce trash in the storm drains.

The *Technical Assessment of BASMAA 2012 Reports* prepared by Environmental Resources Planning, LLC focuses on public education, anti-littering enforcement and improved containment practices backed up by operation and maintenance best management practices (BMPs) to achieve the same credits (88%) as

the BASMAA Credit Allocations. I believe that the credit allocations proposed in the *Technical Assessment of BASMAA 2012 Reports* represent a more diverse, broad-based, equitable and cost-effective allocation of practices to resolve the water quality aspects of trash and litter in storm water runoff.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read 'M. V. Harding', is positioned above the typed name.

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San Diego, CA 92120
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Michael V. Harding is one of the leading technical experts in the erosion control industry. A graduate from Purdue University, Michael has over 35 years experience in erosion and sediment control, resource management, mined land reclamation, wildlife habitat development, and nonpoint source pollution control both in the United States and overseas. Michael specializes in the evaluation, research, development, and application of cost-effective erosion control materials and techniques, and is a Certified Professional Erosion and Sediment Control Specialist (CPESC). He has contributed significantly to the body of knowledge related to the effectiveness of alternative approaches to erosion control through field and laboratory testing programs.

Michael has been involved in projects ranging from erosion control designs for developments, golf courses and landscapes; reforestation and habitat development; abandoned and active mined land reclamation; design of constructed wetlands; and environmental studies. Michael played a key role in the emergency soil stabilization efforts following the 1991 Oakland firestorm, 1993 Southern California fires, the 2003 and 2007 San Diego County/City Fires. Nationally, his efforts on over thirty-six (36) emergency response plans have focused on leadership, financial assistance and technical guidance in the form of post-fire hazard assessment, design of mitigation strategies, and oversight of extensive mitigation implementation efforts before the onset of winter rains.

Michael is three times past President of the International Erosion Control Association (IECA). He has published numerous articles on erosion and sediment control, resource management, and post-fire hazard mitigation in national publications, and frequently teaches seminars and workshops. He has taught continuing education courses for the American Society of Civil Engineers on "How to Prepare an Effective Erosion and Sediment Control Plan," and is the principle instructor for the IECA course "Practical Approaches for Erosion and Sediment Control." He has been the invited speaker at the National Academy of Sciences, the National Transportation Research Board, and was a contributing author to the book *Environmental Restoration, Science and Strategies for Restoring the Earth*, edited by John Berger (Island Press).

Michael's international project experience includes on-site evaluation, planning and implementation of erosion control and revegetation practices for the British Columbia Ministry of Forests (Canada); P.T. Freeport Indonesia (Irian Jaya); Fluor Daniel, Inc. (Java, Sumbawa); P.T. Newmont Nusa Tenggara (Sumbawa); Panvest Corporation (Taiwan); and P.T. International Nickel Indonesia (Sulawesi). Mr. Harding has conducted courses and field instruction for the Department of Land and Water Conservation (NSW-Australia); Department of Mines and Energy - The Republic of Indonesia; and CIHEAM - Instituto Agronomico Mediterraneo de Zaragoza.

Michael was awarded the Outstanding Achievement Award for Applied Innovation by the Peabody Coal Company for his innovative development of constructed wetlands and wildlife habitat for cost-effective compliance with water quality regulations. His guidance to the City of Oakland contributed to their being awarded the Environmental Excellence Award in 1992 by the International Erosion Control Association and the Engineering Excellence Merit Award in 1992 by the Civil Engineers and Land Surveyors of California (CELSOC). Mr. Harding is the past Director and currently acts as technical advisor to the San Diego State University Soil Erosion Research Laboratory in San Diego, CA. Michael is also the Expedition Leader for the Flight of Discovery, a team of pilots and scientists who are re-tracing the Lewis and Clark National Historic Trail to compare 200 years of environmental and cultural change in America.

MICHAEL VERNON HARDING, CPESC

**erosion and sediment control
SWPPP reporting
compliance auditing
education and training
construction NPDES support**

EDUCATION

B.S., Natural Resources and Environmental Science, Purdue University
West Lafayette, Indiana. 1976
Post-Graduate Studies in Psychology/Ethology, Purdue University
West Lafayette, Indiana. 1976-1977

REGISTRATIONS AND CERTIFICATIONS

USDA/FS Habitat Evaluation Procedures (HEP)
Certified Professional in Erosion and Sediment Control (CPESC #679)
Certified Erosion, Sediment and Storm Water Inspector (CESSWI #1229)
Certified SWPPP Practitioner (QSP)
Certified SWPPP Developer (QSD)
CASQA Trainer of Record

CAREER SUMMARY

Michael V. Harding is one of the leading technical experts in the erosion control and storm water industries. He specializes in Storm Water Pollution Prevention Plan development, implementation, inspection and compliance and has developed courses and frequently instructs on these subjects. Mr. Harding over 35 years experience in erosion and sediment control, resource management, mined land reclamation, wildlife habitat development, and nonpoint source pollution control both in the United States and overseas. Mr. Harding is one of the nation's leaders in the evaluation, research, development, and application of cost-effective erosion control materials and techniques, and is a Certified Professional in Erosion and Sediment Control (CPESC). He has contributed significantly to the body of knowledge related to the effectiveness of alternative approaches to erosion control through field and laboratory testing programs. Mr. Harding co-designed, built and directed research and educational outreach at the San Diego State University Soil Erosion Research Laboratory (SERL) from 1998-2002 as part of the Caltrans District 7 Erosion Control Pilot Study.

Mr. Harding has been involved in projects ranging from erosion control designs for transportation, housing and commercial development, golf courses and landscapes; reforestation and habitat development; abandoned and active mined land reclamation; design of constructed wetlands; and environmental studies. He has played key roles in the emergency soil stabilization efforts following several major California wildfires, including the 1991 Oakland firestorm, 1993 Southern California fires, the 2003 and 2007 San Diego County/City Fires. Nationally, his efforts on over thirty-six (36) emergency response plans have focused on leadership, financial assistance and technical guidance in the form of post-fire hazard assessment, design of mitigation strategies, and oversight of extensive mitigation implementation efforts before the onset of winter rains.

Michael is three times past President of the International Erosion Control Association (IECA). Michael's international mining project experience includes on-site evaluation, planning and implementation of erosion control and re-vegetation practices for the British Columbia Ministry of Forests (Canada); P.T. Freeport Indonesia (Irian Jaya); Fluor Daniel, Inc. (Java, Sumbawa); P.T. Newmont Nusa Tenggara (Sumbawa); Panvest Corporation (Taiwan); and P.T. International Nickel Indonesia (Sulawesi). Mr. Harding has conducted courses and field instruction for the Department of Land and Water Conservation (NSW-Australia); Department of Mines and Energy - The Republic of Indonesia; and CIHEAM - Instituto Agronomico Mediterraneo de Zaragoza.

As Reclamation Manager for their Sycamore Mining Complex, Michael was awarded the Outstanding Achievement Award for Applied Innovation by Peabody Coal Company for his innovative development of constructed wetlands and wildlife habitat for cost-effective compliance with water quality regulations. His guidance to the City of Oakland contributed to their being awarded the Environmental Excellence Award in 1992 by the International Erosion Control Association and the Engineering Excellence Merit Award in 1992 by the Civil Engineers and Land Surveyors of California (CELSOC). In 2007 Michael received the Sustained Contributor Award from the International Erosion Control Association for demonstrating a significant and long-term contribution to the erosion control industry through education, government involvement, research or development of technology.

Mr. Harding has been involved in the development and presentation of a number of storm water and erosion control courses that demonstrate his ability to instruct in both a classroom and field setting. He is a co-developer of the CPESC Review Course and Examination and other courses through EnviroCert, International and the International Erosion Control Association (IECA) and numerous State Departments of Transportation (DOTs). He is a CASQA-certified Qualified SWPPP Practitioner (QSP), Qualified SWPPP Developer (QSD) and a Trainer of Record (ToR) under the California Construction General Permit.

SPECIAL PROJECTS AND ACTIVITIES

Domestic

Technical Advisor to Wright Water Engineers (Denver, CO) Four-Mile Canyon Fire
Erosion Control Specialist: Storm Water Compliance Construction Site Audits
Erosion Control Specialist: Nationwide NPDES Construction Site Audits, Geosyntec.
Field Manager for post-fire remediation, 2003/2007, San Diego City and County, CA
Director, San Diego State University Soil Erosion Research Laboratory (1999-2004)
Field Manger for Caltrans District 7 Erosion Control Pilot Study and
Operations Supervisor San Diego State University Soil Erosion Research Laboratory
Site Remediation Consultant, Equilon Enterprises, LLC
Whatcom Creek Incident (June 1999) – Bellingham, Washington
Subconsultant to Pattillo & Garrett Associates – Oakland, CA
Joseph Jensen Water Treatment Plant, Los Angeles
Erosion and sediment control planning for Weyerhaeuser Real Estate Company
Snoqualmie Falls Development
Erosion and sediment control planning for Crown Pacific Lumber
Port Angeles, WA
Boise, Idaho: August 1996 Eighth Street Fire
Special advisor to the mayor, Hon. Brent Coles
Buffalo Creek, Colorado: Post-Fire Remediation
Technical assistance to the U.S. Forest Service
Field Operations Supervisor, East Bay Firestorm Remediation (1991)
Erosion Control Specialist/Field Operations Supervisor Southern California Fires
(1993)
Cities of Laguna Beach, Malibu, Thousand Oaks, Orange County.
Technical assistance to FEMA and California Office of Emergency Services for Hazard
Mitigation Planning for State of California, (1993-94).

International

Technical Assistance Starstroi/Sakhalin Energy – Sakhalin Island, Russia

Technical assistance to Sri Lanka Coir Council and U.S.A.I.D.

Coir Competitiveness Initiative (CCI) and post-tsunami recovery.

Technical assistance (Site Evaluation) to Agriconsulting, Rome, Italy

Treno Alta Velocita (Milano – Naples Bullet Train)

Technical assistance (Site Evaluation) to Raytheon Engineers and Constructors, Inc.

Hydro-Electric Project, Philippines

Technical assistance (Site Evaluation) to P.T. International Nickel Indonesia.

Soroako, Sulawesi, Indonesia - Reclamation, revegetation and erosion control

Technical assistance (Site Evaluation, BMP Manual, Training) to P.T. Freeport Indonesia

Timika/Tembagapura, Irian Jaya, Indonesia - Training, reclamation, revegetation, erosion/sediment control

Technical assistance (Site Evaluation, BMP Manual) to Fluor Daniel Corporation

Unocal Geothermal Plant, Bogor, Java, Indonesia

Batu Hijau Project, Sumbawa, Indonesia

Department of Mines and Energy - Republic of Indonesia (Training)

Erosion and sediment control workshop for mine inspectors

Instituto Agronomico Mediterraneo de Zaragoza, Spain (Training)

Post-Graduate Instructor - CIHEAM 1996

COURSES

General Construction

Qualified SWPPP Practitioner (QSP)

Qualified SWPPP Developer (QSP)

CPESC, Inc. Developed course and certification test for erosion and sediment control professionals.

Post-Disaster Remediation Workshops and Field Demonstrations for Counties of San Diego, San Bernardino and Orange (CA) 2009

Oregon Department of Transportation (ODOT). Co-developer of Erosion and Sediment Control classes and field days for Engineers, Designers and Inspectors (2009)

Oregon Department of Environmental Quality (ORDEQ). Erosion and Sediment Control Manual and Construction Site Inspector's Booklet (April 2005) and accompanying statewide workshops and field training

USEPA/IECA Short Course on Best Management Practices for Storm Water Pollution Prevention Planning– Course Co-Developer and National Instructor

Engineering and General Contractors Association (EGCA) Erosion and Sediment Control Workshop and Field Day – Course Co-Developer and Instructor

County of San Diego – Courses and workshops for inspectors and designers

International Erosion Control Association (IECA). "Fundamentals of Erosion Control" Short Course, "Steep Slope Erosion Control" Short Course.

University of California - Santa Barbara. Extension Course on Post Fire Hazard, Planning-Mitigation

Instructor: American Society of Civil Engineers (ASCE) Short Course, "How to Develop an Effective Plan for Erosion and Sediment Control."

Instructor: Auburn University, College of Engineering Technology Transfer Program

Instructor: University of Tennessee, Technology Transfer Program City of Gresham, OR - Erosion and Sediment Control Practices.

Linear Construction/Transportation/Utilities/Energy

Oregon Department of Transportation (ODOT. Co-developer of Erosion and Sediment Control classes and field days for Engineers, Designers and Inspectors (2009-2011)

CALTRANS Erosion and Sediment Control Training for Landscape Architects and Designers – Course Co-Developer and Instructor

Alaska Department of Highways and Public Facilities. Erosion Control workshops - Fairbanks, Anchorage and Juneau

Sprint Communications Fiber Operations. Erosion and sediment control workshop and field day for Engineering Division, Albuquerque, NM

Federal Energy Regulatory Commission (FERC). Erosion and sediment control short course. San Francisco, CA.

Memphis (Tennessee) Light, Gas and Water Division 1994 Engineering Seminar

Instructor: Idaho Department of Transportation Fundamentals of Erosion and Sediment Control

Instructor: Washington Department of Transportation Temporary Erosion and Sediment Control for Inspectors

Hawaii Department of Transportation – Stormwater Management Training Sessions (27)

Forests/Mountains/Water Resources

USFS Erosion and Sediment Control Workshops and Field Days: WA, OR, ID. Course Developer and Instructor

Port District of San Diego, CA. Erosion control workshops and field days.

Panhandle Health District – Coeur d’Alene, Idaho. Stormwater Management training

Crown Pacific – Workshop and Field Day Olympic Natural Resources Training Center - Forks, WA

Resource Conservation District of Greater San Diego, CA. Sweetwater Watershed Workshop

City and County of Honolulu, HI – Erosion and Sediment Control Workshops

Hawaii Coastal Zone Management - Erosion and Sediment Control Workshop (3)