



**GREEN
MARINE**

2015

GREENTECH

ANNUAL CONFERENCE

SUSTAINABILITY AT WORK
IN MARINE TRANSPORTATION



Lloyd's List Awards

North American
Maritime | 2015



W I N N E R

ENVIRONMENTAL EXCELLENCE

"This award is a testament to the program's success and, even more importantly, to its relevance and credibility throughout North America."

- Greg Wight, Chairman of the Board, Green Marine



Hello!

I am delighted to welcome you to GreenTech 2015 – Green Marine's eighth annual conference and the first to be held on the U.S. West Coast!

This year GreenTech will be a microcosm of what Green Marine does best: namely, to encourage networking and the exchange of relevant information. We have gathered some 40 presenters to share their knowledge and expertise related to our theme of Sustainability at Work in Marine Transportation.

Some of our environmental program's earliest participants will provide the results of installing new technologies aboard their vessels. Others will share the outcome of their inspired collaboration through key partnering efforts. We'll also gain knowledge about the environmental initiatives of new Green Marine participants, learn more about emerging issues related to our industry, and have time to reflect upon the challenges and opportunities for the sustainable development of maritime transportation.

Seattle is the ideal place to gather all of Green Marine's participants, partners and supporters who are working together to steer the maritime industry towards environmental excellence. Seattle ranks fourth overall on the U.S. and Canada Green City Index. This Emerald City also boasts 17 LEED-certified buildings per every 100,000 people, while the average throughout the United States and Canada is 6.4.

Our Certification Ceremony – the event recognizing the significant commitment and efforts of each of our participants in continually improving their environmental performance year over year – will take place at the Seattle Aquarium, which is renowned for its marine conservation. We'll conclude GreenTech 2015 with a guided boat tour of the Port of Seattle facilities and learn about the port's various environmental initiatives.

I believe we've put together a highly relevant program for GreenTech 2015 and wish you all a great conference!

Bonjour,

Je suis heureux de vous souhaiter la bienvenue à ce huitième colloque annuel de l'Alliance verte, le premier à se tenir sur la Côte Ouest américaine.

Cette année, GreenTech 2015 est un concentré de ce que l'Alliance verte fait de mieux : stimuler les rencontres et le partage d'information! En effet, ce sont une quarantaine de conférenciers qui sont réunis pour échanger sur le thème : Développement durable : l'industrie maritime à l'œuvre.

Certains participants de la première heure du programme environnemental viendront témoigner des résultats de l'implantation de nouvelles technologies à bord de leurs navires alors que d'autres partageront leurs efforts de partenariats et de collaboration inspirants. Nous pourrions aussi en apprendre davantage sur les initiatives environnementales de nouveaux participants de l'Alliance verte, découvrir les enjeux environnementaux émergents pour l'industrie puis prendre le temps de réfléchir sur les défis et les opportunités afin de promouvoir le développement durable du transport maritime.

Seattle est le lieu tout indiqué pour réunir sous un même toit les participants, partenaires et supporters de l'Alliance verte qui travaillent ensemble à guider l'industrie maritime vers l'excellence environnementale. La ville de Seattle arrive quatrième au classement des villes vertes du Canada et des États-Unis. La « ville Émeraude » comporte 17 édifices certifiés LEED pour chaque 100 000 habitants; la moyenne à travers le Canada et les États-Unis est de 6,4.

La cérémonie de certification – où nous reconnaissons les efforts continus et l'engagement de nos participants à sans cesse améliorer leur performance environnementale – se déroulera d'ailleurs dans un haut lieu de conservation marine : l'Aquarium de Seattle. Le colloque se terminera par une visite guidée des installations du Port de Seattle, où nous serons à même de constater les différentes initiatives environnementales qui y sont mises de l'avant.

Je crois que GreenTech 2015 propose un programme pertinent et diversifié et je vous souhaite un excellent colloque!



David Bolduc

Green Marine Executive Director

8:30

SUSTAINABILITY AT WORK IN MARINE TRANSPORTATION

Moderator: Ray Johnston, Green Marine

Welcoming Address: David Bolduc, Green Marine

Linda Styrk, Managing Director, Seaport Division, Port of Seattle

Stephen Edwards, CEO, GCT Global Container Terminals Inc.

Dennis McLerran, Administrator, Regional Administrator, U.S. Environmental Protection Agency, Region 10

10:30

TECHNOLOGY GEARED TOWARDS REGULATORY COMPLIANCE: LESSONS LEARNED

Certification of the EGCS on Algoma Equinox Class Vessels

Mira Hube, Algoma Central Corporation

Algoma Central Corporation's new Equinox Class vessels, which are designed and constructed for operations in the Great Lakes and St. Lawrence region of North America, are equipped with a multi-stream, integrated closed-loop exhaust gas cleaning system. The first of these scrubbers was successfully tested and approved to the MARPOL Guidelines for Exhaust Gas Cleaning Systems (MEPC. 184(59)) in 2014 by Lloyd's Register in one of the first Class Society certifications of a closed-loop scrubber for use in fresh water. Certification testing demonstrated that the scrubbers are capable of removing more than 99% of the SOx emissions from exhaust emissions generated by the main engine, auxiliary engines and thermal oil heater.

CSL's Experience with BWMS

Jamie Coates, CSL Americas

This is a discussion of the ship owner challenges and decision-making in selecting, designing and installing a ballast water treatment system for retrofit on a Panamax self-unloading bulk carrier. The selection began with surveying all vendors worldwide, learning about regulations and upcoming changes, and then performing more than a year of due diligence and six months of contract negotiations. The design involved more than 1,000 hours of design work. The installation is currently in process and presents many challenges of its own.

Saga Forest Carriers – BWT Case Study

Birgir Nilsen, Optimarin

As a pioneer in ballast water treatment, Optimarin AS has experience with system installations since April 2000. In 2011/12 Saga Shipholding AS, the open-hatch carrier subsidiary of Nippon Yusen Kaisha (NYK), entered into a retrofit contract that covers complete BWT systems, including engineering and design for 24 existing open-hatch bulk carriers and new-build projects in Japan and Korea. Optimarin subcontracted with Goltens Green Technologies to perform 3D scanning, modeling and detailed engineering for the retrofits. The objective was to complete six to eight ballast water retrofittings per year during normally scheduled dry docking periods. All systems delivered are 1000 or 2000 m³/h. Eleven retrofits and seven new-build installations have been completed to date. The presentation details the installation planning, improvements through extensive operational experience, and general experiences using the system in all ballasting operations since the first installation in August 2012.

Membrane Scrubber Technology for SOx Removal from Engine Exhaust

Gerry Carter and Edoardo Panziera, Ionada Inc.

Ionada has developed a game-changing technology for the exhaust gas cleaning systems (EGCS) industry. With the introduction of the first membrane marine scrubber system, Ionada is applying the high efficiency, reliability, and low energy consumption of membrane technology to EGCS. The result is an EGCS that is 50% smaller and 30% more energy efficient than competitive wet scrubbers. Owners can achieve a rapid return on investment by continuing to use low-cost residual fuels, instead of switching to distillate fuels to meet stringent emission requirements. This presentation will highlight the results of the sea trials of Ionada's pilot scrubber installation on a self-unloading bulk freighter operating in the Great Lakes.

THE PRESENTATIONS

10:30

GOOD COMMUNITY RELATIONS: A KEY PRIORITY FOR A SOCIALLY RESPONSIBLE BUSINESS

Environmental Social Acceptability

Frédéric Maloney, Quebec Port Authority

The Québec Port Authority has made a major shift during the past few years in terms of integrating social responsibilities within its core activities. The port is located in close vicinity to the UNESCO Historic District of Old Québec and its neighbouring residents. The social interaction has been a major driver towards reviewing the port's modes of operation to minimise the impact of 24/7 activities. Part of this major shift involves using an innovative environmental assessment review process customized for application to all projects within the port's jurisdiction. While this new framework is based on Canada's legal environmental requirements, it goes far beyond regulation. Its structure provides transparency, visibility and credibility, offering the Québec Port Authority a platform to showcase its social leadership and environmental stewardship. This collaborative initiative facilitates the port's mission to promote and develop maritime trade, to serve the economic interests of Québec and Canada, as well as ensure the port's sustainability in a way that respects and engages the community.

Social License to Operate - Working with Your Local Communities

Rick Sheckells, EcoLogix Group, Inc.

Achieving growth for seaport, maritime and industrial organizations often involves physical or operational development: new or expanded marine terminal facilities, a dredging project, or an expansion of operations. Opposition is often based on concerns about the environmental and health impacts (both real and perceived) of such growth. Sponsors of growth projects are most times aware of the potential for opposition and typically committed to engaging external stakeholders in discussing a resolution. The difference between successful outcomes and failed attempts is determined by the approach to engagement. This presentation examines how an environmental strategy can identify the external stakeholders that will be most influential, and effectively engage them in developing solutions that move a growth project forward. Using actual growth projects, the presentation will discuss how subtly different approaches to stakeholder engagement can produce vastly different outcomes. Techniques for success will be presented.

Opportunities for Canada LNG Exports - Addressing Concerns, Sharing Facts and Achieving Social License

Stephen Brown, Chamber of Shipping of British Columbia

Capt. Brown will speak to the economic opportunity before British Columbia to develop an LNG export industry comprising tens of billions of dollars of investment, thousands of jobs in construction, and a long-term revenue stream for the province. He will also discuss some of the public concerns by outlining the issues and how are they being addressed with a view to securing a large measure of social license.

1:30

CORPORATE ENVIRONMENTAL LEADERSHIP: INSPIRING INITIATIVES FOR THE INDUSTRY

Cooperation between NGOs and Industry to Define Sustainable Development in the Canadian Arctic

Andrew Dumbrille, WWF-Canada, Marc Gagnon, Fednav

As demand for resources increases, new development opportunities arise in the Arctic with new stresses that, if not properly managed, could put northern ecosystems and cultures at risk. Harsh conditions, limited search and rescue capabilities, and scarce support infrastructure in the Arctic make it essential to avoid accidents and spills. Ships have to use the best information, best practices and latest technology to avoid or minimize the impact of disruptions to wildlife and the release of pollutants. Shipping is important for all current and future economic development in the region, and there is an opportunity to manage and lower the inherent risks of this activity now, while shipping in the Canadian Arctic is minimal compared to other regions. Given the community and economic importance of shipping and its current and potential impact, WWF-Canada, in cooperation with and through funding from Fednav Limited, is studying one of Canada's shipping gateways to the Arctic: the Hudson Strait. The study explores various aspects of the socio-economic, cultural, oceanographic and ecological impact and risk of shipping. The study sets the scientific foundation, outlines options, and considers operational recommendations to avoid, limit or mitigate the risk and impact of shipping in one of the Arctic's most used shipping channels. The presentation will also highlight the benefits and challenges of cooperation between an NGO and a shipping company, the importance of sharing the same overall goal, and the difficulties that unsurprisingly arise when non-profit and for-profit organizations enter into a partnership.

Radical Improvements in Vessel Efficiency

Lee Kindberg, Maersk Line

Maersk Line has dramatically improved energy efficiency and reduced fuel consumption for its vessels. As a result, from 2007 to 2014 the CO2 produced per container per km was reduced by 40%. In November 2014, Maersk's CEO announced that Maersk Line was raising its CO2 intensity goal to a 60% reduction by 2020. The 2020 Absolute CO2 goal was raised to a 40% reduction while growing the business by 80%. Progress to date and the aggressive goals are made possible by a strategy that includes some new-builds, improved network design and execution, and an innovative "radical retrofit" program for existing vessels. This presentation will discuss these aspects, focusing on the new operational approaches, the technologies considered and implemented, and the challenges encountered.

ECHO Program: Collaborating to Manage Potential Threats to At-Risk Whales from Commercial Vessels

Carrie Brown and Órla Robinson, Port Metro Vancouver

The Enhancing Cetacean Habitat and Observation (ECHO) Program is a research and management initiative established by Port Metro Vancouver to coordinate the efforts and resources of multiple interests to better understand and manage the potential cumulative threats to at-risk cetacean (whale, dolphin and porpoise) species that may arise from commercial vessel activities throughout the southern coast of British Columbia. Fisheries and Oceans Canada Recovery Strategies have identified four key threats to at-risk whale species in the region: 1) acoustic disturbance; 2) physical disturbance; 3) environmental contaminants and 4) reduced prey availability. Through the ECHO Program, a series of individual initiatives and projects will be advanced to better understand potential cumulative threats associated with commercial vessel related activities. The outcomes will inform the collaborative development of potential management options to reduce impacts of shipping to cetaceans. Initial projects will focus on the threat of acoustic disturbance. The ECHO Program has started working closely with advisory committees and working groups, technical committees and other relevant interests to seek advice and recommendations from a wide a range of interests and perspectives. Advisors include representation from federal and provincial government agencies, First Nations, as well as marine industry users, NGOs, and science and technical experts. The presentation outlines how the ECHO Program is bringing relevant interests together to explore innovative ways to better understand and manage potential cumulative threats to at-risk marine species from commercial vessels.

THE PRESENTATIONS

3:30

EMERGING ENVIRONMENTAL ISSUES: AN INTRODUCTION TO UNDERWATER NOISE

Whales in an Ocean of Noise: How Manmade Sounds Impact Marine Life

Kathy Heise, Vancouver Aquarium

Jacques Cousteau did many things extremely well, but his film “The Silent World” did not capture the incredibly varied ways in which marine animals use underwater sound. Virtually all of them use sound to undertake vital life processes. In the North Pacific, underwater noise (manmade sound) has been doubling in intensity every decade since the mid-1960s. Much of it is attributable to increases in commercial shipping, although not exclusively. The presentation will focus on the ways in which underwater noise can affect marine life, ranging from plankton to whales, as well as some of the mitigation measures that can reduce these impacts.

Ship Noise in an Urban Estuary Extends to Frequencies Used by Endangered Killer Whales

Scott Veirs, Beam Reach Marine Science

Combining calibrated hydrophone measurements with vessel location data from the Automatic Identification System, we estimated underwater sound pressure levels for 1,724 unique ships that transited the core critical habitat of the endangered Southern Resident Killer Whale during the 28 months between March 2011 and October 2013. The noise levels near the shoreline in Haro Strait (WA) for the ship population were elevated relative to background levels not only at low frequencies (as expected), but also at high frequencies used by odontocetes for communication and echolocation. We present source levels and spectra of ship noise, broken down by class of ship, that could help guide the development of underwater noise pollution standards and mitigation strategies.

Control and Measurement of Underwater Ship Noise

Michael Bahtiaran, Noise Control Engineering

Mitigation of underwater ship noise has kept Michael Bahtiaran and Noise Control Engineering (NCE), LLC (Billerica, MA) busy over the last 15 years. They have completed many quiet vessel designs, including ships for NOAA, the U.S. Navy, the National Science Foundation and other private institutions within the U.S. and abroad. The presentation will outline the “lessons learned” from these projects. The talk will address the numerous sources of underwater noise and their propagation paths, as well as various noise mitigation methods and materials. An update of new guidelines and underwater noise requirements being issued by various organizations will be discussed. The updated general measurement approach with its new standards for underwater ship noise and new measurement technology will also be presented.



3:30

PRACTICAL SOLUTIONS TO IMPROVE AIR QUALITY AT PORTS

Improving Turn Times: Harnessing GPS Data for Drayage Truck Efficiency

Greg Alexander, E2 ManageTech

A first of its kind innovative truck tracking system has been developed to track and report drayage operations. Harnessing GPS data, E2 ManageTech, Inc. (E2), on behalf of the Harbor Trucking Association (HTA), has captured drayage truck data in the largest port complex in North America. The goal: provide an industry-wide metric for drayage truck turn times. Essential to understanding when and where delays occur, this reporting system illustrates time spent waiting outside a terminal and inter-terminal time. The system was created to provide an industry-wide impartial dataset that could be used to track improvements in terminal visit times. With increased environmental compliance requiring trucks with lower emissions, trucking costs have risen significantly over the past few years. Consequently, any delays will directly affect the drayage operator's bottom line. In October 2013, E2 and the HTA began releasing data. The data is made available monthly on a subscription basis via the HTA's website. This reporting system is highly expandable and can be deployed at other ports, rail yards, and distribution centers.

Fairview Shore Power Commissioning: a Case Study and Lessons Learned

Jason Scherr, Prince Rupert Port Authority

On Friday, Oct. 31, 2014, Prince Rupert's first container vessel equipped for shore power was connected to Fairview Terminal's cold ironing equipment, allowing the CSL Xin Ya Zhou to turn off its onboard diesel generators and draw power from the provincial electric grid. It was the first container ship plugged in at a Canadian port – a significant milestone for the Port of Prince Rupert in advancing environmental stewardship. The use of shore power significantly reduces the amount of fuel used by vessels while at berth. The environmental benefits include a dramatic reduction in local air emissions (NOx and SOx) as well as greenhouse gases (CO2). Fairview's shore power capabilities were first designed when the terminal was constructed in 2007 with an initial \$2.5 million. The shore power equipment was then installed in early 2011 as a result of a \$3.6 million investment made jointly by Transport Canada, Western Economic Diversification Canada, the Government of British Columbia, CN Rail, Maher Terminals, and the Prince Rupert Port Authority. Once the vessel with the necessary plug-in equipment arrived in port, determining and overcoming the remaining obstacles became the priority. The PRPA worked with Maher Terminal, China Shipping Line, BC Hydro and a team of engineers to make the commissioning possible. This case study will document the journey to and through the shore power commissioning, outlining the challenges and lessons learned, and outlining the benefits realized with this initiative.

Solutions in a Box – From Ideas to Implementation with Air Quality Strategies

Christina Wolfe, Environmental Defense Fund

This presentation will present quantitative and qualitative analysis of strategies being used at ports to improve air quality, as well as introduce a new port-specific resource of best practices in emissions strategies. Many of these practices can lead to efficiency improvements in port operations, which help make adoption economically sustainable. The presentation will share how ports and port stakeholders can take advantage of opportunities to move their clean air ideas to action, while taking into account lessons learned from others.

THE PRESENTATIONS



Visit Seattle

8:00

COLLABORATION AMONG CANADIAN AND U.S. PORTS TO PROMOTE CLEAN AIR IN THE PACIFIC NORTHWEST

Andrew Green, *Puget Sound Clean Air Agency*

The Northwest Ports Clean Air Strategy is a collaborative effort among the Port of Seattle, Port of Tacoma, and Port Metro Vancouver to reduce air emissions from shipping and port operations in the Georgia Basin–Puget Sound airshed. The voluntarily initiated strategy complements regulations to achieve two goals: 1) reduce diesel particulate matter emissions per ton of cargo by 75% by 2015 and 80% by 2020; and, 2) reduce greenhouse gas emissions per ton of cargo by 10% by 2015 and 15% by 2020. Throughout strategy development and implementation, the ports have collaborated with Environment Canada, Metro Vancouver, the Puget Sound Clean Air Agency, the U.S. Environmental Protection Agency, and the Washington Department of Ecology. In this presentation, Andrew Green will introduce the strategy's origin, purpose and structure, laying the foundation for the following breakout session during which each port will describe its actions in more detail.

8:30

THE NORTHWEST PORTS CLEAN AIR STRATEGY: A COMMON GOAL, THREE COURSES OF ACTIONS

Panel Moderator: Andrew Green, *PSCAA*

Janice Gedlund, *Port of Seattle*

Christine Rigby, *Port Metro Vancouver*

Ron Stuart, *Port of Tacoma*

The Northwest Ports Clean Air Strategy was initially developed by the Port of Seattle, Port of Tacoma and Port Metro Vancouver in 2007 and updated in 2013. The strategy includes actions and performance targets for six port-related emission source sectors: ocean-going vessels; harbor vessels; cargo-handling equipment; trucks; locomotives and rail transport; and, port administration. The representative from each port will discuss that port's specific initiatives and results toward achieving the overall goals.



Visit Seattle

8:30

DOING MORE WITH LESS: PERSPECTIVES ON SHIP ENERGY EFFICIENCY

Design Efficiency of Ships – Historical Developments and Impact of the EEDI

Jasper Faber, CE Delft

As of January 2013, new ships have been required to have an Energy Efficiency Design Index (EEDI) that indicates their design efficiency is better than the average comparable ship built between 1999 and 2008. Starting 2015, the efficiency of new ships has to be 10% better than the initial reference, and 20% better as of 2020. The International Maritime Organization is currently conducting a review of the efficiency targets. CE Delft analyzed the design efficiency of new ships from 1960 to the present. The research indicates that, on average, ships built in the 1980s and 1990s were more efficient than vessels constructed between 1999 and 2008. The study analyses the efficiency of recently built ships in more detail and shows that nearly all types of newly built ships already comply with the 2020 EEDI target.

Review of Strategies and Technologies to Minimize Tug and Barge Fuel Consumption

William L. Moon III and Peter S. Soles, Glosten

Several strategies and technologies are available to the commercial towing industry to decrease fuel consumption. The presentation will expand on strategies and technologies that have only been minimally discussed in existing literature with respect to tug and barge operations – an industry with significant fuel expenditure. The fuel-saving strategies presented include propeller polishing, fuel consumption monitoring, efficient towing configurations, voyage planning, and barge trim consideration. Technologies presented include high-efficiency nozzles and propellers for tugs, high-efficiency skegs for barges, and hull optimization for both types of vessels. For each strategy and technology, the potential for fuel savings is considered along with implementation challenges and costs, and ongoing maintenance requirements. Significant fuel savings can be realized by combining several strategies and technologies, thereby decreasing harmful emissions and reducing the overall lifecycle costs of tugs and barges.

Fuel Optimizing System: Technology, Real Time Experience and Results

Stefan Stan, Pronova Systems

The Fuel Optimizing System is designed to provide a crew with all the necessary information in real time to minimize fuel consumption and maximize a ship's profitability. By using high-tech components and a real-time optimization algorithm, the system achieves the objectives aimed by SEEMP and MARPOL Annex VI in terms of nitrogen oxides and sulfur oxides. Distinguishing characteristics include: a minimum 10% guaranteed fuel savings; load balance between main engines or propellers; trim optimization; weather conditions optimization; anti-fuel theft, maintenance free use; and automatic daily reporting. The Pronova Fuel Optimizing System has been tested and/or permanently installed on a variety of ships (tug-barge systems, ferry-boats, cruise liners, container ships, bulk carriers, etc.) with a fuel saving of at least 10% achieved by ship speed optimization alone. Other optimization functions add more fuel savings.

10:15

COLLABORATION BETWEEN GOVERNMENT AND INDUSTRY TO REDUCE ENVIRONMENTAL IMPACTS FROM SHIPS

NRC Strategic Research, Technology and Investment in Ship Efficiency

Lawrence Mak, National Research Council

Keith Castonguay, Marine Atlantic

The National Research Council Canada (NRC) has assisted Marine Atlantic Inc. (MAI) in a pilot project to reduce fuel consumption. As part of another MAI project, NRC assessed port maneuvering to enhance safety and protect the environment. These projects are contributing to MAI's goal of achieving environmental leadership and a competitive advantage. The presentation is to summarize these achievements and propose recommendations to advance through the levels of the Green Marine environmental program's performance indicators. During the pilot project, NRC collected operational data, conducted analysis to establish trends, identified key performance indicators (KPIs), examined data products for performance management, and developed interactive tools for crew feedback. During the next phases, NRC proposes to establish a baseline, identify critical data products for performance management, develop tools to compute KPIs automatically, introduce changes to improve efficiency and measure fuel savings, as well as explore dashboard tools for interactive feedback and predictive tools to aid bridge crew.

Washington Voluntary Best Achievable Protection/Exceptional Compliance Program VBAP/ECOPRO

Scott Ferguson, Washington State Department of Ecology

Mark Homeyer, Crowley Petroleum Services

The maritime community at all levels of government and industry strive to collaboratively foster an environment that promotes public health and safety and environmental protection. The cost to the public, environment, and industry is potentially too high to do otherwise. This presentation will discuss from the state perspective the "system" of Prevention, Preparedness (Contingency Planning) and Response used to foster safety and environmental protection. The presentation will highlight the Washington State Maritime Exceptional Compliance Program (ECOPRO) which focuses on tank vessel operations and Best Achievable Protections looking at people, systems and processes that companies employ to prevent oil spills that are well above international and domestic standards. The presenters will also talk about the future of the ECOPRO program with the idea of expanding it to other classes of vessels, e.g., bulk carriers. The presenters will wrap up with some practical applications of ECOPRO and its significance for operations, safety, and revenue from a two-time winner of the award, Crowley Petroleum Services.

Creating Grant Successes for Harbor Craft

Beth Carper, Puget Sound Clean Air Agency

Erik Ellefsen, Island Tug and Barge

The Puget Sound Clean Air Agency has worked with several funding agencies on a variety of harbor craft pollution reduction projects. Beth Carper will share lessons learned from grant experience, specifically what attributes are needed from the funding sources, grant partners and the project itself for a successful outcome, and what harbor craft companies can do to help create more funding opportunities to the Pacific Northwest. Island Tug and Barge has partnered with the Clean Air Agency for two different grant opportunities. Erik Ellefsen will share Island Tug and Barge's experience with each of these grants as well as the vision for future collaboration.

10:15

SUSTAINABLE PORTS: COUPLING DEVELOPMENT AND ENVIRONMENTAL PROTECTION

Productivity as a Measure of Determining Offsets

James Slogan, Hemmera

Major projects in the marine environment require significant offsets to address project effects when area-based offsets are used. Costs for offsetting can rise up to \$1M per hectare and it may take a minimum of five years to monitor the effectiveness of offsetting measures – all of which can reduce a project's feasibility. Using an ecosystem-based approach with productivity as the measure of change, proponents can substantially reduce the area of an offsetting project and its subsequent costs. Fisheries and Oceans Canada has amended the federal Fisheries Act and policy, and now uses changes in productivity as the metric to assess potential project-related effects to fisheries. Its science considers an ecosystem-based approach, which evaluates the potential effects of a project both at the species level and among marine biophysical-valued components, to be best practice for major projects that have the potential for ecosystem change. Hemmera recently used an ecosystem model for a proposed major project in the marine environment and has used this model to assess potential changes in productivity and to determine appropriate offsetting requirements. This model not only reduced the projected offsetting budget, but also enabled offsetting measures to focus on those species most affected by the project.

Marrying Sustainability and Port Expansion at Port Everglades

Robert Musser Jr., Port Everglades

Protecting the sensitive environments and unique wildlife and ecosystems that are characteristic of seaports in South Florida is key to Port Everglades' goal of environmental stewardship, sustainability and community accountability. The various critical expansion projects at Port Everglades and how these projects are moving forward with innovative approaches to sustainability will be discussed. As one of the more recent ports to join Green Marine, the port's decision to join the program will also be highlighted. Port Everglades is currently working on the Southport Turning Notch extension project, which when complete will provide up to five new cargo berths by extending the existing 900-foot notch by an additional 1,500 ft., providing 2,400 ft. of berth space. This project is removing more than eight acres of mangrove wetland habitat currently encumbered by a conservation easement. The port is also pursuing a federal U.S. Army Corps of Engineering Civil Works project to deepen and widen portions of the port's navigation channels to accommodate larger container ships that will be able to transit through an expanded Panama Canal. These larger ships and petroleum tankers are already coming to Port Everglades from Europe, but have to be lightly loaded. Both projects have detailed restoration, enhancement and mitigation components to offset impacts.

Port Development in Urban Areas: Portland Style

Marla Harrison, Port of Portland

Have you seen Portlandia? In Portland, the show is more documentary than comedy. Portlanders are passionate about the environment which in many ways is a wonderful element for Port of Portland actions and initiatives. Conversely, this culture provides challenges for organizations attempting to grow, change, or start up while ensuring environmental stewardship. The Port of Portland embraces sustainability as well. Come and see examples and lessons learned about Port of Portland activities and how they conflate environmental stewardship, sustainability, and local culture.

11:45

Conference Luncheon:

The Arctic March – Skiing to the North Pole

Bernice Notenboom, climate change journalist and host of the science series *Tipping Points*

The Arctic March is about the North Pole, a new frontier, epicenter of many opportunities and conflicts. During this presentation, climate journalist and polar explorer Bernice Notenboom takes you on her journey to unravel the issues at stake. What do the newly ice-free waters off Alaska, Siberia, Canada and Greenland mean for the abundance of fish still protected in its once inaccessible waters, claims of sovereignty, and new shipping lanes crossing the North Pole? The area has already been earmarked for massive new oil and gas and methane exploration. But can we afford to risk this kind of commercialization in such a fragile ecosystem? And if so how can we do it with the best sustainable practices? Today it is the vulnerability of this polar landscape that grips our imagination the most.

1:15

PROMOTING SUSTAINABILITY WITHIN THE MARINE INDUSTRY: CHALLENGES AND SOLUTIONS

Panel Moderator: Eleanor Kirtley, Green Marine

Carleen Lyden-Kluss, NAMEPA

Kris Fumberger, RightShip

Paul Holthus, World Ocean Council

Lee Kindberg, Maersk Line

Christina Wolfe, Environmental Defense Fund

This panel discussion will explore the impact of voluntary programs on effectively improving marine transportation sustainability. Panelists will discuss their voluntary program's approach towards our shared mission – improving marine transportation sustainability.

Closing Remarks



THE PRESENTATIONS



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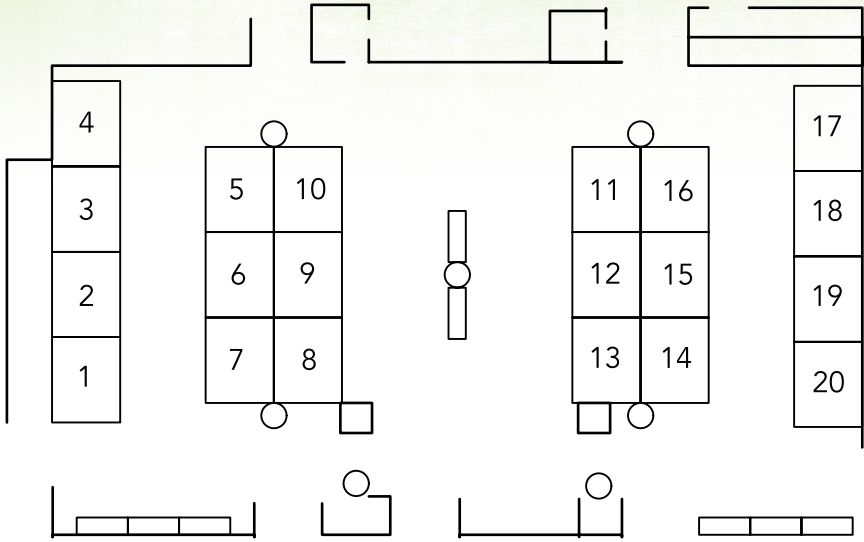
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THE EXHIBITORS



EXHIBITOR

DESCRIPTION

BOOTH



When it comes to your lighting conversion needs, our valued customers are the best people to listen to regarding our ability to provide high quality service and solutions . . . "Once we saw the results from your ALED solution it was clear we made the right choice. You committed to providing us with the highest level of customer satisfaction possible and you definitely succeeded" - Major rail service provider, North America. By being committed to providing unparalleled quality, service and solutions, we continue to exceed the expectations of the companies we work with in the Marine Industry.

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AMERICAN CHEMICAL TECHNOLOGIES, INC.

American Chemical Technologies, Inc. is committed to providing high performance lubricants for the marine industry. Their full synthetic hydraulic and gear fluids meet all the new requirements for the VGP (Vessel General Permit), are approved for use by Transport Canada, and are superior lubricants for equipment longevity.

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EXHIBITOR**DESCRIPTION****BOOTH**

BC Shipping News has quickly become the 'must-read' journal for commercial marine industry stakeholders on the West Coast. With a refreshing and unique perspective on maritime issues, BCSN features exclusive interviews, in-depth reviews of matters that impact on marine businesses as well as regular features on legal affairs and maritime history. Its on-line presence – www.bcshippingnews.com – enjoys a large readership where visitors receive up-to-the-minute news, photos and video. BCSN is as much an industry journal as it is a forum for the industry to tell its own story – not just read by the industry, but written by them as well.

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Brüel and Kjaer is one of the world's largest environmental monitoring organizations. For decades, Brüel & Kjaer has supported various industries and organizations in growing their operations while responsibly managing their environmental impact. The company specializes in providing long-term, short-term, and portable monitoring of any application requiring unattended noise, vibration, or air quality measurement. Our organization provides a complete suite of hardware and software products, coupled with a range of superior managed services tailored to meet the client's operational needs and government compliance requirements. Brüel and Kjaer systems have been implemented at over 200 of the world's busiest airports, large-scale construction projects, major mining operations, and event venues globally.

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EA Engineering, Science, and Technology, Inc., PBC (EA) is a recognized leader in providing environmental compliance, dredged material management, and infrastructure engineering and management solutions to the marine transportation industry. We are committed to constantly advancing new ways and methods for putting sustainability into practice and measuring achievements. A 100% ESOP-owned public benefit corporation, EA employs more than 400 professionals through a network of 23 commercial offices. In business for more than 41 years, EA has earned an outstanding reputation for technical expertise, responsive service, and judicious use of client resources. For more information about EA, visit www.eaest.com.

2

THE EXHIBITORS

EXHIBITOR	DESCRIPTION	BOOTH
	Envirochem has provided innovative environmental management, engineering and software services since 1984. Based in North Vancouver, BC, Canada, Envirochem is one of North America's most established environmental, health and safety (EH&S) consultancies. Their ENVOLV SMS (Sustainability Management Software) was designed to help marine organizations effectively control costs, efficiently reduce risk and effortlessly comply with permit or regulatory requirements.	13
	Ionada, with headquarters in Canada, is a technology leader in air emission and water treatment technologies. A pioneer in developing and implementing membrane exhaust scrubbing solutions, Ionada has developed a gamechanging technology for the marine Exhaust Gas Cleaning Systems (EGCS) market. With the introduction of the first marine membrane scrubber system, Ionada is applying the high efficiency, reliability, and low energy consumption of membrane technology to EGCS. The result is an EGCS that is 50% smaller, and 30 % more energy efficient than competitive salt water scrubbers – making it the ideal solution for ship owners.	11
	Nautican engineers the highest quality marine propulsion products. Our independently tested high-performance hydrodynamic solutions help companies maximize power while reducing fuel consumption and offering an exceptional return on investment. For decades, we have manufactured ultra-reliable Integrated Propulsion Units, Hydralift Skegs, High-Efficiency Nozzles, Triple Rudders, Propellers, and Pre-Swirl Stators using only the highest quality materials and advanced construction techniques – and we continue to research and develop new ways to further improve efficiency, manoeuvrability and performance.	5
	A true continental gateway, the Port of Québec maintains trade relations with over 60 countries every year. Its strategic location is its best calling card, as it provides the shortest route by sea between Europe and the Great Lakes. The major advantage of being the last deep-water port—with a 15-metre depth at low tide—before the Great Lakes is that it allows the Port to effectively connect the industrial and agricultural core of North America. Its diversified activity profile, its full intermodality and its technological equipment have made it the second largest port in Canada, after Vancouver, in terms of tonnage handled.	19

EXHIBITOR	DESCRIPTION	BOOTH
	<p>Founded in 1911, The Port of Seattle owns and operates Seattle-Tacoma International Airport, four container cargo terminals, two cruise ship terminals, one grain terminal, a public cargo terminal, four public marinas, and manages a number of real estate assets for financial return and economic advantage. The port's operations currently help create nearly 200,000 jobs and \$7 billion in wages throughout the region. Over the next 25 years, the port's "Century Agenda" seeks to create an additional 100,000 jobs through economic growth while becoming the nation's leading green and energy-efficient port.</p>	<p>16</p>
	<p>PortTech Los Angeles is a commercialization center and incubation program dedicated to creating sustainable technologies for ports and beyond. We bring together entrepreneurs, strategic partners and investors to accelerate innovation, advance clean technologies and create economic opportunities. We promote and support the development of technologies that enable enterprises to meet their environmental, energy, safety / security and transportation goals. PortTech is a 501(c)(3) non-profit organization and a cooperative effort of the City of Los Angeles, the Ports of Los Angeles and Long Beach, and Harbor Area business communities.</p>	<p>14</p>
	<p>Thordon Bearings is the leading manufacturer of seawater lubricated propeller shaft bearings, grease-free rudder and deck equipment bearings and other shaftline products for the global marine market. Thordon propeller shaft bearing systems eliminate oil leakage, provide excellent bearing wear performance, offer lower in-service costs as well as eliminate emergency seal repairs. Thordon's self-lubricating rudder bearings have a low coefficient of friction and operate without grease above and below the water line.</p>	<p>8</p>
	<p>The Washington Maritime Federation is comprised of maritime, economic development and business organizations that have come together to support the maritime industry. By bringing together these representatives and supporters of the many diverse segments of the maritime industry, and the greater business community at large, the Washington Maritime Federation will build consensus, provide a unified voice for the industry and join together to drive change in matters of common interest.</p>	<p>1</p>

THE EXHIBITORS

EXHIBITOR

DESCRIPTION

BOOTH



FEDNAV



Fednav has been working with WWF Canada to help ensure environmental safety and sustainability in the North since 2010. The first collaboration was for a comparison study of operational best practices for shipping in the Arctic. The latest study is being presented at this year's GreenTech and focuses on one of Canada's shipping gateways to the Arctic: the Hudson Strait. The study explores various aspects of the socio-economic, cultural, oceanographic and ecological impact and risk of shipping. The study sets the scientific foundation, outlines options, and considers operational recommendations to avoid, limit or mitigate the impact of shipping in one of the Arctic's most used shipping channels.

7

THE SPEAKERS



GREG ALEXANDER, *E2 ManageTech*

A Senior Project Manager for E2 ManageTech, Inc., Greg Alexander has focused his career on analytical and regulatory compliance in the marine ports and goods movement sector. His responsibilities include program development, project management, permits and compliance, sustainability, and policy research and analysis. A registered professional civil engineer, he earned his Bachelor degree from Harvey Mudd College and a Masters from the University of Southern California. A native of the Pacific Northwest, he lives and works in Long Beach, Calif.



MICHAEL BAHTARIAN, *Noise Control Engineering*

Michael Bahtarian is the Vice President at Noise Control Engineering, LLC, in Billerica, Mass., which specializes in shipboard noise and vibration control. He convened the ISO working group tasked with the development of standards for the measurement of underwater ship noise. He also served as chair of the American National Standards Institute working group that developed the first commercial standard for measurement of underwater ship noise (ANSI/ASA S12.64-2009). He is a Board Certified member of the Institute of Noise Control Engineering (INCE) and holds a BSME from the Pennsylvania State University and a MSME from Rensselaer Polytechnic Institute.



CARRIE BROWN, *Port Metro Vancouver*

As Director, Environmental Programs, Carrie Brown provides strategic leadership and develops/maintains environmental policies and programs at Port Metro Vancouver. She leads a department of scientists, biologists and engineers who develop and implement programs to promote sustainable port development and operations to reduce impacts to air, land, water, fish and wildlife habitats, the neighboring communities and First Nations. Since joining PMV in 2003, her various roles have included adaptive management strategies and project development. A registered professional geoscientist, she holds a Bachelor of Sciences degree from the University of British Columbia and recently completed an executive management program there as well.



STEPHEN BROWN, *Chamber of Shipping of British Columbia (COSBC)*

Capt. Stephen Brown has served as President of the Chamber of Shipping of British Columbia since September 2008. He previously chaired a number of COSBC committees, served on the board for eight years, and was Chair for 17 months. His early career involved 21 years at sea where he served as Master for the last five. After coming ashore, he worked in various levels of operational management for Gearbulk in South Africa, Indonesia, China, the United Kingdom and Canada. On leaving Gearbulk in 2007, he joined Tidal Transport & Trading as General Manager for Canada and President of Tidal USA.



BETH CARPER, *Puget Sound Clean Air Agency*

In heading the Puget Sound Clean Air Agency's Diesel Solutions program, Beth Carper successfully manages federal, state and local grants that have resulted in nearly 5,000 retrofits and several engine replacements. As part of the Northwest Ports Clean Air Strategy, she works closely with the ports of Seattle and Tacoma, along with the Washington State Department of Ecology, on port-related emissions reduction projects. Recent projects include administering: an ecology-funded harbor craft auxiliary engine replacement program; a U.S. Department of Transportation Maritime Administration grant for tugboat repowers and sustainability projects; and, a second program by the Port of Seattle to scrap and replace drayage trucks called ScRAPs 2.



GERRY CARTER, *Ionada*

Gerry Carter serves on the board of Ionada Canada, which specializes in exhaust gas cleaning technology; as Chair at Ecycle Solutions, which focuses on recycling electronics; and, at the St. Lawrence Seaway Management Corporation. During his 22 years with CSL, he held various executive positions, including President, Canada Steamship Lines from April 2002 until his retirement in March 2012. He has also served the marine industry in numerous other capacities, including as Co-Chair of Green Marine, Chair of the Canadian Shipowners Association, executive committee member of the Chamber of Marine Commerce, and a board member at the International Chamber of Shipping.



KEITH CASTONGUAY, *Marine Atlantic*

Keith Castonguay is the Director of Health, Safety and Environment (HSE) for Marine Atlantic – a Canadian Crown corporation that provides ferry service daily between mainland Canada and Newfoundland and Labrador. Certified as a Canadian Registered Safety Professional, he has more than 25 years of experience as an HSE professional in both the public and private sectors, specifically agriculture, construction, manufacturing and the Royal Canadian Mounted Police. Most of his HSE career has been at the corporate level, working for both Canadian and American multinational companies. He has extensive experience with the bulk handling of grain and fertilizers and the warehousing and handling of crop protection products.



JAMIE COATES, *CSL Americas*

As Project Manager for the CSL Group, Jamie Coates oversees fleet-wide implementation of ballast water treatment systems and exhaust gas scrubbers, as well as some new-builds and conversions. He is a graduate of the U.S. Merchant Marine Academy and holds a degree in Marine Engineering Systems. He also holds an ME in Ocean Engineering from Stevens Institute of Technology, and an MBA from Duke University, Fuqua School of Business.



ANDREW DUMBRILLE, *WWF-Canada*

Andrew Dumbrielle has been with WWF-Canada since 2006. He manages the organization's national oceans governance program and leads its Arctic shipping project. He previously coordinated its climate change communications and worked on its oceans policy. Ever since he started the environment club at his high school 25 years ago, his focus has been on advocating for a greener planet. Trent University led him to jobs with Greenpeace and the Taiga Rescue Network, an international NGO working to protect Boreal forest. Upon returning from Sweden, he took conflict resolution courses, which lead to coordinating communications for the Sierra Club of Canada.



STEPHEN EDWARDS, *GCT Global Container Terminals, Inc.*

Stephen Edwards joined GCT in September 2012 and is responsible for all marine terminals under GCT's corporate and subsidiary divisions in Canada and the United States. He previously worked as president and CEO of Ports America from 2007 to 2010, and was also a senior consultant at a U.S.-based firm providing executive advice to the maritime and ports industry. His operations and management career have taken him through the P&O Group with various appointments in Rotterdam, London, Singapore and Dubai. He holds a Bachelor of Science (Honors) degree in Transport Management from Aston University in England.



ERIK ELLEFSEN, *Island Tug and Barge*

Erik Ellefsen manages operations at Island Tug and Barge. He has worked in the marine industry for nine years, but has been around the business his whole life. He has initiated several projects to make Island Tug and Barge a leader in sustainability and energy efficiency. He's recently been working with the Puget Sound Clean Air Agency and the U.S. Department of Transportation's Maritime Administration (MARAD) on a multi-faceted project involving two tug repowers, engine upgrades, and emissions testing. He also assisted the Clean Air Agency on a white paper analyzing the economic and environmental benefits of several sustainable projects.



JASPER FABER, *CE Delft*

Jasper Faber is Co-ordinator of CE Delft's work on maritime transport and manager economics. He focuses on policy instruments to reduce shipping's climate impact. He was a lead author of the IMO's 2014 Greenhouse Gas Study. He advises the German delegation to the IMO on GHG and energy efficiency. He was a member of the European Commission's High Level Platform on reducing ship GHG and led the impact assessment of European policies regarding ship GHG for the European Commission. His clients include the Panama Canal Authority, IMO, European Commission, and Clean Shipping Coalition. He holds a PhD in economic history.



SCOTT FERGUSON, *Washington State Department of Ecology*

Capt. Scott Ferguson works as the Prevention Section Manager in the Spills Program for the Washington State Department of Ecology. He received a direct commission after graduating from Massachusetts Maritime Academy (1983) and joined the U.S. Coast Guard soon after. His 2014 retirement marked nearly 31 years of service with his last post as Commanding Officer, Sector Puget Sound. He attended the Naval War College and College of Command and Staff, later achieving his MBA (International Maritime Affairs) from Old Dominion University. His awards include eight Meritorious Service medals, three Coast Guard commendations, the DOT 9-11 Medal, Navy Achievement Medal and Commandant's Letter of Commendation.



KRIS FUMBERGER, *RightShip*

With more than 12 years of experience in the environmental sector, Kris Fumberger joined RightShip in 2014 and has been responsible for the development and implementation of RightShip's environmental rating system – an industry framework for the instant comparison of the energy efficiency of more than 76,000 vessels. He's also responsible for providing ports with the necessary framework and tools to reward more sustainable vessels. Prior to joining RightShip, he worked in the water industry, undertaking strategic planning and environmental impact assessments of essential water assets. His formal qualifications include a Bachelor of Environmental Science and a Graduate Certificate in Management.



MARC GAGNON, *Fednav Limited*

Marc Gagnon has been Director, Government Affairs and Regulatory Compliance at Fednav Limited, in Montreal since 2008. He previously worked for 23 years as Executive Director of the St. Lawrence Economic Development Council (SODES), a Quebec City-based association that represents the St. Lawrence maritime community. He currently serves on the boards of Technopole Maritime, the St. Lawrence Shipoperators, and Cargo Montreal. He is also Chair of the Canadian Chamber of Commerce Transportation Committee. He holds a M.Sc. in Geography from Université de Montréal and a B.A. from Université Laval.

THE SPEAKERS



JANICE GEDLUND, *Port of Seattle*

Janice Gedlund is the Seaport Air Quality Program Manager for the Port of Seattle. She is responsible for the port's implementation of the Northwest Ports Clean Air Strategy to achieve reductions in air pollutant and greenhouse gas emissions associated with the seaport. Her extensive background in the environmental sphere includes regulatory development and enforcement, pollution prevention, sustainability programs, environmental management systems, emergency response, and environmental assessment. She has worked for federal, state and local agencies throughout her career. She has a degree in Environmental Health and is a certified hazardous materials manager.



ANDREW GREEN, *Puget Sound Clean Air Agency*

Andrew Green is Director of Air Quality Programs for the Puget Sound Clean Air Agency, which serves Washington's King, Kitsap, Pierce and Snohomish counties. The Clean Air Agency has for many years worked in partnership with the Ports of Tacoma and Seattle, as well as other maritime stakeholders, to quantify and reduce air pollutant emissions. His division also delivers air-quality monitoring, forecasting, planning and public outreach, along with other emission-reduction projects. He has worked on the Northwest Ports Clean Air Strategy since its inception, representing Canada for the first several years, and most recently with the Clean Air Agency.



MARLA HARRISON, *Port of Portland*

Marla Harrison, Environmental Planning Manager, provides support to Marine, Industrial Development, Navigation, and Aviation at the Port of Portland. She is in charge of environmental programs for all these business lines, plus port-wide responsibilities for the National Environmental Policy Act, aquatic permitting, and project environmental reviews. She has 20-plus years of project management experience, ranging from environmental permitting, remediation, and characterization to large engineering projects. She's a registered civil engineer in Oregon and California. She has an M.S. in Environmental Engineering and Environmental Sciences from Stanford University, a B.S. degree in Civil Engineering, and A.S. degree in Nuclear Medicine Technology.



KATHY HEISE, *Vancouver Aquarium*

Kathy Heise is a Research Associate at the Vancouver Aquarium's Cetacean Research Lab in Vancouver, B.C. She has been interested in the issue of underwater noise and its impacts on marine life since the early 2000s when she and co-author Lance Barrett-Lennard were asked to provide a summary of underwater noise impacts on marine mammals to the Royal Society of Canada as part of their work in assessing the potential consequences of lifting the moratorium on oil and gas exploration along the British Columbia coast.



PAUL HOLTHUS, *World Ocean Council*

Paul Holthus is the founding CEO of the World Ocean Council – the international business leadership alliance on “Corporate Ocean Responsibility.” The WOC brings together seabed mining, oil/gas, shipping, fishery, aquaculture, tourism, offshore renewable and other ocean industries for unprecedented business community leadership and collaboration in addressing shared marine sustainability challenges. His previous positions have been with the UN Environment Program and international environment organizations. He has worked since 1998 with the private sector to develop practical solutions to sustainable marine environmental development. His work has taken him worldwide to work with companies, communities, associations, UN agencies, NGOs, foundations and governments.



MARK HOMEYER, *Crowley Petroleum Services*

Capt. Mark Homeyer is the Director of Marine Operations for Crowley Petroleum Services on the West Coast. He has overall responsibility for a fleet of nine tankers and articulated tug-barge units that deliver petroleum by water between U.S. and Canadian ports on the West Coast, including Alaska. He oversees staff that manages approximately 250 mariners. He's a Master Mariner and has been a licensed captain for 25 years. He attended California Maritime Academy where he received a B.S. in Marine Transportation, has completed the Leadership Executive MBA program at Seattle University.



MIRA HUBE, *Algoma Central Corporation*

Mira Hube is Director, Environment at Algoma Central Corporation where she is responsible for monitoring environmental regulatory and industry developments and for implementing environmental policies and programs for Algoma's fleet of vessels. She graduated from the University of Western Ontario with a Master in Earth Sciences and has been working in the environmental field for more than 20 years, with the last five in the maritime industry. She is active in the industry, serving as Chair of Green Marine's Great Lakes Advisory Committee and past Chair of the Canadian Shipowners Association's Environmental Committee.



LEE KINDBERG, *Maersk Line*

Lee Kindberg is Director, Environment & Sustainability for Maersk Line in North America. She is now co-chairing the EPA Ports workgroup, and serves on the U.S. Environmental Protection Agency's Clean Air Act Advisory Committee. She is also active in Business for Social Responsibility's Clean Cargo Working Group. Dr. Kindberg received a B.S. in Chemistry from the University of Alabama and a Doctorate in Chemistry from the University of South Carolina. She has an extensive background in the chemical industry, where she was Director of Government Relations & Environmental Science for the Hoechst Celanese (HCC) Fibers & Specialty Chemicals Groups.



CARLEEN LYDEN-KLUSS, *North American Marine Environment Protection Association*

As Co-Founder and Executive Director of the North American Marine Environment Protection Association, Carleen Lyden-Kluss engages the marine industry, government and regulators to promote sound environmental practices. She focuses NAMEPA on preserving the marine environment by educating seafarers, port communities and students about the need to protect this resource and strategies to do so. She is a marketing and communications professional in the commercial maritime industry with more than 35 years of experience. She helped former clients to develop business, reorganize/reposition their corporations, improve strategic planning, establish better communications (advertising, public relations, investor relations and crisis media), and manage sales.



LAWRENCE MAK, *National Research Council – Ocean Coastal and River Engineering*

Lawrence Mak leads the Marine Structures Team at the National Research Council – Ocean Coastal and River Engineering (NRC-OCRE). He has years of experience in experimental testing of a variety of offshore structures, marine vehicles and lifesaving appliances. Most recently, he and his colleagues have been leading projects to improve ship operational efficiency and reduce fuel consumption through a holistic approach that draws on the multidisciplinary team's expertise in physical and numerical modeling, sea trial, ice mechanics, hydrodynamics, propulsion, seakeeping, maneuvering, marine engineering, data analysis and data modeling. He has an undergraduate Degree in Mechanical Engineering, a Masters in Ocean Engineering, and Masters in Business Administration.



FRÉDÉRIC MALONEY, *Québec Port Authority*

As Director, Environment, at the Québec Port Authority, Frédéric Maloney is leading a team to further develop and implement the environmental stewardship initiated by the port to integrate social responsibility within its core activities beyond regulations. His responsibilities include overseeing changes to minimize the impact of 24/7 operations and implementing an environmental assessment review process customized for application to all projects within the port's jurisdiction. He brings years of experience in ensuring compliance to site operations, as well as environment and industrial hygiene, in the mining and manufacturing sectors. He has a B.S. in Chemistry and a Master's (Water Sciences).



DENNIS J. MCLERRAN, *Regional Administrator U.S. Environmental Protection Agency, Region 10*

Dennis McLerran was appointed by President Barack Obama to serve as the Regional Administrator (RA) for Region 10, leading a staff of over 500 employees, with a responsibility for an annual budget of over \$300 million. He was sworn in on February 22, 2010. As the RA, Dennis oversees the implementation and enforcement of the federal environmental rules and regulations in the States of Washington, Oregon, Idaho and Alaska, including 271 tribal governments in the Pacific Northwest and Alaska. Before moving to EPA, Dennis served as Executive Director of the Puget Sound Clean Air Agency, and has been involved in a wide variety of state, local and federal issues and jobs in both the public and private sectors. Dennis has over 30 years of experience as an advocate, attorney and administrator, working on environmental, land use and climate issues. Dennis is a native of Washington State, a graduate of the University of Washington and the Seattle University School of Law. He has been a Puget Sound Area resident for all of his adult life.



WILLIAM L. MOON III, *Glosten*

A principal at Glosten, William L. Moon III provides support for new construction and refit projects involving research vessels, tugs, barges, and floating structures. A licensed naval architect and marine engineer, he recently served as Project Manager on Glosten's contracted design of an Arctic Class tug, successfully executing a design that will become the new flagship for Foss Maritime. The design paid close attention to mission requirements and ease of construction. A graduate of Virginia Polytechnic Institute, he has more than 15 years of experience in the marine industry. He supports a broad spectrum of naval architecture work at Glosten.



ROBERT MUSSER, JR., *Port Everglades*

Robert (Bob) Musser, Jr. is the Environmental Projects Manager at Port Everglades where he began overseeing all ecological functions and procedures associated with port operations and planning in 2010. He previously worked at Port Canaveral and Port Tampa Bay. He has almost 15 years of maritime experience and nearly 25 years combined in the environmental, marine science, engineering and hazardous waste fields, built on a B.S. in Marine Science and a B.A. in Biology. He's currently part of a team overseeing the development of mangrove wetlands to significantly offset the loss of conservation habitat next to a container cargo area.



BIRGIR NILSEN, *OptiMarin AS*

Birgir Nilsen is Vice President of Business Development and a Director of OptiMarin AS. He joined forces with Halvor Nilsen in May 2000 to develop the OptiMarin Ballast System and to establish OptiMarin as a commercial enterprise in the emerging market for ballast water treatment. He has been a member of the Norwegian delegation on the IMO's Marine Environmental Protection Committee since MEPC 47 in July 2001, as part of the Ballast Water Working Group.



BERNICE NOTENBOOM, *Inuksuk Media*

GreenTech 2015 is welcoming science writer, filmmaker and professional adventurer Bernice Notenboom as its keynote speaker. In 2008 Notenboom became the first woman to reach the North, South, and Cold Pole (in Siberia) and traverse Greenland's icecap on skis all within a single year. In 2009 she climbed to the top of the Mount Everest.

Having mountain-climbed, kayaked and rode horses or camels on all five continents, she admits nothing prepared her for the Arctic and Antarctic experiences. On assignment for National Geographic Traveler, she discovered the fragility of sea ice. Over five years she documented the changes in extreme environments. The result is *Tipping Points*, a six-part one-hour series featuring the knowledge of scientists from around the world about tipping points within our climate system. The series has so far aired in 40 countries.

A year ago Notenboom skied across the frozen Arctic Ocean from the North Pole to Canada but had to be airlifted short of her goal because of poor conditions. She is currently producing a film called *The Arctic March* about her encountering the Arctic frontier as a polar explorer under the new timeline of climate change.



EDOARDO PANZIERA, *Ionada*

Edoardo Panziera is President of Ionada Incorporated., a manufacturer of marine exhaust cleaning systems. He received his Bachelor and Masters in Mechanical Engineering from the University of Toronto, and is a member of the Professional Engineers of Ontario. He has 20-plus years of experience in developing emission-reduction technologies for the marine, automotive, aerospace industries, working on projects with Bombardier, Weir Minerals, GM, Ford, Chrysler, 3M, as well as clean-techs Hydrogenics, Hyroad Industries and SuntoWater. He holds several patents, including pending patents for Ionada. He was nominated in the Technology to Watch category at the UK Fathom Technology 2015 Awards.

THE SPEAKERS



CHRISTINE RIGBY, *Port Metro Vancouver*

Christine Rigby has worked as the Environmental Specialist-Air Emissions with Port Metro Vancouver for 10 years. She focuses on port-related contributions to air quality and climate change. She works closely with stakeholders, customers and regulatory agencies and was part of the original team that developed the Northwest Ports Clean Air Strategy. Prior to joining the port, she was the Air Quality Meteorologist for the Skeena Region with the British Columbia Ministry of Environment. She holds a Master of Science (Atmospheric Science) from the University of Guelph and a Bachelor of Science (Chemistry) from Brock University.



ÓRLA ROBINSON, *Port Metro Vancouver*

As Program Manager for the Enhancing Cetacean Habitat and Observation (ECHO) Program, Órla Robinson provides strategic advice to Port Metro Vancouver and other maritime stakeholders on activities that may intersect with environmentally at-risk whale species. She's an environmental specialist with more than 17 years of experience working on a broad range of projects, including: collaborative research programs; environmental impact assessments; regulatory approvals; hydrogeological and hydrological assessments; water resource assessments; contaminated site investigations and, soil and groundwater remediation projects. She holds a B.Sc. (Earth Sciences) from University College Cork, and a Masters (Hydrogeology and Groundwater Resources) from University College London.



JASON SCHERR, *Prince Rupert Port Authority*

With 18 years of experience in fisheries and environmental monitoring, Jason Scherr is the Manager of the Environmental Sustainability Plan at the Prince Rupert Port Authority (PRPA), which is guided in all of its activities by key principles of environmental sustainability, including pollution prevention, the preservation of environmental integrity, the efficient use of resources, and continuous improvement. He is the designated lead for the PRPA's Green Marine program. An alumnus of the University of Victoria (Geography, History, English), he also has served as the President of the Prince Rupert and District Chamber of Commerce.



RICK SHECKELLS, *EcoLogix Group, Inc.*

Rick Sheckells is Managing Principal of EcoLogix Group, an environmental strategy firm supporting infrastructure development through enhanced public engagement. He began consulting in 2004, focusing on LNG projects and community apprehension regarding environmental and safety concerns. He previously served as Director of Planning and Environment for the Port of Baltimore and is credited with restoring good relationships with environmental and community stakeholders after a particularly contentious period of public opposition to dredging projects.



JAMIE SLOGAN, *Hemmera*

Jamie Slogan is a senior marine and vegetation ecologist with 15 years of experience, including 10 years as an environmental consultant in Vancouver. Jamie has worked throughout BC, Yukon, NWT, Nunavut, Alberta and Manitoba leading environmental assessments and habitat restoration projects in coastal and aquatic habitats. Jamie's project experience includes port development, mining, transportation and infrastructure projects and he currently advises Port Metro Vancouver with their Habitat Enhancement Program. James is also completing his PhD at the UBC Fisheries Centre specializing in the design and evaluation of urban marine fish compensation habitat in Burrard Inlet, specifically offsetting associated with the Vancouver Convention Centre West.



PETER S. SOLES, *Glosten*

As a consultant with more than 15 years of marine industry experience, Peter S. Soles brings a unique combination of practical experience and formal academic training to marine projects on behalf of Glosten. He holds a Master's in Marine Transportation Policy and Management from the University of Washington, and a certificate in Global Trade, Transportation, and Logistics. His areas of expertise include: marine logistics planning, navigation and ship handling, tug and barge operations, as well as break-bulk/project cargo handling, stowage and sea-fastening. He also has extensive knowledge on the subject of maritime activity in the Arctic.



STEFAN STAN, *Pronova Systems Inc.*

Stefan Stan is head of Pronova Systems Inc., where he's been President and Technical Manager for 11 years. His focus has primarily been on R&D activities related to the development of a fuel-optimizing system and its subsequent installation and testing aboard many ships. His earlier positions include 10 years at Siemens Industrial Systems involved in eight large projects for ships built in Canada and the U.S. An electromechanical engineer, he taught Marine Electrical and Automation systems at the University of Galati for 12 years. He also worked at Icepronav in Romania for five years on marine design projects.



RON STUART, *Port of Tacoma*

Ron Stuart joined the Port of Tacoma in 2008 and currently manages its Environmental Sustainability Program. He previously spent 20 years in the pulp and paper industry, working in technical services and environmental compliance. He served as a Chemist, Laboratory Supervisor, Environmental Engineer, and Corporate Environmental Compliance Auditor. For the Port of Tacoma, he's responsible for reducing the impacts of operations by integrating sustainable practices that balance natural resource efficiencies with economic benefits. His Bachelor's degree is in General Chemistry from Humboldt State University and he's a Certified Professional Environmental Auditor.

THE SPEAKERS



LINDA STYRK, *Port of Seattle*

At the Port of Seattle, Linda Styrk is Managing Director of the Seaport Division, which encompasses four container terminals, two cruise ship terminals, one grain terminal, container support facilities, and commercial moorage. She joined the port in 2005 and previously held positions as Director, Container Marketing, General Manager - Container Division, and the Seaport's Director of Strategic and Facilities Planning. She began her career after graduating California Maritime Academy with a B.S. (Nautical Industrial Technology) and USCG Third Mate's License. She serves on several executive boards, including the Manufacturing Industrial Council of Seattle, and the Washington State China Relations Council.



SCOTT VEIRS, *Beam Reach Marine Science*

Dr. Scott Veirs has been at the helm of Beam Reach Marine Science, a Seattle-based non-profit that focuses on marine bioacoustics research and education, for 12 years, and has administered the Salish Sea Hydrophone Network. He was the first Earth Systems major at Stanford University and received his doctorate in Oceanography from the University of Washington in 2003. In his spare time, he enjoys building and sailing small catamarans.



CHRISTINA WOLFE, *Environmental Defense Fund*

Christina (Chris) Wolfe is Manager, Air Quality, Port and Freight Facilities at the Environmental Defense Fund. She has 10-plus years of experience in scientific roles that include air quality, environmental studies, and toxicological assessment, in addition to six years of experience in business analysis and finance. She is a member of the U.S. Climate and Regulatory Air Team, supporting key program initiatives related to advancing EDF's ongoing work to improve air quality at port and other freight facilities. She is also working to identify opportunities for innovative partnerships that leverage grant funds for environmental projects in transportation and goods movement.

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- Port Metro Vancouver
- Port of Gulfport (Mississippi State Port Authority)
- Port of Indiana – Burns Harbor
- Port of Longview
- Port of Milwaukee
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- Toronto Port Authority
- Trois-Rivières Port Authority
- Windsor Port Authority
- St. Lawrence Seaway Development Corporation
- St. Lawrence Seaway Management Corporation





TERMINALS & SHIPYARDS

- BC Ferries
- Bunge of Canada
- Ceres Terminals Inc.
- Empire Stevedoring Company Limited
- Federal Marine Terminals
- Fraser Surrey Docks
- GCT Global Container Terminals Inc.
- Groupe Desgagnés (Relais Nordik Sept-Îles)
- IOC (Iron Ore Company, Sept-Îles)
- Logistec Corporation
- Marine Atlantic Inc.
- Maher Terminals Holding Corp.
- Marine Recycling Corporation
- McAsphalt Industries Limited
- Montreal Gateway Terminals Partnership
- Neptune Terminals
- Norcan Petroleum Group
- Northern Stevedoring
- Ocean Industries (shipyard)
- Pacific Coast Terminals
- Pinnacle Renewable Energy (Westview Terminal)
- Porlier Express
- Richardson International
- Ridley Terminals Inc.
- Rio Tinto Alcan (Port-Alfred)
- Seaspan ULC (shipyards)
- Squamish Terminals
- Sterling Marine Fuels (Windsor Terminal)
- Termont Montreal
- Tidal Coast Terminals Ltd.
- Valero (Jean-Gauvin Refinery)
- Valleytank
- Valport
- Westridge Terminal (Kinder Morgan Canada)
- Westshore Terminals
- Yellowline Asphalt Products Ltd.

GREEN MARINE ASSOCIATIONS

- American Association of Port Authorities
- American Great Lakes Ports Association
- Association of Canadian Port Authorities
- BC Marine Terminal Operators Association
- Canadian Ferry Operators Association
- Canadian Marine Pilots Association
- Canadian Shipowners Association
- Chamber of Marine Commerce
- Chamber of Shipping of British Columbia
- Council of Marine Carriers
- International Ship-Owners Alliance of Canada
- North American Marine Environment Protection Association
- Ontario Marine Transportation Forum
- Shipping Federation of Canada
- St. Lawrence Economic Development Council
- St. Lawrence Shipoperators
- U.S. Great Lakes Shipping Association
- Washington Maritime Federation

GREEN MARINE PARTNERS

INDUSTRY SERVICE, PRODUCTS & TECHNOLOGY PROVIDERS

- ABB Turbocharging
- A-LED-Lights LLC
- American Chemical Technologies
- Bell Marine & Mill Supply
- Britmar Power
- Conflow Technologies
- Drew Marine
- Envirolin Canada
- Environmental Analytical Systems
- Environmental Solutions Inc.
- Filtramax
- Hermont Marine
- International Paint
- Ionada
- Marine and Offshore Canada
- Marine Clean Ltd.
- MSi3D
- OpDAQ Systems
- Pronova Systems Inc.
- RBM HoldSolutions
- RSC Bio Solutions
- Schneider Electric
- Scott's Marine Interiors
- Seagulf Marine Industries Inc.
- S.I.G.E.I.M Inc.
- Techsol Marine
- Terragon Environmental Technologies
- Thordon Bearings Inc.
- Total Marine Solutions Inc.
- True North Marine
- Urgence Marine Inc.
- Uson Marine AB
- VapCor Inc.
- Vickers Oil
- Wärtsilä Canada

CLASS SOCIETIES, VERIFICATION & VETTING SERVICES

- American Bureau of Shipping
- DNV-GL
- Lloyd's Register Marine North America
- Canadian International Bureau of Shipping
- Rightship Americas

SHIPPERS, LOGISTICS, & SHIP MANAGERS

- Aluminerie Alouette
- Canadian Salt Company Limited
- Quickload CEF
- V.Ships Canada Inc.

PILOTAGE

- Atlantic Pilotage Authority
- Corporation des pilotes du St-Laurent Central
- Corporation of Lower St. Lawrence Pilots
- Great Lakes Pilotage Authority
- Laurentian Pilotage Authority
- Pacific Pilotage Authority
- Puget Sound Pilots

ENERGY COMPANIES

- BG Group
- Gaz Metro
- Pacific Northwest LNG
- Stolt LNGaz

ENGINEERING AND ENVIRONMENTAL CONSULTANTS

- Concept Naval
- Envirochem
- Glosten
- Hemmera
- PESCA Environnement
- SNC-Lavalin Environment
- Ventus Development Services Inc.
- WSP Canada

R&D, RESPONSE & TRAINING

- Human Resources Sectorial Committee of the Maritime Industry (CSMOIM)
- Georgian College's Great Lakes International Marine Training Centre
- Maritime Innovation
- Western Canada Marine Response Corporation (WCMRC)



GREEN MARINE SUPPORTERS

GOVERNMENTS

- Environment Canada
- Fisheries and Oceans Canada
- Ministère de l'Énergie et des Ressources naturelles du Québec
- Ministère des Transports du Québec
- Ministère du Développement durable, de l'Environnement et de la Lutte aux Changements Climatiques du Québec
- Ministry of Transportation of Ontario
- Puget Sound Clean Air Agency
- Transport Canada

MUNICIPALITIES

- Board of Harbor Commissioners of the City of Milwaukee
- City of Bécancour
- City of Calixa-Lavallée
- City of Contrecoeur
- City of Longueuil
- City of Matane
- City of Montréal
- City of Montréal-Est
- City of Port-Cartier
- City of Québec
- City of Saint-Amable
- City of Sept-Îles
- City of Varennes
- Communauté métropolitaine de Québec
- Great Lakes and St. Lawrence Cities Initiative
- Marguerite-D'Youville MRC

ENVIRONMENTAL GROUPS AND NGO'S

- Carbon War Room
- Ducks Unlimited Canada
- Georgia Strait Alliance
- Georgian Bay Forever
- International Secretariat for Water
- Les Amis de la vallée du Saint-Laurent
- Nature Québec
- One Drop
- Pacific Salmon Foundation
- Réseau d'observation de mammifères marins (ROMM)
- Sedna Foundation
- Stratégies Saint-Laurent (6 ZIP Committees)
- World Wildlife Fund Canada

CONSERVATION, EDUCATION, ECONOMIC DEVELOPMENT & INNOVATION

- Center of Excellence for Marine Manufacturing & Technology
- CPEQ
- EcoMaris
- Great Lakes Maritime Research Institute
- Northwest Community College
- Ocean Networks Canada
- Promotion Saguenay
- Seattle Aquarium
- Société de promotion économique de Rimouski
- St. Lawrence River Institute of Environmental Sciences
- Technopole Maritime du Québec
- Vancouver Aquarium





WEDNESDAY MAY 27

1:00

EXHIBITORS SET-UP & MOVE-IN

COURTYARD BALLROOM

2:00

**PRE-REGISTRATION FOR ALL PARTICIPANTS, SPEAKERS,
AND EXHIBITORS**

COURTYARD FOYER

Arrive early to get the best choice of amusing ribbons for the delegate nametags and distinguish yourself!

5:00

OPENING COCKTAIL RECEPTION & EXHIBITION VISIT

COURTYARD BALLROOM

THURSDAY MAY 28

7:30	REGISTRATION & BREAKFAST		COURTYARD FOYER AND BALLROOM
8:30	SUSTAINABILITY AT WORK IN MARINE TRANSPORTATION		MADISON A-B-C
<i>Welcoming Address</i>			
<ul style="list-style-type: none"> • Linda Styrk, <i>Managing Director, Seaport Division, Port of Seattle</i> • Stephen Edwards, <i>CEO, GCT Global Container Terminals Inc.</i> • Dennis McLerran, <i>Administrator, U.S. EPA Region 10</i> 			
10:00	COFFEE BREAK & EXHIBITION VISIT 		COURTYARD BALLROOM
10:30	TECHNOLOGY GEARED TOWARDS REGULATORY COMPLIANCE: LESSONS LEARNED	GOOD COMMUNITY RELATIONS: A KEY PRIORITY FOR A SOCIALLY RESPONSIBLE BUSINESS	MADISON A-B MADISON C
<ul style="list-style-type: none"> • Certification of the EGCS on Algoma Equinox Class Vessels Mira Hube, <i>Algoma Central Corporation</i> • CSLs Experience with BWMS Jamie Coates, <i>CSL Americas</i> • Saga Forest Carriers – BWT Case Study Birgir Nilsen, <i>Optimarin</i> • Membrane Scrubber Technology for SOx Removal from Engine Exhaust Gerry Carter & Edoardo Panziera, <i>Ionada Inc.</i> • Environmental Social Acceptability Frédéric Maloney, <i>Quebec Port Authority</i> • Social License to Operate – Working with Your Local Communities Rick Sheckells, <i>EcoLogix Group, Inc.</i> • Opportunities for Canada LNG Exports – Addressing Concerns, Sharing Facts and Achieving Social License Stephen Brown, <i>Chamber of Shipping of British Columbia</i> 			
12:00	LUNCH BUFFET		COMPASS ROOM
1:30	CORPORATE ENVIRONMENTAL LEADERSHIP: INSPIRING INITIATIVES FOR THE INDUSTRY		MADISON A-B-C
<ul style="list-style-type: none"> • Cooperation between NGOs and Industry to Define Sustainable Development in the Canadian Arctic Andrew Dumbrille, <i>WWF Canada & Marc Gagnon</i>, <i>Fednav</i> • Radical Improvements in Vessel Efficiency Lee Kindberg, <i>Maersk Line</i> • ECHO Program: Collaborating to Manage Potential Threats to At-Risk Whales from Commercial Vessels Carrie Brown & Orla Robinson, <i>Port Metro Vancouver</i> 			
3:00	COFFEE BREAK & EXHIBITION VISIT		
3:30	EMERGING ENVIRONMENTAL ISSUES: AN INTRODUCTION TO UNDERWATER NOISE	PRACTICAL SOLUTIONS TO IMPROVE AIR QUALITY AT PORTS	MADISON A-B MADISON C
<ul style="list-style-type: none"> • Whales in an Ocean of Noise: How Manmade Sounds Impact Marine Life Kathy Heise, <i>Vancouver Aquarium</i> • Ship Noise in an Urban Estuary Extends to Frequencies Used by Endangered Killer Whales Scott Veirs, <i>Beam Reach Marine Science</i> • Control and Measurement of Underwater Ship Noise Michael Bahtarian, <i>Noise Control Engineering</i> • Improving Turn Times: Harnessing GPS Data for Drayage Truck Efficiency Greg Alexander, <i>E2 ManageTech</i> • Solutions in a Box – From Ideas to Implementation with Air Quality Strategies Christina Wolfe, <i>Environmental Defense Fund</i> • Fairview Shore Power Commissioning: a Case Study and Lessons Learned Jason Scherr, <i>Prince Rupert Port Authority</i> 			
6:30	CERTIFICATION COCKTAIL RECEPTION		SEATTLE AQUARIUM
Cocktail and hors d'oeuvres, access to all exhibits			

FRIDAY MAY 29

7:30	BREAKFAST		COURTYARD BALLROOM
8:00	COLLABORATION AMONG CANADIAN AND U.S. PORTS TO PROMOTE CLEAN AIR IN THE PACIFIC NORTHWEST		MADISON A-B
	<i>Andrew Green, Puget Sound Clean Air Agency</i>		
8:30	DOING MORE WITH LESS: PERSPECTIVES ON SHIP ENERGY EFFICIENCY	MADISON A-B	THE NORTHWEST PORTS CLEAN AIR STRATEGY: A COMMON GOAL, THREE COURSES OF ACTIONS
	<ul style="list-style-type: none"> • Design Efficiency of Ships – Historical Developments and Impact of the EEDI <i>Jasper Faber, CE Delft</i> • Review of Strategies and Technologies to Minimize Tug and Barge Fuel Consumption <i>Will L. Moon III & Peter S. Soles, Glasten</i> • Fuel Optimizing System: Technology, Real Time Experience and Results <i>Stefan Stan, Pronova Systems</i> 		
9:45	COFFEE BREAK & EXHIBITION VISIT		COURTYARD BALLROOM
10:15	COLLABORATION BETWEEN GOVERNMENT AND INDUSTRY TO REDUCE ENVIRONMENTAL IMPACTS FROM SHIPS	MADISON A-B	SUSTAINABLE PORTS: COUPLING DEVELOPMENT AND ENVIRONMENTAL PROTECTION
	<ul style="list-style-type: none"> • NRC Strategic Research, Technology and Investment in Ship Efficiency <i>Lawrence Mak, National Research Council & Keith Castonguay, Marine Atlantic</i> • Washington Voluntary Best Achievable Protection/Exceptional Compliance Program VBAP/ECOPRO <i>Scott Ferguson, Washington State Department of Ecology & Mark Homeyer, Crowley Maritime Corporation</i> • Creating Grant Successes for Harbor Craft <i>Beth Carper, Puget Sound Clean Air Agency & Erik Ellefsen, Island Tug and Barge</i> 		
11:45	CONFERENCE LUNCHEON: <i>The Arctic March – Skiing to the North Pole</i>		COMPASS ROOM
	<i>Keynote Speaker: Bernice Notenboom, climate change journalist and adventurer</i>		
1:15	PROMOTING SUSTAINABILITY WITHIN THE MARINE INDUSTRY: CHALLENGES AND SOLUTIONS		MADISON A-B-C
	<p>Panel Moderator: Eleanor Kirtley, Green Marine</p> <ul style="list-style-type: none"> <li style="width: 50%;">• <i>Carleen Lyden-Kluss, NAMEPA</i> <li style="width: 50%;">• <i>Kris Fumberger, Rightship</i> <li style="width: 50%;">• <i>Paul Holthus, World Ocean Council</i> <li style="width: 50%;">• <i>Lee Kindberg, Maersk Line</i> <li style="width: 50%;">• <i>Christina Wolfe, Environmental Defense Fund</i> 		
2:30	Bus shuttle to Pier 66 for the Port of Seattle Cruise Tour (Boarding starts at 3pm)		
3:30	PORT OF SEATTLE CRUISE TOUR		



GREEN MARINE

271, de l'Estuaire, suite #101
Quebec City, QC, G1K 8S8

418-649-6004

info@green-marine.org

www.green-marine.org