Alaska
Oil Spill Technology Symposium
March 28 – 30, 2018
The Hilton Hotel
Anchorage, Alaska

Regional Citizens' Advisory Council

907-243-0069

ALASKA MARITIME PREVENTION & RESPONSE NETWORK

GLOBAL

http://dec.alaska.gov/spar/ppr/response-resources/publications-conferences/aosts-2018/

Welcome to the 2018 Alaska Oil Spill Technology Symposium

The AOSTS organizing committee takes pride organizing a unique and professional forum to share information about some of the most recent and cutting edge oil spill policy and technology information in Alaska. We're exceptionally grateful to our speakers and guests for making the symposium a success and helping to shape its future. At the same time, we realize tight budgets have significantly impacted on our abilities to travel and attend conferences, so we want to ensure we're delivering the most useful content in exchange for your time, attention, and money.

With this in mind, we've applied your feedback from the last symposium and shaped this year's event around five smaller sessions, rather than one overarching theme. We hope that when this year's symposium ends you'll leave with a better understanding of: archaeological and cultural resource protection in Alaska; risk assessment; spill research developments and emerging technologies; Federal support during declared disasters and emergencies with an oil/HAZMAT component (ESF-10 events); and remote sensing technologies. We also hope you'll enjoy the poster presentations and static technology displays during an extended lunch break on 29 March. Select researchers and vendors will discuss their findings and demonstrate innovative new technologies during the technology showcase. Our final day (30 March) will highlight capabilities of mobile command posts and crew support equipment, innovative skimmer and recovery systems, new cleanup equipment, and more at two locations in Anchorage. Kevin Kennedy with Pacific Petroleum Recovery Alaska (1206 E 73rd St) and Bruce Shelt with the Alaska Railroad (111 W. Ship Creek Ave) have given us access to their facilities on Friday from 0900-1200 for live technology demonstrations.

We hope you'll take full advantage of the collection of people who have come to participate in the 2018 AOSTS and perhaps make a few new friends and colleagues in the process.

LT James Nunez

USCG

Dr. Richard Bernhardt

ADEC

Jessica Garron

UAF

2018 Alaska Oil Spill Technology Symposium

March 28, 2018

0800 AOSTS Organizing Committee: Welcome to AOSTS

0815 Ms. Dana Tulis (USCG Chief of Response): Keynote Address

0835 Dr. Philip Johnson (DOI): Historic Properties Support Available to OSCs

0905 Dr. Richard VanderHoek (DNR/SHPO): Cultural Resource Protection Priorities

0935 Ms. Debbie Corbett (USFWS, Ret): Case Studies & Lessons Learned

1000 BREAK

1025 Dr. Rosita Worl (Sealaska Heritage Institute, President): Extant Native Culture & Resource Protection Perspectives

1050 Dr. Deb French McCay (RPS Ocean Science): Oil and Chemical Spill Modeling for Risk Assessment (OILMAP/SIMAP, CHEMMAP)

1120 Dr. Bill Stringer (UAF, Ret): Contaminant Transport & Ultimate Fate along Beaufort Sea

11:45 LUNCH (on your own); Response Technology Highlights from YouTube

1320 Dr. Katrina Counihan (AK Sealife Ctr): Health Effects of Crude Oil on Bay Mussels

1345 Dr. Terry Hazen (University of Tennessee): Contrasting Ecosystem Responses Between EVOS and DWH

1415 Mr. Kevin Overhuls (Oil Solutions, Inc): A Unique Recovery System for Petroleum Spills

1440 Mr. Kevin Kennedy (PPR Alaska): Achieving Effective Daily Recovery Capacity (EDRC) Standards Utilizing Innovative Skimmer Recovery Systems

1500 BREAK

1525 Ms. Suzanne Chang (BSEE): Overview of BSEE-Sponsored Research

1550 Panel Discussion: State-of-the-Science for Dispersant Use in Arctic Waters

1650 Closing Comments

1730 Reception

2018 Alaska Oil Spill Technology Symposium

March 29, 2018

0800 AOSTS Organizing Committee: Welcome Back

0810 Senator Lisa Murkowski: Welcome Message and Call to Action

0815 Vice Chancellor Dr. Larry Hinzman: Keynote Address

0835 Dr. Lisa Dipinto (NOAA): Overview of post-DWH NOAA Research

0925 Mr. Vince Mitchell (Lamor): Advances in Arctic Oil-Spill Response Measures and Clean-up Techniques

0945 BREAK

1010 Dr. Mary Beth Leigh (UAF): Results of Recent Enzymatic and Surfactant Research

1040 ESF-10 Panel Discussion

1145 LUNCH, POSTER PRESENTATIONS, & TECHNOLOGY SHOWCASE

1350 Mr. Boaz Ur (Harbo Technologies): Developments on a New Booming System for Immediate Containment at the Point of Failure

1415 Mr. Kevin Hand (Intellisense Marine): Detection & Mapping of Non-Floating Oil, Minerals, Pipelines, and Other Polarizable Materials in Marine and Fresh Water Environments

1450 Mr. Marc Oggier (UAF): Behavior and Fate of Oil in Ice-Covered Waters

1520 BREAK

1545 Ms. Lauren Glushik (Owens Coastal Consultants, Ltd): Streamlining SCAT with Drones and Dogs

1610 Dr. Peter Winsor (UAF): Measuring Ocean Dispersion and Tracking Oil in Arctic Waters

1635 Mr. Hank Statscewich (UAF): Coastal HF Radar Theory and Applications

1700 Dr. Peter Webley: Alaska Center for Unmanned Aircraft Systems Integration (ACUASI): Operational support and Geoscience Research

1720 AOSTS Organizing Committee: Closing Comments

2018 Alaska Oil Spill
Technology Symposium

March 30, 2018

Guests will separate into two groups and visit demonstrations at PPR Alaska and AK Railroad property before rotating to the other site.

0900 / 1030 Mr. Kevin Kennedy and Chris Burns; PPR Alaska (**1206 E. 73rd St**.): Innovative Skimming and Recovery System, Novel Booming, & Test Tank Demos

0900 / 1030 Mr. Bryan Fisher, Robert Blea, & USCG Representative: Alaska Railroad Staging Area Immediately South of Comfort Inn Ship Creek (**111 W. Ship Creek Ave)** Mobile Command Post and Mobile Crew Support Deployments.

- Mr. Larry Carmichael (Air Liquide): Dry ice blasting for heavy fuel cleanup

- Mr. Kevin Overhuls (Oil Solutions):

1200 Staggered Conclusion and Cleanup

Speaker Abstracts

Historic Properties Support Available to OSC's

Dr. Philip Johnson
Regional Environmental Officer
U.S. Department of the Interior
Office of Environmental Policy and Compliance
Anchorage, Alaska
philip_johnson@fws.gov

Speaker Biography

Dr. Philip Johnson joined the U.S. Department of the Interior Office of Environmental Policy and Compliance in 2014 as the Regional Environmental Officer for Alaska. His responsibilities include overseeing the DOI oil spill preparedness and response program in Alaska, serving as the DOI representative on the Alaska Regional Response Team, acting as the Designated Federal Officer for the *Exxon Valdez Oil Spill* Trustee Council Public Advisory Committee, and sitting on the Oil Spill Recovery Institute Advisory Board.

Prior to joining DOI, Dr. Johnson served as the Environmental Contaminants Coordinator for the Alaska Region of the U.S. Fish and Wildlife Service for 17 years, where his duties included oil spill contingency planning and incident response.

Abstract

This presentation will discuss cultural resources and historic properties, providing examples from Alaska. The national and Alaska frameworks for historic properties protection will be reviewed, including contingency planning documents currently in use within the State.

The role of the Federal On-Scene Coordinator (FOSC) in ensuring compliance with the National Historic Preservation Act will be emphasized. Other topics include the Historic Properties Specialist position (adviser to the FOSC), notification of land owners/managers, and inclusion of historic properties protection in exercises.

Speaker Abstracts

Case Studies and Lessons Learned

Ms. Debbie Corbett
nanutsetheritage@gmail.com

Speaker Biography

I began work as an archaeologist in 1980, moving to Alaska in 1983 to work with the Bureau of Indian Affairs on Alaska Native Claims Settlement Act land claims. After getting an MA in archaeology at University of Alaska Fairbanks in 1991 I went to work for the US Fish and Wildlife Service, becoming the Regional Historic Preservation Officer (RHPO) around 2005 or so. Working for the Fish and Wildlife Service was the best experience of my life and I was privileged to be part of it. I retired from the FWS in December 2013 and have been laboring with love as an unpaid researcher at the world headquarters of my company, Nanutset Heritage.

Abstract

I have participated in a number of oil spill responses and have been struck by the recurrence of certain themes with respect to cultural resource protection. Fundamentally, I think, the problem is that responders do not understand the tenets of cultural resource protection. Contributing to the issue is that large incidents happen infrequently, and experience and knowledge are often lost in between. Other issues are institutional, or legal. I will discuss a few of the most prominent themes and offer suggestions about best management practices for effective cultural resource protection during oil spills.

Speaker Abstracts

Extant Native Culture & Resource Protection

Dr. Rosita Worl
President
Sealaska Corporation President
Amy.fletcher@sealaska.com

Speaker Biography

Rosita Worl, whose Tlingit names are Yeidiklasókw and Kaaháni, is Tlingit, Ch'áak' (Eagle) moiety of the Shangukeidí- (Thunderbird) Clan from the Kawdliyaayi Hít (House Lowered From the Sun) in Klukwan. Yeidiklatsókw serves as the President of Sealaska Heritage Institute. She is an anthropologist and for many years served as Assistant Professor of Anthropology at the University of Alaska Southeast. Yeidiklatsókw has a Ph.D. and a M.S. in Anthropology from Harvard University, and a B.A. from Alaska Methodist University. She also holds an honorary doctor of sciences degree from the University of Alaska Anchorage. Dr. Worl has received many honors and works with several different Native organizations. She is an accomplished lecturer and author.

Abstract

Dr. Worl will provide insight into living Alaska Native cultures with special emphasis on shared values and the importance of protecting Alaska's lands and waters (public resources), so Native cultures across the state can continue to harvest and share the bounty as their ancestors have done for millennia. This emphasizes the need to inform and engage all stakeholders, particularly in remote communities, when natural resources are threatened, even when they occur on public land or water.

Speaker Abstracts

Oil and Chemical Spill Modeling for Risk Assessment (OILMAP/SIMAP, CHEMMAP)

Dr. Deborah French-McKay
Director, Research and Model Development
RPS / Ocean Science
South Kingstown, Rhode Island
Debbie.FrenchMcCay@rpsgroup.com

Speaker Biography

Deborah French-McCay received her bachelor's degree in Zoology from Rutgers in 1974 and her Ph.D. in Oceanography from the University of Rhode Island in 1984. Dr. French-McCay specializes in quantitative assessments and modeling of oil and chemical releases for impact, risk, and natural resource damage assessments (NRDA); evaluating transport and fates, exposure, and effects of pollutants on individual organisms, populations and aquatic ecosystems. Dr. French McCay leads development of RPS's oil and chemical spill models (SIMAP and CHEMMAP) and manages numerous projects utilizing these models to evaluate oil/chemical trajectory and fate, impacts and ecological risks. In support of the government's NRDA for the Deepwater Horizon oil spill of April-July 2010 in the Gulf of Mexico, she modeled oil transport, fate and exposure using SIMAP to evaluate injuries for water column organisms. She has been principal investigator and primary author of more than one hundred technical reports and papers, and is an internationally recognized expert in oil spill fate and effects modeling.

Abstract

With decreasing Arctic sea ice cover and seasonal extent, shipping and cruise ship traffic through Arctic waters, as well as Alaskan waters in general, is expected to increase. Various fuels oils are used to propel these vessels, and cargos will include various hazardous materials, petroleum products, and potentially crude oil. New oil and gas well drilling is presently not being undertaken, but could occur in offshore waters in the future. Thus, the risks of oil and chemical spills in Alaskan waters are expected to increase dramatically in the future. Oil and chemical spill modeling provides quantitative information on the consequences of spills that may be used to inform impact evaluations as well as for response and contingency planning. RPS Ocean Science (formerly ASA) has developed a suite of spill models that are used for such purposes: OILMAP for oil spill trajectory analysis; SIMAP for oil trajectory, fate, exposure and impact analyses; and CHEMMAP for chemical spill analysis. These models have been applied in Alaskan waters and globally, using meteorological, hydrodynamic, and sea ice models for input regarding winds, currents and ice cover. In addition to describing modeling capabilities, example oil and chemical spill risk assessment studies will be presented.

Speaker Abstracts

Contaminant Transport & Ultimate Fate Along Beaufort Sea

Dr. Bill Stringer
stringer@acsalaska.net

Speaker Biography

Graduated (PhD) from Geophysical Institute, University of Alaska, Fairbanks 1971. Upon graduation turned interest from auroral studies to applications of satellite remote sensing as data from early remote sensing platforms were becoming available. Conducted early (1975) NASA-funded study of near shore ice behavior in the Beaufort Sea centering on the Prudhoe Bay region. With the advent of the Outer Continental shelf Assessment Program, became principal investigator of a series of studies of sea ice behavior in the seas around Alaska. Also served as coordinator of physical science studies for the program. Was lead investigator of project to map oil spilled from the EXXON Valdez. In recent years has developed an interest in the fate and recovery of petroleum spilled into ice-infested waters and has participated in oil spill conferences and commented publically on related matters.

Abstract

The reaction to and fate of a significant offshore oil spill along the Beaufort Sea petroleum production province is examined. The physical configuration of the coastal region is outlined with attention to ocean and seasonal ice behavior related to spill containment and transport. Cleanup processes are discussed along with human and operational resources required to successfully address challenges presented by a release of petroleum at various times throughout the year.

The importance of time for significant reaction, the selection of remediation techniques, and availability of equipment and trained personnel is discussed. In addition to remediation but related to it are tracking, mapping, and transport projection methodologies.

In recent years multiple observations have documented changes in the timing of sea ice seasons, extent, and thickness of ice in the Arctic Ocean. These changed ice conditions may impact several aspects of spill remediation planning. Response plans must contain flexibility to adjust to conditions not envisioned in current plans.

Speaker Abstracts

Health Effects of Crude Oil Exposure on Bay Mussels

Dr. Katrina Counihan
Scientist
Alaska Sealife Center
Seward, Alaska
katrinac@alaskasealife.org

Speaker Biography

Katrina worked at the Aquatic Toxicology Lab at UC Davis researching pesticides before going to graduate school. She received her PhD in microbiology from the University of California Davis, and joined the Alaska SeaLife Center as a Post-Doctoral Researcher in 2011. She is currently a Scientist and the Director of the COHO Lab, a diagnostic service lab, at the Alaska SeaLife Center. Her research focuses on the effects of infectious diseases and contaminants on marine animal physiology.

Abstract

Increasing oil development around Alaska elevates the risk for another oil spill. Dispersants are chemicals applied to oil spills to break the oil into droplets in an effort to accelerate natural degradation processes. Dispersed oil, or the dispersant itself, may be more toxic than oil alone. However, there is limited research on the effect of dispersed oil on cold water species and ecosystems. Therefore, exposure tests were conducted with bay mussels in seawater with non-dispersed oil, Corexit 9500 and oil dispersed with different concentrations of Corexit 9500. Mortality and acute and chronic physiological impacts due to oil, dispersant and dispersed oil were determined. The majority of physiological impacts caused by oil, dispersant or dispersed oil occurred during the first seven days after exposure. Mussels exposed to non-dispersed oil experienced suppression of immune function and transcription during the first 96 hours of exposure and higher levels of mortality. After 21 days, mussels in all treatments exhibited evidence of genetic damage, tissue loss and a continued stress response.

Speaker Abstracts

Contrasting Ecosystem Impacts Between EVOS and DWH

Dr. Terry Hazen
Environmental Biologist
University of Tennessee
Knoxville, Tennessee
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Speaker Biography

Terry Hazen is an environmental biologist specializing in bioremediation and bioenergy. He holds a joint appointment with the College of Engineering's Civil and Environmental Engineering Department and the College of Arts and Sciences' Departments of Microbiology and Earth and Planetary Sciences at the University of Tennessee (UT). He is also director of the Institute for a Secure and Sustainable Environment (ISSE). He further works with the UT-Oak Ridge National Laboratories (ORNL) Joint Institute for Biological Sciences and the Center for Environmental Biotechnology.

Abstract

Dr. Hazen's research focuses on how naturally occurring bacteria can break down and detoxify hazardous materials. He is also working with a team of researchers who have developed a method to use bacteria to help test for the presence of a wide array of pollutants. Today, he will discuss how his research revealed similarities and contrasts between the Deepwater Horizon and Exxon Valdez Oil Spills.

Speaker Abstracts

Achieving Effective Daily Recovery Capacity (EDRC) Standards Utilizing Innovative Skimmer Recovery Systems

Mr. Kevin Kennedy
Pacific Petroleum Recovery Alaska (PPR Alaska)
Anchorage, Alaska
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Speaker Biography

Kevin Kennedy is the inventor of arguably the world's most efficient oil skimming system. Kevin has began his career as a Bering Sea crab fisherman at the age of 11, and by 16 had become one of the youngest US Coast Guard -licensed Chief Engineers. At 18, he was dual licensed with a 500 ton Open Ocean Captain license and 10,000 horse power designated duty engineer, later becoming an unlimited horsepower engineer. Kevin has served on or taken a leadership role on nearly every major oil spill in Alaska from the Exxon Valdez to the Selendang Ayu, and outside Alaska on the New Carissa to the Deep Water Horizon. He founded Pacific Petroleum Recovery Alaska (PPR Alaska) during the Deep Water Horizon disaster to develop breakthrough oil skimming technology, and his first skimmer design was chosen as one of the world's top 10 most innovative skimming systems for the Wendy Schmidt Oil Clean-Up X-Challenge. During that competition his system proved itself as the most efficient skimmer of all competitors, and has since proven itself to be the only advancing skimming system to post >99% efficiency at OHMSETT. His Otter series skimmers are the only devices that can skim oil sheen, extract light volatiles like kerosene as well as the heaviest of oils such as creosote, while also being able to separate oil from floating ice, bottom sediments and gravel coastlines.

Abstract

Traditional oleophilic skimmers suffer from limitations inherent in their design. They fail to contain collected oil when towing speeds or currents exceed 1.1 knots, and they recover a high percentage of water. These factors make calculated Estimated Daily Recovery Capacity (EDRC) expectations meaningless during actual spills since on-site performance rarely matches extrapolated test-tank ratings.

By regulation, skimmers are tested using an ASTM F2709, which uses a stationary test tank to calculate ORE, Oil Recovery Rate (ORR), and EDRC. Most conventional skimming systems exhibit either a high Oil Recovery Efficiency (ORE) or a high Throughput Efficiency (TE), but seldom both. TE is enhanced by increasing towing speed to encounter more oil; however, increasing the total recovered fluids tends to lower ORE by increasing water collection. Consequently, most systems use middle ground and with speeds of 1.2-1.5 knots, OREs of 30-50%, and TEs of 30-50%.

PPR Alaska's Otter Series Skimmer System applies an innovative oil and water separating technology to overcome these limitations. By using hydrodynamics and specific gravity in conjunction with its vacuum system, Otter skimmers can contain oil without entrainment at speeds greater than 3 knots, and have been ASTM rated at 99.55% ORE. They're effective on a range of products, including crude oil, creosote, bunker fuel, gasoline, and diesel; can process ice and other debris; and can extract light volatiles from recovered water. In diminishing slicks from 75 mm to no visible sheen, the Otter achieved OREs >86% and is scalable to achieve any desired TE without sacrificing ORE. As a result, utilizing this technology under actual spill conditions mirrors test-tank performance, and for the first time allows EDRC achievement under real-world conditions.

Speaker Abstracts

Overview of BSEE—Sponsored Research

Ms. Suzanne Chang
Chemical Engineer
Bureau of Safety and Environmental Enforcement
Oil Spill Preparedness Division, Response Research Branch
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Speaker Biography

Suzanne Chang is a chemical engineer with the Bureau of Safety and Environmental Enforcement in the Oil Spill Preparedness Division, Response Research Branch. She conducts oil spill response research and her area is specialty is chemical treatments of oil.

Abstract

Ms. Chang will be presenting on behalf of BSEE's Oil Spill Preparedness Division, Response Research Branch on "BSEE Oil Spill Response Research Projects" as part of the “Spill Response and Emerging Technologies” session. She will be presenting two specific projects currently underway. These projects are performing on the higher end of OSPD’s nine-step Technology Readiness Level framework and are nearly operational. The first project is a submersible oil skimmer that can navigate under ice and recover oil trapped under ice. The second project is a remote sensor package designed for an arctic environment that can track equipment and assets and relay MetOcean data in real-time to oil spill responders.

Panel Abstract

State-of-the-Science for Dispersant Use in Arctic Waters

Panelists:

- Dr. Nancy Kinner (University of New Hampshire)
- Dr. Scott Pegau (Oil Spill Recovery Institute)
- Dr. Sarah Allan (National Oceanic and Atmospheric Administration
- Mr. Doug Helton (National Oceanic and Atmospheric Administration

Abstract

Chemical dispersants were employed on an unprecedented scale during the Deepwater Horizon (DWH) oil spill in the Gulf of Mexico and could be a response option during a large spill in Arctic waters. The use of dispersants during DWH raised concerns about the need for chemical dispersants, their fate, and their potential impacts on human health and the environment. Concerns remain that would be more evident in the Arctic, where remoteness and harsh environmental conditions would make a response to any oil spill particularly challenging. An outcome of a 2013 Arctic oil spill exercise for senior federal agency leadership identified the need for an evaluation of the state-of-the-science for dispersants and dispersed oil (DDO), and a clear delineation of associated uncertainties that remain, particularly as they apply to Arctic waters.

National Oceanic and Atmospheric Administration (NOAA), in partnership with the Coastal Response Research Center (CRRC), and in consultation with the U.S. Environmental Protection Agency (EPA) subsequently embarked on a project to seek expert review and evaluation of the state-of-the-science and uncertainties involving DDO. The project focused on five area and how they might be affected by Arctic conditions: dispersant effectiveness, distribution and fate, transport and chemical behavior, environmental impacts, and public heal and safety. Panelists will discuss the major findings and recommendations from this effort.

Speaker Abstracts

Overview of Post-DWH NOAA Research

Dr. Lisa Dipinto
Senior Scientist
NOAA Office of Response and Restoration
Southeast Region
lisa.dipinto@noaa.gov

Speaker Biography

Lisa DiPinto is currently the senior scientist for NOAA's Office of Response and Restoration. Since April 2010, she served as the chief scientist and case team coordinator for the Deepwater Horizon Natural Resource Damage Assessment in the Gulf of Mexico that settled for $8.8 billion. She has over 20 years of experience conducting environmental assessments to evaluate and quantify injuries to public trust marine resources resulting from oil and chemical releases into the environment and coordinating with technical and economic experts, attorneys, resource agencies and responsible parties to recover damages to be used for environmental restoration in accordance with CERCLA, OPA and other relevant regulations. She has designed coordinated and implemented assessments nationally and internationally. Additionally, she has led data collection during on-scene oil spill responses and aided in the development of scientifically sound research methods to quantify adverse environmental effects from contaminant releases. She received her bachelor's degree in microbiology from the Ohio State University and her master's and doctorate degrees in marine science from the University of South Carolina where she studied fate and impacts of industrial and agricultural contaminants on sediment associated fauna.

Abstract

Scientific studies conducted during the 6+ year Deepwater Horizon Natural Resource Damage Assessment (NRDA) resulted in significant advances in our understanding of the exposure and effects of oil to aquatic resources and habitats. Scientific highlights and advances in our ability to characterize and understand the effects of oil in the environment will be presented. Advances in our understanding of oil toxicity, the importance of floating oil, impacts of subsurface oil, advances in our understanding of oil transport pathways, and novel considerations for resource exposures and their importance for future responses and assessments will be presented. Following the NRDA settlement, and in recognition of the advances made in our understanding of oil-related effects, NOAA continues to partner with multiple agencies to conduct research to fill important gaps associated with these findings. Preliminary discussions of ongoing projects will be discussed, including plans for future research.

Speaker Abstracts

Advances in Arctic Oil-Spill Response Measures and Clean-Up Techniques

Mr. Vince Mitchell
Vice President of Special Projects
Lamor Corporation AB
vince.mitcheel@lamor.com

Speaker Biography

Vince has a wide range and substantial operational and technical oil spill expertise spanning over twenty nine years leading many teams, projects and operations. Previous working locations have ranged from the sub arctic conditions found in Alaska U.S. to the desert conditions of the Middle East. Vince has a diploma in Marine Science and Oceanography from the U.S. Coast Guard Academy and currently holds a U.S. Masters License. Prior experience also includes service with the U.S. Coast Guard, BP shipping, Alyeska Pipeline Service Company, Abu Dhabi National Oil Company and Arctic Slope Regional Corporation.

Abstract

The seasonal retreat of sea ice in the Arctic regions is occurring and will drastically increase the amount of worldwide marine activity in the arctic. This will include an increase in shipping of all types of marine traffic, oil and gas exploration, development and production activities. This presents new considerations and challenges for arctic nations as the chances increase of oil being spilled in these regions of both persistent oils and non-persistent oils.

This presentation will examine the behavior of spilled oil in arctic regions, the safety of the responders and best response methods. Mechanical recovery tactics will be examined with a look towards new developing technology for oil recovery in broken ice conditions. Recent research and development, future tactics development and case studies will also be presented.

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Speaker Abstracts

Investigating oil spill response products Corexit 9500 and Oil Spill Eater II: composition, fate, and effects on oil biodegradation in Alaskan waters

Dr. Mary Beth Leigh
Associate Professor of Microbiology
Institute of Arctic Biology
University of Alaska Fairbanks
mbleigh@alaska.edu

Speaker Biography

Mary Beth Leigh is an Associate Professor of Microbiology in the Institute of Arctic Biology and the Department of Biology & Wildlife at the University of Alaska Fairbanks. Her research interests include biodegradation of oil and dispersants in Arctic seawater, biodegradation of groundwater contaminants, the use of plants and microbes to remediate contaminated soils (phytoremediation), methane oxidation in Arctic lakes, and boreal forest ecology. She also organizes efforts to foster collaboration between the environmental sciences, arts, and humanities and produces art-science exhibits and performances for the public. Prior to joining UAF in 2006, Leigh earned her Ph.D. in Microbiology at the University of Oklahoma and conducted postdoctoral research at Michigan State University and the NERC Center for Ecology and Hydrology, Oxford.

Abstract

As the risk of fuel and crude oil spills increase in Arctic and sub-Arctic waters there is a growing need to understand the composition and fate of chemical oil spill response additives and their effects on petroleum biodegradation. We are investigating two products on the National Contingency Plan (NCP) Schedule that are eligible for use in Alaska Waters and elsewhere: the chemical dispersant Corexit 9500A and Oil Spill Eater II (OSEII), a product marketed as an enzymatic biodegradation agent. Using seawater mesocosm studies, we're investigating the degradation the major surfactant components of Corexit 9500A in Arctic seawater and its effects on oil biodegradation at low concentrations simulating a dispersed oil plume. We are also conducting studies of OSEII to evaluate its effects on oil biodegradation in Arctic and sub-Arctic seawater and to investigate its composition, which may aid in our understanding of it's potential mode(s) of action and ecological effects. This presentation will include preliminary analytical chemistry and molecular microbial ecological data from these ongoing studies in the interest of providing timely information to regulators, the oil spill response community, industry, and other stakeholders regarding the potential fate, effects, and/or effectiveness of these products to aid in future decision making.

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Panel Abstract

ESF-10 Panel Discussion

Moderator: Mr. Mark Everett, Incident Management & Preparedness Advisor, USCG District 17

Panelists:

- Mr. Bryan Fisher, Chief of Operations for the Alaska Division of Homeland Security and Emergency Management; Incident Commander in the State Emergency Operations Center; and State Coordinating Officer (SCO) during Stafford Act Disasters
- Mr. Robert Forgit, FEMA Region X Alaska Area Office Manager
- CDR Kelly Thorkilson, Deputy Commander of the National Strike Force; Incident Commander and Incident Specific Federal On-Scene Coordinator's Representative (FOSCR) for Hurricane Maria ESF-10 Puerto Rico
- Capt. Sean MacKenzie, US Coast Guard Federal On-Scene Coordinator (FOSC) for Arctic & Western Alaska

Abstract

Following a brief overview of the ESFs by Mr. Everett, the panelists will describe various aspects of ESF-10 policy, process, and pitfalls, including:

- Relevant State of the Alaska emergency response plans, priorities, process, & organization;
- Federal Emergency Management Agency emergency plans, operations in support of the State of Alaska, coordination with other federal agencies, especially regarding disaster operations, response, recovery, and mitigation;
- Special capabilities and functions of the National Strike Team, especially regarding pollution response deployment, organization, operations, and best practices;
- If available, a representative from the US Coast Guard Federal On-Scene Coordinator's office will discuss ESF-10 from the FOSC perspective.

Speaker Abstracts

Developments on a New Booming System for Immediate Containment at the Point of Failure

Mr. Boaz Ur
Co-founder and CEO
HARBO Technologies LTD

Speaker Biography

Boaz is HARBO Technologies LTD, Co-founder and CEO. HARBO provides revolutionary technologies for the immediate containment of Oil Spills. Before HARBO, Boaz was a senior manager at Pacific Gas & Electric where he managed PG&E's Demand Response program portfolio. At PG&E he also successfully developed a novel environmental strategy with the California Air Resource Board and testified in regulatory procedures with the California Public Utility Commission. Boaz was an engineer and product manager at successful semiconductor startups and was a product manager at Amazon.com. He is also a former Captain in the army. Boaz has a dual B.Sc. in Electrical Engineering and Computer Science from Tel Aviv University and an MBA with honors from UC Berkeley.

Abstract

Existing booms are bulky and heavy, so they can only be stored at central locations; they also require trained crews to deploy. When an off-shore spill occurs, it takes response teams hours or days to arrive at the spill site. In the meantime, the oil slick spreads, splits and travels up to tens of miles per day. At this stage, disastrous consequences are practically inevitable despite the efforts of oil spill response professionals. A new paradigm is aiming to solve this problem. HARBO's system can deploy 6,000 ft of super-light and very effective boom in less than 30 minutes. The system is designed to be pre-installed onboard ships, tankers, rigs, coastal infrastructure facilities, ports and marinas, oil terminals, and sensitive pipelines. This enables local, two-person crews to start deploying boom within minutes of spill detection. The system is comprised of a lifeboat-sized vessel equipped with a device that deploys the boom for immediate containment. The deployment vessel can then contain the spill quickly and attach a homing/GPS device to the boom, so response teams can easily relocate the oil and boom. The thick layer of oil remains concentrated and much easier to deal with. All existing oil spill treatment methods (skimming, dispersing and in-situ burning) will become much more efficient since, due to the immediate containment solution, the oil will remain thicker and won't be able to spread or split. Marine and coastal environments will benefit greatly.

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Speaker Abstracts

Detection & Mapping of Non-Floating Oil, Minerals, Pipelines, and Other Polarizable Materials in Marine and Fresh Water Environments

Mr. Kevin Hand
Intellisense Marine LLC
Induced Polarization Associates
kevin.hand@intellisensemarine.com

Speaker Biography

Mr. Kevin Hand has more than 25 years of business management and economics experience spanning a broad range of industry in North America. He has demonstrated successful executive leadership of businesses in remote sensing and autonomous robotics, oilfield, marine, and industrial infrastructure markets; with a passion for integrating intelligent technology for business improvement.

Mr. Hand has proven experience fostering growth in the launch of applied tech businesses including Unmanned Aircraft Systems (UAS) and marine remote sensing markets; as well as oilfield policy organizations, land and infrastructure development, and has more years than he cares to recall in the political and resource industries. Mr. Hand especially enjoys guiding entrepreneurial endeavors, and applying past experience to assist growth-cycle business achieve revenue and P&L targets.

Abstract

Marine Induced Polarization (Marine IP) technology is developed in partnership with, and patented by, the US Geological Survey (USGS) for detection and mapping of non-floating hydrocarbons, minerals, pipelines, and other polarizable materials. Marine IP provides reliable data sets for mapping the extent of hydrocarbon distribution in the water column and seafloor sediments in both marine and freshwater environments. The physical mechanism involves introducing a controlled electrical current into water, with distinct and specific return signals to differentiate between various minerals and other polarizable contaminants, such as oil, sulfides, metallic debris, and more.

Application involves deploying and towing a cable or streamer array behind a vessel, introducing a controlled electrical current into water, and measuring distinct return signals. Marine IP array streamers have been used to locate very large ilmenite deposits off South Africa, sulfides off Papua New Guinea and naphthalene and creosote tars in Washington State. Marine IP provides a mobile, non-invasive method to detect, measure, and map oil during emergency response and long-term environmental monitoring/remediation. Marine IP has proven to be effective at detecting very low concentrations of hydrocarbons in the water column and in seabed sediments, and it satisfies the USCG's new OSRO response criteria for addressing Non-Floating Oils. Induced Polarization Associates, LLC has an exclusive license for USGS patents to further develop and commercialize marine IP technology.

Speaker Abstracts

Behavior and Fate of Oil in Ice-Covered Arctic Waters

Mr. Mark Oggier
GI Snow & Ice & Permafrost
University of Alaska Anchorage
moggier@alaska.edu

Speaker Biography

Mr. Oggier obtained a master in Materials Science and Engineering at the Swiss Federal Institute of Technology in Lausanne. He worked 2 years as research engineer in the Laboratory of Composite Materials and Polymer before starting a Ph.D. degree in Geophysics at the University of Alaska Fairbanks under the supervision of Dr. Hajo Eicken. His research focus is on the interaction of crude oil with sea ice. Oggier has been leading small-scale experiments with the purpose of observing impact of crude oil on sea ice biota in collaboration with the College of Fisheries and Marine Science. He has been involved with two international large-scale experiments. The first one at the Cold Region Research and Engineering Laboratory in Hanover (NH) in collaboration with 7 different research institute under the supervision of the Oil Spill Recovery Institute looking at remote sensing of oil in sea ice. The second one at the Hamburg Ship Model Basin at Hamburg, Germany in collaboration with the Northern Research Institute of Norway and the University of Trondheim.

Abstract

Should an oil spill occur when the sea ice is growing, any oil located under the sea ice will be encased within the growing ice. During the spring/summer transition period, the trapped oil vertically migrates up towards the surface of the sea ice. Mobilization of oil after initial entertainment into sea ice is an important process since it results in surface pooling of oil, driving the clean-up efforts. After introducing sea ice and its microstructure and seasonal evolution, this talk will expose the results of a set of three experiments with oil of two different origins. The unprecedented surfacing of oil despite cold ice temperature (T <-5 °C) challenged the conventional thinking. This presentation will discuss the interaction of crude oil and sea ice as function of the seasonal evolution (growth and melt season), the ice texture (columnar, granular, skeletal), microstructure and properties.

Speaker Abstracts

Streamlining SCAT with Drones and Dogs

Ms. Lauren Glushik
Owens Coastal Consultants, Ltd
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lauren@owenscoastal.com

Speaker Biography

Lauren has been in the field of oil spill preparedness and response for 15 years. She has provided response management and technical support in state and regional government programs, spill incidents, and global oil and gas roles, including major projects in Russia, Kazakhstan, North Africa, and the Americas. As a Senior Associate with Owens Coastal Consultants she continues to support industry with critical aspects of oil spill response preparedness. She also responds to spills in both command and field roles as a SCAT Coordinator, Team Lead or Operations Liaison. Together with Dr. Ed Owens, Lauren is involved in several projects to advance technology in shoreline response. Her education includes a Master's in Environmental Engineering and a Bachelor's in Environmental Science.

Abstract

Most potential recent streamlining strategies and tactics for the Shoreline Cleanup Assessment Technique (SCAT) process are associated with improvements in the field, rather than in the office phase. This presentation will briefly consider two significant advances to support SCAT programs and surveys: Unmanned Aerial Systems and oil detection canines. Small Unmanned Aerial Systems (UAS's) are a relatively easy-to-use and practical support tool for SCAT surveys on shorelines and river banks. UASs can go where ground teams may not be able to access; can collect imagery for information that otherwise may not be available because of access, safety, fog or other constraints, however, surveyors still have to interpret and process that information, so this tool does not necessarily reduce work load or speed up the assessment process. Recent advances for oil detection canines on shorelines have resulted from controlled field trials and participation in an oil spill response operation using professional trained canines and handlers. A combination of these recent field experiences demonstrates the value, reliability, effectiveness, and efficiency of ODC support for high confidence and low risk shoreline oiling assessment surveys (K9 SCAT). K9 SCAT support is a game changer: can rapidly clear large areas where no surface oil or low oil concentrations (not actionable oil) are suspected which enables SCAT teams to focus on higher priority areas. K9 SCAT is quicker and more efficient than "traditional" SCAT for subsurface oil detection and for rapidly clearing large areas with little/no oil.

Speaker Abstracts

Measuring Ocean Dispersion and Tracking Oil in Arctic Waters

Dr. Peter Winsor
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Alaska Ocean Observing System and
Physical Oceanography
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Speaker Biography

Dr. Peter Winsor is a physical oceanographer at the College of Fisheries and Ocean Sciences at UAF. He has multi-decadal experience with Arctic observing systems, modeling and technology development, and has served as the lead PI on a number of large interdisciplinary projects in the Arctic Ocean, Greenland and Antarctica.

Abstract

Here we present recent results from a dye release study in the Chukchi Sea designed to both evaluate observational techniques for tracking an oil spill in Arctic waters, and to elucidate the dominant oceanographic process responsible for dispersion of oil.

Speaker Abstracts

Coastal HF Radar Theory and Application

Mr. Hank Statscewich
Physical Oceanography
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hstatscewich@alaska.edu

Speaker Biography

Mr. Hank Statscewich hails from the great state of New Jersey so he is no stranger to marine pollution… Seriously though, Hank holds a master's degree in Oceanography from Rutgers University and has worked at the University of Alaska Fairbanks as a research engineer and oceanographer since 2001. He is a leader in the field High Frequency Radar with its application to measuring ocean surface currents and waves. He has led multiple expeditions to the Arctic and Antarctic to deploy these radar stations in some of the most remote locations on the planet. Today he will be introducing this measurement technology, some of the data sets that have been collected in Alaska and the application of this technology to oil spill mapping and its capability to improve drift prediction forecasts.

Abstract

With a range of over one hundred miles, High Frequency Radar (HFR) instruments produce measurements of ocean surface currents every hour in real time. High resolution maps of coastal circulation features and their time evolution are available when two or more stations operate as a linked network. Since 2004, the University of Alaska Fairbanks has been a pioneer in the deployment of HFR technology in locations such as Prince William Sound, Cook Inlet, the Beaufort and Chukchi Seas and as far south as the Western Antarctic Peninsula. To limit the damage by a spill and facilitate cleanup efforts, emergency managers need information on direction and speed of oil movement, and wind, current, and wave information for predicting oil drift and dispersion. The main operational data requirements are fast turnaround time with frequent updates to monitor the dynamics of the spill under varying environmental conditions. HFR instrumentation meets most of these requirements by tracking the spilled oil at various resolutions, over wide areas, and at frequent intervals. They also provide key inputs to drift prediction models and facilitate targeting of skimming and booming efforts.

Speaker Abstracts

Alaska Center for Unmanned Aircraft Systems Integration (ACUASI): Operational Support and Geoscience Research

Dr. P.W. Webley
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Geophysical Institute
University of Alaska Fairbanks
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Speaker Biography

Dr. Peter Webley is a Research Associate Professor of Remote Sensing at the Geophysical Institute, University of Alaska Fairbanks and is the Associate Director of Research at ACUASI. Peter has a BSc in Geophysics and an MSc in Atmospheric Sciences, both from the University of East Anglia, UK and a PhD in Remote Sensing from the University of Reading, UK. His research focuses on natural hazards, especially volcanic eruptions, the application of unmanned aircraft systems to hazard mapping, and the use of remote sensing data from the ground to space and back to develop change detection algorithms. Peter is a geoscientist, entrepreneur, and innovator. He was a 2017 inductee into the State of Alaska Innovators Hall of Fame, has patented his research on volcanic ash cloud modeling, and co-founded V-ADAPT, Inc. in 2013, the first start-up company developed from UAF intellectual property, that focuses providing real-time decision support tools for volcanic hazard mapping and ash dispersion.

Abstract

Unmanned Aircraft Systems (UAS) have enormous potential for use in geoscience research and supporting operational needs from natural hazard assessment to the mitigation of critical infrastructure failure. They provide a new tool for universities, local, state, federal, and military organizations to collect new measurements not readily available from other sensors. This presentation highlights the UAS capabilities and research of the Alaska Center for Unmanned Aircraft Systems Integration (ACUASI, http://acuasi.alaska.edu/). Our UAS range from the Responder with its dual visible/infrared payload that can provide simultaneous data to our new SeaHunter UAS with 90 lb. payload and multiple hour flight time. ACUASI, as a designated US Federal Aviation Administration (FAA) test center, works closely with the FAA on integrating UAS into the national airspace. ACUASI covers all aspects of working with UAS from pilot training, airspace navigation, flight operations, and remote sensing analysis to payload design and integration engineers and policy experts. ACUASI's recent missions range from supporting the mapping of sea ice cover for safe passage of Alaskans across the hazardous winter ice to demonstrating how UAS can be used to provide support during oil spill response. Those attending the presentation will learn how UAS can be integrated in operational support systems and at the same time be used in geoscience research projects to provide high precision, accurate, and reliable observations.

Poster Abstracts

Fate and Effects of Petroleum Contamination and Chemical Dispersants in Arctic Marine Environments

Taylor R. Gofstein[1], Matt Perkins[2], Jennifer Field[2], & Mary Beth Leigh[1]
[1]University of Alaska Fairbanks
[2]Oregon State University

Offshore oil development and the shipping of petroleum products, have become a major concern in the Arctic due to increases in exploration and trafficking in recent years. In order to understand the fate of petroleum contaminants and chemical dispersants, their interactions with the environment, and factors that influence their biodegradation by microorganisms, an incubation series of indigenous microorganism in Arctic seawater was conducted to study the Arctic marine ecosystems that can potentially be impacted by petroleum contamination. Seawater was collected from the Chukchi Sea, supplemented with 16 ppm of Bushnell-Haas media, aliquoted 800 milliliters into media bottles, and treated with either 50 ppm of Alaska North Slope crude oil, 5 ppm of Corexit 9500 (1:10 dispersant-oil ratio), or both. Incubations were sampled at 0, 5, 10, 20, and 30 days. An additional incubation of 6 liter aliquots of seawater was also performed and subsampled daily for 7 days in order to study the degradation of the surfactants which compose Corexit. Analyses to date include total petroleum hydrocarbon (TPH) loss using GC/MS, degradation of the surfactants that compose Corexit using LC/MS/MS techniques, and nutrient concentrations (NO_2^-, NO_3^-, NH_4^+, $PO_4^{-3}$and SiO_4^{-4}) using flow injection analysis. Findings include evidence of oil biodegradation and a slight enhancement of oil degradation with the addition of Corexit 9500. Treatments containing oil showed significantly different pH and dissolved oxygen and nutrient utilization, with the greatest nutrient concentration change observed with ammonia. Rapid degradation of the nonionic surfactant components of Corexit was observed. However, conclusions regarding the degradation of the anionic surfactant DOSS remains unclear at this time. Future analyses will focus on changes to the microbial community, including 16S and 18S rRNA gene sequencing, qPCR, and metatranscriptomics to study hydrocarbon degradation, carbon cycling, and nutrient cycling gene expression.

Poster Abstracts

Effects of Oil and Dispersant on Bowhead Whale Baleen

Todd Sformo[1,2], Gary Shigenaka[3], Craig George[1], Teri Rowles[4], Geof Givens[5], Michael Moore[6], Tom Lanagan[6], and Alexander Werth[7]*

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[2] *Institute of Arctic Biology, University of Alaska Fairbanks, Fairbanks, Alaska*
[3] *NOAA/Office of Response and Restoration/Emergency Response Division, Seattle, WA*
[4] *NOAA/National Marine Fisheries Service/Office of Protected Resources, Silver Spring, MD*
[5] *Givens Statistical Solutions, Fort Collins, CO*
[6] *Woods Hole Oceanographic Institution, Woods Hole, MA*
[7] *Hampden-Sydney College, Hampden-Sydney, VA*

We studied the effects of oil and dispersed oil on the functional characteristics of bowhead whale (*Balaena mysticetus*) baleen at a mesocosm scale at the Oil and Hazardous Materials Simulated Environmental Test Tank (OMSETT) facility in Leonardo, NJ. The objective was to measure drag in baleen, estimate how it depends on various factors (control), and evaluate how drag changes when North Slope crude oil and Corexit 9500A dispersant are introduced (treatment). The principle assumption is that oil adhering to baleen plates and fringe "hairs" would increase drag. To secure baleen for movement through water at OHMSETT, a lever arm was fabricated at WHOI consisting of a baleen clamp, load cell, and pivot. An Omega load cell was used and bridge speeds data recorded. Baleen ranged from 1.1 to 2.7 meters in length, having 5 to 30 plates, orientated at 90 and 54°, and each sample was run through water from 0.2 to 1.6 knots, although only 54° and 0.6 knots were used for treatments. For analysis of the various independent racks of baleen, we calculated frontal area that combined plate number, length, and width per rack to create a single variable. For treatments, we applied oil and/or oil-dispersant in various ways, including submerging baleen with a crane and applying fresh oil to the water surface within a containing hoop. The baleen was then lifted through the oil. For dispersed oil treatment, Corexit 9500A was premixed with oil and dispensed through a series of underwater nozzles. Due to the limited number of available baleen racks and the inability to remove oil and dispersant from water in the tank or the baleen itself, we could only apply treatments once, leading to a qualitative assessment. The overall results indicate that under various treatments of oil and/or oil-dispersant the drag does not appear to increase. Finally, I present preliminary findings of a second experiment using crude oil and dispersant on baleen that relates wettability *via* contact angle. In this case, initial findings also suggest that crude oil without dispersant forms a mean(± STD) contact angle of ~ 144° (±22), while the oil-dispersant mixture forms a mean contact angle of ~ 54° (18).

Poster Abstracts

NWS SPOT Forecasts

Joel Curtis
National Weather Service
Juneau Forecast
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One of the highest priority safety considerations during any oil spill incident is the weather, both on-scene and in transit to and from the site. The National Weather Service will provide "SPOT" forecasts on a 24 / 7 / 365 basis to Incident Command as the incident spins-up and during all phases of operations. These forecasts are initialized from the forecast office's current digital forecasts, then human value is added to reflect nuances of terrain effects, local wind regimes, adjustments to specific sea state conditions, and forecaster local experience. Our objective is to support the incident commander's decisions with the best available environmental conditions and forecasts. SPOT forecasts have proven to be extremely valuable during past oil spills, and are easy to request from the nearest forecast office online. This poster will demonstrate how to request the forecasts, and what to expect in the product. The NWS can also provide technical specialists for weather and physical oceanography for large and complex oil spill events.

Poster Abstracts

Transboundary Aspects of Alaska's Emergency Towing System

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The ETS program came into existence following the near grounding of the *Salica Frigo* on March 9, 2007 in Unalaska Bay. The Mayor of Unalaska convened a Disabled Vessel workgroup to address the possibility of future groundings and to discuss local emergency response solutions. This initial meeting prompted the Emergency Towing System (ETS) workgroup; whose efforts resulted in the Alaska emergency towing system (ETS). While originally intended for use in coastal areas of Alaska, the Canadian Coast Guard has noted the successful use of an ETS and has twice requested Alaska for the use of an ETS, has practiced towing with the ETS in conjunction with the USCG and ADEC in Southeast Alaska and now is considering establishing their own ETS program. This presentation will give a brief history of the development of the ETS, successful real-life deployments, and a closer look into the trans-boundary aspects of the Alaska ETS.

Poster Abstracts

Analyses of urine and bile of marine mammals for metabolites of polycyclic aromatic hydrocarbon metabolites by two analytical methods

Gina M. Ylitalo[1], Jennie L. Bolton[1], Raphaela Stimmelmayr[2]*

[1] Environmental and Fisheries Sciences Division, Northwest Fisheries Science Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Seattle, WA 98112 [2] Department of Wildlife Management, North Slope Borough, Barrow, AK 99723

Concentrations of polycyclic aromatic hydrocarbons (PAHs) and their metabolites in tissues and fluids of subsistence-harvested marine mammals on the North Slope, Alaska as baseline exposure levels of oil-spill related contaminants are lacking for marine mammals, particularly endangered or threatened populations (e.g., ice seals, bowhead whales, polar bears) from the Arctic. Identification of the appropriate tissues/fluids to assess recent exposure of marine mammals to oil components must be determined, as well as the type of oil spill-related contaminant (e.g., parent polycyclic aromatic hydrocarbons (PAHs), metabolites of PAHs). To help address these data gaps, various matrices of Arctic marine mammals collected during subsistence harvests were analyzed for PAHs and PAH metabolites using analytical methods developed at the NWFSC. We present our findings on metabolites of polycyclic aromatic hydrocarbons (PAH MET) in bile and urine of important Arctic marine mammal subsistence species determined by two different analytical methods (i.e., high-performance liquid chromatography/ fluorescence screening and liquid chromatography-tandem mass spectrometry). Overall, the levels of PAHs metabolites were low or below the lower limit of quantitation for the majority of bile samples analyzed. Comparative bile data on naturally oil-fouled ice seals is provided. Our results provides a unique baseline data record against which future comparisons can be made.

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Poster Abstracts

MOSIDEO/CIRFA Experiments on Behavior and Detection of Oil in Ice

Marc Oggier and the MOSIDEO and CIRFA Team
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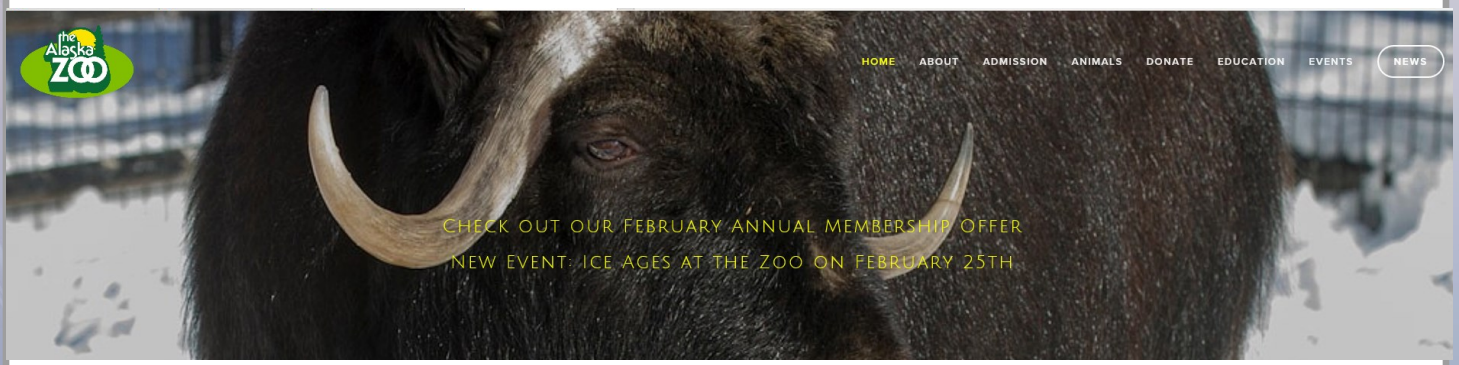
Arctic operations in the presence of sea ice present a challenge to sustainable operations. In order to optimize planning and minimize impact of inadvertent oil spills, oil-in-ice experiments were performed at the Hamburgische Schiffbau-Versuchsanstalt (HSVA) in spring 2017 by participants of Norut Narvik, UiT - The Arctic University of Norway, NTNU, Norut - Northern Research Institute, Université de Rennes 1, University of Alaska Fairbanks, and Ocean Visuals. Following an under-ice spill and simulated spring-time warming, investigations were performed on the microscopic movement and distribution of oil in the sea ice pore space and the detectability of oil as it approaches the surface. Combining expertise of two research projects, the experiments present a unique opportunity to link the signals of a range of surface detection techniques, including electromagnetic (radar, tomographic SAR) and optical (fluorescent, hyperspectral), to the microscopic distribution of oil in sea ice investigated by X-ray computed tomography (CT). Predicting the behavior of oil in ice based on environmental conditions will help optimize the use of methods for spill detection and response. The experiments and initial results will be presented.

Things to Enjoy While in Anchorage

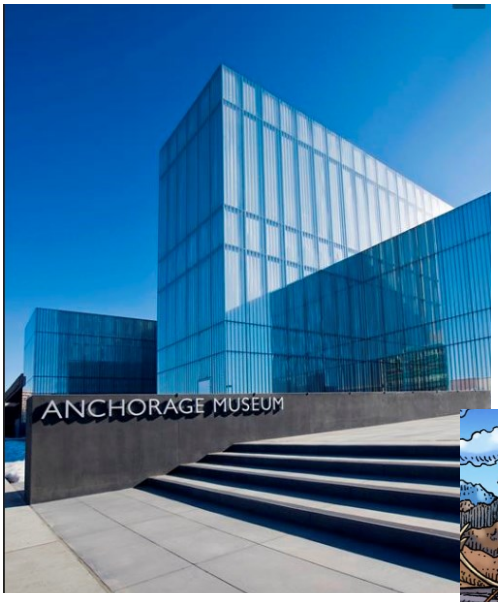
49th State Brewing Company: Please join us in the Heritage Theater at 49th State Brewing Company after the symposium on Wednesday evening between approx 5:30 and 8:30 for a no-host reception, including food, drinks, and conversation! (717 West 3rd Ave).

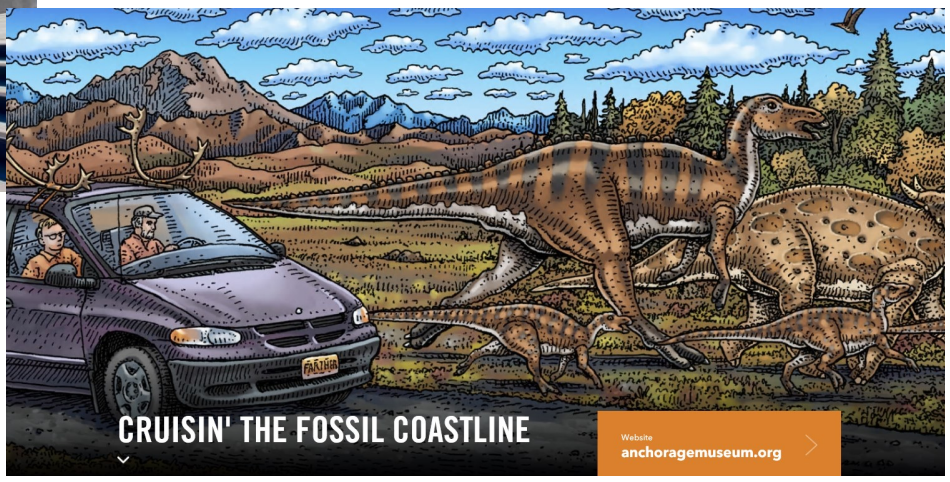
Alaska Zoo: The zoo is home to more than 100 birds and mammals, representing some 50 species. The zoo has the widest variety of animals native to the state of Alaska as well as f few cold-weather adapted exotics, such as Amur tigers, Bactrian camels, and Himilayan yaks. Many of the animals currently at the zoo arrived as orphaned or injured animals. Take an audio tour by downloading the Alaska app on your phone. (4731 O'Malley Rd)



Things to Enjoy While in Anchorage

Anchorage Museum: The Anchorage Museum creates a rich, deep understanding of the human experience and offers something for everyone. Discover Alaskan Native cultures, natural wonders, and diverse wildlife. Explore 2,000 years of Alaskan art, eons of Alaska's dinosaurs, mind bending special exhibits. (**$18**/adult; 625 C St)





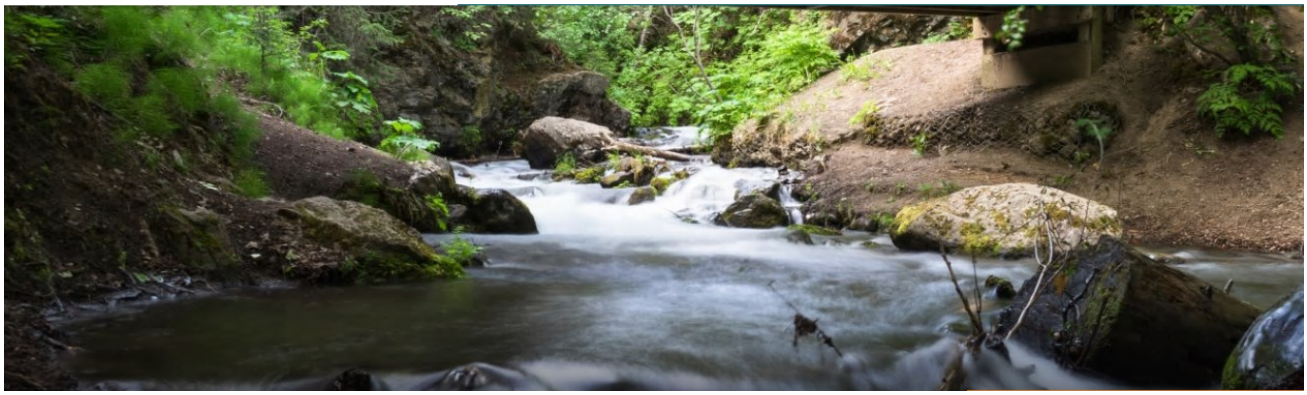
Special Museum Exhibit: Alaskan Artist, Ray Troll, and paleontologist, Kirk Johnson (Director of the Smithsonian Museum of Natural History) collaborated on a 10,000 mile / 250 day journey of North America in search of fossils and the stories they tell. This special exhibit focuses on their Alaska fossil adventure and the remarkable stories that fossils reveal, including: the history of life on Earth punctuated by killer asteroids, and mass extinctions; the ancient geology of prehistoric Alaska and its giant sea-going reptile, the ichthyosaur; the most beautiful of all fossils named after an Egyptian god (ammonites; the long-vanished polar desert landscape of Alaska's Mammoth Steppe; the 13' tall Mega Bear of the Pleistocene; the 50 million-year-old "walking whale," and the much more.

Things to Enjoy While in Anchorage

Monday & Thursday Evening Hikes: The members of "Alaska Outdoors" host weekly hikes from 6:30—8:pm. These social hikes hit the trails year-round, with a different route each time. Come hike with locals. Monday hikes are easier, and follow wide, flat established trails between 3.5 and 4.5 miles long, perfect for beginners and families with kids. Thursday hikes are moderately difficulty. No advance registration required, just meet at the trailhead. Hike starts at 6:35 p.m. sharp!

Locations vary: See www.alaska-outdoors.org/wordpress/ for details

Admission: $1 donation



Symphony of Wines: Delectable appetizers, live music, and delightful silent auction! Join the Anchorage Symphony Orchestra (ASO) for the 21st Annual Symphony of Wines. With more than 100 different fine wines to sample, this is an event you won't want to miss. Proceeds support ASO programming and education.

Location: Hotel Captain Cook, Discovery Ballroom (939 W 5th Ave)

For tickets call: (907) 274-8668

Admission: $75

(Cocktail or business attire)

Things to Enjoy While in Anchorage

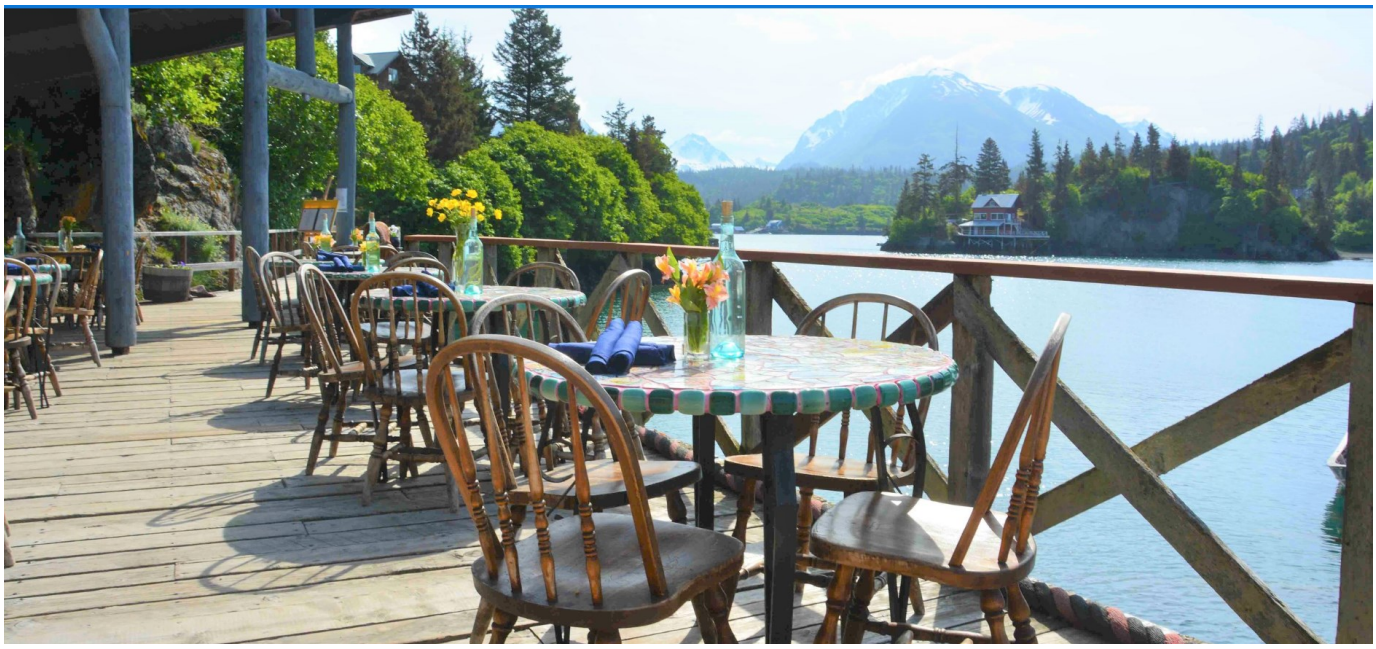
Alaska Railroad Easter Train: Bringing children? The Alaska Railroad Easter Train will offer two departures on Saturday, March 31, and will travel 2.5 hours round-trip from Anchorage to Indian. During the journey, families can celebrate the arrival of spring in Alaska while visiting with the Easter Bunny, being amazed by the onboard magician and enjoying an array of complimentary goodies as the train travels along the coastline of Cook Inlet and Turnagain Arm.

Date/Time: March 31, 10:AM & 3:PM
Location: Anchorage Historic Depot
(411 W. 1st Ave)
Admission: $69/adult and $35/child
(2-11 years old)

Take the Drive: If you're coming to Anchorage early or staying late, you'll want to take the picturesque drive south along the Seward Highway to Girdwood. The steep Chugach Mountain range with glaciers and avalanche chutes begin immediately north of the highway, and Turnagain Arm's silty waters separate the highway from the Kenai Mountains to the south. Watch for Dall sheep, mountain goats, moose, eagles, and the occasional wildlife viewer in unexpected places during your 40 minute drive. Then walk and drive through the Alaska Wildlife Conservation Center (mile 79 Seward Hwy, Portage) where you'll see most of Alaska's larger wildlife species, including America's largest land mammal, the Wood Bison. Then stop for lunch at the Double Musky Inn (3 Crow Creek Rd, Girdwood) or venture up Alyeska's ski lift to magnificent views from Seven Glaciers restaurant (1000 Arlberg Avenue, Girdwood). Save room for ice cream from "The Ice Cream Shop" at the junction of the Seward and Alyeska Highways. If you're very lucky, you might even spot a pod of white beluga whales rolling and spouting in Turnagain Arm on your drive back.

Staying a while longer?

Consider a 4.5 hour drive to Homer, known locally as either “the halibut capitol of the world” or “a quaint drinking village with a fishing problem.” The Lands’ End Hotel at the end of Homer spit is literally at the end of the road. It offers fine dining, an outdoor hot tub on a cedar deck, and spectacular views of the surrounding mountains, glaciers, Cook Inlet, and Kachemak Bay. Did someone mention Mako’s Water Taxi (235-9055) for lunch at The Saltry (226-2424) in Halibut Cove?



Several operators offer whale watching and glacier tours out of Seward, and orcas and gray whales will have arrived just in time for the symposium. Visit http://www.alaska.org/things-to-do/whale-watching for options. While in Seward, don’t forget to visit the Alaska Sealife Center. You can’t get any closer to these species without tasting sea spray!

Thank You to Our Sponsors

The organizing committee would like to express sincere gratitude for the financial support received from our sponsors, who include: the Oil Spill Recovery Institute, Resolve Marine, The Alaska Maritime Prevention & Response Network, Global Diving and Salvage, Prince William Sound Regional Citizens Advisory Council (RCAC), Cook Inlet RCAC, the University of Alaska Fairbanks, and Alaska Department of Environmental Conservation. Finally, we'd like to thank you, our speakers and guests, for joining us this year.

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Please take a moment to answer any or all of the following questions. Your feedback can be anonymously left on the sign-in table or scanned and e-mailed to rick.bernhardt@alaska.gov. Thank you!

Please rate your overall satisfaction with the 2018 AOSTS on a scale of 1 (poor) to 10 (excellent):

- **Ease of Registration:** _____
- **Organization:**_____
- **Subject Matter and Flow**:_____
- **Networking Opportunities**:_____

Why do you attend the Alaska Oil Spill Technology Symposium?

What topics have you found to be most interesting?

Has your attendance enhanced your understanding about Alaskan oil spill prevention, preparedness, or response options?

How effective has the symposium been to stimulate collaboration?

Considering the subject matter and your experience with webinars, would the symposium be as valuable if exclusively offered via webinar? Why?

How often would you like to participate in future symposia (e.g. annually, bi-annually, etc.)?

What would you consider to be the greatest justification to continue, or disband, the symposium?

Would a $100 registration fee affect your decision/ability to attend?

What topics would you recommend for future symposia?

What other comments or recommendations would you like to provide?